



Latvia University
of Life Sciences
and Technologies



Ekonomikas un sabiedrības attīstības fakultāte



Nordic Association
of Agricultural
Science



**Latvia University of Life Sciences and
Technologies**

**Faculty of Economics and Social
Development**

20th International Scientific Conference

**ECONOMIC SCIENCE FOR RURAL
DEVELOPMENT 2019**

**9-10 May 2019, Jelgava,
Latvia**



ECONOMIC SCIENCE FOR RURAL DEVELOPMENT

Proceedings of the
International Scientific Conference

No 52 New Dimensions in the Development of Society
Home Economics
Finance and Taxes
Bioeconomy

No 52

Jelgava

2019

ISSN 1691-3078

ISSN 2255-9930 on line

ISBN 978-9984-48-322-1 (E-book)

Abstracted / Indexed: Web of Science™, Clarivate Analytics (former Thomson Reuters), AGRIS, CABI, EBSCO Academic Search Complete databases and Google Scholar

<http://www.esaf.ltu.lv/lv/proceedings-economic-science-for-rural-development>

<http://webofknowledge.com/WOS>

<http://agris.fao.org/agris-search/index.do>

<https://www.cabdirect.org/>

<http://search.ebscohost.com/login.aspx?direct=true&db=a9h&jid=25AP&site=ehost-live>

<https://scholar.google.com/>

Programme Committee of International Scientific Conference

<i>Professor</i>	Baiba Rivza	Latvia University of Life Sciences and Technologies, Latvia
<i>Professor</i>	Andra Zvirbule	Latvia University of Life Sciences and Technologies, Latvia
<i>Professor</i>	Irina Pilvere	Latvia University of Life Sciences and Technologies, Latvia
<i>Professor</i>	Barbara Freytag-Leyer	Fulda University of Applied Sciences, Germany
<i>Professor</i>	Bo Ohlmer	Swedish University of Agricultural Sciences, Sweden
<i>Professor</i>	Wim J.M. Heijman	Wageningen University and Research, Netherlands
<i>Professor</i>	Bartosz Mickiewicz	West Pomeranian University of Technology, Poland
<i>Professor</i>	Maria Parlinska	Warsaw University of Life Sciences - SGGW, Poland
<i>Professor</i>	Alina Danilowska	Warsaw University of Life Sciences - SGGW, Poland
<i>Professor</i>	Janina Sawicka	Warsaw University of Life Sciences - SGGW, Poland
<i>Professor</i>	Joanna Szwacka-Mokrzycka	Warsaw University of Life Sciences - SGGW, Poland
<i>Professor</i>	Jacques Viaene	University of Gent, Belgium
<i>Professor</i>	Arild Sæther	University of Agder, Norway
<i>Professor</i>	Vilija Alekneviene	Vytautas Magnus University, Lithuania
<i>Professor</i>	Rogier Schulte	Wageningen University and Research, Netherlands
<i>Professor</i>	Csaba Forgacs	Budapest Corvinus University, Hungary
<i>Professor</i>	Elena Horská	Slovak University of Agriculture, Slovakia
<i>Senior researcher</i>	Magnar Forbord	Centre for Rural Research, Norway
<i>Professor</i>	Ingrida Jakusonoka	Latvia University of Life Sciences and Technologies, Latvia
<i>Professor</i>	Aina Dobele	Latvia University of Life Sciences and Technologies, Latvia
<i>Professor</i>	Modrite Pelse	Latvia University of Life Sciences and Technologies, Latvia
<i>Professor</i>	Inguna Leibus	Latvia University of Life Sciences and Technologies, Latvia
<i>Associate professor</i>	Aina Muska	Latvia University of Life Sciences and Technologies, Latvia
<i>Associate professor</i>	Anita Auzina	Latvia University of Life Sciences and Technologies, Latvia
<i>Associate professor</i>	Gunta Grinberga-Zalite	Latvia University of Life Sciences and Technologies, Latvia
<i>Associate professor</i>	Dina Popluga	Latvia University of Life Sciences and Technologies, Latvia

Time schedule of the conference

Preparation of the proceedings and organization: January 2019 – May 2019

Conference: 9-10 May 2019

Researchers from the following higher education institutions, research institutions, and professional organizations presented their scientific papers at the conference:

Agricultural University in Cracow	Poland
Baranovichi State University	Belarus
Batumi Navigation Teaching University	Georgia
Batumi Shota Rustaveli State University	Georgia
„BBS-Dizain” Ltd	Latvia
Central Statistical Bureau of Latvia	Latvia
Corvinus University of Budapest	Hungary
Eugeniusz Piasecki University of Physical Education in Poznan	Poland
Halmstad University	Sweden
Helena Chodkowska University of Technology and Economics	Poland
Institute of Agricultural and Food Economics National Research Institute	Poland
Institute of Agricultural Resources and Economics	Latvia
Institute of Soil Science and Plant Cultivation State Research Institute	Poland
Ivane Javakhishvili Tbilisi State University	Georgia
Jan Kochanowski University in Kielce	Poland
Kaunas University of Technology	Lithuania
Koszalin University of Technology	Poland
Latvia University of Life Sciences and Technologies	Latvia
Latvian Rural Advisory and Training Centre	Latvia
Latvian Trade Union of Education and Science Employees (LIZDA)	Latvia
Liepaja University	Latvia
Ludwigshafen University of Business and Society University of Applied Sciences	Germany
National Academy of Internal Affairs	Ukraine
National Research Institute of Animal Production	Poland
National University of Life and Environmental Sciences of Ukraine	Ukraine
Pedagogical University of Cracow	Poland
Pennsylvania State University	USA
Podilsky State Agrarian Technical University	Ukraine
Polytechnic University of Timisoara	Romania
Pope John Paul II State School of Higher Education in Biala Podlaska	Poland
Poznan College of Communications and Management (WSKiZ)	Poland
Poznan University of Economics and Business	Poland
Poznan University of Life Sciences	Poland
Rezekne Academy of Technologies	Latvia
Riga Stradins University	Latvia
Riga Technical University	Latvia
RISEBA University of Applied Sciences	Latvia
Slovak University of Agriculture in Nitra	Slovakia
Stanislaw Staszic University of Applied Sciences in Pila, Poland	Poland
State Agrarian and Engineering University in Podilia	Ukraine
State Higher Vocational School Stanisława Pigionia in Krosno	Poland
Tashkent State Pedagogical University Named After Nizami	Uzbekistan
Ternopil National Economic University	Ukraine
The State University of Applied Sciences in Plock	Poland
The University of Economics and Culture	Latvia
Transilvania University of Brasov	Romania
"Turiba University" Ltd, Latvia	Latvia
University of Agriculture in Krakow	Poland
University of Latvia	Latvia
University of Lodz	Poland
University of State Fiscal Service of Ukraine	Ukraine
University of Szczecin	Poland
University of Warmia and Mazury in Olsztyn	Poland
University of Zielona Gora	Poland
UTP University of Science and Technology	Poland
Ventspils University of Applied Sciences	Latvia
Vytautas Magnus University	Lithuania
Warsaw University of Life Sciences – SGGW	Poland

Editorial Board

The Editorial Board of the edition of the International Scientific Conference Proceedings:

<i>Professor</i>	Vilija Alekneviene	Vytautas Magnus University, Lithuania
<i>Professor</i>	Alina Danilowska	Warsaw University of Life Sciences - SGGW, Poland
<i>Professor</i>	Csaba Forgacs	Budapest Corvinus University, Hungary
<i>Professor</i>	Barbara Freytag-Leyer	Fulda University of Applied Sciences, Germany
<i>Professor</i>	Wim J.M. Heijman	Wageningen University and Research, Netherlands
<i>Professor</i>	Elena Horska	Slovak University of Agriculture, Slovakia
<i>Professor</i>	Bartosz Mickiewicz	West Pomeranian University of Technology, Poland
<i>Professor</i>	Bo Ohlmer	Swedish University of Agricultural Sciences, Sweden
<i>Professor</i>	Maria Parlinska	Warsaw University of Life Sciences - SGGW, Poland
<i>Professor</i>	Irina Pilvere	Latvia University of Life Sciences and Technologies, Latvia
<i>Professor</i>	Baiba Rivza	Latvia University of Life Sciences and Technologies, Latvia
<i>Professor</i>	Arild Sæther	University of Agder, Norway
<i>Professor</i>	Rogier Schulte	Wageningen University and Research, Netherlands
<i>Professor</i>	Jacques Viaene	University of Gent, Belgium
<i>Professor</i>	Andra Zvirbule	Latvia University of Life Sciences and Technologies, Latvia

Editor – in-chief

Anita Auzina, Associate professor

Responsible compilers of the proceedings:

Gunta Grinberga-Zalite, Associate professor

Simona Zvirgzdina, Lecturer

Assistants to the responsible compilers:

Dzesija Zeiferte

The authors are responsible for the content and language of their papers.

Reviewers

Every article included into the Proceedings was subjected to a scientific, including international review. All reviewers were anonymous for the authors of the articles. The following reviewers from scientific and academic institutions of 13 countries (Belarus, Georgia, Germany, Hungary, Latvia, Lithuania, Poland, Romania, Slovakia, Sweden, Ukraine, USA and Uzbekistan).

Publication Ethics and Malpractice Statement for the International Scientific Conference „Economic Science for Rural Development“

The Editorial Board is responsible for, among other, preventing publication malpractice. Unethical behaviour is unacceptable and the authors who submit articles to the Conference Proceedings affirm that the content of a manuscript is original. Furthermore, the authors' submission also implies that the material of the article was not published in any other publication; it is not and will not be presented for publication to any other publication; it does not contain statements which do not correspond to reality, or material which may infringe upon the intellectual property rights of another person or legal entity, and upon the conditions and requirements of sponsors or providers of financial support; all references used in the article are indicated and, to the extent the article incorporates text passages, figures, data or other material from the works of others, the undersigned has obtained any necessary permits as well as the authors undertake to indemnify and hold harmless the publisher of the proceedings and third parties from any damage or expense that may arise in the event of a breach of any of the guarantees.

Editors, authors, and reviewers, within the International Scientific Conference „**Economic Science for Rural Development**“ are to be fully committed to good publication practice and accept the responsibility for fulfilling the following duties and responsibilities, as set by the *COPE Code of Conduct and Best Practice Guidelines for Journal Editors of the Committee on Publication Ethics (COPE)*.

It is necessary to agree upon standards of expected ethical behaviour for all parties involved in the act of publishing: the author, the editor, the peer reviewer, and the publisher.

DUTIES OF EDITORS

Publication decisions

The Editorial Board is responsible for deciding which of the articles submitted to the Conference Proceedings should be published. The Editorial Board may be guided by the policies of ethics and constrained by such legal requirements as shall then be in force regarding libel, copyright infringement and plagiarism. The editor may confer with other editors or reviewers in making this decision.

Fair play

An editor at any time evaluate manuscripts for their intellectual content without regard to the nature of the authors or the host institution including race, gender, sexual orientation, religious belief, ethnic origin, citizenship, or political philosophy of the authors.

Confidentiality

The editor and any editorial staff must not disclose any information about a submitted manuscript to anyone other than the corresponding author, reviewers, potential reviewers, other editorial advisers, and the publisher, as appropriate.

Disclosure and conflicts of interest

Unpublished materials disclosed in a submitted manuscript must not be used in an editor's own research without the express written consent of the author.

DUTIES OF REVIEWERS

Every submitted manuscript has been reviewed by one reviewer from the author's native country or university, while the other reviewer came from another country or university. The third reviewer was chosen in the case of conflicting reviews. All reviewers were anonymous for 9 the authors of the articles, and the reviewers presented blind reviews. Every author received the reviewers' objections or recommendations. After receiving the improved (final) version of the manuscript and the author's comments, the Editorial Board of the conference evaluated each article.

Contribution to editorial decisions

Peer review assists the editor in making editorial decisions and through the editorial communications with the author may also assist the author in improving the paper.

Promptness

Any selected referee who feels unqualified to review the research reported in a manuscript or knows that its prompt review will be impossible should notify the editor and excuse himself from the review process.

Confidentiality

Any manuscripts received for review must be treated as confidential documents. They must not be shown to or discussed with others except as authorised by the editor.

Standards of objectivity

Reviews should be conducted objectively. Personal criticism of the author is inappropriate. Referees should express their views clearly with supporting arguments.

Acknowledgement of sources

Reviewers should identify relevant published work that has not been cited by the authors. Any statement that an observation, derivation, or argument had been previously reported should be accompanied by the

relevant citation. A reviewer should also call to the editor's attention any substantial similarity or overlap between the manuscript under consideration and any other published paper of which they have personal knowledge.

Disclosure and conflict of interest

Privileged information or ideas obtained through peer review must be kept confidential and not used for personal advantage. Reviewers should not consider manuscripts in which they have conflicts of interest resulting from competitive, collaborative, or other relationships or connections with any of the authors, companies, or institutions connected to the papers.

DUTIES OF AUTHORS

Reporting standards

The authors of reports of original research should present an accurate account of the work performed as well as an objective discussion of its significance. Underlying data should be represented accurately in the paper. A paper should contain sufficient detail and references to permit others to replicate the work. Fraudulent or knowingly inaccurate statements constitute unethical behaviour and are unacceptable.

Data access and retention

The authors are asked to provide the raw data in connection with a paper for editorial review, and should be prepared to provide public access to such data (consistent with the ALPSP-STM Statement on Data and Databases), if practicable, and should in any event be prepared to retain such data for a reasonable time after publication.

Originality and plagiarism

The authors should ensure that they have written entirely original works, and if the authors have used the work and/or words of others that this has been appropriately cited or quoted.

Multiple, redundant or concurrent publication

An author should not in general publish manuscripts describing essentially the same research in more than one journal or primary publication. Submitting the same manuscript to more than one journal concurrently constitutes unethical publishing behaviour and is unacceptable.

Acknowledgement of sources

Proper acknowledgment of the work of others must always be given. The authors should cite publications that have been influential in determining the nature of the reported work.

Authorship of the paper

Authorship should be limited to those who have made a significant contribution to the conception, design, execution, or interpretation of the reported study. All those who have made significant contributions should be listed as co-authors. Where there are others who have participated in certain substantive aspects of the research project, they should be acknowledged or listed as contributors.

The corresponding author should ensure that all appropriate co-authors and no inappropriate co-authors are included on the paper, and that all co-authors have seen and approved the final version of the paper and have agreed to its submission for publication.

Hazards and human or animal subjects

If the work involves chemicals, procedures or equipment that have any unusual hazards inherent in their use, the author must clearly identify these in the manuscript.

Disclosure and conflicts of interest

All authors should disclose in their manuscript any financial or other substantive conflict of interest that might be construed to influence the results or interpretation of their manuscript. All sources of financial support for the project should be disclosed.

Fundamental errors in published works

When an author discovers a significant error or inaccuracy in his/her own published work, it is the author's obligation to promptly notify the editor or publisher and cooperate with the editor to retract or correct the paper.

Editorial Board

Foreword

The international scientific conference „Economic Science for Rural Development“ is organized annually by the Faculty of Economics and Social Development of Latvia University of Agriculture.

The proceedings of the conference are published since 2000.

The scientific papers presented in the conference held on 9-10 May 2019 are published in 3 thematic volumes:

No 50 Rural Development and Entrepreneurship
Production and Co-operation in Agriculture

No 51 Integrated and Sustainable Regional Development
Marketing and Sustainable Consumption

No 52 New Dimensions in the Development of Society
Home Economics
Finance and Taxes
Bioeconomy

The proceedings contain scientific papers representing not only the science of economics in the diversity of its sub-branches, but also other social sciences (sociology, political science), thus confirming inter-disciplinary development of the contemporary social science.

This year for the first time the conference includes the section on a new emerging kind of economy-bioeconomy. The aim of bioeconomy is to use renewable biological resources in a more sustainable manner. Bioeconomy can also sustain a wide range of public goods, including biodiversity. It can increase competitiveness, enhance Europe's self-reliance and provide jobs and business opportunities.

The Conference Committee and Editorial Board are open to comments and recommendations concerning the preparation of future conference proceedings and organisation of the conference.

Acknowledgements

The Conference Committee and editorial Board are open to comments and recommendations for the development of future conference proceedings and organisation of international scientific conferences.

We would like to thank all the authors, reviewers, members of the Programme Committee and the Editorial Board as well as supporting staff for their contribution organising the conference.

On behalf of the conference organisers

Anita Auzina

Associate professor of Faculty of Economics and Social Development
Latvia University of Life Sciences and Technologies

CONTENTS

NEW DIMENSIONS IN THE DEVELOPMENT OF SOCIETY	13
THE DIFFERENCES IN VIEW BETWEEN MANAGERS AND EMPLOYEES OF ENTERPRISES OF LATVIA IN REGARD TO THE PROVISION OF MENTAL WELL-BEING IN THE WORKING ENVIRONMENT	14
Dace Bole, Master in management science.....	14
SMART VILLAGE AS A DIRECTION FOR RURAL DEVELOPMENT.....	22
Agnieszka Budziewicz-Guzlecka	22
MUNICIPAL COASTAL GOVERNANCE PROCESS RESEARCH AND DEVELOPMENT: COASTAL SOCIO-ECOLOGICAL SYSTEM AND ITS GOVERNANCE UNDERSTANDING	29
Raimonds Ernsteins, Prof.Dr.habil.paed., Erika Lagzdina, MSc.env. and Anita Lontone-Ievina, MSc.env..	29
INTERACTION OF EDUCATION, SCIENCE AND BUSINESS IN TERMS OF DIGITAL ECONOMY DEVELOPMENT.....	37
Vladimir V. Klimuk ¹ , Associate professor Ph.D.; Andrejs Lazdins ² , Assistant professor Dr.oec.....	37
ALTERNATIVE WAYS OF FOAMED POLYSTYRENE RECYCLING USING INSECTS AS AN ELEMENT OF SUSTAINABLE DEVELOPMENT.....	45
Olga Kosewska ¹ , inż; Agnieszka Kosewska ¹ , dr hab.; Sebastian Przemieniecki ¹ , dr inż. and Stanislaw Sienkiewicz ² , prof. dr hab.....	45
DISRUPTION POTENTIAL OF THE DISTRIBUTED LEDGER TECHNOLOGY WITHIN THE ECONOMY OF LATVIA	53
Natalija Kostrikova, MBA; Baiba Rivza, Dr. habil. oec.....	53
THE IMPORTANCE OF CORPORATE SOCIAL RESPONSIBILITY FOR THE TODAY'S CONSUMER: OPINIONS OF CONSUMERS AND EXPERTS	62
Toms Kreicbergs, Mg.oec.; Modrite Pelse, Dr.oec.	62
COMPARISON OF THE BALTIC STATES' TAX REDUCTION POLICY FOR DONATIONS TO UNIVERSITIES.....	69
Laila Kundzina ¹ , Mg. hist.; Baiba Rivza ² , Prof. Dr. oec.	69
REGIONAL CONTEXT OF DOMESTIC TRAVEL IN LATVIA	76
Eriks Lingeberzins, dr.oec., assoc.prof.....	76
SATISFACTION WITH ENVIRONMENT OF REGIONAL HEALTH CARE INSTITUTION: PATIENTS' OPINIONS AND SOCIETAL STEREOTYPES	84
Arturs Medveckis, Dr. paed.; Tamara Pigozne, Dr. paed.,	84
LATVIAN NONES AND CHRISTIANS: THEIR VALUE PROFILES	93
Mareks Niklass, Dr.sc.soc./ researcher; Agita Misane ² , Dr.phil./leading researcher	93
INTERNATIONAL AND LATVIAN LEGISLATION ON SPORT	102
Ieva Opolska, Mg.oec.; Liga Proskina, Dr.oec.....	102
ACTIVITIES OF SENIOR COUNCILS IN POLAND	111
Agnieszka Parlinska, PhD, Associate Professor; Maria Parlinska ² , PhD, prof UTH.....	111
LABOUR MARKET EXPECTATIONS OF GENERATION Y	119
Linda Perkune, MBA; Lasma Licite, Dr.oec., associate professor	119
IMPORTANCE OF COLLABORATION WITH EMPLOYERS TOWARDS THE RANKINGS OF HIGHER EDUCATION INSTITUTIONS.....	127
Evija Rusite, Mg.biol., Mg.sc.admin./doctoral student; Biruta Sloka, Dr.oec./Professor.....	127
MIGRANT FAMILIES IN A REGIONAL VIEW	135
Sigita Sulca, PhD student; Ance Cerina	135
CASE STUDY ON COMPETENCE BASED APPROACH IN COURSE "MATHEMATICS FOR ECONOMISTS"	142
Anna Vintere, Mg.Math.....	142
HOME ECONOMICS.....	149
THE STATISTICAL ANALYSIS OF POLISH FOOD ENTERPRISES: - NONPARAMETRIC APPROACH	150
Aleksandra Baszczyńska, PhD	150
SUPPLY CHAIN IN THE MILK MARKET IN THE EU COUNTRIES *.....	157
Piotr Borawski, Associate Professor; Marta Guth, PhD, Assistant Professor and James W. Dunn, Emeritus Professor	157
WORK MOTIVATION AND LABOUR PRODUCTIVITY GROWTH AMONG IT PROFESSIONALS IN CONTEMPORARY LATVIA	165
Svetlana Gribanova ¹ , Mg.soc.; Anna Abeltina ² , Dr.oec.	165

QUALITY EVALUATION SCHEMES FOR AGRICULTURAL PRODUCTS AND FOODSTUFFS IN POLAND IN PREVIOUS AND PRESENT FINANCIAL PERSPECTIVE OF EU	175
Antoni Mickiewicz, Bartosz Mickiewicz and Wojciech Gotkiewicz ³	175
FEATURES OF THE FUNCTIONING OF NATIONAL PENSION SYSTEMS OF EASTERN EUROPE AND UKRAINE IN THE MODERN CONDITIONS	182
Agnieszka Parlinska, PhD; Volodymyr Rudyk, PhD	182
JOB COUNSELING A TOOL FOR SOCIAL INCLUSION: EMPIRICAL RESEARCH IN POLAND.....	188
Mariola Szewczyk-Jarocka, doctor	188
CONCENTRATION PROCESSES IN THE MEAT SECTOR IN POLAND	194
Elzbieta Jadwiga Szymanska, economist/ PhD, Associate Professor	194
<u>FINANCE AND TAXES</u>	<u>202</u>
INVESTMENT OF THE FINANCIAL INSTRUMENTS AND THEIR INFLUENCE ON THE EXCHANGE STOCK MARKET DEVELOPMENT	203
George Abuselidze, Doctor of Economics/ Professor; Anna Slobodianyuk, PhD in Economics	203
THE ROLE OF THE STATE IN THE DEVELOPMENT OF HOUSING LOAN MARKET IN POLAND AND UKRAINE	211
Milena Bera ¹ , PhD; Monika Spiewak - Szyjka ² , PhD	211
SUPPORT FOR THE AGRICULTURAL INVESTMENT IN POLAND – DOMESTIC VERSUS CAP	222
Alina Danilowska, associate professor	222
ESTIMATION OF CAPITAL OF AGRO-INDUSTRIAL ENTERPRISES AS AN ECONOMIC RESOURCE.....	231
Nadiia Davydenko ¹ Prof. dr. hab.; Olha Kliuchka ² PhD; Julia Kulbach ² PhD student	231
PRO-EUROPEAN ORIENTATION OF UKRAINE: ADAPTATION OF THE AGRICULTURAL POLICY OF UKRAINE TO THE CONDITIONS AND REQUIREMENTS OF THE EUROPEAN UNION	237
Nadiia Davydenko ¹ Prof. dr. hab.; Olena Lemishko ¹ PhD	237
INVESTMENT ATTRACTIVENESS OF AGRICULTURAL ENTERPRISES	242
Nadiia Davydenko ¹ Prof. dr. hab.; Halyna Skrypnik ² PhD and Zoya Titenko ³ PhD	242
THE SPATIAL DIFFERENTIATION OF DEVELOPMENT AND THE LEVEL OF THE FINANCIAL SITUATION OF RURAL COMMUNES OF THE SWIETOKRZYSKIE VOIVODESHIP	248
Pawel Dziekanski, PhD; Elwira Lesna-Wierszolowicz, PhD	248
ADVANTAGES AND DISADVANTAGES OF OUTSOURCING ACCOUNTING WORLDWIDE AND IN LATVIA	256
Ivita Faitusa, Dr.oec./ lecturer	256
ASSESSMENT OF ECONOMIC ACTIVITY IN POLAND IN THE LIGHT OF SELECTED TAX REVENUES ...	264
Lukasz Furman, PhD	264
TAX CHALLENGES IN THE COLLABORATIVE ECONOMY.....	271
Maris Juruss ¹ , Dr.oec., asoc. professor; Justina Hudenko ¹ Dr.oec., asis. professor and Ilze Varlamova ¹ , Mg.oec.	271
SELECTED INSTRUMENTS OF ENVIRONMENTAL PROTECTION IN THE CONTEXT OF CONTEMPORARY PARADIGMS OF EU AGRICULTURE	279
Grzegorz Konat, MA; Joanna Pawlowska-Tyszko, PhD and Michal Soliwoda, PhD	279
TAX INCENTIVES FOR MICRO ENTERPRISES – LATVIA’S EXPERIENCE.....	287
Inguna Leibus, Dr.oec., professor.....	287
FINANCIAL EXCLUSION OF A TRANSACTIONAL CHARACTER: CASE STUDY OF THE UNEMPLOYED IN THE CITY OF PLOCK	296
Anna Nowacka, Ph. D.	296
STOCK MARKET INSTITUTIONAL AND REGULATORY FRAMEWORK IN THE BALTIC STATES	302
Aija Pilvere-Javorska ¹ , MBA, Irina Pilvere ¹ , Dr.oec. and Baiba Rivza ¹ , Dr.hab.oec.	302
ASSESSMENT OF BUSINESS ANGEL ACTIVITY IN NORTHERN EUROPEAN COUNTRIES.....	311
Anatolijs Prohorovs ¹ , Dr. sc. administr., associate professor; Levs Fainglozs ¹ , PhD student.....	311
INFLUENCE OF INFLATIONARY TAX ON THE REGIONAL ECONOMY OF GEORGIA AND THE NATIONAL BANK’S MONETARY POLICY	324
Vazha Verulidze, PhD in Economics, Professor.....	324
<u>BIOECONOMY.....</u>	<u>332</u>
INNOVATION OF THE GREEN ECONOMY.....	333
Katarzyna Brodzinska, PhD habilitated; Zbigniew Brodzinski, PhD habilitated	333
SMART SPECIALIZATION STRATEGY MONITORING: THE BIOECONOMY.....	340
Sergejs Gemma ¹ , MPA; Zane Vitolina ² , Dr.oec.	340

EMISSIONS OF CARBON DIOXIDE (CO₂) AND GROWTH THE TOURISM INDUSTRY: CASE STUDY OF LATVIA	347
Tamara Grizane, PhD.; Gusca Julija, Dr.soc.ing.; Aija Sannikova, Dr.oec. and Inguna Jurgelane-Kaldava, Dr. oec.	347
THE CHALLENGES OF BIOECONOMY IMPLEMENTATION CONSIDERING ENVIRONMENTAL ASPECTS IN THE BALTIC STATES: AN INPUT-OUTPUT APPROACH	355
Genovaitė Liobikiene, dr; Janis Brizga, dr	355
DIFFERENTIATION OF THE ECONOMIC VALUE OF POLLINATION OF APPLE ORCHARDS DEPENDING ON THE METHOD OF ESTIMATION	363
Janusz Majewski, PhD, Eng.	363
ENERGY MIX AS THE BASIC REGULARITY OF THE PRINCIPLES OF SUSTAINABLE DEVELOPMENT ...	370
Ireneusz Miciula, Ph.D.	370
AGRICULTURAL AND ENVIRONMENTAL FUNCTIONS OF SUSTAINING LAND USE IN POLISH PROTECTED MOUNTAIN AREAS	379
Kamila Musiał ¹ , PhD; Wiesław Musiał ² , Prof.	379
SIGNIFICANCE OF LEGUMES AS A FEED SOURCE	388
Līga Proskina, Dr.oec.; Irina Pilvere ¹ , Dr.oec.	388
THE FLUCTUATIONS OF MAIZE PRICE IN YEARS 2010-2018 IN POLAND	396
Katarzyna Utnik-Banas, Dr hab. inz.	396
BIOLOGICAL PROGRESS AND THE USE OF NITROGEN BY CEREAL VARIETIES	403
Ludwik Wicki	403

NEW DIMENSIONS IN THE DEVELOPMENT OF SOCIETY

THE DIFFERENCES IN VIEW BETWEEN MANAGERS AND EMPLOYEES OF ENTERPRISES OF LATVIA IN REGARD TO THE PROVISION OF MENTAL WELL-BEING IN THE WORKING ENVIRONMENT

Dace Bole¹, Master in management science

Abstract. The need for mental well-being is substantiated in the working environment by the EU legislation and research. Research is carried out on the opportunities of creating comprehensive well-being at the workplace to promote the productivity of sustainable personnel. The mental well-being of personnel is studied in contexts such as: ecologies of working environment (including occupational safety, occupational health) and quality of life; adaptation and integration of employees into the workplace; psychosocial risks; organizing and conducting of an inclusive mental well-being. These contexts also can be defined as groups of psychosocial factors influencing mental well-being. The goal of the study was to find out how managers and employees of the companies and institutions of Latvia explain mental well-being and its provision in the working environment in order to identify problems and solutions to problems of mental well-being in the working environment. A quantitative approach was used in the research –in cooperation with the SKDS research centre there was worked and carried out online questionnaire (CAWI) in written and extramarital forms for managers of companies / enterprise (N = 263) and employees (N = 570) of Latvia. The substantiation of the survey was to get approval for the conclusions, which had been obtained using the literature analysis. The indicators of difference in the results were obtained using a Kolmogorov-Smirnov test for two groups (Two-Sample Kolmogorov-Smirnov Test). The results show that both managers and employees have got a good understanding of the usefulness of mental well-being in management of a company/enterprise and its personnel. There were found statistically significant differences in the evaluation of managers and personnel for the aspects of mental well-being: the awareness of the concept of "mental well-being of personnel"; the assessment of the mental well-being of personnel: the assessment of psychosocial risk factors, frequency of the assessment of work-related risks; the assessment of the promotion of mental well-being of personnel: the assessment of the practice of promoting mental well-being, the formal formulation of mental well-being, the opportunity for employees to participate in mental well-being promotion activities, the assessment of the importance of the mental well-being of personnel to sustainable development of the company/enterprise. It has been concluded that the mental well-being of personnel is a continuous process of the type of cycles where the individual sense of mental well-being of each employee and the functional action of synergy creates mental well-being in the company as a system. According to the conceptualized promotion of the mental well-being of the personnel in the practice of companies /enterprises of Latvia, such management approach is implemented partially. At the same time, managers and employees appreciate the importance of such management. Overall, the results show the necessity for managers to communicate with employees on mental well-being issues. The study identifies the most important criteria for the assessing the mental well-being of personnel and the topical areas of concern for the mental well-being of personnel.

Key words: the assessment of mental well-being of personnel in organizations of Latvia; promotion of mental well-being in the organization, criteria of mental well-being in the organization.

JEL code: I15 – Health and Economic Development

Introduction

The necessity for mental well-being in the work environment is justified by the legislation of EU, researches (European Pact for Mental..., 2008; Joint Declaration on Mental..., 2014). The issue of comprehensive prosperity is topical (Gallagher M.W., et al., 2009) to promote sustainable personnel productivity. Modern research shows that the issues of mentality and mental well-being are topical in the enterprises (Bowman T.J., 2004; Marques J., Dhiman S., 2014).

Therefore, there is raised the question of the study: what are the differences in the views of the managers of organizations (companies and enterprises) of Latvia and their employees about the mental well-being of the personnel, the provision of mental well-being in the working environment?

¹ Contacts to be added to the author, as a footnote at the bottom of the first page (6 point Verdana font)

The goal of the study was to find out how managers and employees of the companies and enterprises of Latvia explain mental well-being and its provision in the working environment in order to identify the problems and their solutions of mental well-being in the working environment.

The tasks of the study were: to collect and analyse the literature on mental well-being in the working environment and to improve its provision; to conduct a questionnaire in order to research the topicalities, problems and provision of mental well-being in the companies and enterprises of Latvia; to compile and analyse the results identifying the necessity and opportunities for improvement of mental well-being provision.

In the study, written and online questionnaire (CAWI) have been used for managers and employees of the companies/enterprises by the research centre SKDS. The survey was conducted in March and April in 2016 and there were used two types of questionnaires: a questionnaire for employees and a questionnaire for managers. The total amount of respondents there were 263 managers and 570 employees. The difference indicators of the results were obtained using a Kolmogorov-Smirnov test for two groups (Two-Sample Kolmogorov-Smirnov Test).

The novelty and topicality of the study is related to the fact that the mental well-being of the personnel as the concept of the most comprehensive welfare in Latvia has been researched little, and the author of the study according to the number of respondents shows sufficient understanding of the usefulness of mental well-being of managers and employees in the management of the personnel of the companies/enterprises of Latvia at the trend level.

However, at the same time there were also statistically significant differences in the evolutions of managers and employees for the aspects of mental well-being of the personnel that could be identified as a challenge to comprehensive mental well-being at work.

Research results and discussion

1. The concept of personnel mental well-being

Well-being concept, was created by Seligman after more than 20 years, is studied in relation to socio-demographic factors (gender, age, education, marriage and relationships, income, etc.), personality factors (extraversion, introversion, etc.), goals and values, culture etc. (Diener E. et al., 2009; Seligman, 2011). From the point of view of mental well-being, the author considers Seligman's view that well-being is a construct and as well as well-being elements - real things that are directly measured units because well-being is not just the reflection of people about thoughts, feelings or positive emotions. Every welfare element should coincide to the criteria: 1) it contributes to well-being; 2) for people, well-being is the help to get something else (Seligman M.E.P., 2011).

The category of mental well-being is significantly related to the mental health category (Duque L., 2009; Vorone S., 2012). Conceptually, the relationship between physical and mental health is important in the working environment (Duque L., 2009; Joint Declaration on Mental..., 2014).

The author, summarizing the views (Diener E., et al., 2009; Seligman M.E.P., 2011; Vorone S., 2012; Mental health: strengthening..., 2014), conceptualizes the concept of "well-being" including types of well-being: economical, physical, psychosocial, mental. It can be concluded that well-being is a multidimensional phenomenon, and mental well-being as a type of well-being that is the result of the integration of all other forms of well-being is also a multidimensional phenomenon.

The author relies on the approach adopted by S. Vorone (Vorone S., 2012) in Latvia - to study well-being in a holistic way using the term "psychosocial well-being" to define the concept of multi-dimensional well-being which essentially means integrating the subjective, psychological and social aspects of a happy and meaningful life.

At the same time, the author extends the framework setting the goal - the promotion of the mental well-being of the personnel of the organization which means that the ideal goal of personnel management is employee's prosperity based on the integration of other well-being and wellness aspects (Seligman M.E.P., 2011; Vorone S., 2012; Huppert F.A., So T.T.C., 2009).

The author, based on literature analysis and his / her work experience in personnel management, defines the mental well-being of the personnel as a process and state that includes several components: wellness, a sense of mental well-being, productive activity. Therefore, the mental well-being of the personnel is employee's individual well-being (physical and emotional). Well-being determines positive, optimistic self-acceptance, awareness of the situation, the quality of thinking (accuracy, breadth, creativity) - i.e. the mental aspect - the sense of mental well-being. Mental well-being involves a physical, emotional (mental), mental health in a unified system, and mental health is the most important factor influencing mental well-being. Mental well-being is a continuous process of transformation of cycles, with temporarily fixed moments of mental well-being and a relatively stable state of mental well-being - a state of balance and harmony that ensures the continuity of the process. Each employee's individual sense of mental well-being and its appropriate functional behaviour through synergy creates mental well-being in the organization as in the system that promotes its effectiveness.

In the analysis of the literature, especially the published experiences of other countries (the UK, Germany, Canada, etc.) in the research on mental health and mental well-being in the enterprises and various projects to promote mental health and mental well-being (A Manual for Promoting..., 2009, Mental health promotion..., 2011, Recommendations for implementing..., 2014; Workplace Mental Health..., 2015) the author classified factors of employees' well-being and effect of factors: individual level and level of the company/enterprise. These factors are interacting - i.e. one factor can cause the influence of other factors, which in turn affects the initial factor.

In order to promote mental well-being of personnel, promoting health programs are useful. The promotion of mental health is defined as the process of improving protection factors which improves individual, social and environmental conditions which ensures optimal health and promotes person's full development, improves the quality of his/her life. There are two supported broad categories and programs of mental health which are distinguished: 1) mental illness, disorder prevention or preventive work; 2) promoting of mental health. Prevention and promotion of mental health are not mutually exclusive categories because there is necessary a comprehensive approach including both prevention and health promotion (Mental health promotion ..., 2011).

Promoting mental health at the workplace is one of the priorities of the Community Health and Safety at Work Strategy (Mental Health promotion..., 2011). The best practice analysis of mental health and well-being in Europe (Mental Health Promotion, 2011) and the material prepared by researchers and practitioners of Canada (Workplace Mental Health..., 2015) there are promoted the criteria which characterize the main principles. The key principles for promoting mental health and well-being are defined as: theoretical background, holistic approach, regularity, monitoring, active involvement of employees and management, evaluation, continuity and continuity of the process, effective communication, provision of training and support. It is useful to carry out research on the mental well-being of the personnel in the company/enterprise in the areas such as: work environment ecology (including occupational safety, occupational health) and quality of life; adapting and integrating employees into the workplace; psychosocial risks; features of a mental well-being organization.

2. Evaluation results of personnel mental well-being in companies and enterprises of Latvia

The results of the comparison of **the concept "mental well-being of personnel"** are summarized in the Table (Table 1).

Table 1

The relative and differential significance indicators of respondents' awareness of the meaning of 'mental well-being of personnel'

Selection/Indicators	Yes	No	Hard to say	Z criterion	Significance (p)
Managers (N=263)	33.8 %	52.5 %	13.7 %	1.83	0.002
Employees (N=570)	20.2 %	67.4 %	12.5 %		

Source: author's calculations based on results of the survey

The results show (Table 2) that managers have encountered this concept more often, and employees are relatively uncommon. Relatively often, respondents in both surveys find it difficult to answer a question that also indicates a lack of awareness and can reduce the use of opportunities for personnel to promote mental well-being.

The results of **the assessment of the practice of promoting mental well-being of personnel** are summarized in the Table (Table 2).

Table 2

Frequency of respondents' opinions on the existence of mental well-being practices in the enterprise/institution and indicators of significance of differences in the selection of managers and employees

Selection/Indicators	Yes, absolutely	Yes, partly	No	Hard to say	Z criterion	Significance (p)
Managers (N=263)	6.5 %	36.9 %	28.9 %	27.8 %	1.69	0.006
Employees (N=570)	4.7 %	26.0 %	37.9 %	31.4 %		

Source: author's based on results of the survey

The results show (see Table 3) that the practice of promoting mental well-being in a company / enterprise is problematic: it is implemented partly, it is difficult to identify if it is or is not implemented; managers value the existence of such practices more than employees.

In the assessment of personnel mental well-being: in the assessment of psychosocial risk factors managers assessed the extent to which they agreed with the statements of risk factors by extending their assessment to their subordinate employees; Employees appreciated the extent to which they agreed to the statements by referring to their paid employment. The results (significance and importance of Z criterion) showed statistically significant differences in 5 measurements from 11 measurements. The factor of a psychosocial risk that can negatively affect mental well-being of the personnel is an opportunity for employees in the company /enterprise to participate in the decision-making and / or adoption of important decisions by employees (21.2 % of employees do not agree completely and 28.5 % rather disagree than agree that there is such possibility in the company / enterprise; 23.2 % of managers believe that employees rather do not have such opportunity than they have); less, but, however, an important risk factor can also be considered incomplete sense of security of the stability of your workplace and recognition of the necessity for work, family and work-life balance in the company/ enterprise. The results of **the assessment of the frequency of work-related risks** indicate the problematic provision of mental well-being - very significant differences have been identified: in the view of managers the risk assessment is more frequent than that of employees; comparatively (especially in the selection of employees) the assessment „hard to say“ is more often.

The results of **the assessment of work-related risks** show that the use of occupational safety assessments and controls is much more common in the view of managers, and comparatively, also employees have indicated it as the most common practice that can be explained by compliance with regulatory requirements in companies / enterprises. In the context of promoting the mental well-being of personnel the fact that daily conversations with employees are used by 43.0 % of managers in the risk assessment, although almost 2 times less the use of this method has been reported by employees.

The results of **the assessment of the formal formulation of mental well-being** (the question: are there included any mental health issues in the policies of personnel management of the company / enterprise or other documents?) are very different, however, in both respondents' selections there is seen the tendency that it is difficult to answer the question about formal formulation of mental well-being in the documents of the company /enterprise.

The classification of the frequency of the results showed that in the selection of managers- higher level managers and representatives from culture and entertainment, financial, social care, and in the selection of employees representing social care, transport logistics and municipal enterprises responded affirmatively more often.

In order to clarify information about the process of mental well-being and to develop the guidelines for process improvement, the managers were asked **whether criteria have been developed** in the company/enterprise **to determine that the promotion of mental well-being is being implemented**. The results show that the development and use of criteria for assessing mental well-being is problematic. The classification of the frequency of the results showed that the above mentioned criteria were more often developed in the fields of finance, education, public administration.

In order to be able to make recommendations for improving the mental well-being of personnel, the managers were asked to assess whether by the criteria in the Table could lead to the promotion of mental well-being in the company/enterprise. The results are summarized in the Table (Table 3).

Table 3

Relative (%) indicators of the evaluation of the frequency of the evaluation of potential criteria in the enterprise / institution for the promotion of mental well-being in the selection of the managers (N = 263)

No	Criterion	Can completely (%)	Rather can (%)	Rather cannot (%)	Cannot at all (%)	Hard to say (%)
1.	Conversation with an employee about well-being at work	19.8	55.5	7.2	4.2	13.3
2.	Surveys on employee's psychological well-being	15.2	56.7	8.7	5.3	14.1
3.	The strategy of the company / enterprise is to provide a healthy lifestyle at the workplace	14.1	54.8	12.2	4.2	14.8
4.	Managers' observations in daily work	20.2	53.2	10.6	1.5	14.4
5.	Satisfaction survey, including mental well-being issues	16.0	49.4	11.4	6.5	16.7
6.	Consultation with occupational doctors, psychologists	13.3	43.7	15.2	7.2	20.5
7.	Employee's assessment and development conversations	15.6	55.1	11.0	3.8	14.4

Source: author's calculations based on results of the survey

The results show (Table 4) that, when comparing all rating options, the managers consider that interviews with employees about well-being at work and managers' observations in their daily work as the most complete/relevant criteria; more relevant: employee's assessment and development

conversations; the strategy of the company/enterprise is to provide a healthy lifestyle at the workplace; employees' surveys that include issues of mental well-being assessment. The topicality of the criteria development as well as the necessity for professional development of managers in the issues of mental well-being assessment substantiates often chosen rating „hard to say“.

In order to clarify whether and how the promotion of mental well-being happens in the company/enterprise and to get information about that if some of the previously assessed criteria (see Table 4) are being implemented in practice, employees were asked to evaluate: 1) **how much do employees agree with the claims of their wages?** (claims were reformulated criteria; 2) or, **do the employees of the company / enterprise have the opportunity to participate in the assessment of employees' mental well-being?** The results showed that partially evaluated potential criteria are being implemented in practice. Problem areas are managers' conversations with their employees about wellness at work once a half year or more, and the surveys of employees' psychological well-being (more often chosen rating "do not agree"). Employees' participation in the evaluation of mental wellbeing issues is problematic because 70.7 % of respondents indicated that there was No such participation, but 22.6 % said „hard to say“. The results of **the assessment of the employees' ability to participate in mental well-being activities** show very significant differences: the managers evaluate the ability of employees to participate in such activities higher than the employees themselves. More frequent participation in different physical exercise classes is shown in both selections; less often - in seminars on mental health and mental well-being.

The results of personnel assessment of the importance of mental well-being for sustainable development of an enterprise/company show that overall the mental well-being of personnel is assessed as a very important and important factor for ensuring sustainable development of the company/enterprise, however, a high score (7 and 6 out of max 7 possible) has been chosen more frequently in the selection of the managers. The lack of understanding of this issue is evidenced by the relatively often chosen 'hard to say' rating. The explanation of the practical application of the research results is based on the results of the managers' survey which show that there is a sufficient amount of financial, time and personnel resources to ensure the promotion of the mental well-being of the personnel. However, the problem of potential resource assessment is revealed by the relatively often chosen 'hard to say' rating.

Conclusions, proposals, recommendations

- 1) The results of the research show the topicality of the personnel for the promotion of mental well-being in the companies and enterprises of Latvia, as well as the partial use of such an approach and the partial readiness of the managers and employees to implement such management approach. Understanding of the concept of "mental well-being of personnel" is topical.
- 2) From a strategic point of view, the problem is the developed criteria by which it can be determined in the company/enterprise that the promotion of the mental well-being of the personnel is implemented as well as the difficulty of assessing potential criteria for assessing such management. The necessity of criteria is in accordance with the conclusion of the literature analysis that well-being is a directly measurable unit, not just a reflection of people. The results of the survey showed the usefulness of the following criteria: conversation with employees about well-being at work and observations of managers in daily work; staff mental well-being issues included in employee evaluation and development negotiations; moving the strategy of the company/enterprise towards providing a healthy lifestyle in the workplace; employee surveys that include issues of mental wellbeing assessment.

- 3) In the assessment of the importance of personnel for the promotion of mental well-being in the sustainable development of an enterprise/company, the most common tendency is that it is very important and important for both managers and employees to understand the usefulness of mental well-being in the management of the company/enterprise and their personnel. Conceptually, it means that it is important to clarify the importance of such security in the view of the personnel when planning the provision of mental well-being of the personnel.
- 4) Survey results showed managers and employees' perceptions of mental well-being, differences in mental well-being at work. There was more frequent awareness of higher level managers (1 % probability of error) of the notion of "mental well-being of personnel"; significant differences were observed in the assessment of mental well-being of personnel in the working environment (probability of dominance error 0.01 % and 1 %, in some measurements 5 %): the managers assess psychosocial risk factors as less risky; the managers evaluate the ability of employees to participate in mental well-being activities more than employees themselves; the managers more often than employees believe that at least in part in companies/enterprises there is a practice of promoting mental well-being of personnel; the managers more often than employees consider the importance of mental well-being of the personnel to the sustainable development of a company/enterprise as very important. Overall, the results show the necessity that the managers should communicate with employees about mental well-being issues in order to get accurate feedback on the state of mental well-being of the personnel and the usefulness of measures to promote mental well-being.

The results of the study are controversial in several aspects: **the tendency has been observed in the assessment of the mental well-being of the personnel – the managers consider the risk factors are less risky** and may be related to the physical and mental health of the employees what is found in the literature analysis according to their work and working environment in a direct and indirect way. Direct commitment managers are easier to observe because they manifest themselves in the physical working environment and at the health of their employees, but the impact of the psychosocial working environment is more difficult to identify. Differences in the results can also be explained by the recognition that the level of psychosocial well-being is determined by subjective and objective (environmental) factors which degree of influence is determined by how important it is for the personality. Employees can assess subjectively the risk factors more visible, in turn the managers assess them more objectively, and objective risk factors may be less visible. However, the results highlight the necessity to improve managers' understanding of two categories and programs of mental health support measures: 1) mental illness, disorder prevention or preventive work; 2) promoting mental health; **in the assessment of the promotion of the mental well-being of personnel, the managers assess the ability of employees to participate in mental well-being activities more than employees themselves** what can be explained by a different understanding of effective participation - providing access to all relevant information allowing sufficient time for consultations and discussions. Perhaps, employees may not take full advantage of their opportunity, but then the question is whether employees consider the activities are useful because the examples of Good Practice show that if employees find the activities useful, they support them and participate in them; **in assessment the importance of mental well-being of personnel to the sustainability of a company/enterprise, the managers more often consider the importance of mental well-being of the personnel as very important**, which can be explained by greater awareness of the managers on this issue; **evaluating the practice of**

promoting mental well-being of the personnel, the managers evaluate the existence of such practices more than employees, expressing more often that it is partially implemented. Therefore, it is likely that the managers are not sufficiently aware of employees' level of tension and take the necessary activities.

The research showed a controversial issue in the implementation of mental well-being of the personnel: hard-to-identify practices for promoting mental well-being in a company/enterprise and formal formulation of the documents of mental well-being in company/enterprise that can be associated with inadequate awareness and understanding of these issues and/or inadequate identification of mental well-being and indicators.

Bibliography

1. *A Manual for Promoting Mental Health and Wellbeing, ProMenPol Project* (2009). Retrieved: <http://www.mentalhealthpromotion.net/resources/toolit-manuals/manual-for-the-workplace.pdf>. Access: 10.02.2015.
2. Bowman, T. J. (2004). *Spirituality at Work: An Exploratory Sociological Investigation of the Ford Motor Company*. London: London School of Economics and Political Science. p. 340.
3. Diener, E., Wirtz, D., Tov, W., Kim-Prieto, C., Choi, D., Oishi, S., Biswas-Diener, R. (2009). New Measures of Well-being: Flourishing and Positive and Negative Feelings. *Social Indicators Research Series*; 39, pp. 247–266.
4. Duque, L. (2009). *Mental Health of Expatriates in Finnish Enterprises in Brazil*. Dissertation. Turku: University of Turku. Retrieved: <https://www.tsr.fi/tsarchive/files/TietokantaTutkittu/2006/106388Loppuraportti.pdf> Access: 12.12.2015.
5. *European pact for mental health and well – being* (2008). Retrieved: http://ec.europa.eu/health/ph_determinants/life_style/mental/docs/pact_en.pdf Access: 10.02.2015.
6. Gallagher, M.W., Lopez, S.J., Preacher, K.J. (2009). The Hierarchical Structure of Well-Being. *Journal of Personality*; 77(4), pp. 1025-1049.
7. Huppert, F.A., So, T. T. C. (2013). Flourishing Across Europe: Application of a New Conceptual Framework for Defining Well-Being. *Social Indicators Research*; 110(3), pp. 837–861.
8. *Joint Declaration on Mental Health in the Workplace* (2014). Conference „Driving Mental Health at the Workplace. Learning from Each Other” material. Retrieved: <http://ge.tt/35KUFG42> Access: 08.01.2015.
9. Marques, J., Dhiman, S. (2014). *Leading Spiritually: Ten Effective Approaches to Workplace and Spirituality*. New York: Palgrave Macmillan. p. 183 p.
10. *Mental Health Promotion in the Workplace – A Good Practice Report* (2011). European Agency for Safety and Health at Work. Retrieved: https://osha.europa.eu/en/publications/reports/mental-health-promotion-workplace_TEWE11004ENN Access: 05.02.2015.
11. *Mental health: strengthening our response* (2014). Retrieved: <http://www.who.int/mediacentre/factsheets/fs220/en/> Access: 06.09.2014.
12. *Recommendations for Implementing Psychosocial Risk Assessment* (2014). Conference „Driving mental health at the workplace. Learning from each other” material. Retrieved: <http://ge.tt/35KUFG42> Access: 08.01.2015.
13. Seligman, M.E.P. (2011). *Flourish: A Visionary New Understanding of Happiness and Well-being*. New York: Free Press. p. 368.
14. Vorone, S. (2012). *Musdienu studejoso psihosocialas labklajibas saturs*. Promocijas darbs. Daugavpils: DU. Retrieved: http://dnl.biblio.du.lv/promocijas/DU_2012_santa_vorone_promdarbs.pdf Access: 17.09.2015.
15. *Workplace Mental Health Promotion. How-To Guide* (2015). Retrieved: <http://wmhp.cmhaontario.ca/> Access: 16.02.2015.

SMART VILLAGE AS A DIRECTION FOR RURAL DEVELOPMENT¹

Agnieszka Budziewicz-Guzlecka²
University of Szczecin

Abstract. Smart villages are an approach to the local development of a village that reflects the contemporary dynamics and direction of development processes as well as the challenges of civilization. It originates not only from observing the processes taking place in the countryside but from "smart" ideas that are widely advertised, for example in the concept of smart development. In Poland, saturation with internet access services is lower in rural areas than in cities. However, the information transmission network is being expanded all the time. Yet, the development of technology alone is not enough to develop smart areas. The concept of smart villages refers to rural areas and communities. This concept must also include regional and local specificities to a large extent.

In smart villages, traditional and new networks and services are strengthened by means of digital technologies, telecommunications, innovation and better use of knowledge, for the benefit of residents and enterprises. The objectives of the presented article are:

- presentation of areas that have an impact on the development of smart villages,
- an indication of the directions of rural development.

The article presents the following research hypothesis - increasing the awareness of rural residents will be conducive to the development of the smart village concept.

Key words: smart village, society, ICT.

JEL code: A14, D80.

Introduction

Currently, the digital economy, which is determined by the intensive development of modern IT technologies, is developing dynamically. The transition to the digital economy is associated with the dissemination of the use of information technology, and above all, advanced data exchange, as well as the development of new forms of communication in society. This development applies to the whole society; however, it proceeds with varying intensity, which is also related to the fact of certain divisions and differences that exist between the city and rural areas.

The peripheral regions do not have the same access to resources and markets and differ in terms of socio-economic conditions and social structures. They are generally characterized by low spatial availability, a negative migration balance and diverse levels of education of residents. They also do not have large potentials for endogenous development (Bilbao-Osorio, Rodríguez-Pose 2004; Naldi et al., 2015). In Poland, saturation with internet access services is lower in rural areas than in cities. However, the information transmission network is being expanded all the time. The concept of smart villages refers to rural areas and communities. This concept must also include regional and local specificities to a large extent. In smart villages, traditional and new networks and services are strengthened by means of digital technologies, telecommunications, innovation and better use of knowledge, for the benefit of residents and enterprises. The objectives of the presented article are:

- presentation of areas that have an influence on the development of smart villages,
- an indication of the directions of rural development.

The article presents the following research hypothesis - increasing the awareness of rural residents will be conducive to the development of the smart village concept. In reference to the assumed goal and adopted hypothesis in the article, the following research question was posed - what actions should be taken in the process of striving to achieve the concept of a smart village.

¹ The project is financed within the framework of the program of the Minister of Science and Higher Education under the name "Regional Excellence Initiative" in the years 2019 - 2022; project number 001/RID/2018/19; the amount of financing PLN 10,684,000.00
² agnieszka.budziewicz@wzieu.pl

The research methods used in the work were literature studies and a survey carried out among residents of the Dobra commune.

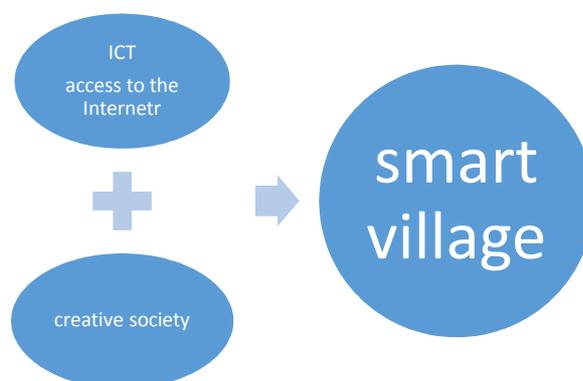
The essence of smart villages

The concept of smart villages derives from reflections on smart cities. Initially, the idea of a smart city assumed top-down creation of the city, with particular emphasis on technological solutions as a factor which on the one hand drives the economic development of cities, and on the other hand improves the quality of life in them (Letaifa, 2015). The concept of a smart city indicates the need for widespread use of new technologies to improve the environmental conditions of the city (Fernandes et al., 2011). On the other hand, the key assumption of the smart villages concept (analogically as it is adopted in the smart city concept) is the fact that technological progress, if it is effectively integrated with other rural development initiatives, can create new opportunities to increase revenues, provide services and strengthen social potential, which can significantly improve the quality of rural life (van Gevelt, Holmes, 2015). The above issues point to the differences between smart cities and smart villages. In the case of smart cities, more emphasis is placed on large data sets and the possibilities of transforming the way cities operate thanks to the associated digital technologies. Smart villages are not simply about expanding these principles to dispersed areas. In the case of smart villages, more emphasis is put on local communities that take the future into their own hands - often, but not exclusively, with the help of digital technologies.

Smart villages are an approach to the local development of the village, which reflects the contemporary dynamics and direction of development processes and the challenges of civilization. It originates not only from observing the processes taking place in the villages (Naldi et.al., 2015) but from smart ideas that are widely advertised, for example in the concept of intelligent development.

It should be pointed out that the concept of smart development is one of the key elements of the European economic policy included in the document "Europe 2020", which defines strategic actions aimed at faster economic growth related to the reduction of social inequalities. The problem of implementing the assumptions of the concept of smart development refers to the specificity of the area and resources that it is endowed with.

A smart village is a village that uses advanced technologies to improve the quality of life, maintain the principles of sustainable development, protect the natural environment and achieve the desired effects with the lowest costs incurred in the long run.



Source: author's study

Fig. 1. The key elements for the development of the smart village concept

As indicated in Figure 1, the key elements for the development of the smart village concept are the use of information transmission techniques and technologies. However, a society that thinks creatively and is open to change, which improves the quality of life is of great importance. Currently,

more and more attention is paid to the participation of local communities and their ideas in creating a village (Calzada, 2017). It should be noted that creativity and openness to change is expected not only from residents, but also from representatives of these residents, or councillors, commune heads or mayors. Thus, county and municipal authorities should strive to meet the expectations of residents by creating villages that are friendly to life (Bruska, 2012).

Dynamic development is fostered by the use of ICT and creative society. Presented below are the differences in the possession of computers by households in large cities and rural areas with an indication of their use (Table 1).

In 2018, nearly 83 % of households had at least one computer in the home. Taking into account different types of households, the possession of computers is quite diverse. In large cities, the percentage of households equipped with computers was larger than in rural areas, as shown in Table 1.

Table 1

Households with computers (in % of total households of a given group) and people regularly using a computer

Households with computers						
specification	years					
	2013	2014	2015	2016	2017	2018
Big cities	79.1	82.0	82.9	83.2	85.7	86.6
Rural areas	71.7	73.6	75.0	77.0	78.8	81.0
People regularly using a computer						
specification	years					
	2013	2014	2015	2016	2017	2018
Big cities	71.4	74.4	75.7	79.1	80.8	79.9
Rural areas	51.4	54.8	56.0	60.5	63.2	63.5

Source: author's study based on: Information society in Poland. Results of statistical surveys in the years 2014–2018, GUS, Warszawa-Szczecin 2018.

The fact that households are equipped with computers does not mean that they are regularly used; however, compared to 2014, the highest increase in this ratio was recorded in rural areas. In rural areas, households were less likely to have broadband access to the global network than households in cities. In 2018, this percentage among households in rural areas amounted to 76.2 %, while in large cities - 83.4 %. In comparison to 2014, the highest increase in the percentage was recorded in rural areas - by 9.5 percentage points, while in smaller and large cities by 9.1 pp and 5.9 pp respectively, as shown in Table 2.

Table 2

Households with Internet access and broadband access at home (in % of total households of a given group)

Households with an access to the Internet at home						
specification	years					
	2013	2014	2015	2016	2017	2018
Big cities	76.9	79.9	81.2	82.9	85.6	87.8
Rural areas	67.8	71.5	72.0	77.8	78.6	82.0
Households with a broadband access to the Internet at home						
Specification	years					
	2013	2014	2015	2016	2017	2018
Bog cities	75.1	77.5	77.7	79.1	81.5	83.4
Rural areas	63.0	66.7	64.7	71.3	74.1	76.2

Source: author's study based on: Information society in Poland. Results of statistical surveys in the years 2014–2018, GUS, Warszawa-Szczecin 2018.

The above information indicates that it is important to ensure that households in rural areas have access to the Internet; however, the low number of households using computers is also worrying. This causes that attention should be paid to the training of residents regarding the use of computers and the Internet. Digital technologies can significantly reduce the problems of rural areas that result from remoteness and low population density because they allow instant internet communication and access to electronic services.

Implementation of the smart village concept

Smart village is a well-functioning future village created by several areas and based on the active action of conscious, independent and decisive citizens. These areas include:

- smart economy - competitiveness,
- smart environment - natural resources,
- smart people - social and human capital,
- smart governance - participation.

The development of the smart economy area should help to establish local connections with other areas. It is connected with competitiveness, which should be achieved through technologically advanced products or services, as well as the introduction of innovations. The introduction of innovations should be strictly defined with specializations so as to build territorial competitive advantages (Rodrigues-Pose, 2004).

M. Wojcik points to smart specialization in rural areas in three contexts (Wojcik 2018, pp. 8-9), i.e.:

- embeddedness - attachment of business entities to the territory is a sign of maturity in economic development; cultural conditions play a big role. Issues such as social neighbourhood and family should not be overlooked;
- connections and closeness (relatedness) - they are very strongly related to the process of transferring knowledge. The economic, technological, but also social link can be considered in relation to the dissemination of information and the knowledge built on it. The role of space in the transfer of knowledge is important, i.e. it takes place mainly at the local level, and even at the neighbourhood level;
- connectivity - the essence of this aspect is the inclusion of networking as an essential feature of economic and social life, especially in the era of rapid development of new technologies. On the one hand, it is the mobility of people in space and the ease of making migration decisions of different social and spatial rank, on the other hand, it is virtual mobility, the ability to act in a parallel reality.

Another area important for the implementation of the smart village concept is the smart environment. It concerns the sustainable use of natural resources, in other words, striving to increase the use of renewable energy sources; for example, street lighting is controlled, pollution is measured, controlled and monitored, buildings are renovated to reduce their energy consumption. This is an area that is difficult to understand and implement, especially for people living in rural areas, who have no knowledge about the harmfulness of obsolete solutions used by them for many years. Attention should be paid to the need to make members of local communities aware of the necessity of implementing changes.

As emphasized by Klodzinski, in the marginalized areas, the preparation of local communities is a very important issue, so that they can by utilising the principles of sustainable development use local resources in a pro-development manner. Further development of education and lifelong learning

is currently the basic problem and at the same time the basic way to change the human mentality (Klodzinski 2014, p. 109).

The smart people area indicates that the initiators of changes in rural areas should be residents who, thanks to high qualifications and competencies, creativity and cooperation skills with the support of information and communication technologies (ICT) are able to strive to continuously improve the quality of rural life.

On the other hand, in the area of smart governance, social participation in decision making, transparency of action, quality and accessibility of public services play an important role. It is necessary to strengthen civic participation. Participation, generally speaking, can be understood as more or less direct participation of citizens in social, public and political life (Kazmierczak, 2011). Social or community, or horizontal, participation is understood as the participation of members of the local community in collective activities, which include, above all: active presence in the creation and functioning of civic groups and non-profit organizations, as well as permanent or occasional work as a volunteer. One can also indicate individual participation in everyday choices, actions and expectations of the individual in relation to the character and type of society in which he or she wants to function. The civic budget is an example of civic participation, i.e. the residents decide about the purpose of a separate part of the commune's budget in voting. In Poland, the idea of a civic budget came true relatively late - only in 2011, the city of Sopot began its introduction for the first time. In subsequent years, civic budgets were introduced in other cities and in rural areas. However, it is still not a common form of activity of residents in co-deciding about the fate of the places they live in.

For example, in the Dobra commune¹, in 2018, 23 projects were submitted to the Civic Budget of the Dobra Commune (including 11 investment projects and 12 non-investment projects). The implementation of these projects will start in 2019. The number of registered residents of the Dobra commune amounts to almost 21,000, while only 1,416 people participated in the vote. The author interviewed 56 residents to obtain information on the reasons for not voting by the residents and the reasons that led in turn to voting. The main reasons for not participating in voting for projects from the citizens' budget were:

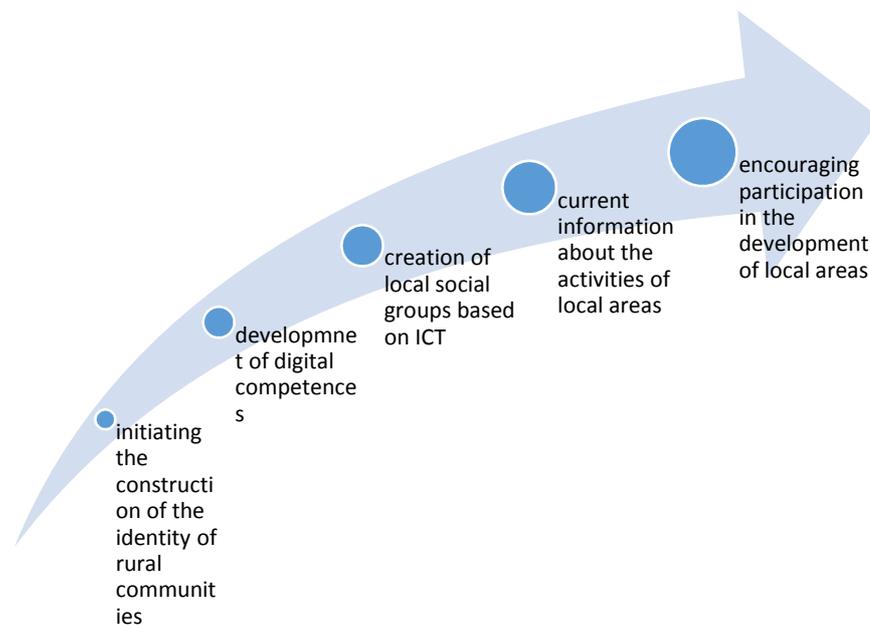
- lack of knowledge about the possibility of voting,
- unwillingness to vote, because the respondent does not have the feeling of being a member of a larger community (lack of a sense of belonging),
- unwillingness to vote, resulting from the conviction that this one vote will not change anything,
- lack of conviction that an individual can co-decide on the selection of projects.

The author also interviewed 30 residents who voted in the civic budget. 66 % of them admitted that they were encouraged to vote by information sent on a social network by another person. Other people indicated that their involvement resulted from the willingness to participate in the development of the commune's areas and the conviction of civic responsibility.

As follows from the above studies, the basis should be strengthening social bonds. In this aspect, volunteers from local communities who will initiate the development of these bonds can play an important role. Social bonds will allow for the identification of members of society with the inhabited rural area, which will increase the sense of responsibility for taking part in civic participation. This should be supported by the use of new techniques and technologies by creating, for example,

¹ The Dobra Commune is a rural commune located between the City of Szczecin and the Polish-German border, from the south and north bordering the communes of Police and Kolbaskowo. It consists of 17 localities, forming 12 villages.

discussion groups of local communities. The basic steps that should be taken to initiate the development of smart villages are presented in Figure 2.



Source: author's study

Fig. 2. Steps for implementing the concept of smart villages

The awareness of the possibility of making decisions is very important. This awareness determines the willingness to participate in making decisions for local communities. The local community is responsible for the initial stage of development of smart villages; it jointly develops a strategy based on local resources and aspirations.

It is necessary to support the development of digital infrastructure, competences to use it, but also to assist rural residents with developing solutions that enhance the viability and sustainability of rural areas thanks to social innovation and smart specialization. This will allow for the development leading to a smart village. In the future, a smart village in its development will go beyond the boundaries of the village. Despite the fact that initiatives take place at the local level, smart communities should recognize that the village functions in the setting of a specific landscape, and is also associated with other villages and cities. Therefore, they should activate these connections.

There is not one standard model of a smart village, nor a closed set of tools that they use.

Rural areas oriented towards development towards a smart village, evaluate their resources, apply the best available knowledge and take initiative in shaping the surrounding reality.

Conclusions

Multifunctional development depends on local conditions, so it will be different in each region. Changes and focus on development should lead to the economic revival of rural areas. The aim of rural development towards a smart village should be taken up by local organizations and residents, creating partner relations, using modern ICT in order to strive for the image of a smart village in the future.

In accordance with the assumed objectives of the presented article, a presentation of the areas affecting the development of smart villages and the directions of development of rural areas was made. The effect of this study was also to prove the hypothesis that in the development of the smart village concept, a key issue is raising the awareness of rural residents. In conclusion, it should be pointed out that this article should be treated as a signalling article, indicating the development of the smart village concepts which will become the starting point for further broader analysis.

Bibliography

1. Andersson M., Klaesson J., Larsson J.P., (2016), *How Local are Spatial Density Externalities? Neighbourhood effects in agglomeration economies*, „Regional Studies”, 50: p. 1082–1095.
2. Bruska A., (2012), Logistyka jako komponent smart city, *Studia Miejskie*, 6, p. 9–19.
3. Calzada I., Cobo C., 2015, Unplugging: Deconstructing the Smart City, *Journal of Urban Technology*, 22, 1, p. 23–43.
4. European Commission, (2010), *Europe 2020: a European Strategy for Smart, Sustainable and Inclusive Growth*, European Commission, Brussels.
5. Fernandes O. E., Meeus L., Leal V., Azevedo I., Delarue E., Glachant J.M., 2011, Smart Cities Initiative: How to Foster a Quick Transition towards Local Sustainable Energy Systems. Final Report, Firenze, European University Institute.
6. <https://enrd.ec.europa.eu/enrd-thematic-work/smart-and-competitive-rural-areas/smart-villages>
7. Information society in Poland. Results of statistical surveys in the years 2014–2018, GUS, Warszawa-Szczecin 2018.
8. Kazmierczak T., (2011), *Partycypacja publiczna: pojęcie, ramy teoretyczne*, [w:] *Partycypacja publiczna. O uczestnictwie obywateli w życiu wspólnoty lokalnej*, red. A. Olech, Instytut Spraw Publicznych, Warszawa
9. Klodzinski M. (2014). Przedsiębiorczość pozarolnicza na wsi w procesie wielofunkcyjnego rozwoju obszarów wiejskich. *Wies i Rolnictwo*, 4 (165), p. 97–112.
10. Letaifa S.B., (2015), How to strategize smart cities: Revealing the SMART model, *Journal of Business Research*, 68, 7, p. 1414–1419.
11. Naldi L., Nilsson P., Westlund H., Wixe F., (2015), What is smart rural development?, *Journal of Rural Studies*, 40, p. 90–101.
12. Wojcik, M. (2018). Koncepcja inteligentnego rozwoju (smart development)–wyzwanie dla planowania obszarów wiejskich. *Acta Universitatis Lodziensis. Folia Geographica Socio-Oeconomica*, p. 5-15.

MUNICIPAL COASTAL GOVERNANCE PROCESS RESEARCH AND DEVELOPMENT: COASTAL SOCIO-ECOLOGICAL SYSTEM AND ITS GOVERNANCE UNDERSTANDING

Raimonds Ernsteins¹, Prof.Dr.habil.paed., **Erika Lagzdina**², MSc.env. and **Anita Lontone-Ievina**³, MSc.env.

^{1,2,3}Environmental Science Dept., University of Latvia, Riga, Latvia

Abstract. Understanding and management of the coastal resources in integrated manner, taking into account all sustainability dimensions, since approaching coastal governance as social-ecological system (SES) governance, is still a theoretical and practical challenge for those working in the field, e.g. researchers, politicians, especially for local governments and coastal communities. Integrated coastal management (ICM) is also about creation of such governance systems that allow to integrate stakeholders and diverse knowledge tools and mechanisms to enhance them. The EU BONUS BaltCoast project (2015-2018) provided an internationally acknowledged methodology – System Approach Framework (SAF), that has been adjusted in Latvia’s case study for particular situation as not just one topical coastal management problem case, but as the whole rural territories coastal governance process case, being based on research-and-development (R&D) framework study at Salacgriva local rural municipality. This allowed for SES based assessment of the local coastal governance process with five key coastal governance problem clusters identification. Further on concrete proposals for collaborative and participatory coastal governance innovation development for Latvia’s situation were suggested, being based on previously elaborated coastal science-policy interface model application at the local level and, particularly, creation of idea and designing of municipal monitoring system for first time in Latvia. Case study research application and coastal governance development recommendations from pilot practice are presented.

Key words: coastal assessment, coastal inhabitants, stakeholders, governance system, collaborative governance,

JEL code: Q20, Q57, Q58

1. Introduction

Understanding and management of coastal zone processes and resources is of great economic and social importance as at least half of the world’s population resides and works within the coastal zone. Integrated coastal management (ICM) embodies governance system capable to manage multiple uses in an integrated way through the cooperation and coordination of involved stakeholders at different levels of authority and of different economic sectors (Ehler, 2003; Ernsteins, 2010; Ernsteins et al., 2011).

System Analysis Framework (SAF) has been elaborated and now is internationally recognized method equipped with a number of tools for better ICM particularly building on public involvement idea (Ostrom, 2009; Hopkins). SAF method has set a basis for research and development (R&D) type of project that has been implemented in a pilot municipality in Latvia with goal to develop locally feasible tools for coastal resources governance within the context of overall municipal sustainable development governance. Before that SAF relevance has been retrospectively tested also in a number of Baltic Sea Region and also three Latvian case studies selected as the best available ICM application records in the region addressing complex coastal problem situation (Jansen et al., 2016). These Latvian cases demonstrated clear orientation towards use of the whole set of collaborative environmental communication instruments that was ultimately recognized as key pre-requisite for adequate ICM process management. (Ernsteins, Lontone-Ievina et al., 2017).

During the EU BONUS programme co-financed international project BaltCoast– „A Systems Approach Framework for Coastal Research and Management in the Baltic“ (2015-2018) research-and-development framework study was conducted in Latvia with goal to develop locally feasible tools

¹ Raimonds.ernsteins@lu.lv

² Erika.lagzdina@lu.lv

³ Anita.lontone-ievina@lu.lv

for coastal resources governance within the context of overall municipal sustainable development governance. SAF was methodologically adapted for particular need of assessment and planning of the local level governance process study and development - Salacgriva municipal coastal governance study and proposals for innovative governance instruments were elaborated (Kudrenickis, 2016, Ernsteins, et al., 2017).

2. Methodological approach

The SAF method set a basis for research and development (R&D) frame type of project that has been implemented in a pilot municipality in Latvia - the Salacgriva coastal municipality. The research activities in the pilot territory were conducted step-wise, accordingly to the needs identified in the iterative process of SAF application and adaptation to the municipal coastal governance case as a social-ecological system (SES), as it has been framed by the overall approach of the BaltCoast project and specified for the University of Latvia as a project partner. The activities implemented by the University of Latvia as one of project partners, were based on a case study research (CSR) methodology utilizing the set of complementary and integrative methods. Identification and mapping of all stakeholders and institutions involved in the coastal governance as well as document studies are both the key SAF elements and it is used to explore local practices that form corestones of further to be used for build governance models.

Coastal SES assessment within a SAF methodology was the first research step that leads to identification of complex coastal issue to be addressed through ICM perspective using SAF tools. Assessment was an iterative multi-step process with different levels of engagement of stakeholders and experts. Each next step enriched information basis and extended understanding of the researcher team and also project beneficiaries from the local community on the coastal issues. Findings supplemented or even modified earlier results/conclusions leading to thought through g higher level generalizations for next SAF steps (coastal system formulation and analysis, etc.) (Lagzdina et al., 2017).

To assess significance of the coast in real activities of the local people (bottom-up governance experience), citizen contribution to the coastal management through project initiatives also were studied. The source of information was publicly available information from the Rural Development Service (state institution supervising implementation of the EU support programme LEADER for rural communities) and local initiative group „Jurkante“ that officially unifies Vidzeme region communities beyond Salacgriva municipality. The criteria for our selection of the relevant projects include the following aspects: activities for protection of coastal resources; equipping coastal small scale infrastructure; activities improving coastal economic development; improvement of services (better access to services) to people to motivate them to live in the coastal territories.

In September 2015 a complex field study was carried out with aim to obtain as much as possible basic information on the coastal situation and its management of the whole Salacgriva municipality, utilizing two main sources: 1) semi-structured deep interviews with local citizens living in close proximity to the coast (coastal strip) thus having immediate personal experience/relation to the coast. Besides, another selections criterion was for them to be active member/opinion leaders of the society (either belonging to some citizen activist groups, or business etc.) and 2) visual observations **and** photodocumentation of the coastal SES elements: nature, infrastructure, human pressures, business activities etc. This significantly enriched material for successive analysis. A total of 19 direct interviews took place in eight different coastal strip locations, incorporating two towns (Salacgriva, Ainazi) and six smaller settlements (villages/communities) along the whole municipal coastal strip

that stretches for 55 km. Though for this step, it was not meant to interview representatives from all stakeholder groups, as primary goal was to find coast-related people, still key local coastal stakeholder groups were covered: NGOs and citizens (7 respondents), educators (3), business (6), public sector (3).

Next consecutive step in the research accordingly SAF, was involvement of stakeholders in discussion on initial findings on situation with the coastal resources and coast as a whole. This took place in stakeholder seminar held in October, 2015 in Salacgriva, the administrative premises of North Vidzeme Biosphere Reserve (NBR). Goal of seminar was to present results from 19 interviews and other studies, and, introduce initial conclusions that stem into expert done document analysis, as well as to encourage local people to identify collaboratively their interests and explore opportunities for coastal resources conservation, protection, use and development. Even widely announced, the seminar was not fully representative as for all groups of the local coastally inhabiting people (a few from each group: businessmen, NGOs, pensioners, educators, NBR staff, and village elders), even those present were actively engaged in discussions lead for necessary summaries to be done. Importantly, that second separate and complementary meeting was organized with municipal administration and that took place some weeks later. It was attended by the municipal council chair, its deputy in development matters, and executive director who is responsible for daily operations of the municipality.

After each step of field studies and stakeholder discussions, research findings were processed by the key researchers and interim harmonized in project expert meetings with relevant and experienced specialists from various environmental management fields.

3. Research results

3.1. Identification and synthesis of coastal problems

System analysis of material from all the mentioned studies (except interviews) there was the long list of coastal issues in rural territories established: 19 specific problem areas were withdrawn as the most typical for the particular coastal territory (Lagzdina et al., 2017). During stakeholder seminar some different angle of issues was revealed, as the most of people complaints related to restrictions for coastal management set by the national regulatory acts (particularly, in the fields of environment, health, construction, and entrepreneurship in the very coastal zone). People were convinced that this is a reason why coastal zone is undermanaged and why pressures from human activities lead to the coastal degradation.

A comparison made for coastal priorities derived from two sources of assessment within SAF Issue Identification step – those from system analysis and those for inhabitants' interviews - demonstrated certain similarities, however different levels of generalization and profoundness of analysis should be considered to judge them (Tab.1). The issue of under population in the coastal zone (close proximity to the sea) clearly stays as most critical cause for a number of other, particularly access, maintenance, and infrastructure problems. Insufficient municipal environmental (coastal) management capacity, complemented with limited coastal information a coastal communication in general, are clearly pointing out to need for more systemic coastal governance as a central problem. Unsustainable coastal resource management at the local municipal level is preventing local development and causing coastal degradation what is threatening sustainability of the coast, its ecosystem and resources.

Priority areas for coastal governance

Coastal priorities as result of system analysis	Coastal priorities based on citizen views
<ul style="list-style-type: none"> → Management of sparsely populated/ low density coastal territories → Overall municipal environmental management capacity → Endangered sustainability of unified coast specific nature and culture heritage that are set as national priority → Coastal communication problems → Sea-based marine litter /littered beach 	<ul style="list-style-type: none"> → Access to the sea and coast (access points in unpopulated places, lack of coastal communication) → Overall municipal environmental management capacity → Insufficient information level of people and institutions and passivity in communication → Access to the coast for people with special needs (access points in unpopulated places) → Biological pollution from rivers to sea → High seasonal pressures /pollution (in unpopulated places) → Management of low density and sparsely populated coastal territories

The most significant issue is lack of appropriate infrastructure to enhance not only economic development and use of coast for various human activities (tourism as one of the most important elements for local coastal economies), but also for environmental purposes – reducing human impacts on fragile coastal ecosystems.

3.2. Bottom-up initiatives on the coast: implementation of LEADER projects

Local initiative group „Jurkante” is the only eligible local (regional) organization that can benefit from the EU LEADER financing as it is established by and unifies interests of wide local stakeholder community. Importantly, this membership organization involves stakeholders from two neighbouring coastal municipalities: Salacgriva and Limbazi. Besides, this membership has to be based on legal entities to meet project requirements. Thus projects are usually submitted by local municipal administration or local registered NGOs. Therefore, conclusions provided further in analysis shall be considered as merely indicative and they do not characterize all, but active part of local society.

Territorial analysis of LEADER results reveals that from a total of funding received for projects during implementation period 2009-2014, only 15 % were spent directly on the coast, 59 % were spent in villages or cities directly in the wider coastal zone. And only 15 % of funds were invested directly for the coastal needs, some 31 % were less directly related to these needs. Here is considerably equal intensity of projects number between local administration and citizen groups in Salacgriva municipality. Eight projects were submitted by the municipal administration, but none of them addressed directly coastal issues. Unlike three local NGOs implemented 16 projects out of whom eight were targeted directly to the coast. The most active of all applicants is NGO Tujaskrasts that acts in one of quite densely populated and attractive for visitor coastal village Tuja.

3.3. Interviews: coastal governance summary clustering

Assessment of answers of the municipal stakeholder representatives living in close proximity to the coast is summarized in five key coastal governance problem clusters. More detailed assessment of these issues and identification of governance solutions basically requests further development of existing results of locally/nationally comparatively innovative collaboration governance between the municipal authority and general public and its interest groups. Albeit, variety of general forms of 'top-down' and 'bottom-up' governance have already been successfully practiced and improved in the Salacgriva municipal practice, and it is believed that they can be used as good example for many other municipalities in Latvia.

1) External restriction in the coastal zone and internal disarray – problem governance (conflict governance). Interviewed citizens mentioned firstly restrictions for coastal management due to

requirements set in the national legislation and, what is even more essential concern, they pointed to the lack of flexibility in attitude of the State Environmental Service (Inspectorate). addressing acute coastal problems or situations of basic development needs. These two obstacles are ones which have been partially blamed for underdeveloped and insufficient coastal infrastructure and high level of littering observed in the coastal dunes, as well as for problems of the coastal accessibility. The access to the coast in some places (particularly in Tuja village and southward it) has been determined by obstacles caused by the private construction, which interlocks spatially the coast. Such construction practice has not been both timely, nor sufficiently regulated and controlled by the local administration. And it has not been properly managed nowadays either, as the current issue of spatial governance. It must be noted that these aggregated factors (in terms of long-term municipal problem governance) impedes development not only of the coastal zone, but also broader coastal territory and municipality as a whole.

2) Insufficient municipal governance capacity – daily management of environmental and coastal issues, as well as insufficient communication with the citizens. As to 'top-down' coastal governance, the stakeholders emphasize that in general their communication with the local administration is good, though not regular, however it lacks environmental and coastal context. In addition, few NGO and business representatives believe that administration's interest, in terms of its capacity in particular, about the coast and its development is superficial, inactive and it is not updated or discussed, nor adequately planned. This particularly applies to the remotendly located rural territories.

3) Insufficient self-governance capacity of the public representation praxis. Public stakeholders lack unified understanding about current coastal problems. Of course, problems in different places quite vary, and their perception by the stakeholders varies as well. The local people do not see coastal problems as outstanding or emergent, thus they do not see need for response. Though there are some exemptions in the attitude. Summarizing pro-active manifestations of public participation in the coastal governance of Salacgriva municipality in terms of 'bottom-up' governance and admitting variety and number of public and stakeholder participation forms and instruments in the municipality, several limiting factors must be recognized. Just to mention the Village elders who are elected by the village people to serve their interests. In general, their activities are not directly targeted neither to environmental, nor coastal issues. Even more, there are identified risks that they represent interests of narrow citizen groups. Interest, though limited, and willingness to deal with environmental and coastal issues has been related with so called consultative bodies (Youth Board and others) having advisory role in communication with the municipal administration. Active participation has been demonstrated by the Fishermen and Anglers Board members. Alike, activities of different citizen stakeholder groups are not targeted to the coast, coastal governance, nor development. Again, there is one exception – NGO Tujaskrasts (Tuja Coast).

4) Lack of coastal development vision and practice. In the context of previously described insufficient capacity of 'top-down' and 'bottom-up' governance, as well as due to the underdeveloped coastal infrastructure, currently it is hardly possible to plan and promote purposefully neither coastal attractiveness by employing possible diverse uses of internal and external resources in their complementarity, from one side, nor at least/to start with short term, seasonal, thematic or other kind of visits to the coast, from the other side. Similarly, it is not possible to implement some of potential municipal development scenarios and use rich and diverse coastal resources in their totality for the municipal territory selectively zoned as 55 km long coastal territory. This means that there is need for promotion of more active cooperation between some of the coastal stakeholders, as well as

between them and different state institutions, primarily, environmental, health, and forestry services, and other sectors at the national and regional governance levels.

5) Networking approach of the coastal municipal governance. Due to insufficient governance capacity of the local administration, a public participation approach, that is not yet well manifested here, has to be suggested as a conceptual potential solution for governance of sparsely populated and remotely situated territories. For that, a municipality has to find governance development solutions, which have to be done selectively, thematically attractively and adapting appropriate instruments. This request employing both the administrative capacity development approach and a coast-targeted public participation approach, which have to be mutually supportive and complementary, thus moving towards collaborative coastal governance practice. Such networking approach of the coastal municipal governance with its focal points in the local administration, and social and business activity centres located along all 55 km of the coast exercising thematical deepness of the coastal issues in their activities, shall be further discussed for developing integrated governance scenario applicable for coastal rural territories.

4. Discussion and conclusions

In most of the rural coastal territories in Latvia local coastal governance is comparatively underdeveloped and limited by lack of main necessary capacities and that result in unsustainable use of the coastal resources, thus preventing local development and causing coastal degradation which remains a threat to sustainability of the resources. It is essential to find ways how to organise coastal governance (the governance process and structure) in the coastal rural territories, which are characterised by a small number of residents and low population density, but a long coastline.

1) Limited capacity of the coastal municipality's administration/planning considerably affects the traditional „top-down“ governance approach realisation as well as its application and efficiency for particular coastal governance process development. The solution should be found in complementary further development of the „bottom-up“ governance models and instruments, and, strengthening the interaction of the „top-down“ and „bottom-up“ governance approaches, in order to extend some existing collaboration governance models and practice, to be also oriented towards coastal governance.

2) Coastal governance problematic in Latvian case has typical drivers and derived responses. Firstly, coastal problem governance, particularly in relation to crisis and risk governance, is strongly driven by the external factors (restrictions) which integrate with internal disarray. Municipal governance capacity in performing daily management of environmental and coastal issues is insufficient. Shortcomings are found also at the societal developments, which lacks self-governance capacity of the public representation praxis. There is overall lack of coastal development vision and practice at all local governance spheres. Experience in partnerships and networking approach for the coastal municipal governance is underdeveloped.

3) New approach for science-policy interface model within ICM in Latvia, being based on such local innovation and design of municipal coastal monitoring and related indicators systems, organizing data from natural and social sciences as for SES approach, as well as citizen science mandatory developments provide a basis for eventually sound rural local coastal governance perspective. Municipal coastal monitoring system proposal includes parameters from monitoring systems of all types of planning documents at all local planning levels. System is composed of indicators and planning supervision parameters, including qualitative indicators.

4) Public monitoring shall constitute a significant part of municipal monitoring system, because ensuring fulfilment of such measurements, for which otherwise data are possible to obtain only as a result of specific monitoring/research. Public involvement is necessary in all monitoring stages, beginning with data obtaining and ending with final monitoring report approval. Collaborative governance can be a crucial factor not only of successful functioning of the monitoring system, but for the functioning of the whole coastal SES governance system.

Acknowledgement

R&D data were collected, elaborated and the whole study done within the framework of the BaltCoast project „A Systems Approach Framework for Coastal Research and Management in the Baltic“ and with financial support of EU BONUS program and related national co-funding. Authors would like to acknowledge all researchers and administrators being involved in the project, but, particularly,

Jānis Kaulins and Krista Ošniece for conducting of related studies.

Bibliography

1. Cepuritis, E., Ulme, J., Graudina-Bombiza, S. (2017). Development of Beach Litter Monitoring on the Latvian Coastline: The Citizen Science Perspective. *Journal of Social Sciences, Regional Formation and Development Studies*. No. 1 (21), pp.7-18.
2. Cuadrado Quesada, G., Klenke, T., Mejía-Ortíz, L.M. (2018). Regulatory Challenges in Realizing Integrated Coastal Management – Lessons from Germany, Costa Rica, Mexico and South Africa. *Sustainability*, No. 10, p. 3772.
3. Ehler, C.N (2003). Indicators to Measure Governance Performance in Integrated Coastal Management. *Ocean & Coastal Management*, Volume 46, pp.335-345.
4. Ernsteins, R. (2010). Sustainable Coastal Development and Management: Collaboration Communication and Governance. Human Resources – the Main Factor of Regional Development. *Journal of Social Sciences*, No.3, pp.247-252.
5. Ernsteins, R., Kaulins, J. et al. (2011). Integrated Coastal Management for Local Municipalities in Latvia: Sustainability Governance and Indicator System. *WIT Transaction*. Volume 149, pp.29-40.
6. Ernsteins, R., Kudrenickis, I., Lontone-Ieviņa, A. et al. (2017). Municipal Sustainable Coastal Governance: Participatory Approaches for System Analysis and for Local Monitoring Development. *WSEAS Transactions on Environment and Development*, Volume 13, pp.276-290.
7. Ernsteins, R., Lontone-Ievina, A. et al. (2017). Integrated Coastal Management Practice Case Studies: Deficiency of Collaboration and Socio-Ecological System Approaches“. Book Series: *Economic Science for Rural Development*. Agriculture University of Latvia, Jelgava, Latvia. Issue 45, pp.63-70.
8. Jansen, H., Ernsteins, R., Stottrup, J., Dinesen, G., Povilanskas, R., (2016). A retrospective analysis of best practice Integrated Coastal Management cases around the Baltic Sea. International conference, 7th European Coastal Lagoons Symposium. Vindicating the biological and socioeconomical importance of transitional waters, Thesis compendium, Spain, Murcia.
9. Hopkins, S., Bailly, D. et al. (2012). A Systems Approach Framework for the Transition to Sustainable Development: Potential Value Based on Coastal Experiments. *Ecology and Society*, Volume 17, Issue 3, p.39.
10. Kalpakis, V. et.al. (2019). An integrated coastal zone observatory at municipal level: the case of Kavala Municipality, NE Greece. *Journal of Coastal Conservation*, Volume 23, pp.149-162.
11. Kaulins, J., Ernsteins, R., Kudrenickis, I. (2017). Indicator systems for municipal sustainable development governance: prerequisites for design and implementation. *Ecosystems and Sustainable Development XI*. WIT Transactions on Ecology and The Environment, Volume 214, pp.35-45.
12. Lagzdina, E., Kudrenickis, I., Ernsteins R., et.al. (2017). Coastal Sustainable Development Studies in Latvia: Integrated Local Social-Ecological Systems Governance. *Regional Formation and Development Studies*, Volume 1, Issue 21, pp.83-96.
13. Lapinskis, J. (2017). Coastal Sediment Balance in the Eastern Part of the Gulf of Riga (2005-2016). *Journal Baltica*, Volume 30, Issue 2, pp.87-95.
14. Ostrom, E. (2009). A General Framework for Analysing Sustainability of Social-Ecological Systems. *Science*, No. 325, pp.419-422.
15. Schernewski, G., Schönwald, S., Kataržyte, M. (2014). Application and evaluation of an indicator set to measure and promote sustainable development in coastal areas. *Ocean & Coastal Management*, Volume 101, pp.2-13.
16. Schumacher, J., Schernewski, G. Bielecka, M. et al. (2018). Methodologies to support coastal management – A stakeholder preference and planning tool and its application. *Marine Policy*, Volume 94, pp.150-157.

17. Ulme J., Graudina-Bombiza, S., Ernsteins, R. (2017). *Beach Marine Litter Monitoring: Citizen Science Data Series for Coastal Monitoring Development and Governance in Latvia*. Vienna GREEN Conference Proceedings, Volume 17, Issue 33, pp.91-102.
18. H. Jansen, R. Ernsteins, et al., „A retrospective analysis of best practice Integrated Coastal Management cases around the Baltic Sea,” in European Coastal Lagoons Symposium. Abstracts Book. Marcos C., Perez-Ruzafa A., Perez-Marcos M., (eds.), Compobell, Murcia: pp. 212, 2016.

INTERACTION OF EDUCATION, SCIENCE AND BUSINESS IN TERMS OF DIGITAL ECONOMY DEVELOPMENT

Vladimir V. Klimuk¹, Associate professor Ph.D.; Andrejs Lazdins², Assistant professor Dr.oec.
¹Baranovich State University; ²Latvia University of Life Sciences and Technologies

Abstract. The normative basis for the regulation of effective relationships between the educational, scientific and business sectors is presented. Based on statistical data, the dynamics of the development of the innovation infrastructure in the Republic of Belarus is analyzed and shows the need for change in collaboration between universities and business structures, development it. The university development models „University 3.0” are described which demonstrates the need for university-business collaboration. The indicators of the development of the innovation environment in the Republic of Belarus are analyzed. University cooperation should take place the east as well the west direction. The aim to analyse experience of the collaboration models of education and business in the context of efficiency and quality. Research tasks: to collect information on theoretical aspects on experience of collaboration model; to describe and explain the role and perspective of the model of universities-business cooperation. Experience, literature and internet source content analysis. Selected data were processed and interpreted applying statistical data processing and interpretation methods as well as matrix structuring, index approach and method of synergy. The goal has been achieved and the tasks are fulfilled.

Key words: sustainable development, digital economy, business incubator, „University 3.0”.

JEL code: O31.

Introduction

The effectiveness of the scientific, innovative project is determined by the synergy between the participants, which allows maximizing the planned result, compared with the sole, separate work.

Research goal – to analyse experience of the collaboration models of education and business in the context of efficiency and quality. **Research tasks:** 1. to collect information on theoretical aspects on experience of collaboration model. 2. to describe and explain the role and perspective of the model of universities-business cooperation. **Research methods:** for analysis and evaluation methods were used content analysis of literature and internet sources was performed to prepare the research paper. The selected data were processed and interpreted applying statistical data processing and interpretation methods as well as matrix structuring, index approach and synergistic method. **Research innovation:** analysis of an innovative collaborative model between universities and business structures.

The effectiveness of the functioning of organizations, considering the growing competition within the country, as well as from abroad, is determined by the conditions and actions taken in the direction of cooperation. By combining certain types of resources of partner organizations, the aim is to strengthen competitive positions and achieve synergies from cooperation, in contrast to the possible result of individual work.

The current stage of development of society is based on innovations in each of the spheres of life and sectors of the economy. The leading role in the socio-economic development of the country based on the intensification of innovation processes should be taken by educational and scientific organizations. The university needs to develop innovative, creative, entrepreneurial initiatives for young people, to form relevant professional competencies. And the main principle in this process is the principle of „the utility of labor” - any ongoing activity should be in demand, useful, otherwise the invested funds are unjustified. The university is gradually transformed into an innovative scientific and educational economic center, which allows to train a highly qualified specialists, create an innovative scientific and technical development, incorporating it into practical areas of the country's economy.

Researcher Neborsky E.V. based on a compilation of scientific materials, was determined four formats of the university models. Format 1.0 "Corporate University" - the first European universities, organized as corporations of students and teachers, whose external referent was culture. Format 2.0 „Research University” - various forms of university life organization, such as the „Intellectual University” by J. Newman, the „Research University” by V. Humboldt and later the „University of Culture” by H. Ortega i Gasset, united by the idea of „Pure Science” and „Universal Knowledge”. Format 3.0 "Technocratic (innovation) University" - a complex of education, science and business, which is a "Multiversity" K. Kerr control mechanisms similar factory-production. Format 4.0 „Biocomputer University” is a promising model of universities that combine physical and virtual space, developing on digital platforms. As the external factor is creativity that the educational process is based on meta-individuality and smart technologies (Neborsky, E. V., 2017).

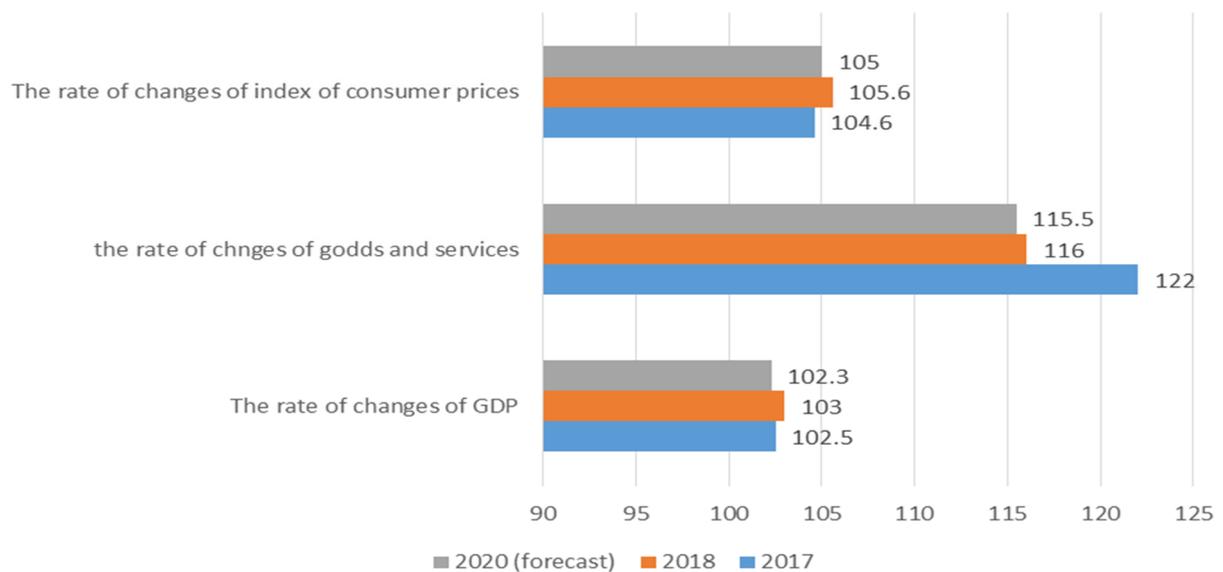
Kuznetsov E. B., Engovatova A. A. in their work, a modern university is defined as „a resource base for ensuring synergy of convergence of types of activity” and presents an assessment of the contribution of universities to the development of the economy, which exceeds the economic effect of individual industries. Scientists also identify 4 models of university development according to their main purpose: educational "University 1.0", educational and research "University 2.0", educational, research and technology transfer function "University 3.0", educational, research, technology transfer and future knowledge provider function „University 4.0” (Kuznetsov E. B., Engovatova A. A., 2016).

Callas M.S. in his study emphasizes the existing problems of „uneven distribution among partners, the pinpoint nature of interaction with enterprises, which lessens effective triangular cooperation” (Callas M. S., 2011).

The issues of interaction of educational, scientific, business organizations are considered in the context of the cluster approach. Anissyna N. N. explains as a structure for stimulating innovation in the university, an innovation cluster is defined, which „... should be viewed as a network of enterprises in the real sector of the economy interrelated in innovation activity and organizations generating new knowledge: universities, research centers, technology transfer structures and business associations” (Anissyna N. N., 2010). Scientists emphasizes the formation of the cluster is on the scientific and educational functions based. A cluster is a network organization of complementary, geographically interrelated relations of cooperation between enterprises and organizations (including specialized suppliers of goods and services, as well as producers and buyers), united around a research and educational center, which is connected by partnership relations with local institutions and authorities to increase competitiveness of enterprises, regions and national economy " (Jaseva G. A., 2008).

One of the main ones in the process of coordinating the functioning of the socio-economic system is the authorities, which must prepare a stable and operatively adaptable institutional base for the development in the country (region). Some researchers consider interaction as a network of participants using shared resource capabilities to achieve a common goal - the creation of an innovative product (service). In order to improve the efficiency of integration processes in the field of education, science and business, Makoveeva V.V. stressed the need to form network structures with the functions of "interaction, integration and organization of institutions" (Makoveeva V. V., 2011). The advantages of creating a network are the speed of adaptation to changing conditions, the concentration of activities of network participants on their core competencies, the optimisation of production and sales costs, the use of a joint resource base.

The direction of effective interaction is also reflected in one of the 17 sustainable development goals of the Republic of Belarus „Partnership for Sustainable Development“, included in the Sustainable Development Agenda until 2030 (Agenda - 2030). This goal aims to strengthen global partnerships to promote and achieve ambitious goals by providing knowledge, experience, technology and financial resources (Basic Message (summary)..., 2017). Within the goal, several indicators have been identified, the dynamics of which determines the degree of effectiveness of the implementation of the country's sustainable development strategy (Fig. 1).

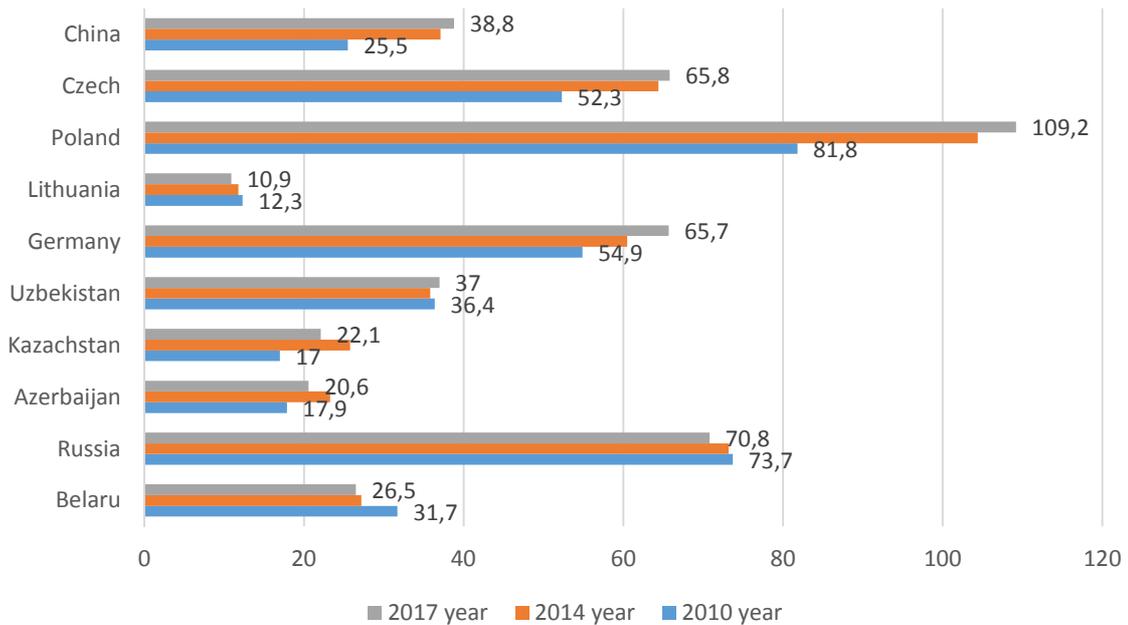


Source: author calculations based on Statistical Yearbook of the Republic of Belarus, 2018

Fig. 1. The rate of change of indicators of the sustainable development goal of the Republic of Belarus „Partnership for Sustainable Development“, %

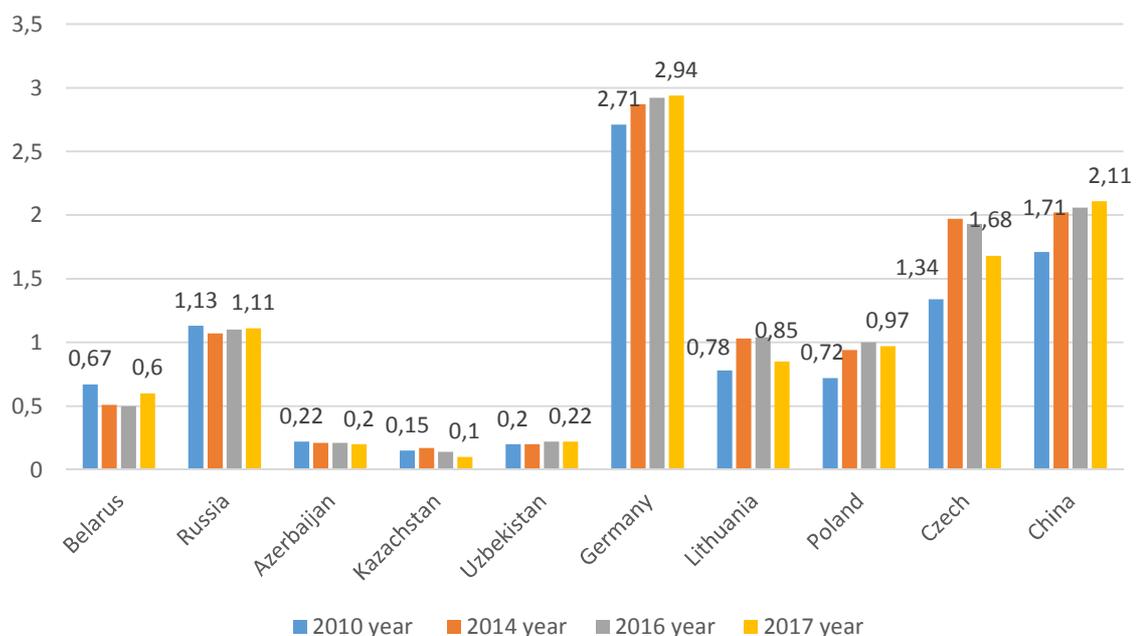
The top management of countries emphasizes undoubted role of science in the cooperation with the real sector. The President of the Republic of Belarus, Alexander G. Lukashenko, during the 2nd Congress of Scientists of the Republic of Belarus noted the urgent need for interaction between science, education and business, emphasizing the leading role of industry: „After all, industry is the core of all innovations.

There are No countries with strong science and weak industry. And vice versa „... the industry, in conjunction with science and the education system, must solve several main issues dictated by time: to determine the directions of diversification and modernization of production - from the examination of new technologies and equipment to participation in the creation and putting them into operation. New modern plants should be built, based on scientific basis. To ensure systematic work in the field of assessing the reliability and quality of products at all stages - from its design to production“ (Lukashenko A G., 2018). The role of science in the development of the modern economy is significantly increasing, which is also expressed in the volume of innovative products produced, the export of high-tech products, and research costs (Fig. 2-3). The country's top leadership defines the scientific component as one of the leading tools in the development of a modern socio-economic system and building a new model — an innovative economy based on the interaction of functional units — education, science and business.



Source: author calculations based on Statistical Yearbook of the Republic of Belarus, 2018

Fig. 2. The number of people employed in research and development, thousand people



Source: author calculations based on Statistical Yearbook of the Republic of Belarus, 2018

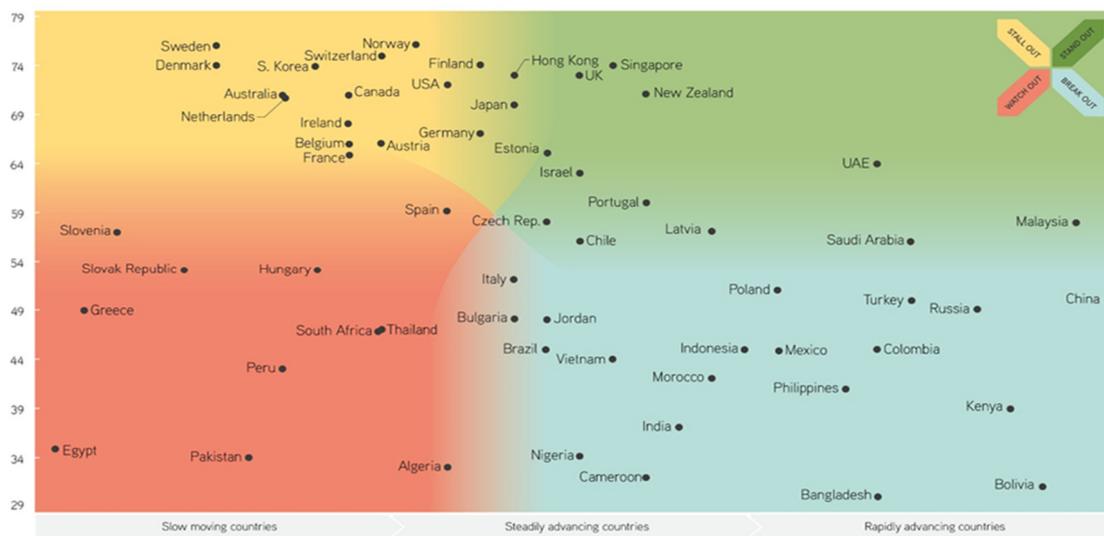
Fig. 3. Domestic expenditures on research and development in the country, in % of GDP

Research results and discussion

At the meeting of the Council on Science and Education on the issues of global competitiveness of Russian science, the President of the Russian Federation Vladimir V. Putin noted that „the interaction of science and business should be a key condition for the implementation of the program „Digital Economy“.

Vladimir Putin stressed the need to develop own research infrastructure in the country, emphasized the need to form powerful international research groups in Russia, to develop scientific cooperation with other countries and to increase the openness of native science, to expand interaction with other countries in science and to form powerful international research centers in the country (Putin V., 2018).

The current research was conducted by the experts of the School of Law and Diplomacy named after Fletcher at Tufts University in collaboration with Mastercard to assess the development of the digital economy in a country context (Fig. 4).



Source: author calculations on 60 Countries' Digital Competitiveness, Indexed

Fig. 4. Evaluation of the development of digital economy in a country context

Russia is in a promising group of countries, characterized by the intensifying (based on 2008–2015 data) of a general level of „digitalization“, a transitional stage to a group of leading countries (Norway, Sweden, Switzerland, Denmark, Finland, Singapore, South Korea, the United Kingdom, Hong Kong, USA).

The creation of new, informational productions that meet the demands of society and enable them to participate in the global competitive struggle forces industry organizations to cooperate (60 Countries' Digital Competitiveness, Indexed, 2017).

Often there is No direct, not formal, interaction, although everyone has an interest in the success of the project. Some participants of the process adhere to the position of receiving returns only at one stage, without considering the need for productive completion of the whole complex of operations: from the generation of an idea to its mass use in practical areas.

The origin of an idea is, as a rule, not a spontaneous decision, but a form of expression of an urgent need (The most digital countries in the world, 2017).

The emerged idea of improving an area, the components of which is updated by a detailed analysis of market conditions in order to assess the level of demand, the potential supply of the idea's originality, its scale and, directly, the social and economic benefits of implementation (Klimuk, V. V., Semashko M. Y., 2018).

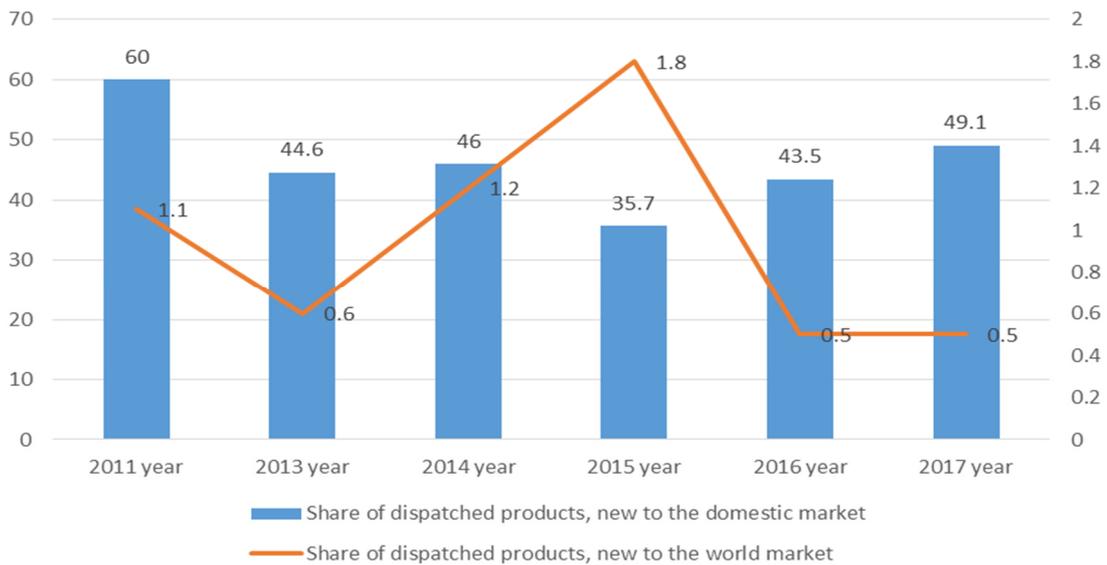
The conducted analysis of the economic basis, confirmed by the organizational and technical analysis of profitability, allows us to create an innovative development. It is important to consider not only own resources, but necessarily the potential cooperation (intellectual, material and technical, financial).

The resulting sample (prototype) of innovation must necessarily pass the test sale stage in order to get feedback from customers.

The success of the previous stage is well-grounded decision of mass production with components of innovation promotion for the real sector of the economy, ensuring satisfaction of needs and improving the quality of life of the population, the level of scientific and technological development of organizations, regions, and the country. As a result, the integrated structure (educational,

scientific, business sectors) forms a synergetic effect that differs from the total result of separate work of each component of the system. However, a synergistic effect is possible only if the condition of innovative product or service is observed.

Growth in the share of innovative products indicates an effective state policy of industrialization, modernization of industrial production, the cost of research and development (Fig. 5).



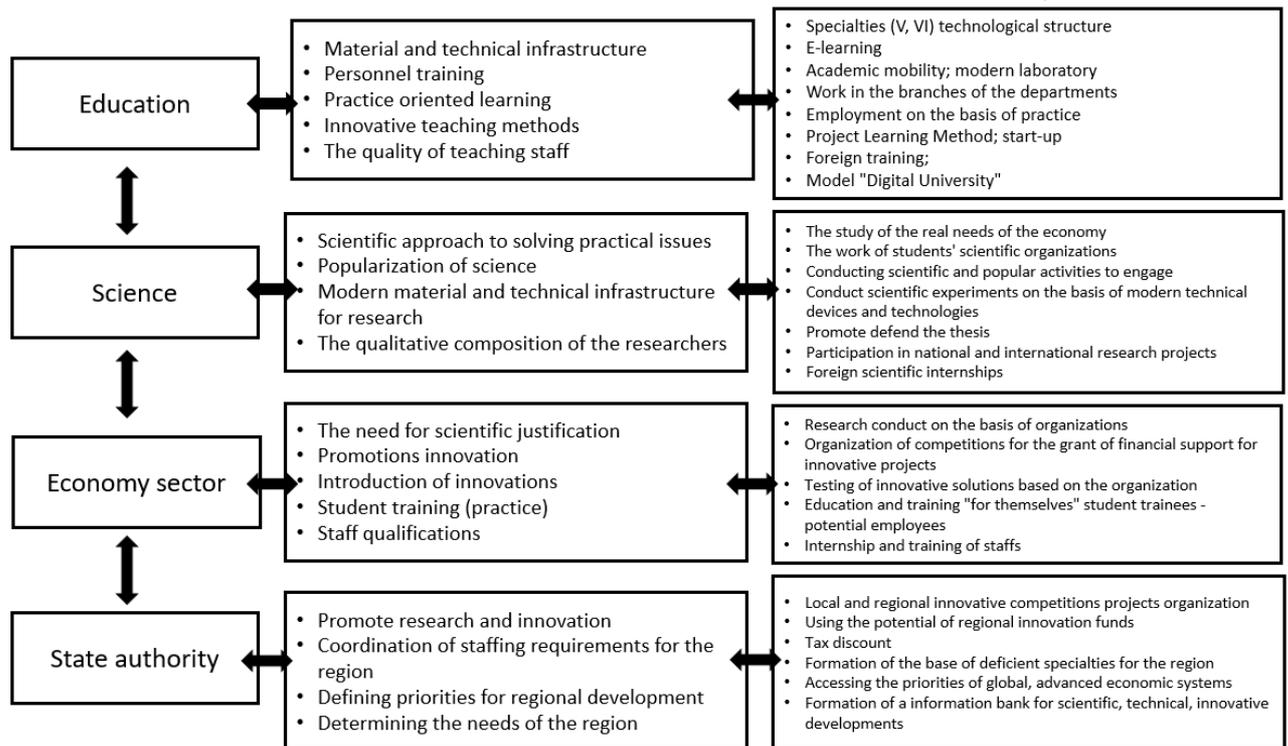
Source: author calculations based on *Statistical Yearbook of the Republic of Belarus, 2018*

Fig. 5. The share of dispatched industrial products, new to the domestic market and new to the world market, respectively %

The presented algorithm for implementing an innovative solution must be accompanied using mechanisms for effective interaction. One of them is the model of business-incubation. The goal of business incubator is the creation, testing and market access for new firm producing goods (as a rule the original one). Customers focus on the current market on innovative products; therefore, the business incubator must meet this criterion. This model corresponds to the implementation of the concept of "University 3.0" - a modern entrepreneurial university based on the integration of the educational, scientific and business environment.

There are 4 formats of the university model, formed at different historical stages. Format 1.0 "Corporate University" - the first European universities, organized as corporations of students and teachers, whose external referent was culture. Format 2.0 „Research University” - various forms of university life organization, such as the „Intellectual University” by J. Newman, the „Research University” by V. Humboldt and later the „University of Culture” by H. Ortega -Gasset, united by the idea of „pure science "and" universal knowledge. Their external referent was the truth. Format 3.0 "technocratic (innovative) university" is a complex set of education, science and business, which is K. Kerr's "multiversity" with control mechanisms like factories-manufactures. The external referent is quality, and the university is increasingly immersed in bureaucracy and accountability. Format 4.0 „Biodigital University” is a promising model of universities that combine physical and virtual space, developing on digital platforms. The external referent is creativity, when the educational process is based on meta-individuality and smart technologies (Neborsky, E. V., 2017).

Thus, an effective cooperation model for achieving mutual economic effect should be formed based on an educational, scientific, business component with the obligatory participation of the authorities in coordinating and managing the relationship processes. The author suggests an interaction model with a description of the activities of each component and the results of their successful implementation (Fig. 6).



Source: the authors developed a model

Fig. 6. A four-force model for cooperation in education, science, economics and State authority

Conclusions, proposals, recommendations

- 1) The Innovation development of the country are insufficient of the lack of cooperation between universities and real economy. Universities prepare specialists which are not requested from employers which not specialties with specific knowledge.
- 2) Synergistic effect is possible only in the case of direct interaction between the sectors of education, science and business, which is expressed in the creation of a market demand, competitive with world manufacturers, unique, as a rule, high-tech goods.
- 3) As an effective model for the development of cooperation between educational institutions, scientific organizations, and business structures, a model of an innovative, entrepreneurial university called „University 3.0“ has been defined. Considering the experience and evaluation of strategic plans, we consider reasonable the transition to building a model of „University 4.0“ based on the development of digital technologies in the implemented activities of the university (educational activities, scientific activities, international cooperation, entrepreneurial initiatives).
- 4) The development of this model "University 3.0" should be the transformation into an innovative, scientific, industrial and technological, what can be entrepreneurial cluster forming process of satisfying all requests at each stage and in each component of the interconnected chain. The creation of such a cluster seems appropriate for differentiation by specialization (engineering, medical, educational, etc.) and regionalization.
- 5) Interdisciplinary research should be the priority type of scientific, innovative activity of universities ensuring an increase in the efficiency of functioning of the object under study through the cooperation of specific intellectual specialists (knowledge of professionals) and the resource bases - enterprise (conducting experiments on modern, powerful equipment of other organizations).
- 6) The growth in expenditures on research and development, the number of scientific personnel engaged in research indicates an increase in the indicators of innovative activity of the country, an increase in the rating of its positions in the global innovation index.

Bibliography

1. Anissyna, N. N. (2010). Innovaci nauko-obrazovatelni klaster kak sposob organizacii innovacionni dejatelnosti v VUZe/Kreativnaja ekonomika (Innovative research and education cluster as a way of organizing innovation activities at the university/creative economy). No. 4. 2010. Retrieved: <https://creativeconomy.ru/lib/4133>. Access: 30.01.2019.
2. 60 Countries' Digital Competitiveness Indexed (2017). Retrieved: <https://hbr.org/2017/07/60-countries-digital-competitiveness-indexed>. Access: 30.01.2019.
3. Kallas, M.S. (2011). Vzaimodeistvie nauki, obrarozovanija i biznesa kak osnova formirovanija innovacii sredi v Rossii (The interaction of science, education and business as the basis for the formation of the innovation environment in Russia). Вестник Томского государственного университета. Serija: „Ekonomika i pravo“ 2011; No. 4, (16). p. 186-191.
4. Klimuk, V. V., Semashko, M. Y. (2018). Innovatization of industrial business in the direction of integration with education and science/Economic trends. Retrieved: http://ej.barsu.by/download/1//3_7.pdf. Access: 28.02.2019.
5. Kuznetsov, E. B., Engovatova, A. A. (2016). „Universiteti 4.0“: tocki rosta ekonomiki znanii v Rossii („Universities 4.0“: points of growth of the knowledge economy in Russia). Innovacii 2016; No. 5, (211). p. 3-9.
6. Jaseva, G. A. (2008). Klasternaja koncepcija innovacionnovo razvitija ekonomiki: obosnovanie i mehanizm realizacii (Cluster concept of innovative development of the economy: the rationale and mechanism for implementation). Vestnik RUDN. Serija: „Ekonomika“ 2008; No. 4, p. 63-67.
7. Makoveeva, V. V. (2011). Setevoe vzaimodeistvie – klucboi faktor razvitija integracii obrazovanija (Networking is a key factor in the development of education integration). Nauka i biznesa 2011; p. 163-166.
8. Neborsky, E. V., (2017). Rekonstruirovanie modeli universiteta: perehod na formu 4.0 (Reconstruction of the university model: transition to the 4.0 format). Retrieved: <https://mir-nauki.com/PDF/26PDMN417.pdf>. Access: 28.02.2019.
9. Samie cifrovie straini mira (The most digital countries in the world) (2017). Retrieved: <https://hbr-russia.ru/innovatsii/trendy/p23271>. Access:30.01.2019.
10. Lukashenko, A G. (2018). The first direction of development of science - in conjunction with the production. Retrieved: <https://www.sb.by/articles/lukashenko-pervoe-napravlenie-razvitiya-nauki-v-soedinenii-s-proizvodstvom.html>. Access: 30.01.2019.
11. Osnovnie soobscenie (rezume) dobrovolnogo nacionalnogo doklada Respubliki Belarus ob osuscestvlenii novestki dna v oblasti ustoiciviva razvitija na period do 2030 goda (THE MAIN MESSAGE (SUMMARY) OF THE VOLUNTARY NATIONAL REPORT OF THE REPUBLIC OF BELARUS ON THE IMPLEMENTATION OF THE AGENDA FOR SUSTAINABLE DEVELOPMENT FOR THE PERIOD UP TO 2030). (2017). Retrieved: <https://sustainabledevelopment.un.org/memberstates/belarus>. Access: 02.02.2019.
12. Putin, V. V., (2018). Putin zajavil o neobhodimosti nacelitsja na prorivnie proekti v nauke (Announced the need to target breakthrough projects in science). Retrieved: <https://tass.ru/nauka/4940938>. Access: 30.01.2019.
13. *Statistical Yearbook of the Republic of Belarus, 2018* (2018). Retrieved: http://www.belstat.gov.by/en/ofitsialnaya-statistika/publications/statistical-publications-data-books-bulletins/public_compilation/index_12543/ Access: 30.01.2019.

ALTERNATIVE WAYS OF FOAMED POLYSTYRENE RECYCLING USING INSECTS AS AN ELEMENT OF SUSTAINABLE DEVELOPMENT

Olga Kosewska¹, inż; Agnieszka Kosewska¹, dr hab.; Sebastian Przemieniecki¹, dr inż. and Stanisław Sienkiewicz², prof. dr hab.

¹Department of Entomology, Phytopathology and Molecular Diagnostics, University of Warmia and Mazury in Olsztyn, Prawochenskiego 17, 10-720, Olsztyn, Poland; ²Department of Agricultural Chemistry and Environmental Protection, University of Warmia and Mazury in Olsztyn, Oczapowskiego 8, 10-744, Olsztyn, Poland

Abstract. Pursuant to the principles of sustainable development, so as not to diminish the chances of living on our planet for future generations, special attention should be paid to certain aspects of our economy, including waste management. This paper presents an alternative way of recycling Styrofoam, by employing larvae of one of the common warehouse pests, the mealworm beetle (*Tenebrio molitor* L.). The aims of the research were to assess the biometric and enzymatic parameters of *T. molitor* larvae fed on Styrofoam, and to evaluate their possible use to decompose polystyrene waste. The experiment consisted of maintaining larvae for 10 weeks on nutrient substrates composed of foamed polystyrene (the control substrate was composed of oatmeal flakes). During the experiment, the mass of insects and the mass of ingested substrate were controlled. On the termination of the culture, digestive tracts of larvae from each replication was dissected to determine the enzymatic activity of the digestive system cells. To the biochemical analyses were made using the API® type assays. It has been demonstrated that owing to the enzymatic activity of the larval digestive tract and that of the gut microflora, mealworm larvae were able to digest waste slow to biodegrade, including polystyrene. A solution has been proposed, where providing suitable conditions it will be possible to use mealworm larvae to utilise polystyrene waste.

Key words: biodegradation, Styrofoam, mealworm, sustainable development.

JEL code: O31

Introduction

The economic growth in many countries across the world, beside supporting the improved quality of life and stimulating enormous consumption, gives rise to an increasing problem of how to manage the waste generated by man. Waste has a direct impact on all compartments of the environment, i.e. air, water, and soil, often causing their degradation or devastation (Juda-Rezler, Manczarski, 2010). Plastic waste poses a particularly grave problem due to its long degradation period. The rather inefficient recycling of plastics nowadays means that huge amounts of this waste persist in the environment, polluting water or soil. The hydrosphere is penetrated by around 10 % of all produced plastics (Thompson et al., 2009), of which a large share ends up in the marine environment (Jambeck et al., 2015). Polystyrene is one of the most widely made synthetic polymers. It has many uses, e.g. for insulation or packaging. Around 35 million tonnes of Styrofoam is produced annually, and this amount increases by an average of 5 % each year (Baker, 2018).

According to the principles of sustainable development, which assumes that, irrespective of human activities, the Earth's resources should be preserved for future generations and our planet must not be damaged, new waste management technologies and plans ought to be designed. There are many ways in which waste can be managed, for example it can be stored, recovered and recycled, thermally neutralised via pyrolysis or incineration, etc. (Zebek, 2018). However, there are alternative approaches, less known yet highly innovative, e.g. a technology where living organisms are employed to decompose waste (Yang et al., 2014; Yang et al., 2015). For instance, some insects are capable of utilising synthetic material waste owing to the microorganisms they retain in their digestive tract that aid the digestion of such unusual food as plastics (Bombelli et al., 2017). Examples of such insects are mealworm beetle (*Tenebrio molitor* L.), caterpillar of honeycomb moth (*Galleria*

¹ Corresponding author: Agnieszka Kosewska, e-mail: a.kosewska@uwm.edu.pl

mellonella L.), indianmeal moth (*Plodia interpunctella* Hübner) and morio worms (*Zophobas morio* Fabricius) (Ritter, 2017; Pelley, 2014).

Mealworm beetle (*Tenebrio molitor*) is a dark-brown beetle, with the body length of 15 mm, which belongs to the darkling family (Tenebrionidae). It is a pest of cereals and cereal products, and in the natural environment it can be found in bird nests and under tree bark (Nawrot, 2001). This insect, owing to its high protein content, can be used as feed for animals (Ramos-Elorduy et al., 2002; Weiner et al., 2018) and as an alternative source of protein for humans (Siemianowska et al., 2013; Fialkowski 2016). Larvae of mealworm beetle, just like the adult form, mostly forage on cereal products, but are also capable of surviving on a diet composed of synthetic materials, e.g. Styrofoam, which they can decompose into biodegradable components (Drahl, 2015). The first step of this process consists of the fragmentation of Styrofoam by larvae chewing it, which increases the proper surface area of the material and improves the contact of this material with enzymes and microorganisms dwelling in the insect's digestive system. Once Styrofoam and intestinal microbiota mix, enzymes produced by the intestinal microorganisms and the ones produced by larvae are secreted. Thus, a reaction leading to the decomposition of foamed polystyrene under the influence of enzymes occurs, as a result of which small-molecular fragments are obtained. The energy generated from the decomposition of polystyrene foam is used by larvae for their living processes. During the reaction of Styrofoam decomposition, apart from the energy which powers larval living processes, carbon dioxide and undigested molecules are produced, with the latter being excreted by larvae as faeces (Yang et al., 2015).

The purpose of this research has been to assess the biometric and enzymatic parameters of mealworm larvae fed on Styrofoam, and to evaluate their possible use to decompose polystyrene waste with a long biodegradation time.

Material and methods

Larvae of the mealworm beetle originating from the culture maintained at the Department of Entomology, Phytopathology and Molecular Diagnostics of the University of Warmia and Mazury in Olsztyn, Poland, were used for the experiment. 100 larvae at the same developmental stage were selected and transferred to previously prepared substrates composed of comminuted Styrofoam (5 g in a 1 dm³ container) and oatmeal flakes (20 g in a 1 dm³ container) as the control substrate. In order to ensure an additional source of nitrogen, the tested substrates were enriched with about 1 % (relative to the mass of the substrate) of dried distillers' grains with solubles (DDGS), a by-product of bioethanol production. The experiment was conducted in three replicates (4 variants x 3 replications x 100 larvae). The mealworm larvae remained on the substrates for 10 weeks. Every 14 days, the mass of the substrates and the weight of larvae were measured. Following the biometric analysis of the larvae, the microbiota dwelling in their digestive system was analysed. Approximately 50 g of digestive tracts of larvae from each replication was prepared to determine the enzymatic activity of the digestive system cells, employing to this aim the biochemical assays types API 20 NE and API 20 E by Biomerieux, according to the manufacturer's instructions attached to the assays.

Research results and discussion

1. Biometric analysis

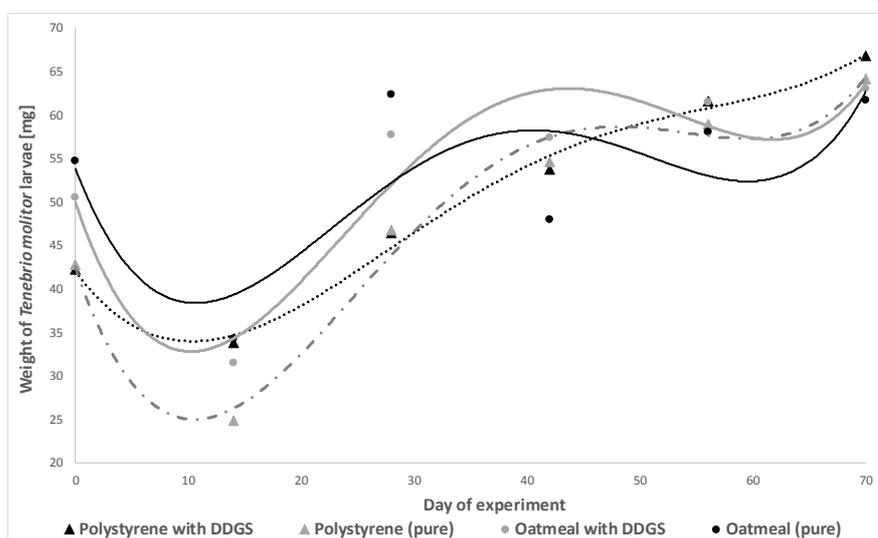
The biometric analysis of the mealworm beetle larvae lasting for 70 days revealed an increase in the average weight of larvae fed either type of a diet (Styrofoam or oatmeal) (Table 1). It was also observed that the average weight of larvae was higher when the substrate had been enriched with DDGS as a source of nitrogen.

Average weight [in mg] 1 larva of *Tenebrio molitor* at the onset and termination of the experiment

Day of experiment	Polystyrene		Oatmeal	
	Pure	(+) DDGS	Pure	(+) DDGS
1	42.81	42.24	54.78	50.60
70	64.15	66.84	61.72	63.08

Source: author's calculations based on the experimental data

An analysis of the measurements taken revealed a specific trend. Irrespective of the applied diet, the mass of larvae decreased until around the 10th day of culture. Afterwards, there was a distinct increase in the mass until the 40th day of the experiment. Subsequently, the cycle repeated in 3 of the 4 tested variants (oatmeal with DDGS and oatmeal without DDGS as well as Styrofoam without added DDGS). The average weight of one insect decreased for about 15 days, after which it increased above the weight gained before the decrease phase. In the variant of Styrofoam with added DDGS, a second decrease in the average mass of the body of a larvae was not observed (Figure 1).



Source: author's calculations based on the experimental data

Fig. 1. Trend in changes of the weight of 1 mealworm larva during the experiment

While analysing the effect of an external source of nitrogen in the form of added DDGS, it was noticed that the additive had a positive influence on the weight of a single insect regardless of the diet. Loss of the weight of larvae fed Styrofoam with added DDGS was smaller and characterised by smaller fluctuations than among the larvae given pure Styrofoam without DDGS (Figure 1).

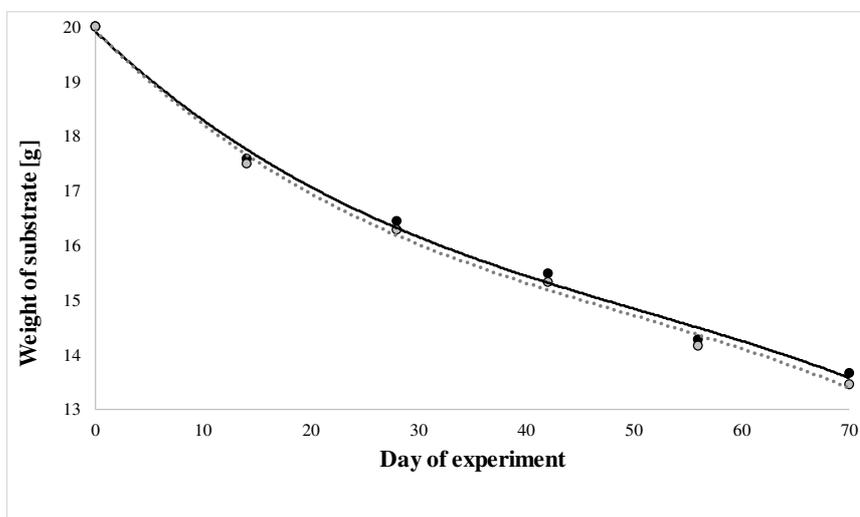
After 10 weeks, the mass of each tested substrate was found to have decreased (Table 2), suggesting that it had been ingested by the insects. The biggest decrease was noted in the control variant, with the substrate composed of oatmeal, which is a typical food for mealworms (31.7 % - pure oatmeal, 32.7 % -oatmeal with added DDGS). The mass of Styrofoam given to larvae as food also decreased, albeit to a lesser extent, i.e. by 12-13 %. Of the two Styrofoam substrates tested, a greater decrease in the weight was observed for the substrate enriched with DDGS. On the termination of the experiment, the mass decrease was as high as 13.2 %. Yang et al. (2018) maintain that an addition of nitrogen can even double the amount of degraded Styrofoam. Under more suitable culture conditions (lower temperature and higher humidity), the initial mass of Styrofoam can decrease by as much as 31 % (Yang et al., 2015).

Mass of a nutrient substrate [in g] at the beginning and end of the experiment

Day of experiment	Polystyrene		Oatmeal	
	Pure	(+) DDGS	Pure	(+) DDGS
1	5.00	5.00	20.00	20.00
70	4.39	4.34	13.67	13.47

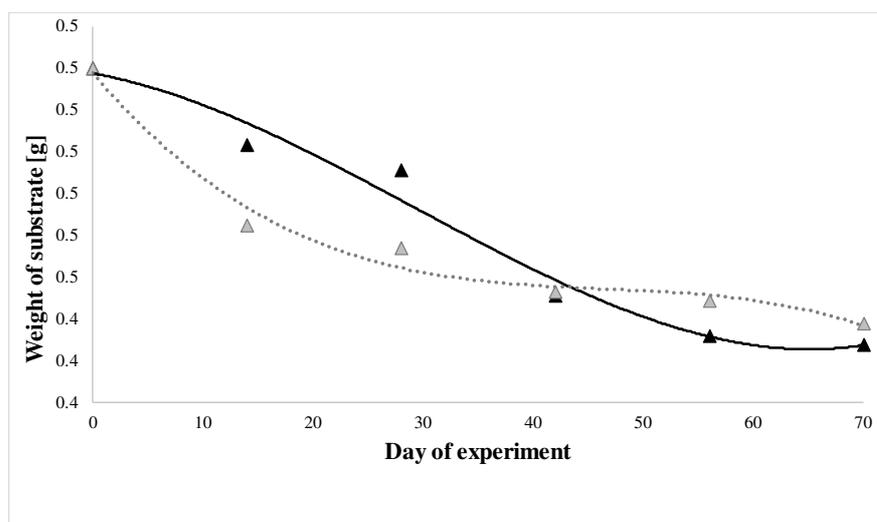
Source: author's calculations based on the experimental data

The highest decrease in the mass of oatmeal was noticed after 14 days (the first measurements), where it reached 2.42 g for oatmeal with DDGS and 2.51 g for pure oatmeal. During the consecutive measurements, made at two-week intervals, the noted losses of the mass of nutrient substrates were similar, 1 g on average for both oatmeal with DDGS and pure oatmeal. Based on the plotted trend lines, a steady decrease in the mass of the substrate was identified in both combinations with oatmeal (with and without DDGS) (Figure 2).



Source: author's calculations based on the experimental data

Fig. 2. Trend in the loss of weight of oatmeal substrates during the experiment (black points – with DDGS, grey – without DDGS)



Source: author's calculations based on the experimental data

Fig. 3. Trend in the loss of weight of Styrofoam substrates during the experiment (black points – with DDGS, grey – without DDGS)

Losses in the weight of Styrofoam as a substrate could also be observed during the experiment. On average, there was 9.3 mg less of Styrofoam daily. The addition of DDGS effected a regular decrease in the weight of the substrate throughout the experiment, which in the other variant using the Styrofoam substrate lacking DDGS was inhibited after about 50 days (Figure 3).

2. Biochemical analysis

The level of enzymatic activity to a large extent depends on a diet (Howis, 2012). Regardless of the type of food supplied to the larvae, their enzymatic activity was confirmed, which implicates that microbiota of mealworm larvae could be employed for the sake of recycling synthetic material waste (Table 3). Enzymes are secreted by both larvae and their digestive tract microorganisms, and the combined activity of the released enzymes generates better effects as regards digestion of waste (Kosewska, 2018). Our analysis of the current results revealed that a higher enzymatic activity in the digestive tracts appeared in larvae fed Styrofoam than in the ones receiving oatmeal (Table 3). This may indicate the high adaptability of *Tenebrio molitor* and rapid multiplication of the gut microorganisms, which supported the digestion of the food that is not typical for mealworm. The results implicate the multitude of processes which are run in order to enable Styrofoam decomposition. The more processes there are, the better a given food is digested by larvae and their intestinal microorganisms. However, the absence of any disturbances in enzymatic processes and even their improved efficiency are suggestive of the digestive system's homeostasis being maintained in a situation when larvae are fed synthetic material. Our comparison of the diets showed a much lower enzymatic activity of the digestive tracts of larvae receiving oatmeal, which testifies to a lower biodiversity of their microbiota, as the source of food did not present any special requirements regarding its decomposition. The highest activity was noted in the tests of the activity of β -glucosidase and fermentation-oxidation of amygdalin. High activity was also demonstrated in the tests concerning the fermentation-oxidation of arabinose and reduction of nitrogen compounds. Their adequate amounts in the digestive system is ensured by microorganisms which multiply when the quantity of these compounds is limited (Engel and Moran, 2013). Then, the microorganisms conduct various processes in order to achieve an appropriate level of nitrogen compounds. An example is the microflora living in the digestive tract of termites, because it converts nitrogen metabolites of the insects into the forms that can be re-used (Honghoh et al., 2008). In turn, cockroaches comprise in their digestive tract certain bacteria that store nitrogen by converting it into uric acid (Sabree et al., 2009). Therefore, the enrichment of a substrate with a source of nitrogen, such as DDGS, resulted in the larvae and their gut microorganisms directing their activity elsewhere, not having to focus on acquiring nitrogen, and consequently the results of assays testing enzymatic activity were higher. On the other hand, it is worth noticing that an addition of DDGE activated proteolytic processes in both diets. Providing the larvae with a diet composed of Styrofoam intensified the reaction of fermentation-oxidation of most sugars, including glucose, mannitol and melibiose. Increased activity after an application of the Styrofoam diet was also noticed in the case of assimilation reactions, e.g. assimilation of adipic acid or malic acid.

Changes in the metabolism of microbiota inhabiting the digestive system of *Tenebrio molitor* depending on the nutrient substrate provided

Process	Active ingredients	Polystyrene		Oatmeal	
		(+) DDGS	Pure	(+) DDGS	Pure
NO ₃ reduction	potassium nitrate	3	3	2.5	3
indole production	L-tryptophane	2	2	2	2
acetoin production	sodium pyruvate	2	2	2.5	2.5
protease	gelatin (bovine origin)	0.5	0	2	0
β-glucosidase	esculin ferric citrate	3	3	3	3
β-galactosidase	4-nitrophenyl-βD-galactopyranoside	3	3	2	2
arginine dihydrolase	L-arginine	3	3	1.5	2.5
ornithine decarboxylase	L-ornithine	3	3	3	1
fermentation / oxidation	D-mannitol	3	3	2.5	1
	inositol	0.5	0	0	0
	D-sorbitol	2	2	1	1
	L-rhamnose	2	3	1.5	1
	D-sucrose	1	2	1.5	1.5
	D-melibiose	2	0.5	0.5	0
	amygdalin	3	3	3	3
	L-arabinose	3	3	2.5	3
Utilisation	D-glucose	3	3	2.5	3
	D-mannose	2	1.5	2	1.5
	N-acetyl-glucosamine	2	2	1.5	2
	D-maltose	2.5	2.5	2	2
	potassium gluconate	2.5	2.5	2	1.5
	adipic acid	0	0.5	0	0
	malic acid	2.5	2.5	0.5	1
		50.5	50	41.5	37.5

Source: author's calculations based on the experimental data

3. Implementation of research results

Reviewing the current methods of the recycling of Styrofoam, and particularly incineration, which puts a heavy burden on the environment, the use of mealworm larvae to decompose this synthetic material seems promising. This can be achieved by creating special rooms and containers, for the purpose of this method called insectoboxes, where Styrofoam waste will be decomposed. To ensure smooth processing, it is necessary to maintain relatively constant conditions inside an insectobox, such as the temperature of 20-25 and humidity at 60-80 %. Such conditions can be achieved when the culture is conducted in a room in which the temperature can be controlled. Appropriate humidity can be maintained by regular spraying of the insects with water or by adding some biomass waste to the substrate. Our experiment demonstrated that mealworm larvae were able to degrade 13.2 % of Styrofoam, i.e. 0.66 g, in 10 weeks. It can therefore be assumed that if the density of larvae was 8 times higher (from 100 to 800 larvae) and the same conditions were maintained as during our experiment, then 10 weeks would be enough to degrade 100 % of the initial mass of Styrofoam (5 g). Assuming that 800 larvae utilise 5 g of Styrofoam in 10 weeks, then 160 000 larvae would be needed to degrade 1 kg of Styrofoam waste. This number of larvae, providing that a single larva on a Styrofoam diet with DDGS weighs 0.05 g on average, would reach a total weight of 8 kg. Thus,

larvae should be placed in appropriately large boxes. However, this is not a minimal capacity, and should a larger-scale process be needed, larvae could be kept in boxes of a smaller convertible capacity per specimen. It is therefore possible to use a container with the capacity of 800 dm³, assuming that 0.5 dm³ capacity falls for 100 larvae. When implementing this technology, it is advisable to remember to use insects that have previously had Styrofoam added to their diet, because this will considerably improve the process of digestion of this waste and reduce the mortality rate among larvae.

Conclusions

- 1) Mealworm larvae are able to digest Styrofoam.
- 2) Addition of an external source of nitrogen in the form of DDGS has a positive effect on the weight of an individual larva foraging on such untypical food as polystyrene, by improving the conditions for the population of insects and increasing the chances of successful utilisation of this waste.
- 3) The digestive system of a mealworm including the microbiota inhabiting it presents a higher enzymatic activity when fed polystyrene, especially mixed with an external source of nitrogen, such as DDGS, than on a diet typical for this species. Styrofoam with added DDGS is a waste which can be recycled with the help of mealworm larvae.
- 4) When adequate conditions are ensured, it is possible to use mealworm larvae to recycle polystyrene waste, which might become an important element supporting the protection of our planet in compliance with the rules of sustainable development.
- 5) The biochemical assays type API® are a very good biomarker of the condition of larvae fed hazardous waste.

Bibliography

1. Juda-Rezler, K., Manczarski, p. (2010). *Zagrożenia związane z zanieczyszczeniem powietrza atmosferycznego i gospodarka odpadami komunalnymi*. Nauka, No 4. pp. 97-106.
2. Thompson, R.C., Swan, S.H., Moore, C.J., Vom Saal, F.S. (2009). *Our plastic age*. Royal Society. 364 (1526), pp. 1973-1976.
3. Jambeck, J.R., Geyer, R., Wilcox, C., Siegler, T.R., Perryman, M., Andrady, A., Narayan, R., Law, K.L. (2015). *Marine pollution. Plastic waste inputs from land into the ocean*. Science, No 347, pp. 768-771.
4. Baker, I. (2018). *Fifty Materials That Make the World*. Springer. Dartmouth College-Hanover USA, p. 271.
5. Zebek, E. (2018). *Zasady gospodarki odpadami w ujęciu prawnym i środowiskowym*. Kortowski Przegląd Prawniczy Monografie(KPPMonografie). Olsztyn, p. 371.
6. Yang, J., Yang, Y., Wu, W.M., Zhao, J., Jiang, L. (2014). *Evidence of Polyethylene Biodegradation by Bacterial Strains from the Guts of Plastic-Eating Waxworms*. Environmental Science & Technology 2014; 48(23), pp. 13776-13784.
7. Yang, J., Wu, W., Zhao, J., Yang, R. (2015). *Biodegradation and Mineralization of Polystyrene by Plastic-Eating Mealworms: Part 1. Chemical and Physical Characterization and Isotopic Tests*. Environmental Science & Technology 2015; 49(20), pp. 12080-12086.
8. Bombelli, P., Howe, C.J., Bertocchini, F. (2017). *Polyethylene bio-degradation by caterpillars of the wax moth Galleria mellonella*. Current Biology 2017; 27(8), pp. 292-293.
9. Ritter, S.K. (2017). *Wax worms take a liking to plastic shopping bags*. Chemical & Engineering News 2017; 95(18), pp. 10-11.
10. Pelley, J. (2014). *Pantry Pests Harbor Plastic-Chomping Bacteria*. Chemical & Engineering News. <https://cen.acs.org/articles/92/web/2014/12/Pantry-Pests-Harbor-Plastic-Chomping.html>. Access: 20.02.2019.
11. Nawrot, J. (2001). *Owady – szkodniki magazynowe*. Themar Import-Eksport, Warszawa, p. 149.
12. Ramos-Elorduy, J., González, E.A., Hernández, A.R., Pino, J.M. (2002). *Use of Tenebrio molitor (Coleoptera: Tenebrionidae) to Recycle Organic Wastes and as Feed for Broiler Chickens*. Journal of Economic Entomology 2002; 95(1), pp. 214-220.
13. Weiner, A., Paprocka, I., Kwiatek, K. (2018). *Wybrane gatunki owadów jako źródło składników odżywczych w paszach*. Życie Weterynaryjne 2018; 93(7), pp. 499-504.
14. Siemianowska, E., Kosewska, A., Aljewicz, M., Skibiniewska, K., Polak-Jaszczuk, L., Jarocki, A., Jedras, M. (2013). *Larvae od mealworm (Tenebrio molitor L.) as European novel food*. Agricultural Sciences 2013; 4(6), pp. 287-291.

15. Fialkowski, p. (2016). *Robale w Robakowie pod Poznaniem - pierwsza w Polsce fabryka insektow*. Magazyn Poznanski. <http://poznani.wyborcza.pl/poznan/1,105531,19477818,robaki-w-robakowie-pod-poznaniem-pierwsza-w-polsce-fabryka.html>. Access: 20.02.2019.
16. Drahl, C. (2015). *Plastics recycling with microbes and worms is further away than people think*. <https://cen.acs.org/environment/sustainability/Plastics-recycling-microbes-worms-further/96/i25>. Access: 4.12.2018.
17. Yang, S.S., Brandon, A.M., Xing, D.F., Yang, J., Pang, J.W., Criddle, C.S., Ren, N.Q., Wu, W.M. (2018). *Progresses in Polystyrene Biodegradation and Prospects for Solutions to Plastic Waste Pollution*. IOP Conference Series: Earth and Environmental Science. Vol. 150, pp. 1-10.
18. Howis, M. (2012). *Aspekty biologiczne rodziny pszczolej- relacje między Apis mellifera a Varroa destructor przy stosowaniu zabiegów ograniczających populacje pasozyta*. Uniwersytet Przyrodniczy we Wrocławiu. Praca doktorska. Wydział Biologii i Hodowli Zwierząt. Wrocław, p. 109.
19. Kosewska, O. (2018). *Porównanie parametrów enzymatycznych w przewodzie pokarmowym macznika młynarka (Tenebrio molitor L.) w zależności od podawanego pokarmu*. Monografia. Red. Tanska, M., Sosna, p. Koła Naukowe szkola twórczego działania – Nauki Rolnicze i Weterynaryjne. Wyd. ABADA, Olsztyn. Volume 5 (2), pp 5-16.
20. Engel P., Moran, N.A. (2013). *The gut microbiota of insects – diversity in structure and function*. FEMS Microbiology Reviews 2013; 37(5), pp. 699–735.
21. Hongoh, Y., Sharma, V.K., Prakash, T., Noda, S., Taylor, T.D., Kudo, T., Sakaki, Y., Toyoda, A., Hattori, M., Ohkuma, M. (2008). *Complete genome of the uncultured Termite Group 1 bacteria in a single host protist cell*. Proceedings of the National Academy of Sciences of the USA 2008; 105, pp. 5555–5560.
22. Sabree, Z.L., Kambhampati, S., Moran, N.A. (2009). *Nitrogen recycling and nutritional provisioning by Blattabacterium, the cockroach endosymbiont*. Proceedings of the National Academy of Sciences of the USA 2009; 106(46), pp. 19521-19526.

DISRUPTION POTENTIAL OF THE DISTRIBUTED LEDGER TECHNOLOGY WITHIN THE ECONOMY OF LATVIA

Natalija Kostrikova¹, MBA; Baiba Rivza², Dr. habil. oec
^{1,2}Latvia University of Life Science and Technologies

Abstract. The main research **objective** is to identify and analyse significant economic sectors subject to potential disruption from the distributed ledger technology (DLT) within the economy of Latvia. The **tasks** are 1) to identify sectors subject to disruption from DLT in line with global technological developments, business readiness trends and distributed ledger use cases, 2) to identify sectors generating the most significant output within the economy of Latvia, 3) to analyse interconnections of global trends related to DLT and the areas of potential disruptions to the identified sectors within the economy of Latvia. The research **concluded** that economic sectors with the most significant output within the economy of Latvia are all subject to disruption from distributed ledger use cases and global DLT trends in the short, medium or long term.

Key words: distributed ledger technology, blockchain, disruption.

JEL code: O33.

Introduction

Alongside more frequent appearance of words 'blockchain' and 'distributed ledger technology' (DLT) in research as well as deployment of DLT use cases beyond crypto-currencies and initial coin offerings (ICOs), the broader community has ultimately reached the point when blockchain's association with purely crypto-currencies and Bitcoin is fading away. By business leaders, DLT is no longer seen as a stand-alone technology, but rather as a business enabler, that can not only provide faster, more secure and cost-efficient transactions, but also streamline democratization of trust and fundamentally reshape existing business models. DLT can record transactions, track the origins of goods, store medical records, verify information, facilitate automatic payments through implementation of smart contracts and provide many other opportunities to ensure transparency, security and operational efficiency. However, it brings no benefit unless it is linked to a solid use case, thus, serving as a Trust-as-a-Service (TaaS) that improves ways of trust management within cloud environments.

The research is focused on identifying potential for emergence of DLT use cases beyond crypto-currencies and ICOs that can bring the most significant economic impact measured by output to the economy of Latvia. The research does not specifically analyse fintech DLT solutions since those solutions are considered to be cross-sectorial, thus, requiring a separate in-depth analysis. The **content analysis method** is applied for identification of DLT use cases within recent research papers as well as web-sites of actual DLT applications, DLT communities and DLT consortia. The relevant content is further analysed from the use case perspective within appropriate economic sectors. The **descriptive statistics method** is applied for identification and visualisation of the sectors that bring significant contribution to the economy of Latvia derived from quantitative statistical data. **Inductive reasoning** is further applied for concluding on the disruption potential to the identified sectors within the economy of Latvia based on the time frame approximation, which is required for the identified DLT use cases and trends to disrupt the established business models globally, regionally and locally. The time frame approximation exercise is based on the assumption that identified DLT use cases have already been put into use and identified DLT trends will be put into use in line with Rogers' innovation diffusion theory that implies reaching the 4th stage of innovation decision-making process named 'Implementation' (Rogers, 1962). The reasoning process presumes that use cases that are

¹ kostrikova.natalia@gmail.com

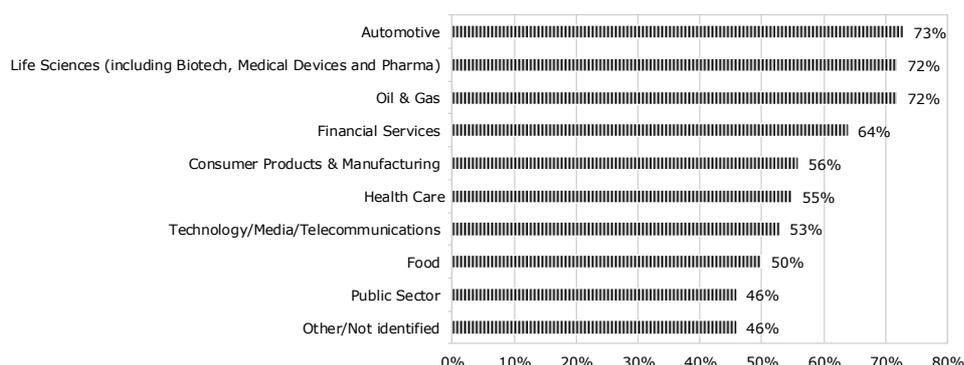
² baiba.rivza@llu.lv

currently present in Latvia are likely to disrupt relevant economic sectors in short term, use cases that are present in Central and Eastern Europe are likely to disrupt relevant economic sectors in medium term, uses cases in other geographies and overall global trends are likely to disrupt relevant economic sectors in long term, whilst non-existence of use cases and global trends would presume No disruption potential in relevant sectors.

Research results and discussion

1. Analysis of global and regional DLT trends and use cases

According to Deloitte's 2018 global blockchain survey of more than 1,000 blockchain-savvy executives, a majority (74 percent) of respondents report that their organizations see a 'compelling business case' for the use of blockchain technology, however, only 34 percent say their company has initiated some sort of blockchain deployment (Deloitte, 2018). This certainly reflects not only the existence of business rationale for DLT implementation (since blockchain is a form of DLT), but also a potential for narrowing the gap between 'Decision' and 'Implementation' stages according to Rogers' innovation diffusion theory (Rogers, 1962) through emergence of new and further development of existing DLT use cases in short to medium term globally. The same survey (Deloitte, 2018) indicates that there is a clear market sentiment that blockchain technology is expected to disrupt an array of industries with Automotive, Oil&Gas and Life sciences topping the list (73 %, 72 % and 72 % of respondents accordingly) and Public sector being at the bottom of potential disruption (46 % of respondents).



Source: Deloitte 2018 Global Blockchain Survey

Fig. 1. Answers to the question 'Blockchain technology will disrupt my organization's industry – What is your level of agreement or disagreement with this statement regarding blockchain technology?', % of respondents, who agree with the statement

The Public sector being a laggard for DLT deployment globally is explained by the fact that there are very few governments that mainstream and officially encourage development of DLT use cases. Examples of such countries are the United Kingdom with its public office supporting DLT start-ups financially, Estonia experimenting with DLT use cases for verification of citizens' records on government databases (E-Estonia, 2018), the United Arab Emirates working towards developing applications for government transactions being implemented predominantly through blockchain by 2021 (Smart Dubai, 2018) and Sweden with its blockchain land registry project based on blockchain. Despite the fact that The European Commission supported the signing of the European Blockchain Partnership by 27 EU Member States and established the European Blockchain Observatory to undertake research on blockchain, it is yet too early to comment on EU readiness to streamline DLT applications.

When analysing DLT use cases it is important to understand that three types of organizations are pursuing DLT innovations: established companies, start-ups and institutions. Certainly, it is more difficult for an established company or institution to fundamentally change its operating model and

rearrange processes to match DLT functionalities that require investments, reorganizations, layoffs, new hires and completely new business philosophy. It is much easier for start-ups to streamline DLT use cases, whose whole business models are inspired by DLT.

According to Rogers' innovation adopter categories (Rogers, 1962) DLT start-ups (and probably some established companies and/ or institutions that participate in DLT consortia) can be classified as 'innovators', whose risk tolerance allows them to develop and adopt technologies that may ultimately fail and the tech and enthusiast community around DLT can be classified as 'early adopters', who make a more judicious choice of innovation adoption than innovators, but are still ready to take risk of failure. However, start-ups and early adopters are not enough to boost DLT diffusion globally, thus, established companies and/ or institutions are prerequisite to reach Rogers' 'early majority' category, who usually adopt an innovation after a varying degree of time that is significantly longer than the innovators and early adopters. 'Early majority' for DLT use cases are likely to be established companies and/ or institutions, that will integrate DLT into an already existing operational paradigm, and the final beneficiaries, who will ultimately use end products and services, that will be reshaped through DLT.

There are many examples of start-ups that reshaped traditional business models through business enabling technologies that were perceived with a degree of skepticism at the time of their occurrence and are now considered success stories. Such examples include Airbnb, Uber, Carguru, Taxify, Couchsurfing, etc. that streamlined online payments and online reservations for creating new business models in transportation and hospitality industries. In this light, streamlining DLT can bring similar effects and challenge traditional business models across an array of industries. Thus, for established companies it is important to look at DLT not only from a proof of concept angle, but also from its game changing capabilities. Hesitance to pursue certain DLT use cases are associated not only with the need to fund DLT development, but also with barriers related to regulatory uncertainty, potential security threats, necessity to reorganize legacy systems, and vague return on investment.

Adoption of DLT use cases can certainly be motivated by cost savings due to operational efficiencies, since private record-keeping becomes obsolete, when all transactions are recorded in a distributed ledger, which is shared across the network. Reconciliation of transactions across private ledgers takes a lot of time and human intervention (Iansiti and Lakhani, 2017), whilst the cost of simple transactions such as invoice processing might be decreased by as much as 80 % in distributed networks (IBM, 2017).

Many companies in Mexico, China, France and least in the United States are replacing parts or all of their existing systems with blockchain-based enhancements through either integrating blockchain into core operations or building new applications (Deloitte, 2018). The principles of instantaneous digital transferability of assets and the real-time confirmability of identity credentials enable new modes of contracting between parties and new forms of money (Swan et al., 2019). For example, the concept of integrated supply chain ledgers assumes that distributed ledger transactions from approved trade partners can automatically post to ledger accounts of involved parties (Swan, 2018) allowing for better financial control and risk management.

The technology sector is the most prominent for deploying DLT use cases due to vivid activity of DLT tech start-ups. For media and entertainment companies, blockchain can help track and monetize content, address piracy, and manage digital assets from creator to consumer as well as solve such challenges as simplifying tracking content usage and returning royalties to rights holders with DLT use cases for identifying, recording, and settling content interactions wherever they happen (Deloitte,

2018). For the telecom industry, blockchain can simplify billing systems, decrease roaming fraud, create decentralized and immutable records for accounting and audits, and enable more dynamic and flexible next-generation network services, ultimately enabling telecom operators to sell Identity as a Service (IDaaS) for customers and connected devices (Deloitte, 2018). Cloud providers are adding blockchain development tools to their platform service offerings, and chipmakers are creating specialized graphics processing units (GPUs) and application-specific integrated circuits (ASICs), start-ups and independent consortia are also working to develop blockchain solutions for identity, value exchange, and open models that anchor content rights to creators (Deloitte, 2018). These developments can disrupt the framework for provision of online services since established companies will lose its key role in content and identity management.

In Agriculture and food sector, blockchain could be used to enhance the traceability and reduce food-fraud by recording validated information concerning the origin and the state of the food – on one hand, all parties in the value chain (farmers, suppliers, processors, distributors, retailers, consumers and regulators) can access real-time information about the food product (e.g. to trace contaminated goods to its source, verify that food is produced without child labour etc.), on the other hand, users will be able to trace-back the entire product lifecycle from the farm to a retailer (ILNAS, 2018). From the food safety perspective, during contamination fast traceability of food origins can save lives. Walmart, which sells 20 per cent of all food in the U.S., conducted a traceback test on mangoes in one of its stores, that took six days, 18 hours, and 26 minutes to trace mangoes back to its original farm, whilst by using blockchain, Walmart can provide all the information the consumer wants in 2.2 seconds (Charlebois, 2018).

The Blockchain In Transport Alliance (BiTA), has quickly grown into the largest commercial blockchain alliance in the world that leads the effort to develop and embrace a common framework and standards from which transportation/ logistics/ supply chain/ freight marketplace participants can build revolutionary blockchain and DLT applications (BiTA, 2018). The logistics giant Fedex is actively testing ways to use blockchain to track high-cost, mission-critical cargo (Mathis, 2018).

In its automotive industry research Deloitte has developed three use case groups to cover the breadth of the automotive market and blockchain application based on the analysis of over 40 use cases: Verification and process improvements, Vehicle management and incentives and Finance, payments and insurance (Deloitte, 2018).

The Construction Blockchain Consortium (CBC) supports knowledge transfer, arranges commercial and academic presentation, assesses and tests commercial services and technology, conducts research, and works on relevant case studies and proof of concept in Building information modelling, Internet of things and Machine Learning (CBC, 2018). CBC also works towards solutions to reduce incidences of parties suing one another for shoddy work or delays in project completion (Rothrie, 2018). Probuild, one of Australia's largest building firms, has partnered with US blockchain construction innovator Brickschain for managing its global supply chain (Coincentral, 2018).

Deloitte has identified six areas for improving the leasing and purchase and sale process of real estate through the use of blockchain: improve property search process, expedite pre-lease due diligence, ease leasing and subsequent property and cash flow management, enable smarter decision-making, transparent and relatively cheaper property title management, enable more efficient processing of financing and payments (Deloitte, 2017). The actual use cases include such start-ups as Propy, which allows investors to purchase property through blockchain in a variety of locations and aids cross-border property transactions, Streetwire, a clearinghouse for real estate

data and transactions, which streamlines processes around closing, lending and valuing property while returning value and control to data producers and many others (Dunn, 2018).

According to the Deloitte 2018 Global Blockchain survey most of the CEE respondents have not yet started to invest into Blockchain technology, only one quarter of the respondents claimed to have made investments so far, the existing investments have been manifested mostly in the Financial services and Technology/Media/Telecommunication sectors with some investments being made in Consumer Products & Manufacturing and Energy & Resources sectors and the existing use cases are mostly related to digital recording and payment solutions, but there are prototypes under construction for digital identity and also for supply chain traceability (Deloitte, 2018). There is a logical distribution of the use cases in line with the main profile of the sectors: supply chain solutions are mostly popular in the Consumer products & Manufacturing sector.

2. Analysis of sectors subject to disruption by DLT within the economy of Latvia

In 2018 Latvia together with other European countries signed the declaration of 'Cooperation on a European Public Blockchain Partnership', which aims to develop a trusted, secure and resilient European Blockchain Services Infrastructure (EBSI) meeting the highest standards in terms of privacy, cybersecurity, interoperability and energy efficiency, as well as fully compliant with EU law (EC, 2018). This signature signals that the government of Latvia is aware of DLT and will further be involved in experience exchange and DLT use case development activities on EU level. These developments reflect that Latvia has reached the 3rd stage of innovation decision-making process titled 'Decision' as suggested by Rogers' innovation diffusion theory (Rogers, 1962), meaning that the government of Latvia currently weighs advantages and disadvantages of using DLT.

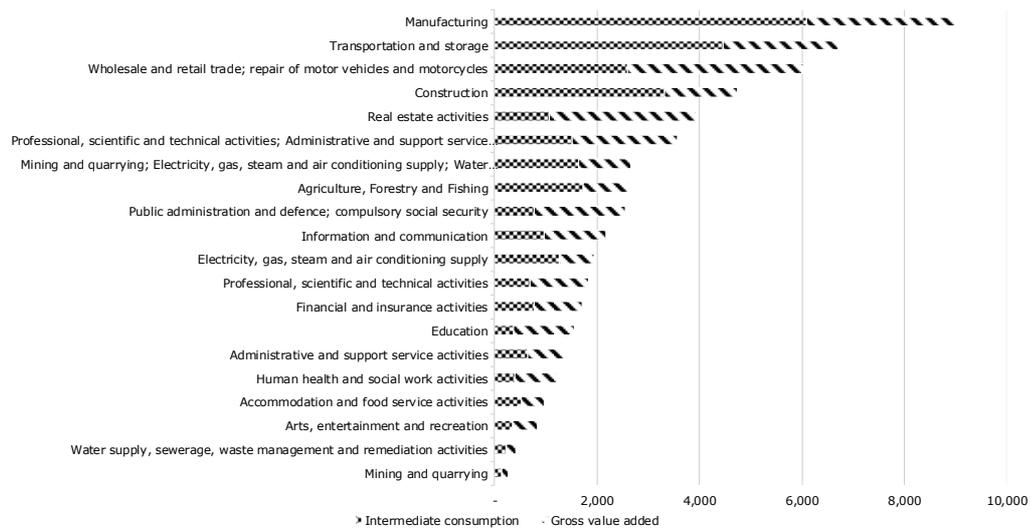
Due to non-existence of use cases beyond crypto-currencies and ICOs in Latvia and the indecisiveness of the government of Latvia about willingness or unwillingness to support distributed ledger applications, it is impossible to analyse disruption potential based on practical examples, thus, it is necessary to assess potential for emergence of such cases in Latvia in short, medium or long term. The time frame cannot yet be precisely quantified and should be interpreted relatively to the global time frame, since DLT use cases (apart from crypto-currencies and ICOs) have not yet reached the 'early majority adopter category' globally or regionally as per Rogers' classification of individuals within a social system on the basis of innovativeness (Rogers, 1962).

In order to identify sectors with significant contribution, intermediate consumption and gross value added accounts are used as indicators for assessing activity related to exchange of goods and services within particular sector (as per Nace 2 classification). Intermediate consumption is an indicator for B2B activity, whilst value added is an indicator of B2C activity, both subject to disruption by DLT.

Sectors with the most significant contribution to the economy of Latvia measured by output (trespassing a 5 % weight in the total output) are Manufacturing, Transportation and storage, Wholesale and retail trade, repair of motor vehicles and motorcycles, Construction, Real estate activities, Agriculture, Forestry and Fishing, Public administration and defence, compulsory social security, and Information and communication.

Manufacturing is the most significant sector within the economy of Latvia that constituted 17.8 % of total output, 22.9 % of total intermediate consumption and 14.6 % of total gross value added in 2017. The research has identified the existence of DLT use cases for supply chain traceability in the manufacturing sector within the Central and Eastern Europe. Since those applications are already being developed within the CEE region, it is only a matter of time when those applications will reach

Latvia, thus, distributed ledger solutions for supply chain traceability are potential disruptors for the Latvian manufacturing sector in the medium term.



Source: author's calculations based on Central Statistical Bureau of Latvia

Fig. 2. Intermediate consumption and gross value added per sector in Latvia at current prices in 2017, MEUR

Transportation and storage sector constituted 13.4 % of total output, 16.7 % of total intermediate consumption and 12.2 % of total gross value added in 2017. The Blockchain In Transport Alliance is actively working on developing industry standards deploying DLT technology, thus, potential DLT solutions related to administrative improvements, trade finance, dispute resolution, load planning and distribution and freight tracking are potential disruptors to Transportation and storage sector in Latvia in the long term when the whole global Transportation sector will adopt DLT standards. Global DLT adoption is prerequisite since Transportation involves cross-border transactions being implemented by multiple stakeholders, which makes it virtually impossible for single or couple major players to reinvent such complicated and mutually reliant business processes.

Wholesale and retail trade, repair of motor vehicles and motorcycles constituted 12.0 % of total output, 12.4 % of total intermediate consumption and 12.1 % of total gross value added in 2017. The research has identified the existence of distributed ledger use cases for supply chain traceability in the Consumer products sector within the Central and Eastern Europe. Since those applications are already being developed within the CEE region, it is only a matter of time when they will reach Latvia, thus, distributed ledger solutions for supply chain traceability are potential disruptors for the Latvian Wholesale and retail trade sector in the medium term. Deloitte research on the automotive industry records development of at least 40 use cases globally, thus, solutions for supply chain traceability and vehicle information improvements are potential disruptors for Repair of motor vehicles and motorcycles sector in the long term, when at least one leading automotive producer will implement DLT within its supply chain.

Construction sector constituted 9.4 % of total output, 9.7 % of total intermediate consumption and 9.5 % of total gross value added in 2017. The Construction Blockchain Consortium is actively working on developing DLT use cases as well some companies are fostering their own use cases, thus, potential DLT solutions related to supply chain traceability, dispute resolution and operational improvements are potential disruptors to Construction sector in Latvia in the long term. However it is also theoretically possible for local construction companies to develop their standalone DLT use cases through applications related to supply chain traceability since Construction sector is not as

global as Transportation, thus, it is possible to reorganize business processes within a supply chain of one particular company (subject to technological savviness and business rationale).

Real estate activities constituted 7.8 % of total output, 6.5 % of total intermediate consumption and 7.6 % of total gross value added in 2017. The research has identified areas in the real estate sector that can be improved through DLT as well as several use cases outside the CEE region have been identified, thus, potential DLT solutions related to improving the leasing and purchase and sale processes are potential disruptors to Real estate activities sector in Latvia in the long term. However, it is also theoretically possible for local real estate companies to develop local DLT use cases through applications related to purchase/ sale and leasing transactions, since real estate activities can be managed locally (subject to technological savviness and business rationale).

Agriculture, Forestry and Fishing constituted 5.2 % of total output, 4.8 % of total intermediate consumption and 6.1 % of total gross value added in 2017. The research has identified areas in the Agriculture sector that can be improved through DLT as well as several use cases outside the CEE region have been identified, thus, potential DLT solutions related to improving food safety and supply chain traceability are potential disruptors to Agriculture, Forestry and Fishing sector in Latvia in the long term. However, it is also theoretically possible for local farmers to develop local DLT use cases through applications related to storing data about production life cycle of agricultural products (subject to technological savviness and business rationale).

Public administration and defence; compulsory social security constituted 5.1 % of total output, 4.0 % of total intermediate consumption and 5.0 % of total gross value added in 2017. The research has identified areas in the Public sector that can be improved through DLT, several country's efforts to streamline DLT adoption, including neighbouring Estonia as well as Latvia's participation in European Blockchain Partnership, however, potential DLT solutions related to citizen's identity management, management of land/assets, inter- or intragovernmental transactions and sharing health records are potential disruptors to Public administration sector in Latvia in the long term taking into account higher public sector rigidity to innovation and Latvia's position as an e-government laggard among Baltic states (Kostrikova, Rivza, 2017).

Information and communications (ICT) sector constituted 4.3 % of total output, 3.7 % of total intermediate consumption and 5.0 % of total gross value added in 2017. The research has identified areas in the IT and Telecom sectors that can be improved through DLT as well as several use cases in Technology/Media/Telecommunication sectors have been identified in the CEE region. Also, there are already some start-ups in Latvia that develop DLT solutions in the ICT sector such as Digipulse – digital asset inheritance platform, Aeternum – platform, through which every individual can invest in intellectual property rights of scientists around the world, Notakey – solution for identity verifications and Know-Your-Customer checks and others. Identified use cases signal that ICT sector in Latvia has already reached the 4th stage of innovation decision making process titled 'Implementation' (Rogers, 1962), when DLT is being employed in practice. Thus, potential DLT solutions related to improving identity, digital content and copyright management are potential disruptors to ICT sector in Latvia in the short term.

Conclusions, proposals, recommendations

- 1) Global leaders acknowledge the disruptive potential of DLT and its capabilities to fundamentally alter existing business models. The level of awareness and readiness is lower in the CEE region comparing to global trends. Many market leaders participate in various blockchain inspired consortia that aim towards development of DLT based industry standards and DLT use cases.

However, in practice there are very few functioning DLT use cases beyond crypto-currencies and ICOs. Companies and governments globally invest in developing such DLT use cases with the majority of use cases being deployed in the developed countries. None of such use case has yet reached the early majority adoption stage.

- 2) Identified economic sectors with the significant value added within the economy of Latvia are all subject to disruption from DLT in the short, medium or long term. The short-term disruption potential from DLT has been identified in the Information and communications sector. The medium-term disruption potential has been identified in Manufacturing, Wholesale and retail trade and Public administration sectors. The long-term disruption potential has been identified in Transportation, Repair of motor vehicles and motorcycles sector, Construction, Real estate activities and Agriculture, Forestry and Fishing sectors.
- 3) Further research will focus on quantifying potential economic impact from deploying DLT use cases within identified economic sectors of substantial weight within the economy of Latvia as well as assessing indirect effects from sectors with lesser weights within the economy of Latvia.

Acknowledgements

The preparation of the paper was supported by the National Research Programme 5.2. Project „INTERFRAME-LV“.

Bibliography

1. Anand, S. (2018). *A Pioneer In Real Estate Blockchain Emerges In Europe*. The Wall Street Journal. Retrieved: <https://www.wsj.com/articles/a-pioneer-in-real-estate-blockchain-emerges-in-europe-1520337601> Access: 15.02.2019.
2. Blockchain in Transport Alliance (2018). Retrieved: <https://www.bitastudio.com/> Access: 15.02.2019.
3. Central Statistical Bureau of Latvia (2018). Retrieved: <https://www.csb.gov.lv> Access: 10.02.2019.
4. Charlebois, S. (2018). *How Blockchain Technology Could Transform The Food Industry*. Retrieved: <https://theconversation.com/how-blockchain-technology-could-transform-the-food-industry-89348> Access: 12.02.2019.
5. Construction Blockchain Consortium (2018). Retrieved: <https://www.constructionblockchain.org/> Access: 15.02.2019.
6. Deloitte (2018). *Breaking Blockchain Open. Deloitte's 2018 Global Blockchain Survey*. Retrieved: <https://www2.deloitte.com/content/dam/Deloitte/cz/Documents/financial-services/cz-2018-deloitte-global-blockchain-survey.pdf> Access: 02.02.2019.
7. Deloitte (2018). *Breaking Blockchain Open. Central and Eastern European Perspective*. Retrieved: <https://www2.deloitte.com/content/dam/Deloitte/ce/Documents/about-deloitte/ce-blockchain-survey-2018-central-europe-perspective.pdf> Access: 10.02.2019.
8. Deloitte (2018). *Accelerating Technology Disruption In The Automotive Market. Blockchain in the Automotive Industry*. Retrieved: <https://www2.deloitte.com/content/dam/Deloitte/cn/Documents/consumer-business/deloitte-cn-consumer-blockchain-in-the-automotive-industry-en-180809.pdf> Access: 07.02.2019.
9. Deloitte (2017). *Blockchain in Commercial Real Estate: The Future Is Here. How Blockchain-based Smart Contracts Could Revolutionize Commercial Real Estate*. Retrieved: <https://www2.deloitte.com/content/dam/Deloitte/us/Documents/financial-services/us-dcfs-blockchain-incre-the-future-is-here.pdf> Access: 11.02.2019.
10. Dunn, J. (2018). *4 Blockchain Real Estate Startups Shaking Up Property Investment*. Retrieved: <https://espeoblockchain.com/blog/blockchain-real-estate-startups/> Access: 15.02.2019.
11. E-estonia (2018) Retrieved: <https://e-estonia.com/solutions/e-identity/id-card/> Access: 15.02.2019.
12. European Commission (2018). *European Countries Join Blockchain Partnership*. Retrieved: <https://ec.europa.eu/digital-single-market/en/news/european-countries-join-blockchain-partnership> Access: 15.02.2019.
13. Iansiti, M. and Lakhani, K. R. (2017). *The Truth About Blockchain*. Harvard Business Review 95(1). pp. 118 - 127
14. IBM (2017). *Boosting Financial Intelligence With Cognitive Computing*. Retrieved: <https://economia.icaew.com/features/july-2017/boosting-financial-intelligence-with-cognitive-computing> Access: 12.02.2019
15. ILNAS - Institut Luxembourgeois de la Normalisation, de l'Accréditation, de la Sécurité et qualité, Agence pour la Normalisation et l'Economie de la Connaissance des produits et services (2018). *White Paper. Blockchain And Distributed Ledgers Technology, Economic Impact And Technical Standardization*. Retrieved:

<https://portail-qualite.public.lu/dam-assets/publications/normalisation/2018/white-paper-blockchain-june-2018.pdf> Access: 05.02.2019.

16. Kostrikova, N., Rivza, B. (2017). *E-government And E-participation In Baltic States: Comparison of Estonia, Latvia, Lithuania* in Proceedings of the 2017 International Conference „ECONOMIC SCIENCE FOR RURAL DEVELOPMENT” No 45 Jelgava: LLU ESAF. pp. 118-126.
17. Mathis, J. (2018). *FedEx Is Testing Blockchain Tech For Critical Cargo Shipments*. Retrieved: <https://www.ccn.com/tracking-key-shipments-fedex-is-testing-with-blockchain> Access: 12.02.2019.
18. Rogers, E. M. (1962). *Diffusion Of Innovations*. New York: Free Press of Glencoe. pp 172-175, p. 249.
19. Rothrie S. (2018). *How Blockchain And Construction Will Build A New World*. Retrieved: <https://coincentral.com/blockchain-and-construction/> Access: 08.02.2019.
20. Smart Dubai (2018) Retrieved: <http://smartdubai.ae> Access: 07.02.2019.
21. Swan, M. (2018). *Blockchain Economics: Ripple For ERP Integrated Blockchain Supply Chain Ledgers. Integrated Supply Chain Ledgers To Free \$3.9 Trillion In Capital?* The European Financial Review. pp. 24-26.
22. Swan, M. et al. (2019). *Blockchain Economics: Implications Of Distributed Ledgers – Markets, Communications Networks And Algorithmic Reality*. London: World Scientific Publishing Europe. p. 6

THE IMPORTANCE OF CORPORATE SOCIAL RESPONSIBILITY FOR THE TODAY'S CONSUMER: OPINIONS OF CONSUMERS AND EXPERTS

Toms Kreicbergs, Mg.oec.; **Modrite Pelse**, Dr.oec.

Faculty of Economics and Social Development, Latvia University of Life Sciences and Technologies

Abstract. This research examines the necessity of Corporate Social Responsibility for the today's consumer. It analyses studies conducted in the field of CSR with a thorough literature review and compares them to the results gathered from in-depth interviews with experts of CSR field that follow the tendencies of the consumer's needs and execute CSR strategy and campaigns, as well as the results from a focus groups with consumers.

The research found that consumers are quite sceptical and cynical toward some of the CSR campaigns that they found not to be genuine but rather solely based on profit or covering up social irresponsibility on the behalf of the company. However, when the CSR is embedded at the core of the brand consumers find CSR very compelling and appreciate it greatly, that results in customer loyalty and willingness to share the story about company's CSR efforts further.

Key words: Corporate Social Responsibility (CSR), sustainability, consumers, the environment.

JEL code: A10, M2.

Introduction

Corporate Social Responsibility is defined as the voluntary actions that a corporation implements as it pursues its mission and fulfills its perceived obligations to stakeholders, including employees, the environment, communities, and society as a whole (Coombs W., et al., 2012). The true meaning of CSR is being interpreted depending on who is being asked. For instance, from the right wing politicians, CSR is often viewed as a violation of the principles of free enterprise and confusion of the private and governmental, and nonprofit sectors. However, from the left wing politicians and ideological supporters, CSR is viewed as the best public relations strategy for complacency and control (May S., 2007). Those who favour the free market and the profit view of corporations, might view CSR as decreasing competitiveness, while those who support the business case of CSR favour CSR as increasing competitiveness (Coombs W., et al., 2012). It is also stated that the greatest strength and weakness of CSR is that it can cover so many different issues and be enacted in so many different ways. CSR can cover concerns as diverse as worker rights, environmental preservation, clean energy, water rights, child labour, HIV prevention and treatment, disaster relief, and treatment of indigenous people, to name but a few (Coombs W., et al., 2012).

More importantly for marketing purposes, it has to be discussed that CSR is definitely becoming a key component in a company's marketing mix (Mogele B., 2010). Companies have been looking almost continuously for powerful links and relevant bridging modules for attracting the readers' attention on the one hand and for providing relevant information conveying a high degree of credibility through their CSR commitment on the other hand (ibid). Therefore the aim of this research is to analyse whether the interest for corporations into becoming more socially responsible is justified or not. Thus, the authors identified three key tasks for this research: conducting a study examining what do consumers think about CSR by 1) interviewing consumers during a focus group and 2) interviewing experts in the CSR field as well as 3) conducting a thorough literature review.

Research results and discussion

By examining the appropriate literature, the task was to determine whether the companies truly invest into their CSR efforts and has the scientific community found it to be true that consumers value CSR and prefer brands who are socially responsible. Therefore, the literature review was mostly focused on the importance of CSR for the consumer and from competition point of view.

Studies show that a popular form of CSR initiative that consumers appreciate is corporate philanthropy, where a company supports a social cause or non-profit organization through sponsorships – typically in the form of profit and/or resource donations. Through such philanthropic initiatives, organizations can positively enhance their corporate image among their stakeholders, which in turn can yield tangible returns (e.g. higher profitability) and/or intangible benefits (e.g. positive attitude towards the firm and its brands; enhanced loyalty) (Sohn Y., et al., 2012). A similar opinion is expressed in Watt's 2010 study, which states that sponsorship continues to evolve and take an ever-more important role in the overall marketing and positioning of companies and brands. Its greatest objective is to engage audiences and communicate more relevant messages personally to more targeted audiences. This means a move away from the media rights-based model towards more value-based partnerships between sponsors and rights holders. Leverage activities will be more thematic, more authentic and aligned to engaging more targeted communities. Hence, there is an opportunity for the integration of CSR and sponsorship strategy and implementation (Watt K., 2010).

Globally, consumers are demanding a higher level of Corporate Social Responsibility (Diehl S., et al., 2016). It is fair to say that Corporate Social Responsibility is becoming more interesting and profitable for companies to be engaged in, because supply has to meet the demand. From a competition standpoint, which also exemplifies how relevant CSR has become, studies find that companies show commitment to minimizing or eliminating any harmful effects and maximizing [their] long-run beneficial impact on society (Vanhamme J., et al., 2015).

There are also indications, for example, that consumers will switch from one brand to another of same price and quality if the other brand is associated with a cause. In 1999 a survey found that 65 percent of consumers would switch under such conditions versus 87 percent of consumers in 2007 (Mirvis P., 2008). So this tendency of consumers preferring companies being socially responsible is becoming higher and higher.

There are, however, some data pointing to the opposite side of this discussion- that the gain from CSR or the importance of it is rather overrated. For instance, the UN's environmental program describes a 40/4 gap where 40 percent of consumers say they want to buy green product but only 4 percent regularly do, at least as of 2004 when the report was issued (Mirvis P., 2008). There is, not surprisingly, considerable debate about the gap between people's expressed interest and actual buying behaviour in these regards, and certainly as to whether consumers will pay a premium for such goods and services. Claims that consumers will pay 5 percent more for brands from socially responsible companies simply don't bear out in some cases as evident by this study. (Mirvis P., 2008). Therefore one could make the argument that while the consumers do appreciate CSR, they are not willing to pay more for it, which bears asking what is the point of companies being socially responsible, when the consumer is not willing to pay even a little bit more.

As some other studies have pointed out, the reason for that might be the fact that consumers are cynical towards companies being socially responsible and therefore diminish the importance of it due to the history of many companies and their misconduct in regards to CSR. Companies that communicate about their CSR activities often confront allegations of social irresponsibility. (Vanhamme J., et al., 2015).

Other studies emphasize that the consumers see the true motivation behind CSR as it is largely focused on communicative, relational, and reputational benefits which naturally compromises its morality (Ihlen O., et al., 2011). The authors make the case by saying CSR is only possible where a company's profits will be enhanced: it is impossible to escape the self-interested perspective;

financial profits are sought at any cost (Ihlen O., et al., 2011). It is possible that this is the reason why some consumers don't see the good in CSR which makes it rather irrelevant for certain amount of consumers.

Also, there are studies that question the difference of values in different cultures, asking does the consumer even value that the company which products he or she is buying contributes to make the world a better place across all cultures? An argument is made that different cultures have different values and some values may exist everywhere, but, even so, there is a difference in ranking priorities of values (Mooij M., 2005).

However, it must be stated that the authors analysed 17 academic articles and 14 books about the subject, and out of all these studies founded in these materials, there were only four studies that did express arguments for lack of significance of Corporate Social Responsibility, which arguably is very little compared to the total amount of studies analysed.

In summation of the literature review, there seem to be an overwhelming conclusion that CSR does work and the consumers are willing to switch products because of CSR, in favour of the companies that are socially responsible. Consumers will switch brands due to the CSR efforts (Mirvis P., 2008). Indeed, evidence is that when a product's social content aligns with their consumers' personal interests; it can be decisive in building brand loyalty (ibid). Not only the consumers will switch to another brand or product due to the CSR efforts, it will also build brand loyalty which is highly important for the brand's personal sustainability in the market.

Methodology of the practical research

This research focused on qualitative methods by conducting five in-depth interviews with experts of CSR and a focus group with consumers. This was done to ensure meaningful data that would help to understand in-depth the reasons of why consumers prefer or do not prefer socially responsible companies as well as in-depth reasons from the experts of their CSR commitments. The interviews were conducted in both Denmark and Latvia. The focus group was conducted in Denmark. Both, the interviews and focus group were conducted at the end of year 2016.

The in-depth interviews were conducted with five experts in the field of CSR, for instance, sustainability (CSR) manager Fleming Lynge Nielsen of a large Danish company Danfoss. The company Danfoss was chosen due to their CSR efforts that help the community and emphasize their green energy commitments, therefore indicating that they would have a lot of relevant information to share for the purposes of this study. Other interviewees were Povl Schroder who is Senior Director and Head of Group Regulatory at Danfoss, Juste Brukiene who is project manager of sustainability projects at Danfoss, Otilia Dragan who is corporate brand manager at Danfoss. And finally, in order to get a different perspective on CSR, as the fifth expert interviewed for this research was a partner and a strategist of a large advertising agency in Latvia, the ad agency Weekend, Edgars Petersons. As the man who meets with clients and proposes to follow the market tendencies such as CSR, he had valuable insights to provide during the interview about the consumers and companies in regards to CSR efforts.

In order to find out whether consumers appreciate that companies make Corporate Social Responsibility efforts a focus group was conducted. Eight people were selected for this focus group from various countries to ensure a wider representation of backgrounds: Estonia, Denmark, Latvia, the Czech Republic, Slovakia and Lithuania. There were 3 men and 5 women, the participants were not briefed before the focus group to ensure total objectivity of the data and the process.

Research results of the interviews and the focus group

Interviews

Prior to the interviews with experts there were several questions that the authors needed to get answers to from a real life business perspective about Corporate Social Responsibility. Up until the interview process the authors only had the theoretical answers from the literature review process. The authors did not let the theory influence the process of the interviews and humbly paid attention to the interviewees, which were the experts within CSR area.

The main question and the most telling about the subject of this research, that the interviewees were asked, was the necessity or the importance of CSR for the consumers. Edgars Petersons answered: *„They (consumers) demand more and companies have realized that, so companies are trying to cash in on that. It used to be that a company is giving money to charity and that was it, but now the consumer has also become more cynical and more difficult to convince. So companies now are thinking more of how to integrate CSR in the core of their brand.“*

A similar opinion is expressed by the other interviewees, which is also found to be true according to the studies in the subject examined during the literature review. Meaning that consumers, indeed, are demanding brands to be more socially responsible and that is shaping their buying behaviour. Therefore the companies are following the demand as a consequence. The interview with Edgars Petersons and other interviewees also reveal another telling key element, that companies have changed their approach of CSR. Companies used to make rather temporarily campaigns or even less simply give money to a charity fund. However, now companies have discovered that the consumer sees through the motivation of some companies' CSR activities, which makes them cynical, which is also what the scientific literature suggests. According to the interviewees, this factor has made companies more thorough in their CSR efforts, even more, it has made the companies to put their CSR activities at the core of their brand.

Another relevant question that is worth discussing was about how the companies get the information about the market tendencies particularly the necessity of CSR from the consumer point of view. Fleming Lyng Nielsen said that they are doing a thorough research about the needs of the customer, saying:

„Yes, we are hiring research and consulting companies to get information. We are talking to our peers, business partners and customers. We ask them does this and this make sense to you. We do customer perception studies. We also have students who are doing their PhD projects with relevant research for our company's CSR strategy.“

The same is expressed by Juste Brukiene and Otilia Dragan, who concur to Fleming's description of the process of getting vital information about customers' perception of Corporate Social Responsibility. This indicates that the necessity of CSR is very fundamentally established, because the companies do their own research as well, not just rely on the research from the academics and the scientific community, which shows alignment with the results from different areas and make a more compelling argument about the importance of CSR.

And finally, it is vital to know how companies measure the results and do these results confirm the necessity of CSR campaigns? Fleming Lyng Nielsen answered: *„We do customer perception studies. We also hire consultants and researchers to help us find out the effect of the campaigns.“* Otilia Dragan provided a more specific answer saying that: *„They (results from the research about CSR campaigns) show improved perception of our company. We see that we have a greater purpose doing what we do.“* These opinions are also in alignment with Edgars Petersons who suggests that:

„We can see the tendencies that it (CSR) does give positive platform for the brand and communication, and there are many world-wide studies that prove the fact that CSR is profitable.“

Focus group

The main part of the focus group was to find out if the consumers actually value corporate social responsibility, therefore does it even matter from a profit motive for the companies to go the extra mile and be socially responsible for the benefit of the community, the environment and even their own employees. First, starting by asking the respondents a simple question *„Does everyone know what is CSR?“* As a big surprise for the authors and the moderators of this focus group, the participants nearly unanimously said No, except for one of the respondent: *„Company has to have some sort of environmental responsibility. Especially if you are a huge company you should do charity.“* (Respondent 7) Perhaps it was due to the participants being shy at first, but later, though, the respondents became much more open and energetic, and provided longer and more detailed answers, that were useful for the research. After the first question, the authors explained to the respondents what CSR is, and gave examples of it, which immediately showed understanding in the participants of the focus group. *„It sounds so weird. I knew something like this, but did not know that this stands for that term.“* (Respondent 5)

The term CSR was very unclear to the respondents, and even though they knew CSR activities, they did not know that this phenomenon is called CSR, and certainly they did not know that the word 'Sustainability' stands for CSR (which it does, according to the interviewees and several scientific literature sources): *„That is very vague... I associate it to green energy“.* (Respondent 4) But despite the lack of knowledge about the term CSR, the respondents (consumers) have a very positive attitude towards what CSR actually stands for. For the question *„Would you be willing to switch to a product if you found out that the company producing this product does CSR, if the product cost the same compared to the alternative?“* The respondents answered unanimously *„Yes“*. To the question *„What if the CSR product costs more than the alternative? The answer largely was „Depends“: „Depends how much more, and what the product is.“* (Respondent 2)

A relevant aspect of seeing the value of CSR for the consumers was to find out if the consumer would tell their friends about a certain CSR activity? Because that indicates how relevant the CSR aspect is to the consumers, that they would try to convince their friends and peers about something that they themselves feel strongly compelled to support. And the answer to this vital question was mostly *„Yes“*. The answer was rather cautious in support of telling friends about a certain brand's CSR efforts when it came to posting it on Facebook (sharing a CSR related article, for example). The answers to this question were: *„Yes I would tell it. Depends how relevant it is to my friends. Some companies test cosmetics on animals. I have told a friend that.“* (Respondent 7). Others were a bit more distant into providing a positive answer to the question of whether they would share a CSR article about a brand on their Facebook wall: *„It depends on the issue, if it would matter to me than I would“* (Respondent 2) And some respondents simply answered with *„No“* (Respondent 3, Respondent 4, Respondent 6).

The focus group really became live on the question *„Does your favourite brand/ product is involved in CSR?“* The answers provided became more than just about favourite brands and CSR but the use of CSR for the companies in general.

„I would not know it unless I checked.“ (Respondent 6). Another respondent answered: *„Many big corporations do not do CSR, like Calvin Klein“* (Respondent 7). However, perhaps the most telling comment came from Respondent 2, saying that: *„In the production line they do some really messed*

up things, and then later they give money to charity, to make up for it (production)." This cynicism speaks directly to the research results from the interviews as well as what the scientific literature suggest, that consumers often see CSR as an escape from the social irresponsibility, as a means to make up for the enormous mistakes made in the community or in regards to the environment. It therefore suggest that companies should be careful not to come off as disingenuous, but be sincere in their CSR efforts. Another respondent concurred to this same thought, saying that: *„They are saving environment by giving you paper bag instead of plastic bag, even though they really screw up before (environmentally).*" (Respondent 6)

However, there was an answer that provided a fair and balanced view on companies that make CSR efforts: *„It is definitely not black or white issue. There are some companies that genuinely try to be as good as possible, but of course there are companies who only do it for profit or to cover up their lack or social responsibility.*" (Respondent 7) This opinion shows that while there are companies that deserve a cynical view from the consumers about their CSR activities, there are also that sincerely are caring about the community, their employees, the environment and the society in general.

There was also a specific example mentioned in the focus group discussion, particularly talking about the companies that are likeable due to their CSR efforts: *„But we learned about Innocent- they build their company based on a model that they only used fresh fruit, and give money to charity.*" (Respondent 6) This opinion that was echoed by others in the focus group shows that consumers are aware of the companies being socially responsible and appreciating it. Another company that was mentioned during this part of the focus group was Danfoss as also one of the companies being socially responsible. Although, in fairness, it could be because it is one of the largest companies in Southern Denmark. However, it still shows awareness for CSR activities of Danfoss that in this case is directly linked with likeability, which shows the importance of CSR. It was also observed that nationality of the participants of the focus group did not play a role in their responses to the questions and the process in general.

Conclusions, proposals, recommendations

- 1) The literature review combining many studies on the matter of CSR strongly confirm the importance of CSR for the consumers which is in alignment with the rest of the research. There is an overwhelming evidence of Corporate Social Responsibility is very important in the eyes of today's consumer. That was expressed by the experts of the CSR and marketing industry who are dealing with CSR campaigns. It was also evident by the focus group providing answers to questions about the relevance of CSR in their purchases and views on CSR driven brands in general.
- 2) Consumers often are quite skeptical and cynical due to companies that only follow CSR practices after being caught of being involved in wrong doing and being socially irresponsible, therefore the CSR campaigns and efforts have to be genuine, not as means to correct past mistakes.
- 3) Companies should embed CSR at the core of their brand and make their activities fundamental, continuous and not just temporary campaigns and a one- time donations to a charity organization, which might seem disingenuous in the eyes of the consumer.

Bibliography

1. Coombs, W., Holladay, S. (2012); *Managing Corporate Social Responsibility- A Communication Approach*. Malden: Blackwell Publishing.
2. Diehl, S., Terlutter, R., Mueller, B., (2016); *Doing Good Matters to Consumers: the Effectiveness of Humane-Oriented CSR Appeals in Cross-Cultural Standardized Advertising Campaigns*. *International Journal of Advertising*. 35:4, 730.-757.
3. Ihlen, O., Bartlett, J., May, S. (2011); *The Handbook of Communication and Corporate Social Responsibility*. Malden: John Wiley & Sons, Inc.
4. May, S., Cheney, G., Roper, J. (2007); *The Debate Over Corporate Social Responsibility*. New York: Oxford University Press, Inc.
5. Mirvis, P. (2008); *Can You Buy CSR?* *Journal of California Management Review*, Vol. 51, No. 1. Fall. Page 109.-115.
6. Mogeles, B., Tropp, J. (2010); *The Emergence of CSR as an Advertising Topic: A Longitudinal Study of German CSR Advertisements*. *Journal of Marketing Communications* Vol. 16, No. 3, July 2010, 163.-181.
7. Mooij, M. (2005); *Global Marketing and Advertising- Understanding Cultural Paradoxes*. London: Sage Publications.
8. Sohn, Y., Han, J., Lee, S. (2012); *Communication Strategies for Enhancing Perceived Fit in the CSR Sponsorship context*. *International Journal of Advertising*, 31(1), pp. 133.-146.
9. Vanhamme, J., Swaen, V., Berens, G., Janssen, C. (2015); *Playing With Fire: Aggravating and Buffering Effects of ex Ante CSR Communication Campaigns for Companies Facing Allegations of Social Irresponsibility*. *Mark Lett*, 26:565.-578.
10. Watt, K., (2010); *The Future of Sponsorship Integrated With CSR/CSI Strategy*. *Journal of Sponsorship*. VOL. 3. NO. 3. 220.-227. MAY 2010

COMPARISON OF THE BALTIC STATES' TAX REDUCTION POLICY FOR DONATIONS TO UNIVERSITIES

Laila Kundzina¹, Mg. hist.; **Baiba Rivza**², Prof. Dr. oec.

Abstract. The oldest Universities of the Baltic states: Vilnius University, Tartu University and University of Latvia are financed by governments. Finances are short for all universities' development plans and they are looking for donations from private patrons and entrepreneurs. Tax reduction substantially motivates philanthropists to donate to university development projects. Aim of this research is to compare the legal framework for attracting donations to universities of the Baltic States. In each of the Baltic States there is a different tax reduction policy, but in all countries are the same strands stated by state for stimulating receive tax reductions if philanthropists are willing to donate to universities. Tax reductions and their application principles to donors in the Baltic States provide a sound opportunity to donate to universities.

Key words: philanthropy, university, Baltic States, tax reduction policy, public benefit.

JEL code: M30

Introduction

Universities are increasingly looking for donations from private persons and entrepreneurs to supplement the public funding to contribute to various scholarships and research projects. This indicates that, in case of universities, the costs are proportionally higher than the revenue (Sato M., 2005). At present, universities can benefit from unprecedented opportunities (Orlikov J., 2006), receiving funding from the state and various European grants, which must be augmented by additional funding from philanthropists, both individuals and enterprises, to compete in the global market and simultaneously prove their competitiveness at the national level. To attain these aims, it is necessary to reduce costs while increasing productivity and finding alternative sources of revenue (Bloland H., 2002). This situation means that universities are compelled to invest more intense effort in seeking diverse sources of funding, including philanthropists' donations for university projects, scholarships. Throughout the world, the importance of donation to universities is considered a very important factor to ensure full development of universities (Barr N., 1993; Johnstone D., 2016; Chung-Hoon T., 2005; Fransen F., 2007; Jacobs L., 2007; White F., 2011). Tax reduction substantially motivate donation (Isa, R. 2014).

The authors' research is aimed at comparing the legal framework for attracting donations to universities of the Baltic States. The hypothesis – tax deductions and their application principles to philanthropists in the Baltic States provide a sound opportunity to donate to universities.

The research employs qualitative research: the logical constructive method, the monographic method, the method of analysis and synthesis. The research is based on scientific theoretical literature, scientific articles and the legal framework analysis of the Republic of Latvia, the Republic of Lithuania and the Republic of Estonia.

Research results and discussion

1. The legal framework for philanthropists and donation recipients in the Republic of Latvia

The tax reduction policy in the Republic of Latvia is defined by a number of regulatory documents. Associations and foundations need to register for the public benefit status granted by the Republic of Latvia Ministry of Finance to be able to provide tax incentives to their donors. The operation of public benefit organizations is governed by the Public Benefit Organization Law determining which organizations are to be considered public benefit, how do they obtain and lose that status, how donations can be received and used, as well as restrictions on the activities of these organizations and the use of donations. The law also determines the tax deductions that can be granted to natural

and legal persons who donate to a public benefit organization (Public Benefit Organization Law, 2004).

Public benefit organization status may be granted to an association, foundation or religious organization. The procedure of granting the status is maintained by the Public Benefit Commission. It consists of an equal number of authorized officials, as well as representatives of associations and foundations, and works under the auspices of State Revenue Service. It provides a justified opinion on the conformity of the applying association, foundation or religious organisation to the essentials of public benefit organisation activities, as well as the conformity of the use of property and financial means thereof to the provisions of the Public Benefit Organization Law. If such an opinion is received, the organization must additionally meet the following criteria: the purpose stated in the statutes, constitution or statutes of the association, foundation or religious organization is the activity of the public good, and the association, foundation or religious organization carries out the activity of public good; the association, foundation or religious organization has No tax debts (Law on Public Benefit Organizations, 2004). The non-governmental organisation that has received the status of the public benefit organization can attract donors – legal entities entitled to tax relief provided for in Section 12 of the Enterprise Income Tax Law – residents and permanent representations can receive a tax reduction in three different ways.

The law stipulates a tax relief to donors applicable to the taxpayer donating to a public benefit organisation. The taxpayer is entitled to choose one of the following relief possibilities:

- 1) Not to include the donated amount in the base taxable with the enterprise income tax in the taxation period but not more than 5 % of the profits from the previous reporting year after the calculated taxes (Enterprise Income Tax Law, 2017);

If, for example, in 2017, the profit for the previous reporting year is 10 000 euro, then the company is exempt from paying the enterprise income tax, if this company donates up to 500 euros (that is, 5 %) to a public benefit organisation.

$10\,000 \times 5\% = 500$ euro as the maximum in this case.

However, if the company donates over 500 euro, it has to pay an extra 25 %. For example, if 500 euros are donated and there is another donation of 500 euro, then that company donates those additional 500 euro and still has to pay 25 % enterprise income tax, which for the donating company means parting with 500 euro plus 125 euro.

- 2) Not to include the donated amount in the base taxable with the enterprise income tax in the taxation period but not more than 2 % of the total gross work remuneration calculated for employees in the previous reporting year from which State social insurance contributions have been made (Enterprise Income Tax Law, 2017);

If in 2017 the total gross salary of the employees was 10 000 euro, then 2 % is the donation ceiling.

$10\,000 \times 2\% = 200$ euro as the maximum in this case.

However, if the donor donates more than 200 euros, for example, another 200 euros, the donor pays enterprise income tax 25 % of the additionally donated amount, which in this case means paying additional 50 euro.

- 3) Since 2019, the following option is also in force: to reduce the enterprise income tax calculated on the dividends for the reporting year in the taxation period by 75 % of the donated amount but not exceeding 20 % of the calculated amount of enterprise income tax calculated on the dividends.

Choosing the third option, the donation amount does not reduce the taxable base, but instead reduces the enterprise income tax from dividends.

Private persons who have the right to use the tax relief specified in the Personal Income Tax Law – the relief on the taxable income of a natural person may not exceed 20 % of the taxable income (Personal Income Tax Law, 1993).

2. The legal framework for philanthropists and donation recipients in the Republic of Estonia

In the Republic of Estonia, for philanthropists to receive tax relief, the non-profit organization, foundation or religious organization, to whom the philanthropists aspire to donate, must be included into the list of non-profit associations, foundations and religious associations benefiting from income tax incentives approved by the government after obtaining a recommendation from expert committee. Then the philanthropist payable income tax can be reduced by the amount that equals the donated sum (Income Tax Act, 2000). New organizations are included in the list twice a year, and the list is confirmed by the government. The same status applies to donations made to church and parish registers (Income Tax Act, 2000). Organizations also have a duty to report to the Estonian Tax and Customs Board about their philanthropists, while the donors must fill out a tax declaration form. If any of these actions are not carried out, the donor will not receive tax deduction. Overall, a philanthropist, who is a private individual, can receive up to 5 % of the same year's income from which other deductions have already been made (interest, education costs etc.). The Tax and Customs Board may request documentary evidence of the donation (Income Tax Act, 2000).

Companies – philanthropists also receive tax relief, if the total donated amount does not exceed 10 % of the previous year's profit, or 3 % of the current year's social tax amount, i.e., 3 % of the sum of paid salaries and benefits (Income Tax Act, 2000). Tax reliefs are also applied to non-residents, whether corporate or private (Income Tax Act, 2000).

3. The legal framework for philanthropists and donation recipients in the Republic of Lithuania

In the Republic of Lithuania, donation is governed by the Law on Charity and Sponsorship Funds of the Republic of Lithuania, 2000. This law combines the definitions of charitable organizations and defines who can be a philanthropist and a recipient, as well as stipulates the legal framework for charity and sponsorship. Currently, both charity and sponsorship funds are entitled to establishing enterprises to carry out economic activities by that are not prohibited by law, do not run counter to the organisation's goals and are necessary to achieve the organisation's goals.

The purpose of the law is to determine in which cases the tax deductions and relief from import duties are applicable. The law distinguishes between the concepts of charity and sponsorship.

Charity is an activity aimed at:

- 1) assistance and free provision of services to persons to whom that is essential: physically restricted, sick or lonely people unable to work, orphans and children deprived of parental care, large families or families with insufficient resources, unemployed, as well as the people whose income fails to meet their minimal socially acceptable needs;
- 2) assistance to charity organizations and *Caritas* (Lithuanian Women's Association) organizations, as well as foundations and religious centres that implement charity and sponsor the individuals listed in Article 2 (1) (1), as well as Lithuanian communities abroad;
- 3) persons recognised as victims of war, natural disasters, fires, ecological catastrophes, epidemics, and outbreaks of contagious diseases, and assistance in relief of such catastrophes and epidemics;

- 4) assistance in finding employment by creating jobs or retraining socially excluded people who have lost their jobs.

On the other hand, sponsorship is aimed at:

- 1) promoting development of science, culture, education, art, religion, sport, health care or social care, and support programmes thereof;
- 2) to promote environmental protection and environmental planning programmes;
- 3) to support work programmes aimed at the protection of historical, natural, architectural, cultural and artistic monuments; and
- 4) to promote other programmes of social interest initiated by the Government of the Republic of Lithuania (Law on Charity and Sponsorship Funds of the Republic of Lithuania, 2012).

The funds of charitable organizations and foundations are completely exempt from income tax irrespective of the amount. However, if they generate income from economic activity and their income exceeds 300 000 euro per annum, the income tax of 15 % is applied to all the income brought by economic activity. For philanthropists, the portion of the donation that exceeds 20 % of taxable income is taxed according to the normal procedure. Unfortunately, this applies only to donors – legal entities. In the earlier version of the law, the philanthropists – private individuals were able to receive a reduction from income tax, reducing the taxable base amount by 15 %. In the later amendments to the law, this deduction disappeared, leaving only the deduction from income tax of legal entities (Jatautaite E., Vaidelyte E., 2015). For legal entities, the tax relief can reach even 40 % when donating to organizations with a charity recipient status. These can include not only charitable foundations but also schools, museums, libraries, etc. There is also a model, where an organization donates a certain percentage of its income to a charitable organization or to an organization with a charity recipient status. This percentage may not exceed 2 % (Jatautaite E., Vaidelyte E., 2015).

The Republic of Lithuania Law on Charity and Sponsorship Funds also provides for a special regulatory framework for the formation and management of endowment fund, which must also be laid down in the organisation's (i.e., Fund's) statutes, in accordance with the stipulations of the Law on Charity and Sponsorship Funds. The amount of the endowment fund may increase from the Fund's own resources, following the decision issued by the general meeting of the Fund's shareholders on the principles of investment policy for the next period, but not exceeding 50 %, or from the additional sums donated to endowment fund. Endowment fund may also decrease, but it must be restored over a period of three financial years from the date when the first decrease is registered. If the endowment capital is not restored within the period of three years, or has fallen by more than 30 % of the average endowment fund capital registered over three years, the law requires the Fund to terminate the management of endowment fund (Law on Charity and Sponsorship Funds of the Republic of Lithuania, 2012).

Lithuania's percentage system works quite similarly to other countries. Lithuanian citizens and non-residents of Lithuania may choose to divert up to 2 % of their paid personal income tax to the chosen public benefit structure. It is possible to divide 2 % in portions, provided the set amount is not below 2.9 euro. From July to mid-November of each calendar year, the tax inspectorate transfers the specified amounts to the recipients, whom the private philanthropists have indicated in their income declarations. The Lithuanian State Tax Inspectorate also publishes 2 % of the results for the year (Law on Charity and Sponsorship Funds of the Republic of Lithuania, 2012).

State-defined support strands for receiving tax reduction

Purpose of donation	Latvia	Lithuania	Estonia
Charity	X	X	X
Defence of human rights and individuals' rights	X	X	X
Promotion of civil society development	X	X	X
Promotion of science	X	X	X
Promotion of education	X	X	X
Promotion of culture	X	X	X
Promotion of health	X	X	X
Support to disease prevention	X	X	X
Support and promotion of sport	X	X	X
Environmental protection	X	X	X
Assistance in catastrophes and emergency situations	X	X	X
Raising of social welfare of society, especially the poor and socially disadvantaged groups	X	X	X
Support to religious organisations	X	X	X
Support to political organisations			
Support to enterprises			
Support to trade unions		X	X

Source: author's analysis based on documents' studies

Table 2

Tax reduction applicants

Types of philanthropists	Latvia	Lithuania	Estonia
Private individuals, residents	X	X	X
Private individuals, non-residents		X	X
Companies, residents	X	X	X
Companies, non-residents		X	X

Source: author's analysis based on documents' studies

State-defined support strands for receiving tax reduction for all the Baltic States generally are the same, the same are exceptions: do not support donations for political parties and enterprise organizations. Regarding the types of philanthropists who can receive tax reductions, only in Latvia non-residents cannot receive tax reductions.

Conclusions, proposals, recommendations

- 1) In defining the criteria for acquiring the status of a public benefit organization, the state indicates the purposes whose attainment it considers to be in public interest. Donation to such organizations permit to obtain tax relief, thus indicating that the state accepts the purposes for which these donations are being diverted. It does not only relieve the state of the required expenditure, but also promote the involvement of the wider society in solving topical problems. It might seem that legislation for non-governmental organizations should be as liberal as possible, so that engagement in civic activities is simple and, as a minimum, would not cause problems and losses.
- 2) On the other hand, the role of the state is to prevent abuse of the non-profit organization and public benefit organization status. The aim of the regulations is to ensure that private funds are to the highest possible level channelled to the purposes beneficial to the state and society.
- 3) In case of Latvia, tax reduction can only be obtained for donations to public benefit organizations, whereas tax relief is not granted for donation to organizations that have the same goals but have not obtained this status, nor for giving to organizations that work in several directions, including

those that might qualify as public benefit activities. Thus, in Latvia it is not possible to grant tax reduction for donations to specific projects, if they are not carried out by public benefit organizations. Such regulation to a certain extent limits the possibilities for donation, as well as the opportunities to implement public benefit projects, if aspired to by organizations whose main activity does not fall within the definition of public benefit.

- 4) The legal framework of the Republic of Latvia provides for tax reduction to philanthropists who are residents of Latvia: companies and private persons. Businesses and individuals who are non-residents of the Republic of Latvia in case of donation are not subject to tax relief. The new legal framework for philanthropists – companies – has been recently changed, despite the heated public protests of the associations and foundations. Prospectively, a study would be needed exploring the ways how the new legal framework has changed the culture of donation from the perspective of companies.
- 5) The legal framework of the Republic of Estonia provides for more extensive possibilities for philanthropists' groups to receive tax relief, donations can be made by both residents and non-residents. On the other hand, there are only two options for applying tax rebates.
- 6) The legal framework of the Republic of Lithuania provides extensive opportunities for philanthropists to receive tax relief. However, the recipients of donations have to wait over half a year until they receive donations for the previous period. Lithuanian charity and sponsorship funds can engage in economic activities and receive tax reductions on the respective taxes. It is an additional incentive for organizations to develop and increase their charity activities based on additional income.
- 7) To sum up, all three Baltic States have a sufficient legal framework, enabling attraction of donations to the universities, ensured by the valid tax incentives and their application principles to philanthropists.
- 8) The questions arising from the current study: Do universities of the Baltic States have strategies for attracting donations based on the existing legal framework for philanthropists, enabling them to receive tax relief? If such strategies exist, are they updated with the changes of the tax reduction policy?

Acknowledgments

The preparation of the paper was supported by the National Research Programme 5.2. Project „INTERFRAME-LV”.

Bibliography

1. Barr, N.A. (1993). Alternative Funding Resources for Higher Education. *Econ. J.* 103, pp. 718–728.
2. Betzler D. U. (2014). Governance and Professionalization in Fundraising Management. *Doctoral thesis.* Faculty of Economics and Social Sciences of the University of Fribourg, Fribourg, p. 180.
3. Bloland, H.G. (2002). No longer emerging, fundraising is a profession. *CASE Int. J. Educ. Adv.* p. 3, 7–19.
4. Chung-Hoon, T.L.; Hite, J.M.; Hite, S.J. (2005). Searching for enduring donor relationships: Evidence for factors and strategies in a Donor/Organization integration model for fund raising. *CASE Int. J. Educ. Adv.* p. 6, 34–53.
5. Enterprise Income Tax: The Republic of Latvia law. (2017). *Latvijas Vestnesis*, No. 156, 08.08.2017, p. 2.
6. Franses, F.J. (2007). Leveraging philanthropy in Higher Education. *Acad. Quest.* 2007, p. 20, 150–153.
7. Income Tax Act: The Republic of Estonia law. (2000). Retrieved: <https://www.riigiteataja.ee/en/eli/504092017017/consolide>. Access: 15.02.2019.
8. Isa R. M. (2014). Growing the University's funding through philanthropy: an Australian and a Malaysian case study. *Doctoral thesis.* University of Tasmania. p. 128.
9. Jacobs, L. (2007). The kindness of strangers: Philanthropy and Higher Education. *CASE Int. J. Educ. Adv.* p. 7, 65–67.

10. Jatautaite, B., Vaidelyte, R. (2017). Lithuania Country Report. *ERNOP publication*. Retrieved: <http://ernop.eu/wp-content/uploads/2017/01/Giving-in-Europe-2013-total-versie-16-01-2017-upload-to-ERNOP.pdf>. Access: 15.02.2019.
11. Johnstone, D.B. (2004). University revenue diversification through philanthropy: International perspectives. Retrieved: <http://www.intconfhighered.org/BruceJohnstone.pdf>. Access: 15.02.2019.
12. Law on Charity and Sponsorship: The Republic of Lithuania law. (1993). Retrieved: <https://e-seimas.lrs.lt/portal/legalActPrint/lt?jfwid=rivwzvpng&documentId=TAIS.21900&category=TAD>. Access: 15.02.2019.
13. Moore D, Hadzi-Miceva, K., Bullain, N. (2008). A Comparative Overview of Public Benefit Status in Europe. *International Journal of Not-for-Profit Law*, 11(1). Retrieved: http://www.icnl.org/research/journal/vol11iss1/special_1.htm. Access: 15.02.2019.
14. On Personal Income Tax: The Republic of Latvia law. (1993). *Latvijas Vestnesis*, No. 32, 01.06.1993, p. 6.
15. On Taxes and Duties: The Republic of Latvia law. (1995). *Latvijas Vestnesis*, No. 26, 01.04.1995, p. 15.
16. Orlikoff, J.E.; Totten, M.K. (2006). Philanthropy and governance. It's déjà vu all over again. *Healthc. Exec.* p. 22, 54–57.
17. Public Benefit Organisation Law: The Republic of Latvia law. (2004). *Latvijas Vēstnesis*, No. 106, 07.07.2004, p. 7.
18. Rutzen, D., Moore, D., Durham, M. (2009). The Legal Framework for Not-for-Profit Organizations in Central and Eastern Europe. The International Journal of Not-for-Profit Law, 11(2), *International Center for Not-for-Profit Law*. Retrieved: [http://www.icnl.org/research/resources/regional/CEE %20Overview_eng.pdf](http://www.icnl.org/research/resources/regional/CEE%20Overview_eng.pdf). Access: 15.02.2019.
19. Sato, M. Education, (2005). Ethnicity and Economics: Higher Education Reforms in Malaysia 1957–2003. Nagoya Univ. *Commer. Bus. Adm.* p. 1, 73–88.
20. White, F.L. (2011). Creating effective Board-CEO relationships and fundraising to achieve successful student outcomes. *New Dir. Community Coll.* p. 156, 23–29.

REGIONAL CONTEXT OF DOMESTIC TRAVEL IN LATVIA

Eriks Lingeberzins¹, dr.oec., assoc.prof.
Turība University

Abstract. Tourism is often considered as an opportunity for sustainable development, providing opportunities in job creation, rising awareness of cultural heritage and stimulating local economies via service exports. While much of scientific and applied research is targeting international tourism in the context of service exports, current evidence shows that international tourism does not provide equal opportunities for all regions and tourism places. Therefore, current tourism studies suggest paying attention also to domestic tourism that has been unnecessarily forgotten even. Topic is of a particular interest in developed countries where domestic tourism forms important part of all tourism transactions including overnight stays and revenues not to forget also positive social impact on regional development. Lack of comprehensive research does not allow proposing specific development strategies for regions and local municipalities. The aim of the research is to obtain comprehensive data about current domestic travel trends in Latvia. In order to fill this information gap, quantitative research with more than 1700 respondents has been completed. Research object is domestic travel habits. Results disclose strong presence of domestic tourism in Latvia, at the same time highlights need to address various challenges – among first to be mentioned is the large number of one day visitors, instead of overnight travellers, problems related to information access and local resident willingness to travel within region of their domicile. Results clearly demonstrate current situation as well as suggest activities to be performed by those involved in tourism planning and in execution, including tourism entrepreneurs.

Key words: domestic tourism, tourism destinations, destination preferences.

JEL code: L83.

Introduction

Tourism industry has been on a track of stable growth for past decade. This growth reflects in increasing number of international tourist arrivals globally, increasing spending on tourism, diversification of trips and modification of customer preferences towards destination selection. Even international tourism is considered as the most important part of this development, current statistics in the European Union indicates on strong importance of domestic travel. Similarly, across the world domestic tourism is gaining its attention as is more often admitted to be an important player in the tourism and hospitality business. The lack of scientific and applied research limits from understanding domestic tourism trends and Latvia is not an exception. Available statistics (CSP, 2018) provides overall indications about existing domestic tourism trends and also points to large differences on the number of overnight visitors in Riga and its surroundings at the rest of the country. Obviously, this allows initiating discussion about current challenges and possible development scenarios for economically sustainable domestic tourism development in Latvia. This discussion is of a particular importance in Latvia where certain regions and tourism areas are in a need of strong tourism development strategies, providing opportunities for new job places, economic development and overall development of tourism infrastructure. Prior to developing strategies to attract international tourists, strong development of domestic tourism can give solid ground to create international strategies. The aim of the research is to explore current trends of domestic travel in Latvia and develop recommendations to elaborate guidelines for tourism planning strategies, stimulating the interest in domestic travel in Latvia. To achieve this aim, quantitative research with respondents, living in largest cities of Latvia that represent high proportion of potential domestic travel has been done.

¹ Graudu street 68, Riga, LV1058, Latvia. Eriks.Lingeberzins@inbox.lv

Quantitative research that has been done, based on electronic survey of more than 1700 respondents in major cities of Latvia, allows analysing current trends of domestic tourism and comprehensive results illustrate main challenges of tourism business environment. Author suggests that addressing the perception of domestic travel and changing attitudes towards domestic travel has potential to stimulate growth of domestic tourism intensity. The main task of the research has been to perform quantitative research with respondents in all major cities of Latvia, thus having opportunity to analyse differences among regions of Latvia in relation to travel habits, intensity, destination preferences, duration and spending. Results can provide unique opportunities for local municipalities interested in domestic travel, tourism information centres and those in charge of tourism policies, in particular the Ministry of Economics and the Department of Tourism of the Latvia Investment and Development Agency (LIAA). They can also be a source for regional entrepreneurs aiming to attract domestic travellers and raise share of this market segment.

The importance of domestic tourism

Although the concept of domestic tourism is clear for the industry professionals and those engaged in providing of tourism services, there is No one universal definition that could cover all aspects of it. Overall perception of the terminology can be grounded in A.K. Bhatia summary of definitions, claiming it to be a form of tourism where people traveling outside of their domicile to certain areas within the country (Bhatia, 2007; Hall and Lew, 2009). The complexity of domestic tourism can be explored also within the context of tourism statistical accounts and general definition of tourism. C.M. Hall and S. Page indicate on existing practice to underestimate the performance of domestic tourism as often domestic tourism accounts are not related to tourism statistics due to the fact that not all domestic tourists are considered as overnight visitors. Still, their contribution to economy might be important and should be considered (Hall, Page, 2005). In the meantime, current statistics on tourism spending and tourism contribution to economy in the European Union indicates on strong presence of domestic tourism and emphasize the importance of the tourism form. In 2018 World Travel and Tourism Council in its annual report indicates that 67.1 % of total tourism spending in Europe relates to domestic tourism and the total value of domestic tourism transactions has exceeded 1 billion EUR a year. It is also expected that in the period until 2020 annual growth of domestic tourism spending will be increase by at least 1.7 % a year (WTTC, 2018). Similar tendency is confirmed also by the European Commission, indicating that Europeans spend 74 % if their holiday trips in their own country, thus confirming very strong importance of domestic travel in Europe. Among economically active citizens in the age group between 25 and 44, 51 % admit that they travel only domestic and the share of those traveling only domestic below 50 % is only in age groups of 15 to 24 years and 45 to 64 years (UNWTO, 2018). These Figures allow concluding that domestic tourism as a form of tourism plays overall important role in the tourism and hospitality industry from the economical point of view and at the same time invites to explore the topic in depth. There are various further discourses that can be analysed and they may include traveller motivation, impact on regional economy, local inhabitant awareness of local heritage and some others.

There are various approaches countries have applied to stimulate growth of domestic tourism. There are countries that have used the power of domestic tourism to solve some economic problems and dissociating from the global political context Russia can be used an example of rapid growth of domestic tourism, stimulated by certain mechanisms. In response to declining incoming tourism Figures and in responding to economic sanctions applied by the European Union, Russian Federal Agency for Tourism (Rostourism) has prioritized domestic tourism politically. This resulted in an

increasing number of operators working domestically, increasing number of arriving tourists to some existing tourism destinations such as Moscow, St. Petersburg and the Golden Ring, as well as the implementation of new strategies aiming to develop new destinations, including Siberia and Altai Krai in particular (Veselova, 2017). Slightly different approach has been used in Italy, where an emphasis in domestic tourism development has been by analysing the importance and the potential of UNESCO's World Heritage Sites in stimulating domestic tourism flows and analysing trends of domestic tourism (Patuelli-, et.al., 2013). Even these two approaches are different as they based on different models in customer attraction, they still have a common aim that is to increase domestic tourism flows and add certain value to domestic travel. Among the main conclusions of research lead by R. Patuelli is a conclusion that by increasing particular region (on tourist area) attractiveness, in domestic travel context inhabitants of surrounding regions considering them as potential domestic travel destinations. This assumption confirms conclusions made by R. Nair and J. Ramachandran claiming that successful development of domestic tourism is possible once domestic travellers are perceived as self-tailoring customers and their destination selection often is determined by destination attractiveness and perception of destination attractiveness (Nair, Ramachandran, 2016).

R. Scheyvens has been exploring development of domestic tourism and has concluded that researchers often consider domestic tourism as „poor cousin“ in opposition to international tourism (Scheyvens, 2007). Same considerations have been explored also by other authors (Ghimire, 2001; Coles, Timothy, 2004). At the same time she emphasizes various aspects how domestic tourism can contribute to development, highlighting that domestic tourism can bring economic benefits to areas not frequented by other tourists, contribute goods and provide financial assistance to families of more distant areas, increase spending on locally produced products, provide multiplier effect on local skills and resources and it is less seasonal compared to foreign tourists (Scheyvents, 2007). Ironically, the paradox of disrespecting domestic tourism and its positive impact on economy and sustainable development of tourism is more common in developing countries while developed countries have realized the potential and the importance of domestic tourism (Kabote, Mamimine, Muranda, 2017). Most common reason of undermining the importance of domestic tourism is within lack and willingness to understand the motivation of domestic travellers to choose or not to choose traveling within country of their residence. Destination awareness, destination preference, intention to visit is the most common elements to be considered in analysing destination selection. These are influenced by such factors as personal characteristics, motives, values, attitudes, money, time, weather transportation, travel companion and others (Li, Meng, Zhang, 2016). It can be concluded that there is a need to create interest to engage in domestic travel and that can be done by creating favourable conditions and rising awareness of travel, as observed previously in examples from cases in Russia (Veselova, 2017), Italy (Patuelli-, et.al., 2013) and India (Nair, Ramachandran, 2016). The need to learn and analyse prospective domestic visitors, including their motivation, destination selection tactics, destination and experience preferences is strongly supported also by T. Huybers, analysing tourism trends in Australia and admitting the trend in a shift to more regular domestic travel in general in various countries, including Australia (Huybers, 2003). Fast development of social media can be considered as another boost to bright future perspective of domestic tourism, as social media disclose new opportunities to those in charge of destination development where access to domestic inhabitants is much easier than it has been ever before (Hysi, Gorcia, Luzi, 2015).

These arguments allow concluding that domestic tourism should be explored as an opportunity for regional economic development and appropriate research can support initiatives, performed by local municipalities, tourism agencies and other entrepreneurs.

Domestic tourism in Latvia: switch from visitors to tourists

In order to identify current trends of domestic tourism in Latvia, to evaluate domestic tourist profiles and the destination perception, quantitative survey has been performed. Sample size of the research is 1732 respondents who are residents of major cities in Latvia – Riga, Daugavpils, Rezekne, Vamiera, Jelgava, Jekabpils Jurmala, Liepaja and Ventspils. Currently presented results are interspace results of research aiming to analysing differences among customer perception towards domestic tourism destination selection and decision making process based on their domicile in one of the cities included in the research. The research is continuous and further data will allow analysing domestic travel trends, based also on the origin of traveller. However, with sample the given sample size of 1732 respondents in relation to all inhabitants of Latvia results are with 99 % confidence interval and not less than 4 % margin of error. Therefore, if not analysed by addressing differences among inhabitants of each particular city, they represent high level of credibility (Kristapsone, Kamerāde, 2011: 78; Hair-, et. all, 2003:218). Sampling has been organized as online survey, thus making it voluntary survey, during the period from October 26th, 2018 to January 7th, 2019. Survey web link has been promoted via various social media channels, including Facebook, Twitter and Draugiem.lv. Facebook provided tool Ads Manager has been used to promote survey and 46 617 people have been reached with 4175 engagements. During entire data collection period, audience targeting has been used, concentrating on residents of specific areas and age groups. Additionally to that, survey link has been distributed via e-mail, to random 5000 recipients. Survey consist of 29 questions, with multiple choice questions regarding regularity of travel, period within which decision is made, points of interest, range of expenditures on travel services and accommodation, preferred type of accommodation, motivation to travel, areas of interest, sources to gather information about possible destination, as well as a list of specific questions regarding selected destinations. In order to obtain data regarding the importance of specific services, products, areas of improvements Likert scale attitude questions have been asked. Respondents are representing different age groups (19 % are in the age group 18-24 years, 38 % in the age group 25-34 years, 23 % in the age group 35-44 years, 13 % in the age group 45-54 years and 26 % in the age group of 55+), different occupation types (66 % are employees, 12 % students, 12 % self-employed, individual entrepreneurs, contractual workers or employers, 4 % unemployed and 6 % retired). Survey has been made available both in Latvian and Russian languages, aiming to reach as diverse sample, as possible. Data reliability tests for quantitative data have been done using SPSS, to collect data in summarized version, Google Forms have been used.

Research data demonstrates that overall engagement in domestic travel is high – 82.4 % respondents have answered positively, confirming they are considering themselves as regular domestic travellers. Even this Figure exceeds average number of domestic travellers in the European Union – 74 % (UNWTO, 2018), in depth data analysis indicates on strong presence of visitors (one day travellers) and tourists (including overnight). 35.3 % have indicated that their travel duration is only 1 day that allows considering them as visitors, remarkably reducing the number of domestic travellers according to the notion of the definition of domestic traveller. Asked about preferred overnight accommodation establishment, 44 % have indicated that most of their trips are one full

day trips not involving any accommodation at all. These data clearly indicate that domestic tourism, at least in its traditional interpretation, in Latvia at the present moment is less developed as it might look at a first glance, at the same time, there is a clear observation that confirms local resident strong interest in domestic travel. Therefore, author concludes that extending of average duration of a trip, seeking appropriate and attractive forms encouraging local residents to extend their domestic trips, adding at least one overnight could become a task for domestic tourism developers, in particular regional tourism organizations, tourism associations and tourism entrepreneurs. Exploring the part of those respondents who have indicated that they do not travel (not even as visitors) domestically most often are respondents from Liepaja, Rzekne and Riga, more often in the age groups 45-54 years and 55+ years.

Frequency of domestic travel is in average higher for those in the age group 25-34 years and in this age group more common is domestic traveling including at least 1 overnight stay. While in all other age groups the number of domestic trips including overnight stay can be considered as equal. Overall, majority of respondents have indicated that they travel 2-3 times in average a year – 43 % of respondents fit into this group, followed by those traveling 4-6 times a year – 22 % and 7-10 times a year – 13 %. Considering previous observation and conclusion regarding misinterpretation of domestic tourists and visitors and based on survey data, author concludes that among those who have indicated that they travel not more than 2-3 times a year is higher probability of promoting domestic tourism with overnight stays. This observation can be addressed by local tourism authorities and municipalities in communication of respective group of domestic visitors with highest potential of transitioning to domestic travellers.

Destination selection when considering and planning domestic trips highlights strong preferences among all respondents in all age groups, travelling frequencies and domiciles. In this questions respondents were allowed to give multiple answers and results gives the total number of responses for each of proposed answers.

Table 1

Latvia residents' domestic tourism destination preferences

Object	Times mentioned
Natural areas and/or objects (natural parks, nature trails, caves, etc.)	1090
Cities of Latvia, separate independent best known tourism objects (sights)	732
Mix of various interdependent objects	725
Sights and objects related to cultural heritage (churches, museums, castles, manors etc.)	668
Active tourism sights (skiing, biking, canoeing, horseback riding)	453
Largest cities of Latvia	407
Rural areas (villages, farms, craftsman houses, countryside houses etc.)	252

Source: author's data

Author suggests that the data indicates on very strong preference towards rural areas, when choosing domestic travel destinations and that currently the main limitation is the lack of overnight stays in the region. These data are better explained when analysed in relation to expectations of activities and destination offerings. Piece and silence is most often mentioned as first option what tourists and visitors expect from domestic travel in Latvia. This is first preference among those who are 1 day travellers and should be considered as visitors and those who travel with an inclusion of at least 1 overnight stay and can be considered as domestic travellers according to the definition. This answer scores an average of 3.20 evaluation, where 1 means that proposed option is not important and 5 means it is very important when traveling domestically. This is followed by gastronomic and

culinary offering in the destination scoring an average score of 3.18 points and followed by active tourism offer with an average score of 3.17 points. Among other options for answers were proposed also cultural offers and entertainment, rural farms and agricultural tourism offers, opportunity to meet new people and acquaintances and event (concert of festival taking place in the destination). Piece and silence is the option that most often has been mentioned as very important (228 times or 15.9 % among all respondents), followed by gastronomic and culinary offering (187 times or 13,1 % among all respondents) and active tourism offer (140 times or 9.7 % among all respondents). As important most often has been mentioned active tourism offer (544 times or 38,2 % among all respondents), followed by gastronomic and culinary offering (512 times or 35.8 % among all respondents) and cultural offers and entertainment (474 times or 33,1 % among all respondents). Opportunity to meet new people, visit to rural farms and agricultural tourism offers are most often mentioned as unimportant, when making decisions about destination for domestic tourism trips. It allows concluding that overall aim and primary interest among all respondents is nature based tourism activities that might be supplemented with gastronomic and culinary offerings and eventually some elements of active tourism. Author suggest that these conclusions could be taken into considering when developing regional tourism strategies and designing tourism products. At the same time, it is important to note that even cultural offers and entertainment or events taking place in destination are not among first named very important and important reasons to visit destinations, results indicate on strong presence of large target groups who still find these as important factors and they should be explore in-depth, developing targeted niche products, respecting interests of these perspective client groups.

As existing travellers have very useful and practical information that allows developing strategies and action plans, special attention has been paid to feedback received from those who actively engage in domestic travel or at least domestic visits with a purpose related to tourism. Respondents have been asked to assess the importance of improvements and disclose required improvements, prioritizing them. Respondents have been asked to evaluate the importance to improve accommodation options, including the number of accommodation establishments and quality of provided service, entertainment options, active tourism opportunities, the number of quality of catering options, infrastructure objects, comforTable recreation areas nearby water reservoirs, education in nature protection area, road signs to accommodation establishments, infrastructure objects and major tourism sights, information accessibility, and others, in total 12 questions. Among all respondents and all questions most often as very important improvement required to improve domestic traveling experience has been mentioned road signs to accommodation establishments, infrastructure objects and major tourism sights – 736 this has been mentioned as a very important task, followed by comforTable recreation areas nearby water reservoirs – 621 time and infrastructure objects, including nature trails, observation towers and bike routes – 601 time. Most often as important has been mentioned entertainment opportunities and events – 729 times, the number and service quality of accommodation establishments – 718 times and active tourism opportunities – also 718 times. These data clearly confirm previously observed trend where domestic travellers are seeking experiences related to nature objects and different type of outdoor activities allows concluding that domestic travel in Latvia, overall, is nature based, providing opportunities for regions, including their nature parks or nature protected areas to engage actively in domestic tourism.

These observations are reconfirmed by another question that was asked to evaluate the scenarios that would encourage tourists and visitors to return to a destination they have already visited.

Respondents were offered multiple choices (13 in total) of various tourism products and services and asked to assess how they feel about them being important in making decision to return to a destination they have already been. Also here clearly can be observed overall trend confirming domestic traveller and visitor interest in nature based tourism, as nature, possibility to explore new scenery has highest evaluation of being an important factor making decision to return – 34.4 % respondents claim this is a very important factor and 46.2 % claims this is an important factor. 26.5 % have stated that opportunities for families traveling with children would be very important and for 32.2 % it would be an important pull factor to return. In this question can be observed also interest in culture heritage as a motivator and point of interest in travel as 50.2 % have admitted that cultural and entertainment activities, including concerts or exhibitions could be an important pull factor (as very important it is for 15.2 % respondents).

On the opposite side, response can be also observed from the point of view about areas that are of a less importance and could not be considered as important pull factors to visit a destination again. Sport events, activities related to gastronomy and culinary heritage, new or interesting accommodation establishments or new restaurants are not likely pull factors to attract repeating visitors to a destination they have once visited. Creative workshops for 15.1 %, sport events for 15.8 % and new accommodation establishments for 13.4 % are completely unimportant pull factors to return.

Overall, it can be concluded that there is moderately strong optimism towards domestic tourism in general, as among all respondents 63.3 % have admitted that they are either confident or fully confident that within the following year they will be traveling more in Latvia. 27.5 % are unsure if they will or not and only remaining 9.2 % most probably will not travel more regularly domestically. Respondents were asked about their preferred region to travel next time evaluating probability their next travel destination will be Riga, Vidzeme, Kurzeme, Zemgale or Latgale. Results are summarized in Table 2.

Table 2

Destination of next domestic tourism trip

	Very little	Little	Neutral	Positive	Very positive
Riga	34.2 %	15.0 %	15.0 %	10.2 %	25.6 %
Vidzeme	4.9 %	11.6 %	26.8 %	28.8 %	27.9 %
Kurzeme	5.9 %	7.0 %	20.6 %	28.2 %	38.3 %
Zemgale	9.7 %	18.3 %	31.8 %	23.8 %	16.4 %
Latgale	11.4 %	16.8 %	25.8 %	21.5 %	24.5 %

(Research data)

Obviously can be explained very little probability that the next domestic tourism trip will be to Riga is due to the high concentration of inhabitants in Riga city and surrounding areas. While other figures according to research data and author's opinion clearly highlights general trend of destination preferences – Kurzeme can be considered as the most popular domestic tourism destination when considering next trip and at the same time it can be considered that Zemgale needs stronger communication to domestic tourism consumer as high number of neutral responses can indicated on need to stronger communicate destination among potential clients.

Conclusions, proposals, recommendations

- 1) Research results indicate and allow concluding that overall there are positive prospects for domestic tourism in Latvia; even there is a strong need to encourage domestic tourism product development, aiming to increase trips with overnight stays. It is recommended for all involved

stakeholders involved in tourism planning to address this issue in relationship with service providers. Further research on spending and correlation analysis with general accommodation establishment prices is required to obtain in depth understanding of reasons.

- 2) Domestic tourism products should be developed respecting local resident strong preferences towards nature based activities. Respecting this preference can be a starting point in developing tourism routes and programmes that can allow integrating further points of interest. In this context, policies and practice regarding road signs appears to be a crucial factor encouraging guests to engage more actively in domestic travel.
- 3) Cultural heritage that traditionally is promoted as primary destination attraction should be reinvented by offering new approaches as research result clearly indicates on comparably weak interest in culture heritage in domestic tourism trips. It is recommended to explore optimal communication channels to create awareness and interest about culture heritage tourism opportunities in Latvia.
- 4) Research results in relation to destination preference selection indicate on differences among various regions of Latvia. This requires comprehensive further analysis on destination image and factors affecting it. It can be expected that continuation of the research and obtaining sufficient data to analyse domestic travel habits in cross-regional context will allow having further understanding about domestic tourist movements in Latvia between major cities.
- 5) Domestic travel, as a form of travel, should be considered seriously as a tool for regional economic development. This is a common practice in various European countries and globally and the international practice has demonstrated positive impact of strong domestic tourism to the overall development of tourism industries and related industries.

Bibliography

1. Bhatia, A.K. (2007). *The Business of Tourism and Concepts*. Sterling Publishing, p.460.
2. Central Statistical Bureau of Latvia (CSP), (2018). *Tourism in Latvia 2018*, p. 64.
3. Coles, T., Timothy, D.J. (2004). *Tourism, Diasporas and Space*. Routledge, p. 320.
4. Ghimire, K.B. (2001). The growth of national and regional tourism in developing countries: an overview. In Ghimire, K. editor. *The native tourist: mass tourism within developing countries*. Earthscan, pp. 86-108.
5. Hair, J.F., Babin, B., Money, A.H.et.al. (2003). *Essentials of Business Research Methods*. Leyh Publishing, 440 p.
6. Hall, C.M., Page, S. (2005). *The Geography of Tourism and Recreation*. Routledge, p. 456.
7. Hall, C.M., Lew, A.A. (2009). *Understanding and managing tourism impacts. An integrated approach*, Routledge, p. 388.
8. Hysi, V., Gorkia, K., Luzi, S. (2015). Social Media: Opening New Doors for the Domestic Tourism Industry in Albania. *ACTA Universitatis Danubius*. Vol. 11, No.2, pp. 168-178.
9. Huybert, T. (2003). Domestic Tourism Destination Choices – a Choice Modelling Analysis. *International Journal of Tourism Research*. 5, pp. 445-459.
10. Kabote, F., Mamimine, P.W., Muranda, Z. (2017). Domestic tourism for sustainable development in developing countries. *African Journal of Hospitality, Tourism and Leisure*. Volume 6 (2), pp. 1-12.
11. Kristapsons, S., Kamerāde, D.u.c. (2011). *Ievads pētniecībā: stratēģijas, dizaini, metodes*. Rīga: RaKa, 284 lpp.
12. Li, H., Meng, F., Zhang, Z. (2016). Non-participation of Domestic Tourism: Analyzing the influence of Discouraging Factors. *International Journal of Tourism Research*. (18), pp. 567-578.
13. Nair, R.B., Ramachandran, J. (2016). Determinants of Domestic Tourism Growth in India. *SDMIMD Journal of Management*. Vol. 7, Issue 1. pp. 49-55.
14. Patuelli, R., Mussoni, M., Candela, G. (2013). The effects of World Heritage Sites on domestic tourism: a spatial interaction model for Italy. *Journal of Geographic Systems*, Vol.15, Issue 3, pp. 369-402.
15. Scheyvens, R. (2007). *Valuing the development potential of domestic and diaspora tourism*. *Progress in Development Studies* 7,4, pp. 307-325.
16. UNWTO (2018). *European Union Tourism Trends*, p.126.
17. Veselova, E.S. (2017). Tourism. The Mobilization of Internal Resources. *Problems of Economic in Transition*. Vol. 59, No 6, pp. 411-242.
18. World Travel and Tourism Council (2018). *Economic impact 2018*. Europe, p.20.

SATISFACTION WITH ENVIRONMENT OF REGIONAL HEALTH CARE INSTITUTION: PATIENTS' OPINIONS AND SOCIETAL STEREOTYPES

Arturs Medveckis¹, Dr. paed.; **Tamara Pigozne**², Dr. paed.,
¹Liepaja University; ²University of Latvia

Abstract. Several factors determine selection of a medical institution: demand, accessibility, quota system, distance from residence etc. However, patients' subjective attitude towards the medical system and especially towards the medical establishment is also important, which is optimal in terms of accessibility. Patients' attitude depends on the direct personal experience which has been obtained in the particular medical establishment. Information found by patients, while communicating with each other in social environment, is important, similarly encountering media environment and communication in social networks. Negative information is sometimes perceived or even stereotypes cultivated without direct experience, which contrast the true situation.

To assess patients' opinion on Regional Hospital's environment, extensive studies were carried out in one of Latvia Regional Hospitals during 2007 and 2016, based on direct information acquisition from patients who received a particular medical service cycle in Admission Department, also when discharging from certain profile departments. During the research confirmation was obtained that patients assess objectively provided service quality, express attitude towards different aspects of physical and social environment. Comparative studies provide patients' opinion in dynamics about satisfaction with Regional Hospital's environment, medical staff's attitude towards patients. To make sure improvements of Regional Hospital's environment and service quality are objectively assessed in social environment, qualitative research was carried in 2018 to find out whether in the region living potential patients' opinions reflect the real situation, and whether negative stereotypes exist. Conclusion made that respondents have overcome negative stereotypes, essential improvements of service quality have been noticed objectively, affecting physical and social environment.

Key words: satisfaction, hospital environment, quality of service

JEL code: R58, I31

Introduction

The state protects people's health (The Constitution of the Republic of Latvia, 1922). Stating and implementing the policy and activities of all communities, a high level of people's health protection has to be provided (The consolidated version of the contract about Foundation of the European Union and European Community, 2007). Improvement of patients' service is one of healthcare responsibilities. Patients/clients' well-being is greatly affected not only by the process and outcomes of the treatment or provided service, but also by the access to the service, culture of communication, as well as the environmental accessibility and quality. Information on how patients assess the work of healthcare institutions: what gives them satisfaction, what claims there are, what expectations there were and the real assessment (of expectations) based on the personal experience, can facilitate development of particular improvement measures.

In recent decades the interest in patients' satisfaction with the quality of healthcare and environment as its essential criterion has increased (Valencia-Arias et al., 2018). Patient's satisfaction as the individual's positive assessment about different healthcare dimensions (Linder-Pelz, 1982) or assessment of the particular service received includes cognition and emotional reactions (Fitzpatrick, 1997). In its turn, the quality of service is a measurement of how satisfactorily the delivered service can meet the standard or justify the client's expectations (Azmi et al., 2018). The quality of service has been analysed in five dimensions.

- Tangibility is the physical evidence of the service, e.g. appearance of tools, gadgets and physical facilities, applied to provide the service.

¹ arturs.medveckis@liepu.lv

² tamara.pigozne@lu.lv

- Reliability is the ability to perform the promised service in an accurate, precise and neat way.
- Responsiveness is the employees' readiness and willingness to assist customers, providing them with services in good time.
- Assurance is the employees' knowledge and ability to have trust and confidence in customers.
- Empathy is caring, individualized and customized attention to the customer (Parasuraman et al., 1985).

The framework of the integrative quality is based on the model of the holistic quality system, which consists of 3 domains related to quality:

- Paying attention to the manufactured attributes/products, their quality and design during the production process;
- Focusing on how the manufacturer produces and provides services during the experience process, which is affected by patients' knowledge, motivation and emotions;
- Emphasizing the quality assessment during the assessment process according to clients' hopes and expectations (Golder et al., 2012).

The criteria of the healthcare quality identified in the critical review are accessibility of services, communication with the staff, care workers' knowledge and skills, hospital staff's responsiveness, responsibility, attitude, behaviour, flexibility, dignity, faithfulness, privacy, pain management, information, cleanliness, silence etc. (Ferrand et al., 2016), also modern and efficient technologies (Okpala, 2018), social responsibility (Radu, 2018), and flexibility of service convenience (Sergio, 2015; Ponsignon et al., 2015; Kumar et al., 2017).

Service convenience in the healthcare context is characterized by the ability to react flexibly to the patient's desires in order to provide a convenient and efficient service. There is a correlation between patients' satisfaction and service convenience flexibility, concentrating on the delivery place and time, new, unique and innovative value-added services, different registration modes in the healthcare delivery system, etc. (Kumar et al., 2017).

The outcomes of the research confirm that the emotional intellect is one of the patients' determinant factors of satisfaction - a positive and statistically significant relationship between „the satisfaction scores and emphatic concern, utilization of emotions, and emotional awareness subheadings of the patients“ (Celik, 2017, 1363), doctors' empathy (Wang et al., 2018) and nurses' leadership styles (Sfantou et al., 2017) has been identified.

In 2007 and 2016, a study was carried out in one of regional hospitals of Latvia in order to find out patients' opinions on the services, course of treatment, medical staff's attitude provided in the hospital in order, applying the obtained outcomes of the research analysis, assess claims, identify possible insufficiencies in patients' service and improve the system of measures in the hospital work development, in order to analyse patients' satisfaction with the service quality provided by the hospital in dynamics. One of the reasons for a repeated study was the reconstruction carried out in the hospital (from February 2011 till September 2014). After the reconstruction not only the outer appearance has changed, but also the infrastructure has been improved, better energy efficiency achieved, indoor aesthetic environment has changed and functionality of the rooms available for patients enhanced. Standard departments with a modern planning have been built. Also, new equipment for diagnostics and treatment has been obtained. When implementing the reconstruction of the hospital, lots of attention has been paid to both the hospital staff and clients' convenience. The focus of the research has been directed towards the assessment of Environmental Improvements on patients/ clients' well-being.

The outcomes of the research cannot be related to the work of healthcare institutions in the whole country, they only reflect the patients/clients' assessment in the particular regional hospital. Findings of the research cycle have been used for service culture enhancement and patients/clients' satisfaction increase. Such an approach can also be applicable for the assessment of own work and environmental culture organization in other healthcare institutions.

Goal of the research: analyse in dynamics patients/clients' opinions and society's stereotypes about the satisfaction with the regional hospital's environment.

In 2007 and 2016 research methodology was developed studying and adapting to local needs the applied methods of the World Health Organization's (WHO) hospital performance assessment project „Performance Assessment Tool for Quality Improvement in Hospitals (PATH)“ and the self-assessment model used in US hospitals „Consumer Assessment of Healthcare Providers and Systems (CHAPS)“.

The empirical methods applied in the research:

- Data acquisition methods (survey and focus group discussions);
- Data processing methods Kolmogorov-Smirnov's Test for the empirical division determination, Mann-Whitney U Test and Kruskal-Wallis H Test for the difference determination between the criteria and indices depending on the respondents' profile, Kendall's Tau-b Test for the coherence determination and Chi-Square for the comparison of 2007 and 2016 outcomes for the quantitative data processing of the programme in the SPSS environment.

The research has been implemented in 3 stages:

- Stage 1 from June 1 till July 1, 2007;
- Stage 2 from July 5 till September 14, 2016;
- Stage 3 from September 10 till October 10, 2018.

In the survey, the questions were included which reflect information on the length of treatment, number of patients in a ward, staff's culture of communication, accessibility of the physical environment, informative environment etc., which enabled to obtain a direct respondents' subjective point of view about the quality of service, satisfaction with services, doctors' attitude, satisfaction with the infrastructure and environment applicable and available for the hospital patients etc.

The respondents' selection was determined according to the nesting principle in order all departments of the medical institution would be represented, determining the number of respondents in the selection proportionally to the number of patients in the full previous year, within the margin of a 5 % tolerable statistical error.

In Stage 1 of the research, 444 respondents (patients) took place, but in Stage 2 of the research 483 respondents (patients) participated, who during the survey were discharged from the hospital:

- 137 men and 346 women;
- 303 towns where the regional hospital, inhabitants are located; 89 regional inhabitants and 91 inhabitants from other regions;
- 18 aged 14-18, 143 aged 19-39, 180 aged 40-65, 152 older than 66.

In Stage 3 of the research, 9 respondents of each focus group took part in the interviews, modelling the represented respondents' profile according to the age, gender and division of residence, but they are the people who have not used the hospital services for at least 2 years.

In the daily informative environment, we sometimes encounter an opinion expressed by individual people on topics topical to the society, including accessibility of medical institutions, quality of

treatment, service and medical staff's attitude to patients. The most active commentators of the informative reports or articles are sometimes the sceptically-orientated ones.

With the help of the focus group interview there has been set a goal in the research to find an answer to the question whether in the social environment stereotypes are generated about the quality of the institution's medical and physical environment which has not been rooted in the personal experience?

In data of 2007 the reflected gender proportion confirms that there are women almost twice as more (65.5 %), whereas the data of 2016 mark slight changes, where the proportion of women among the patients increases up to 71.4 %.

Two essential aspects characterize the accessibility of healthcare: the financial one – people's opportunities to use healthcare services depending on their financial means, and the accessibility – possibilities to get to the doctor, distance to the healthcare institution, as well as the opportunity to receive medical services (doctor's availability and working hours). The regional hospital offers medical services to anybody, whoever needs them. However, they are basically used by the city inhabitants of the regional hospital's location and people of its nearest rural territory and towns within 100km radius. Similarly to the survey in 2007, the people living in the regional city dominate in the patients' flow – 62.7 % (in 2007- 73.4 %). The number of patients who do not live in the particular region has increased: if in 2007 there were 4.3 % such respondents, then in 2016 there were already 18.8 % such respondents. This leads to the conclusion that the services of Regional Hospital are chosen not only by the inhabitants who live nearby, but also by patients who have chosen their treatment purposefully just in the particular hospital and not in the medical institution closest to their place of residence.

Most patients (72 %) still received their treatment in Regional Hospital for the first time and their assessment of the hospital's service culture was not influenced by the previous experience. In 2007 there were 66.9 % such patients. The patients, who have been to the hospital for the second time or several times, most probably, express their subjective assessment comparing it with their previous experience, which in most cases, assessing in dynamics, is with a positive tendency.

In 2007 on average patients were treated in the hospital for 21 days, but in 2016 the length of treatment decreased by 6 days. The decrease of the days spent in hospital confirms the successfully introduced approach in the treatment process, patients more often go home, but they only go to hospital when there are planned treatments, check-ups, they stay at the day care unit.

According to the data of Survey in 2016, 23 % of respondents received their treatment in a single-room ward, in comparison with the data of Survey in 2007, the number has decreased by 3.1 %. The number of patients who received their treatment in a double-room ward has slightly changed: the results of Survey in 2016 are similar to the results of Survey in 2007 (in 2016 35.4 % respondents, in 2007 35.6 % respondents). Comparing the research outcomes of Stage 1 and 2, the number of patients placed in triple-room wards has increased essentially ($p \leq 0.05$). If in 2007 only 16 % of the surveyed patients were treated in a triple-room wards, then in 2016 38.9 % of patients were treated in a triple-room ward. The number of patients has decreased who were treated in a quadruple and more room wards. In 2007 there were 13.7 % such respondents, but in 2016 – only 2.1 % respondents. Also, the number of patients who were more than four in a ward has decreased: in Survey 2016 the number has decreased from 8.6 % (in 2007) to 0.4 % (in 2016).

Research results and discussion

Admission Department is sometimes the first place the patient encounters when gets to hospital. It is a place where the first aid is provided and the patient's health problems are assessed in order to refer patients further for an appropriate treatment. The patient makes a direct first impression just about Admission Department.

In order to find out satisfaction with the quality of service in Admission Department, the patient was asked to give their subjective assessment, as well as assess the timely help provision, show to what extent they are satisfied with the services of Admission Department. The outcomes of the survey prove that 74.8 % of respondents are satisfied with Admission Department services, but 19.4 % of respondents are partly satisfied.

There is a statistically significant correlation ($p \leq 0.05$; $r = 0.83$) between the quality assessment of Admission Department services and the time spent in Admission Department – most of the respondents who have spent in Admission Department less than 30 min are satisfied with the quality of services, whereas the most dissatisfied ones are the respondents who have spent in Admission Department more than two hours. Respondents' satisfaction with the quality of Admission Department's services is inversely proportional to the time spent in Admission Department - it increases when the time spent in Admission Department decreases, and it decreases when the time spent in Admission Department increases. Quite logical is the tendency: the more time is spent in Admission Department, the lower assessment is received for the quality of the obtained service ($p \leq 0.05$).

In the comments written by patients the long waiting time has been mentioned as a reason for dissatisfaction. It can be concluded that dissatisfaction is caused not by the quality of service (staff's attitude, quality of the performed treatments, professionalism, quality of help provision etc.), but rather the long time spent in Admission Department.

There is a statistically significant difference ($p \leq 0.05$) between the time spent in Admission Department in 2007 and 2016, marking a positive dynamics: the number of patients who have spent there up to 30 min has increased essentially, so decreasing the number of patients who have spent there more than 2 hours.

The results of Mann-Whitney U Test confirm a statistically significant difference ($p \leq 0.05$) in the quality assessment of Admission Department's services depending on the respondents' gender – males are tended to assess it higher (Mean rank=232.89) than females (Mean rank=209.68).

The results of Kruskal-Wallis H Test confirm a statistically significant difference ($p \leq 0.05$) in the quality assessment of Admission Department's services depending on the respondents' age – respondents aged 14-18 are tended to assess it higher (Mean rank=235.09) in comparison with the respondents aged 19-39 (Mean rank=200.58).

Most or 88.2 % of the surveyed patients have assessed the quality of services provided by Regional Hospital as positive. The data of Survey 2016 have marked a positive tendency in its assessment – a statistically important difference ($p \leq 0.05$) has been noticed between the satisfaction with the quality of services provided by Regional Hospital in 2007 and 2016 – the number of the respondents who are completely satisfied with it has increased.

Patients' satisfaction with the provided service quality is related to awareness of the quality of the surrounding environment, as well as assessment of the social environment which depends on the mutual medical staff and patient's communication culture, as well as on the systemic standard congruity or incongruity with patients' expectations, for instance, waiting time to receive services.

The reasons for dissatisfaction with the quality of the regional hospital's services in 2016 are mentioned such as food (the reason for dissatisfaction 30 times). It is likely that the assessment has not been affected by the quality of the food, which complies with the set diagnosis requirements, but rather their eating habits, family traditions etc., and this is also confirmed with the comments expressed by patients: *vegetarian food, fresh fruit and vegetables should also be included in the offer*. For some patients the food seemed too salty, for others too small portions. Some patients have expressed their dissatisfaction with the doctors' attitude (mentioned 6 times as the reason for dissatisfaction). On very few occasions the reason for dissatisfaction was the nurses' attitude, quality of the performed tests (mentioned as a reason for dissatisfaction 3 times) and access to the necessary objects in rooms, corridors, treatment rooms, lift, etc. (mentioned as a reason for dissatisfaction twice).

As a recapitulative hospital service assessment could be used the respondents' reply to the question whether they would recommend the hospital to others or whether they themselves would choose it again in case of a necessity.

The outcomes of Survey 2016 prove that 89.5 % of respondents would recommend the services of Regional Hospital to their relatives, friends, acquaintances, but 86.4 % of the respondents would choose the hospital again in case of a necessity.

In 2016, a positive tendency was observed in comparison with 2007 – the number of patients has increased who have positive feelings regarding the service culture and environment in general, and in case of a necessity, they would be ready to recommend this hospital to their relatives, friends and family members, also, if there was such a need, they would be ready to receive treatment for themselves there.

The outcomes of Kruskal-Wallis H Test confirm that there is a statistically significant difference ($p \leq 0.05$) between the opinion whether Regional Hospital would be chosen as a place for treatment and respondents' place of residence in case of a necessity. A positive answer has been given by respondents living somewhere else (Mean rank=267.90) in comparison with the respondents living in the city where Regional Hospital is located (Mean rank=220.58).

In general, the outcomes of Survey 2016 reflect a very positive assessment of the hospital and staff's activity. Several indices prove that, especially the respondents' positive attitude, expressing an assumption that in case of a necessity they would choose Regional Hospital for treatment purposes and would also recommend others to do it.

In the interviews of the focus groups opinions were found out about the environment of Regional Hospital from the point of view of the people who have not used the hospital services recently, which was important in the research in order to find out who and what way creates the attitude towards the hospital environment.

In the epitome of the interviews it was revealed that the social experience developed historically is sometimes related to the preconceptions about the current situation what it is like in Regional Hospital: *I had received treatment in Riga Old Clinic. The atmosphere was depressing. Buildings reminded me of a museum. Cramped for space and overpopulation. I could not imagine that our Regional Hospital would change my impressions about the hospital environment. That is true, one can get lost at first if a room has to be found. (Male, 24, city dweller)*

People of rural areas, who have lost their opportunities to receive certain medical services in the nearest medical institution, consider distance as the main problem, paying less attention to the aesthetic or functional environmental factors of the renovated hospital: *For me it would be better if*

I could go to my hospital with my health problems, but there are No more such departments and specialists. Now I have to drive 60km from my house. Everything is alright if you make an appointment in advance and wait for your turn, but getting there is difficult. (Female, 35, town dweller)

The developed infrastructure has been approved which preserves personal privacy: I really do not feel like putting my problems for everybody on a tray. It used to be very annoying when some time ago I had to sit at a door on which it was written what kind of room it was. Now only the number of the room is written on the door and on my appointment note. (Female, 46, city dweller)

Technologies and informative resources of the 21st century are important achievements. However, possibilities of face-to-face communication are appreciated highly: *For an elderly person it is not easy to deal with the room numbers unless nurses help them. It is hard to follow the lights when they are on and when you can go in or when you have already missed your turn. No way I could manage it without my daughter's help. (Female, 79, rural resident)*

People, who have encountered services of medical institutions for several decades, can assess objectively the changes of the environment and service culture: *I have faced hospital several times during my lifetime. It cannot be compared with the appearance of the newly-built hospital 30 years ago and now. When my first child was born, it was another time. I have had to visit my relatives recently. It is better than in a hotel. (female, 50, city dweller)*

The assumption that negative stereotypes have got an essential importance was not approved. Nowadays informative space provides fast circulation of information. However, negative comments are quite often reproduced in news portals by a limited range of people. The assumption, that the people who are not the medical service recipients themselves, are affected by the information and manifested attitude of the closest people's circle has been partly approved. Moreover, stereotypes are generated by the opinions expressed in the mass media, which may not coincide with the immediate information, obtained in the quantitative study straight from the service recipients, that has been obtained straight after the discharge from hospital.

Conclusions, proposals, recommendations

- 1) The assessment of Regional Hospital's physical and social environment has been positive in general from the patients' point of view both in research 2007 and 2016. The positive assessment in dynamics is even more distinct that was affected by the modernization and infrastructure development of Regional Hospital, which provides a better service accessibility for patients and enables the hospital to implement higher quality standards in health care.
- 2) The proactive action of Regional Hospital's administration has promoted high standard improvement of the social environment and communication culture.
- 3) The relatively low number of dissatisfied patients has been assessed as a special case. However, it has been a ground for negative comments presence in the informative space. In Stage 1 of the research existence of separate negative impressions was affected by the negative social and personal experience developed historically during several decades- stereotypes, which were associated with the environment of medical institutions in different curative establishments. In Stage 2 of the research it was possible to notice that the presence of negative stereotypes has decreased essentially, which can be explained with the proportional increase of the new patients' generation whose personal experience is not related to the negative past heritage.
- 4) In group interviews , which were specially directed to find out the existence of stereotypes, it has been discovered that also the people, who have not encountered the regional hospital's

environment recently, do not represent any stereotypes in general, which could have been met ten or more years ago, but they make objective judgements about the environmental coordination and on separate occasions they refer to the problems which emerge from the patient's individual desires or systemic problems as well, determined by the service availability quota and the waiting time related to it.

- 5) The stereotypes noticed during the last decade and earlier cultivated myth about the dissatisfactory or partly satisfactory hospital environment were decreased by the objective improvements of the situation, which are appreciated by any service recipient and the approval received from the professional medical staff's associations, Latvian Medical Association available of the public information space.
- 6) The outcomes of the research cannot be related to the work of healthcare institutions in the whole country, they only reflect the patients/clients' assessment in the particular regional hospital. Findings of the research cycle have been used for service culture enhancement and patients/clients' satisfaction increase. Such an approach can also be applicable for the assessment of own work and environmental culture organization in other healthcare institutions. Systemic and systematic monitoring of patients' satisfaction and the desire to improve the service quality is an essential tool for patients' satisfaction enhancement. Its introduction in all medical service provision institutions would be a highly recommended measure.

Bibliography

1. Azmi, T., Rahman, H., Mustafi, M.A.A., Islam, R. (2017). Measurement of Patient Satisfaction with SERVQUAL Model of Private Hospitals: SEM Approach. *American Journal of Management*, 17(3), 64-76.
2. Celik, G.O. (2017). The relationship between patient satisfaction and emotional intelligence skills of nurses working in surgical clinics. *Patient Preference and Adherence*, 11, 1363-1368.
3. Champagne, F., Guisset, A.L., Veillard, J., & Trabut, I. Performance Assessment Tool for Quality Improvement in Hospitals (PATH). (2005). Available: <http://www.irspum.umontreal.ca/rapportpdf/R05-06.pdf>
4. Consumer Assessment of Healthcare Providers and Systems (CHAPS). Available: <https://www.cms.gov/Research-Statistics-Data-and-Systems/Research/CAHPS/>
5. Ferrand, Y., Siemens, J., Weathers, D., Fredendall, L.D., Choi, Y., Pirrallo, R.G., & Bitner, M. (2016). Patient Satisfaction with Healthcare Services: A Critical Review. *Quality Management Journal*, 23(4), 6-22.
6. Fitzpatrick, R. (1997). The assessment of patient satisfaction. In C. Jenkinson *Assessment and evaluation of health and medical care*. Buckingham: Open University Press, 85-101.
7. Golder, p. N., Mitra, D., & Moorman, C. 2012. What is quality? An integrative framework of processes and states. *Journal of Marketing*, 76, 1-12.
8. Kumar, P., Sasadhar Bera, S., & Chakraborty, S. (2017). An Examination of the Association between Service Convenience Flexibility in Healthcare Delivery Systems and Patient Satisfaction. *South Asian Journal of Management*, 24(4), 35-54.
9. Linder-Pelz, S. (1982). Social psychological determinants of patient satisfaction: a five test hypothesis. *Social Science and Medicine*, 16, 583-589.
10. Okpala, p. (2018). Assessment of the influence of technology on the cost of healthcare service and patient's satisfaction. *International Journal of Healthcare Management*, 11(4), 351-355.
11. Parasuraman, A., Zeithaml, V. A., & Berry, L. L. (1985). A conceptual model of service quality and its implications for future research. *Journal of Marketing*, 49(4), 41-50.
12. Ponsignon, FreWilliams, M., & Hall, J. (2015). Healthcare experience quality: an empirical exploration using content analysis techniques. *Journal of Service Management*, 25(3), 3-29.
13. Radu, G., Maria Radu, M., Andrei Condurache, A., & Victor Lorin Purcarea, V.L. (2018). Managerial strategies and policies – Analysis of patient satisfaction based on demographic data. *Journal of Medicine and Life*, 11(3), 218-224.
14. Sergio, A. (2015). A model of antecedents for the co-creation of value in health care: An application of Structural Equation Modeling, *Brazilian Business Review*, 12(6), 121-149.
15. Sfantou, D.E., Laliotis, A., Patelarou, A.E., Sifaki-Pistolla, D., Matalliotakis, M., & Patelarou, E. (2017). Importance of Leadership Style towards Quality of Care Measures in Healthcare Settings: A Systematic Review. *Healthcare*, 5(4), 73.
16. The consolidated version of the contract about Foundation of the European Union and European Community. (2007). Available: <http://www.ecb.europa.eu/ecb/legal/pdf/ce32120061229lv00010331.pdf>
17. The Constitution of the Republic of Latvia. (1922). Available: <http://likumi.lv/doc.php?id=57980>

18. Valencia-Arias, A., Bran-Piedahita, L., Botero-Zapata, Benjumea, M., & Palacios-Moya, L. (2018). Mapping the Healthcare Service Quality Domain: A Bibliometric Analysis. *Journal of Clinical and Diagnostic Research*, 12(8), 1-5.
19. Wang, H., Kline, J.A., Jackson, B.E., Laureano-Philips, J., Robinson, R.D., Cowden, C.D., d'Etienne, J.P., Arze, S.E., & Zenarosa, N.R. (2018). Association between emergency physician self-reported empathy and patient satisfaction. *PLOS ONE*, 13, 1-12.

LATVIAN NONES AND CHRISTIANS: THEIR VALUE PROFILES

Mareks Niklass¹, Dr.sc.soc./ researcher; **Agita Misane**², Dr.phil./leading researcher
¹University of Latvia; ²Rīga Stradins University

Abstract. The present study explores the values of Christians as compared to those of the „religious nones” - unchurched or religiously indifferent part of the Latvian society. The content of the term ‘value’ is often overlooked and the actual values of those who identify with religious tradition have remained insufficiently studied in Latvia. The authors use the theory of basic human values developed by Shalom H. Schwartz and the data from a representative survey carried out in 2015 to measure and compare the values of various religious groups. The logistic regression analysis identifies that one’s religious affiliation have a significant impact on the higher order values of conservation and self-transcendence but No effect on one’s openness to changes or self-enhancement. Borrowing from Scott Page’s ideas on diversity, the authors conclude that various religious groups (including nones) within a religiously highly diverse society should inevitably become more similar by various measures including their value-orientations.

Key words: theory of basic human values, Christian values, religious nones.

JEL code: N30.

Introduction – the research problem and theoretical approach

Already fifty years ago, social scientists had come up with as much as one hundred eighty different definitions of the term ‘value’ (Lautmann 1969) – we may assume that the number is even higher now. The authors of this paper have adopted the classical understanding suggested by Clyde Kluckhohn: „A value is a conception, explicit or implicit, distinctive of an individual or characteristic of a group, of the desirable which influences the selection from available modes, means, and ends of action” (Kluckhohn, 1951, p. 359). As Helmut Thome has acutely observed, this definition implies several distinctions (Thome, 2009, pp. 279-281). These are the distinctions of concepts, ideas or ideals versus valued or desired objects, the desired versus the desirable, and also the selection of modes and means of actions versus selection of perceptions. What is most important for the purpose of the present study – values serve as characteristics of certain identity, individual or collective. „Christian”, „traditional” or „Latvian values” often evoked in the public discourse are all examples of the above. However, even the apologists of the above concepts often find it difficult to explain their contents.

In the public discourse of modern secular societies, the Christian message is sometimes deprived of its transcendent, ontological content and serves as a therapeutic culture-religion concerned mainly with preservation of the social order (Taylor, 2007). The authors believe it is the case also in Latvia and this is why collective value characteristics (like „Christian values” and „traditional values”) are often used interchangeably. The content of the term ‘value’ is often overlooked and even more so, the actual values of those who identify with religious tradition have remained insufficiently studied.

This contribution is aimed at the exploration of values of the Christians as compared to the values of the „religious nones” - unchurched or religiously indifferent part of the Latvian society, i.e. individuals who would choose the option „none” when surveyed about their religious affiliation.

Empirical social research usually relies on the assumption that values are observable and measurable. The instrument presently used for such measurements is representative social surveys. Two most common modes of interpretation are those promoted by Ronald Inglehart’s materialistic and post-materialistic value theory and Shalom H. Schwartz’s theory of basic human values, respectively.

¹ Tel.: +371 259971880 E-mail address: mareks.niklass@lu.lv

Inglehart's theory concentrates primarily on the value change as exemplified by the shift from materialistic to post-materialistic values (Inglehart, 1997). His understanding of value function reads as follows: „Value orientations set standards for desirable and undesirable goals“ (Inglehart & Wetzel, 2005, p. 23). Inglehart's two basic hypotheses are 'scarcity hypothesis', i.e. implying that individuals objectively assign highest value to those entities that are limited in supply, and 'socialization hypothesis', stating that individuals' basic values are developed through lifetime and largely root in the socialization experience during their pre-adult life, i.e. „People tend to retain a given set of value priorities through adult life, once it has been established in their formative years.“(Inglehart, 1997, p. 23).

Schwartz defines values as „desirable, trans-situational goals, varying in importance, that serve as guiding principles in the life of a person or other social entity“ (Schwartz, 1994, p. 21). His theory identifies ten universal human values and organizes them in four groups. (Schwartz, 1994; Schwartz, 2003). These are further explained through sets of underlying motivators. The borders between the values are somewhat blurred as one may mix into another - theory also describes how the values are connected and affect each other, either in coordination or in contradiction. Thus, openness to change motivates self-direction and stimulation, self-enhancement drives hedonism, power and personal achievement, conservation is a motivator for security, conformity and tradition, while self-transcendence drives towards benevolence and universalism. Values can lightly or more strongly oppose each other, which has led Schwartz to the organization of the values in a circle along two polar dimensions or axes. The first dimension is openness to change versus conservation, or independence versus obedience. The second dimension is self-enhancement versus self-transcendence and opposes the interests of one-self and concern with the welfare of others.

The studies that compare Inglehart's and Schwartz's models remain few. Wilson (2005) has concluded that post-materialism is positively correlated with universalism, self-direction and benevolence (values of self-transcendence) but negatively correlated with conformity, security and power. Becker, Siegers and Kuntz (Becker, Siegers & Kuntz, 2012, p. 20) have concluded that both theories have different theoretical and empirical contents and do not refer to the same underlying phenomena. They concluded that Schwartz's model is better suited to explain the social and moral attitudes of particular groups, similar conclusion has been reached in a study on political choices (Rossteutscher, 2005).

The aim of this study was to compare the values of the self-defined Christians in Latvia to those of 'nones' or religiously non-affiliated residents, using Shalom H.Schwartz'es basic human value theory. Thus we intend to discover if there are differences between the religious (Christian) and non-religious segments of the Latvia's population and, also, between different Christian denominational and demographic groups.

1. Data and methodology

The present study analyses a data set of a representative survey of Latvian residents organized by the Advanced Social and Political Research Institute at the University of Latvia in 2015. The authors use the Schwartz's Human Values Scale (2003) to measure the value predispositions of Latvian residents. The questionnaire included 21 items asking respondents to agree or disagree with such statements like „Thinking up new ideas and being creative is important to him/her“ or „Having a good time is important to him/her“ (Schwartz, 2003, pp. 284-286). Respondents could choose answers from a six point Likert scale, where 1 corresponds to „very much like me“, 2 - „like me“, 3 - „somewhat like me“, 4 - „a little like me“, 5 - „not like me“ and 6 - „not like me at all“.

The authors derive four distinct higher order values from the Human Value Scale, i.e. openness to change, conservation, self-enhancement and self-transcendence. Openness to change indicates one's predisposition to pursue any intellectual or emotional directions one wishes, however unpredictable or uncertain the outcomes (ESS EduNet, 2013). Conservation is about one's predisposition to preserve the status quo and the certainty in one's relationships with others. Self-enhancement is one's pursuit of self-interests even at the expense of others. At last, self-transcendence corresponds to one's predisposition to transcend one's interests and to promote the welfare of others (ESS EduNet, 2013).

The authors followed the same procedures how to construct new variables indicating each higher order value as indicated in the above European Social Survey website (ESS EduNet, 2013). The variables are the mean of those questionnaire items accounting for one or another higher order value. Therefore, they retain the same scale and are easy to interpret. Cronbach's alpha was calculated for each higher order value (see Table 1) to check the reliability of newly created items.

Table 1

Cronbach's alpha for each of the higher-order values

Higher order values	Cronbach's alpha	Number of questionnaire items
Openness to change	0.689	6
Conservation	0.627	6
Self-enhancement	0.682	4
Self-transcendence	0.654	5

The Cronbach's alpha values are lower in comparison with other countries where similar studies have been conducted (Schwartz, 2003, p. 318). It suggests that the calculated higher order values and the subsequent study results should be carefully considered. However, it could be noted that Slovenia and Israel show similar results as regard to the Cronbach's alpha values, therefore, the current calculations are not to be viewed as something extraordinary (Schwartz, 2003, p.318).

Initially, the authors intended to use linear regression to find out which factors account for the value predispositions of Latvian residents. However, all items failed the test of normality and no transformation (log-transformation and square root calculations) redressed the issue. Another concern was multicollinearity between two important items included in regression models, i.e. one's religious affiliation and language spoken at home. In Latvia, those who identify themselves as Orthodox believers tend to be Russian speaking (81 % in the sample). Similarly, Lutherans are predominantly ethnic Latvians (100 % in the sample). At last, most items included in regression analysis are categorical variables (regions, religious affiliations, education level etc.). Hence, it would be difficult to establish linear relationship between dependent and independent variables.

As a result, the authors decided to dichotomize the scale with a cut point 2.5 on the Likert six point scale, which closely corresponds to the answers of respondents „very much like me” and „like me”. The dichotomized higher order value items could be used in binary logistic regression analysis, which is a more robust method and less prone to the violations of different assumptions. The outcome (dependent) variable identifies two groups of respondents, i.e. those with distinct predisposition to a higher order value and those with low scores on the scale (with little or no predisposition). Logistic regression model shows which factors account for the predisposition of one's openness to changes or self-transcendence.

2. Empirical results

The authors include nine dependent variables in logistic regression models. One's gender, age (three age groups), education level, employment status, minors at home, language spoken at home, religious affiliation, regions and an item indicating the attendance of regular church services in the last two years (see Table 2 for the descriptive statistics of the sample). Women and the elderly attend church services more often (Misane, 2014) and thus may have been exposed to church teachings more intensively. As indicated above, the language spoken at home and one's religious affiliation are closely correlated. There are also considerable regional differences in Latvia in terms of living standards, educational levels attained and urbanization. The presence of minors at home may influence one's lifestyle and outlook on many things. Caring parents may have to take into consideration the interests of others. The attendance of regular church services may promote certain value traits. Regular churchgoers may have more may be less likely to pursue their interests at the expense of others as this is what the church doctrine teaches.

Table 2

Description of Data Set for Logistic Regression Analysis

		%		%	
Gender	Men	46.2	Regions	Riga	31.3
	Women	53.8		Riga metropolitan	18.2
Age	15-34	33.7	Other regions	50.5	
	35-54	36.9	Religious affiliation	Non-affiliated	21.3
	55+	29.4		Orthodox	30.1
Educational level	Primary	16.4		Catholics	21.2
	Secondary	18.5		Lutherans	21.2
	Secondary vocational	31.3		Other Christian	6.3
	Tertiary	33.8	Regular service attendance in the last two years	Yes	24.6
Employment status	Not employed (unemployed/inactive)	37.6		No	75.4
	Employed	62.4	Dichotomized scores for higher order values	Openness to change	41.9
Minors in one's household	No minors	71.8		Conservation	48.2
	Minors	28.2		Self-enhancement	29.1
Language spoken at home	Non-Latvian	38.8		Self-transcendence	68.6
	Latvian	61.2			

n=948

**Atheists, non-Christians and those who could not identify their religious affiliation are not included. They represent 5.3 % of all cases. Their numbers are too small to treat them as separate groups and analytic categories.*

***"Dichotomized scores for higher order values" are calculated as a share of those respondents with values equal or less than 2.5 (a cut point) on a six point scale where 1 stands for very much like me, 6 – not like me at all.*

41.9 % of respondents may be identified as open to changes. One might expect that various factors account for that. However, the logistic regression model presented in Table 3 shows that only one's age and the presence of minors at home are the factors, which explain the value predisposition of openness to change. Young people aged 15-34 are much more likely to show the value trait. To a lesser degree, it holds true also for those who have children at home. One's education level and religious affiliation have No impact on one's openness to change. It is also sometimes believed that religious people are reluctant to embrace new ideas. 48.2 % of respondents have scored high on the conservation scale. One might argue that a well-known pattern emerges. Women, older respondents,

those living outside metropolitan areas, those affiliated with certain religious groups and church goers are more likely to score high on the conservation value scale. A closer inspection of the model shows some differences between religious groups. In comparison with „nones“, Orthodox believers, Catholics and a small minority of other Christians groups tend be more predisposed to preserve the status quo. However, there are essentially No differences between non-affiliated and Lutherans in this regard. The interaction between one’s language and religious affiliation also play a part. Non-Latvian speaking population in different religious affiliation groups are more inclined to preserve the status quo.

Table 3

Predisposition of being open to changes and predisposition to conservation

		Open to changes		Conservation	
		p-value	Exp(b)	p-value	Exp(b)
Gender	Men (ref.)				
	women	0.70	0.95	0.00	1.82
Age	15-34	0.00	5.43	0.00	0.33
	35-54	0.00	1.93	0.00	0.43
	55+ (ref.)	0.00		0.00	
Education	Primary	0.62	1.13	0.06	0.64
	Secondary	0.06	1.49	0.74	0.93
	Secondary vocational	0.10	1.35	0.70	1.07
	Tertiary (ref.)	0.21		0.15	
Employment status	Not employed (ref.)				
	Employed	0.41	1.15	0.60	0.92
	No minors (ref.)				
Minors in household	Minors	0.00	1.84	0.56	1.10
Language spoken at home	Latvian	0.52	1.30	0.32	1.56
	Non-Latvian (ref.)				
Regions	Riga (ref.)	0.73		0.03	
	Riga metropolitan	0.43	1.19	0.75	0.93
	Other	0.61	1.09	0.03	1.45
Religious affiliation	Non-affiliated (ref.)	0.38		0.05	
	Orthodox	0.87	0.94	0.01	2.98
	Catholics	0.17	0.51	0.04	2.77
	Lutherans	0.54	0.87	0.25	1.30
	Other Christian	0.41	0.65	0.01	4.64
Interaction - religious affiliation by language	Religious affiliation*language	0.54		0.08	
	Other Christian by Latvian	0.87	0.88	0.05	0.21
	Orthodox by Latvian	0.58	0.75	0.02	0.26
	Catholics by Latvian	0.45	1.51	0.08	0.38
Regular services attendance	Yes	0.38	1.16	0.02	1.46
	No (ref.)				
Constant		0.00	0.14	0.19	0.52
Hosmer & Lemeshow		0.26		0.18	
Nagelkerke R2		.149		.174	
Classification accuracy		66.7 %		64.9 %	

n=940

*Cases with Cook’s distance values ≥ 1 (influential cases) and standardized residual values ≥ 3 (outliers) were not included.

A minority of respondents (29.1 %) scored high on the self-enhancement scale. Logistic regression analysis (Table 4) reveals that young people and those living in Riga (a capital city with the highest living standard in Latvia) are more likely to pursue their self-interests. Other factors do not have any considerable effect on the value predisposition. Churchgoers are not different in this regard. About 2/3 of respondents (68.6 %) have high propensity scores on the self-transcendence scale. Self-transcendence is one's predisposition to look beyond one's self-interests and take care of other people. This value trait is more prevalent among women, older respondents, those living outside Riga, churchgoers and those affiliated with a certain religious group. Catholics, Orthodox believers, other Christians groups and, to a lesser degree, Lutherans tend to be more mindful of other people.

Table 4

Predisposition to self-enhancement and self-transcendence

		Self-enhancement		Self-transcendence	
		p-value	Exp(b)	p-value	Exp(b)
Gender	Men (ref.)				
	women	0.26	0.84	0.00	1.56
Age	15-34	0.00	2.92	0.02	0.62
	35-54	0.02	1.65	0.03	0.63
	55+ (ref.)	0.00		0.05	
Education	Primary	0.79	1.07	0.44	0.82
	Secondary	0.79	1.06	0.81	0.95
	Secondary vocational	0.77	0.95	0.49	0.88
	Tertiary (ref.)	0.95		0.85	
Employment status	Not employed (ref.)				
	Employed	0.77	0.95	0.30	0.83
	No minors (ref.)				
Minors in household	Minors	0.91	1.02	0.69	0.93
Language spoken at home	Latvian	0.96	0.98	0.66	1.19
	Non-Latvian (ref.)				
Regions	Riga (ref.)	0.00		0.03	
	Riga metropolitan	0.05	0.64	0.01	1.82
	Other	0.00	0.52	0.04	1.44
Religious affiliation	Non-affiliated (ref.)	0.97		0.00	
	Orthodox	0.86	1.07	0.01	2.70
	Catholics	1.00	1.00	0.04	2.60
	Lutherans	0.54	1.17	0.02	1.78
	Other Christian	0.75	1.18	0.00	11.90
Interaction - religious affiliation by language	Religious affiliation*language	0.27		0.08	
	Other Christian by Latvian	0.11	0.14	0.02	0.10
	Orthodox by Latvian	0.67	1.26	0.11	0.44
	Catholics by Latvian	0.53	1.42	0.10	0.42
Regular services attendance	Yes	0.26	1.22	0.00	1.77
	No (ref.)				
Constant		0.02	0.32	0.78	1.14
Hosmer & Lemeshow		0.69		0.24	
Nagelkerke R2		.091		0.131	
Classification accuracy		70.7 %		69.8 %	

n=940

**Cases with Cook's distance values ≥ 1 (influential cases) and standardized residual values ≥ 3 (outliers) were not included.*

A final technical note. The classification accuracy of the presented models is satisfactory. It ranges from 64.9 % to 70.7 %. However, logistic regression models explain only a small share of the total variance (9 % to 17 %). Most likely, other demographic and non-demographic have more impact on the value traits of respondents. Unfortunately, the questionnaire used in the study does not include more contextual items. This aspect should be taken into account when interpreting the results of the analysis presented in this paper.

3. Discussion

As regard to different factors that may account for one's value predispositions, two factors stand out, namely, respondent's age and place of residence (region). Young people living in Riga tend to be less conservative, less mindful of others and more likely to pursue their own interests. Older people and to a lesser degree women tend to be more conservative and more mindful of other people's interests. One's religious affiliation may have impact on the higher order values of conservation and self-transcendence. Orthodox believers, Catholics and a small minority of other Christians groups are more predisposed to preserve status quo and more likely to transcend their own interests. Lutherans and nones differ very little – this supports earlier findings that of all Christian groups in Latvia, Lutheran's beliefs are most similar to the beliefs and worldview of the un-affiliated (Misane, 2014). At last, one's religious affiliation does not have a significant impact on one's openness to changes or pursuit of self-interests.

The minimal differences in value orientation between self-identified Lutherans, Roman Catholics and Russian Orthodox, and Latvian 'nones' is best explained by the structure and nature of religious diversity of the Latvian society. Latvia ranks high 5.7 on the PEW religious diversity index (2012) which places it above any other Baltic Sea nation. Moreover, had intra-religious diversity been considered in the calculation, the index would have been even higher as three largest denominations are represented by similar numbers of adherents. The number of nones is also very close. The same survey revealed that 20 % of the Latvian population adhere to Lutheranism, 20,4 % identify as Roman Catholics, 29 % as Russian Orthodox, 20,4 % do not belong to any religion and 3,3 % are Atheists (Krumina-Konkova & Misane, 2018, p. 742). Media often remark that the Christian churches in Latvia tend to grow more similar with time. This applies, in particular, to the growing closeness of the Evangelic Lutheran and Roman Catholic Churches and is evident both in the doctrinal developments and liturgical practices.

Scott Page describes three types of diversity, distinguishing diversity within a type or variation, diversity of types and kinds, and diversity of composition (Page, 2011, p. 20). Variation within a type plays important role in adaptability and robustness of given complex system and, hence, different actors in the field can occupy different niches and adapt to the environment. Different Christian denominations represent, in this respect, different variations of the same religion and thus attract, potentially, adherents with disparate religious goals and preferences. Difference of types, on the other hand, represent difference of functions and further, we suggest, disparate attitudes towards religion in general – this is how Christians and nones differ. The difference of composition refers to how the types are arranged. Examples of this would be religious groups with different legal status or position in the religious market and/or religious hierarchy. Marginal, less privileged religious communities that are subject to more regulation should, in theory, display more difference from the mainstream churches and the non-believers.

In practice, this means that religious groups (including non-believers) within a religiously highly diverse society should inevitably become more similar by various measures, including value-orientation, due to their interdependence within their shared religious environment and history while providing for the religious needs of the population.

Conclusions

- 1) The present study explores the values of Christians as compared to those of the „religious nones“ - unchurched or religiously indifferent part of the Latvian society. „Christian“, „traditional“ or „Latvian values“ are often used interchangeably. The content of the term 'value' is often overlooked or poorly defined and the actual values of those who identify with religious tradition have remained insufficiently studied in Latvia.
- 2) The authors use the theory of basic human values developed by Shalom H. Schwartz and the data from a representative survey carried out in 2015 to measure and compare the values of various religious groups. By using logistic regression analysis, the authors seek to identify various factors that may account for one's value traits as well as to find out value differences between various religious affiliation groups.
- 3) The logistic regression analysis reveals that young people living in Riga tend to be less conservative, less mindful of others and more likely to pursue their own interests. Older people and to a lesser degree women tend to be more conservative and more mindful of other people's interests.
- 4) The analysis also identifies that one's religious affiliation have a significant impact on the higher order values of conservation and self-transcendence but No effect on one's openness to changes or self-enhancement. Orthodox believers, Catholics and a small minority of other Christians groups are more predisposed to preserve status quo and more likely to transcend their own interests. Lutherans and nones differ very little thus conforming earlier findings in other studies in Latvia.
- 5) Borrowing from Scott Page's ideas on diversity, the authors conclude that various religious groups (including nones) within a religiously highly diverse society should inevitably become more similar by various measures including their value-orientations.

Bibliography

1. Becker, T., Siegers, P., and Kuntz, A. (2012). Congruence and Performance of Value Concepts in Social Research. *Survey Research Methods*, Vol.6, No.1, pp. 13-24.
2. ESS EduNet. (2013). *Chapter 5: Higher-order Values*. Retrieved: <http://essedunet.nsd.uib.no/cms/topics/1/5/all.html>
3. Inglehart, R. (1997). *Modernization and Post-modernization: Cultural, Economic, and Political Change in 43 Societies*. Princeton: Princeton University Press.
4. Kluckhohn, C.K.M. (1951). Values and Value Orientations in Theory of Action. In: Parsons, T. & Shils, E. *Toward a General Theory of Action*. Cambridge, MA: Harvard University Press, pp. 188-433.
5. Krumina-Konkova, S. & Misane, A. (2018). Religions in Latvia. In: *Latvia and Latvians*. Riga: Latvian Academy of Sciences. pp. 720-751.
6. Lautmann, R. (1969). *Wert und Norm. Begriffsanalysen für die Soziologie*. Cologne & Opladen: Westdeutscher Verlag.
7. Misane, A. (2014). Latvijas iedzīvotāju reliģiskās identitātes un reliģiozitātes dinamika pēc neatkarības atjaunošanas. In: Rozenvālds, J. & Zobena, A. (eds.) *Daudzveidēgas un mainīgas Latvijas identitātes*. Riga: LU Akadēmiskais apgads. 284-295.lpp.
8. Page, S. (2011). *Diversity and Complexity*. Princeton & Oxford: Princeton University Press.
9. Rossteutscher, S. (2004). Explaining Politics: an Empirical Test of Competing Value Measures. *European Journal of Political Research*, 43, pp.769-799.
10. Schwartz, S.H. (1994). Are There Universal Aspects in the Structure and Contents of Human Values? *Journal of Social Issues*, Vol. 50, pp.19-45.

11. Schwartz, S. H. (2003). *A Proposal for Measuring Value Orientations across Nations. Chapter 7 in the Questionnaire Development Package of the European Social Survey*. Retrieved: http://www.europeansocialsurvey.org/docs/methodology/core_ess_questionnaire/ESS_core_questionnaire_human_values.pdf
12. Taylor, C. (2007). *A Secular Age*. Cambridge, MA: Harvard University Press.
13. Thome, H. (2009). Value Change in Europe from the Perspective of Empirical Social Research. In: *The Cultural Values of Europe*. Eds. H. Joas & K. Wiegandt. Liverpool: Liverpool University Press.
14. Wilson, M.S. (2005). The Social Value-Analyses of Postmaterialism. *The Journal of Social Psychology*, 145, pp. 209-224.

INTERNATIONAL AND LATVIAN LEGISLATION ON SPORT

Ieva Opolska¹, Mg.oec.; Liga Proskina², Dr.oec.

^{1,2}Faculty of Economics and Social Development, Latvia University of Life Sciences and Technologies

Abstract. A healthy nation is the cornerstone of a country. Sports as a growing economic and social phenomenon greatly conduce the achievement of strategic goals of the European Union as pertains to solidarity and well-being. At the international level, the Latvian sport sector is coordinated by International Olympic Committee, The World Anti-Doping Agency, Court of Arbitration for Sport; European Union: European Sports Charter. Programmes and activities for sport development are Erasmus + Sport and European Sports Week. The main sports legislation in Latvia is the Sport Law, which defines the general and legal foundations of sport organization and development, the mutual relations of the sports organizations, state and local government institutions and the basic tasks in the development of sport, and the fundamentals of financing the sport, as well as the principles that are significant when participating in the international sport movement. The sport sector is coordinated and managed by associations. The sport sector plays an important role in the development of regions, as physical activity affects public health. Main conclusions: it is inferred that the sports legislation is too general and non-specific. It has to be improved in order to ensure the development of sports industry. The current sports industry administration in Latvia is insufficient to manage the industry successfully and achieve the goals set by the guidelines. The authors draw attention to the consideration that the sports administration and budget would have to pursue the higher achievement of volumes.

Key words: sports law, sports legal, sports organisations, Latvian sports industry, sports economics.

JEL code: available on: K10.

Introduction

Sport is one of the sectors of the national economy that promotes not only a healthy lifestyle, but is also a business which is taxed and money goes in the state budget. By sports we understand all kinds of individual or organised activities for person's physical and mental health and fitness, as well as achievements in sports competitions. Each country takes care of the health and welfare of its nation. The development of the national economy can be facilitated by the occupation of the population by sport, as well as the organization of important sports events (Research on the Impact of Large-Scale Sports Events on the Latvian Economy, 2016). Since the development of sports organizations and the quality of their activities in the regions have a major impact on the social development of the population (improvement of health, socialization, patriotism, prevention of social risks), as well as growth of economic indicators (increase of working capacity, jobs opportunities, tax contributions, attractiveness of the region for investors), it is important to study the legislation and its impact on the sport sector.

Lifestyle and behavior are factors affecting society's health. The most important public health problems are non-communicable diseases. The main behavioral factors contributing to the development of these diseases are unhealthy diet, insufficient physical activity and addictive substances and processes (Public Health Policy Guidelines 2014-2020). According to the Eurobarometer survey, 44 % of the population in Latvia do not have physical or sporting activities, while the EU average is 39 %. It was also found that at least 1-2 times a week in Latvia, only 28 % of the population is engaged in physical or sporting activities, while the EU average is 40 % (Eurobarometer, 2010). In 2002, the World Health Organisation deemed „Physical Activity” the theme of World Health Day. Since that time, April 6th is celebrated as the World Day for Physical Activity. This is an excellent example of a global initiative aimed at promoting health through physical activity across populations (Who.int, 2019).

¹ Ieva Opolska, ieva.opolska@gmail.com, +371 26550385

² Liga Proskina, liga.proskina@llu.lv, +371 28206624

Doping, match-fixing and violence are the problems what demand attention. Legal and regulatory frameworks define the frames and guidelines of the sports industry (all sports related products and organisations). And due to the globalization of sports activities, this analysis maintains that the role to be played by public international law is one of the key elements of this process.

This article tries to show, sports importance in humans life and social economics, what laws and organizations regulate the Latvian sport industry and how it affects. In our study, we provide a literature review of sports law and sports management organizations.

In view of the extensive research topic, the general acts of the sport sector will be dealt with in general terms.

The **aim** of article is to review and analyse international and Latvian legislation on sport, to review and analyse recent researches on the sports law in context social economics.

To achieve the aim, the following specific **tasks** were set:

1) To give insight into the links between the sport industry and socio-economic indicators; 2) give insight into the situation in the field of Latvia sports legislation, placing a particular focus on sports managing organisations; 3) to analyse the International legal and regulatory frameworks on sports sector; identify the role of sport in the EU; 4) to analyse the Legal framework on Sport in Latvia.

The research employs qualitative research: the logical constructive method, the monographic method, the method of analysis and synthesis. The research is based on scientific theoretical literature, scientific articles and the legal framework analysis of the Republic of Latvia, International sports industry and European Union framework and programmes. By applying various research methods, documents focusing on sport, sports law and sports organizations were analysed. The authors gathered studies and literature about the: Sport as an important factor in human development; International legal and regulatory frameworks on sports sector and Sports role in EU; Legal framework on Sport in Latvia.

Research results and discussion

The goal of the Latvian state is a healthy and active young generation, promoted by regular physical activity. The goal of the Latvian state is a healthy and active young generation, promoted by regular physical activity. DNB Latvian Barometer study conducted in 2014, people aged 18-74 have acknowledged that one of the most important things to do for a healthy lifestyle and to maintain health is regular physical activity and sports (it considers 41 % of respondents). However, people's answers also suggest that things that are considered to be most important in maintaining a healthy lifestyle are far from common in everyday practice. Only 29 % of respondents actually engage in regular physical activity and sports (DNB Latvian barometer, 2014). According to the guidelines developed by the World Health Organization, a sufficient amount of physical activity is 150 minutes a week.

The Ministry of Education and Science (MES) shall implement the State administrative functions in the sports sector: implement a unified State policy; develop draft laws and regulations; implement purposeful international co-operation and ensure Latvian representation in international sports organisations; perform other functions and tasks specified in laws and regulations. The Law on Sports provides for the competencies of other ministries in the domain of sports, intended for implementation in cooperation with the Ministry of Education and Science. The structures involved in the development of the sports industry are: the Ministry of Welfare, the Ministry of the Interior, the Ministry of Defence, the Ministry of Justice and the Ministry of Health. The competencies of municipalities and employers in the domain of sports are also allocated separately. Municipal

competencies determine the rights of municipalities as pertains to the promotion of healthy lifestyle and development of sports within the administrative territories thereof, as well as stipulate the municipal funding of the licensed sports education programs implemented by accredited sports education institutions subordinate to the respective municipalities (Law on Sports). Competencies of employers include promotion of their employees' engagement in sports activities; apart from that, employers have the right to organise sports competitions for employees and ensure their participation in athletic competitions held by other persons or entities (Sports law). Being aware of the competences of the state and local governments in the field of sport, it is important to do research in the field of sports legislation.

1. International legal and regulatory frameworks on sports sector

Sport as a social practice is highly rule-bound. Individual sports are regulated by their own dedicated constitutional rulebooks and adjudication machinery. The volume of rules varies between different sports. Some are particularly multifarious. Rules in sport exist for both its organisation and playing. The interaction of sports' internal rules and the influence of the law are also important; the internal rules of sport need to be examined before the role of the law in sport can be fully evaluated. (Gardiner S., O' Leary J., Welch R., 44)

International sports federations are the bodies in charge of the organization of sports activities at the international level. International Olympic Committee (IOC), the World Anti-Doping Agency (WADA), and international sports federations have undeniable power (Oxford bibliographies, 2019). From a legal perspective, they are private associations created in accordance with private domestic law whose members are national sporting associations that have been admitted into membership. Their task is to organize and coordinate the particular sport and also organize international competitions and events.

The emergence of private mechanisms of settling sports disputes through national and international sports arbitration tribunals being the Court of Arbitration for Sport (CAS) the supreme instance of this system seeks to avoid the intervention of national courts (Oxford bibliographies, 2019).

Each day, the development of technology and medication brings about new substances that may help boost one's athletic performance. In order to maintain adherence to fair play principles and make sure that the fastest, strongest and best ones win, a potent organisation and system is required to govern the use of restricted substances.

Doping is cheating (Green, 2014) in the sense that it is a breach of the rules of sport. Sports regulations provide sanctions against all these different types of cheating. Most forms of cheating are punished as part of the game, race or tournament although some may result in some post-competition sanctions such as a fine. The reality of elite sporting competition is that cheating in one form or another is relatively commonplace; however, none carry the stigma nor result in such punitive and emotive reaction as doping cheats (Gardiner S., O' Leary J., Welch R., 364). WADA key activities include scientific research, education, development of anti-doping capacities, and monitoring of the World Anti-Doping Code (Code) – the document harmonizing anti-doping policies in all sports and all countries.

CAS gained popularity thanks to the growing number of cases registered therewith. Just 2 cases were filed in 1989, as distinct from 599 cases in 2016. (Court of Arbitration for Sport). CAS is used for adjudicating disputes between private individuals through the use of national and international sports arbitration tribunals. This agency tries to avoid the intervention of state courts (Oxford

bibliographies, 2019). It is subordinate to the administrative and financial institution International Sports Arbitration Court Council (IAKS). CAS employs its own professional regulations (Code of Sports-related Arbitration), with the latest version thereof effective since January 1, 2019. These regulations provide for an independent regimen and govern just about every practical aspect of the arbitration process (Code of Sports-related Arbitration, 2018).

Sports industry is indeed a broad one, and it keeps on developing with each passing year. Are the legal acts in effect as of today capable of addressing the entire range of issues in the industry? The author suggests that the answer is no, as these are written generally and only provide general answers. These documents have been developed for traditional sports, failing to consider the rapidly increasing popularity of e-sports that can be observed at the moment. Is the law going to be capable of governing this branch of the industry as well?

Sports role in the EU. Sport and exercise are an integral part of life for millions of Europeans and a key feature of the EU's new Erasmus+ programme, which promotes cooperation, dialogue and participation. The EU supports cooperation between policymakers and dialogue with sports organisations, to promote the positive values associated with sport and tackle challenges (EU, 2018). European Sports Charter (adopted by the Committee of Ministers on 24 September 1992 at the 480th meeting of the Ministers' Deputies and revised at their 752nd meeting on 16 May 2001) is the major document and regulation is sports in EU. "Sport" means all forms of physical activity which, through casual or organised participation, aim at expressing or improving physical fitness and mental well-being, forming social relationships or obtaining results in competition at all levels (Sports Charter). The Charter complements the ethical principles and policy guidelines set out in: the European Convention on Spectator Violence and Misbehaviour at Sports Events and in Particular at Football Matches; the Anti-Doping Convention (Council of Europe).

Europeanin Commission (EC) on 2011 opened funding programme „Erasmus+“ to support education, training, youth and sport in Europe. „Erasmus+“ funds partnerships between sports organisations, non-profit events and research to strengthen policymaking. Also, the EC is in charge for „European Week of Sport“ event which is taking place right across Europe, aims to encourage Europeans to be active in their everyday lives and European Union work plan for sport (2014-2017). Under the plan, the Commission organises forums of experts who meet to find solutions to problems facing European sport.

2. Legal framework on sport in Latvia

In Latvia there are: 781 sports organisations, 1223 sports halls, 49 stadiums, 92 sports schools and clubs, 55 mountain skiing tracks, and 81 public swimming pools (Sports, Latvia.eu) which are governed by the laws of Latvian sports. In Latvia sports sector is divided into several levels. The main authority of the sports sector structure is the Saeima of the Republic of Latvia, the sports subcommittee. The Sports Subcommittee was set up to deepen the work of the Education, Culture and Science Commission in the field of sports. After that, the Cabinet of Ministers has the highest influence.

The National Sports Council of Latvia is a public advisory body that participates in the development of a state sports policy, promotes sports development and co-operation in the field of sports, as well as decision-making on sports related issues (MES). The composition of the National Sports Council of Latvia was approved in 2016 by the Cabinet of Ministers Order No. 169 "On the composition of the National Sports Council of Latvia".

In Latvia, the development of sport is coordinated and regulated by the Ministry of Education and Science, under the authority of sports organizations, federations, associations and sports clubs. The goal of the Latvian national sports policy is the formation of healthy, physically and mentally highly developed personalities. The general legal basis of sports organisation and development in Latvia is determined by the Sports Law. The Ministry of Education and Science is the state administration institution responsible for the area of sports.

The direction of sports policy can be divided into four sections: Children and youth sports; Sports for everybody; High achievement sports; Sports for people with disabilities. The MES influence management consists of: State Secretary, Deputy State Secretary, Director of Sports Department and Sports Department. The interests of clubs and federations are represented by associations - non-governmental organizations. These are: Latvian Sports Federation Council, Latvian Olympic Committee and Latvian Paralympic Committee (MES).

Consolidation in the form of structures to represent common interests enhances the public and political influence of the organisation. Non-government organisations are mainly non-profit associations incorporated for representing a specific sport and conducting its development.

Legislation in the sports sector. The main sports legislation in Latvia is the Sport Law (adopted on October 24, 2002), which defines the general and legal foundations of sport organization and development, the mutual relations of the sports organizations, state and local government institutions and the basic tasks in the development of sport, and the fundamentals of financing the sport, as well as the principles that are significant when participating in the international sport movement. However, without Sport Law, there are issues of importance to the sports industry are addressed both in international law and in policy planning documents for other sectors and are: Latvian National Development Plan 2014-2020, Public Health Guidelines 2011-2017, Youth Policy Guidelines 2009-2018, Regional Policy Guidelines 2013-2019, the European Sport Charter, the Olympic Charter, the Code of Conduct for Sports, the White Paper on Sport and others.

The purpose of Sports Law is to specify the general and legal basis for sports organisation and development, mutual relationships of sports organisations, State and local government institutions and basic tasks in sports development, and the basis for the financing of sport, as well as the principles that shall be observed when taking part in the international sports movement (Sports Law).

The Law on Sports bestows a number of competencies in sports on municipalities. One of these competencies is to promote the establishment and operation of sports organisations, including sports clubs. Sports organisations are sports clubs, sports federations and other institutions provided for by this law. A sports federation may represent several sports or areas of operation. A sports federation may manage and coordinate activities in the respective sport or area of operation at the national level or represent its country with the respective international sports organisation, if such federation is recognised in accordance with the procedure provided for by this law. Only one federation may be recognised in a specific sport or area of operation.

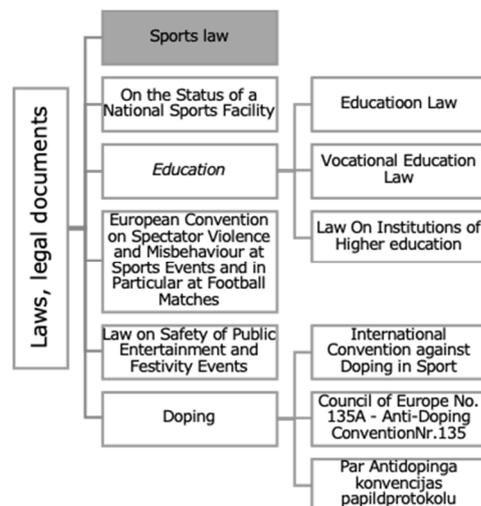
The authors have studied the legislative regulation of how a federation is established and which criteria have to be met in order for it to be recognised in Latvia and internationally. It leads to the inference that anyone willing to develop a new sport in Latvia may establish a federation. The status of a recognised federation may also be achieved by means of fulfilling the requirements of the Latvian Sports Federations Council (LSFP) and the Latvian Olympic Committee (LOK).

Article 12 of the Law on Sports contains provisions in respect of the maintenance and usage of sports camps, which prioritise the need to provide sports opportunities to the population. The Cabinet

of Ministers can assign the status of a national sports facility to a sports camp in accordance with the procedure provided for by the Law on the Status of a National Sports Facility.

The law stipulates the way of raising financial resources for sports. These are comprised of government funds, municipal funds, funds provided by individuals and legal entities, funds of sports organisations and transfers of international sports federations. Government budget funds are allocated to sports in accordance with the annual government budget law. The law stipulates that the main priority of the government is to support children's and youth sports, thus emphasising the future of national sports. Paragraph 6, article 13 says that the government provides funds for the preparation and participation of national athletic games teams in qualifying and final tournaments of European and World Championships and the Olympic Games in accordance with the procedure provided for by the Cabinet of Ministers; however, there are no separate provisions in respect of government funding or support of individual sports or the procedure to be followed in respect thereof.

The law determines the procedure for awarding cash rewards for excellent achievements in sports. These can be awarded to Latvian athletes, their trainers and sports service personnel. According to the Order of the Cabinet of Ministers No. 680 of 19 December, 2018 on high achievements, 59 athletes and their preparation team members were rewarded. In order to ensure the payment of cash prizes totalling to 1.2 M EUR, the Ministry of Finance was asked to allocate an amount of EUR 1 240 050 to the Ministry of Education and Science from the government budget program 02.00.00 "Funds for unforeseen expenses" (Latvijas Vestnesis, 2018).



Source: author's scheme

Fig. 1. Sports legislation in Latvia

In order to study the institutional system and legal acts in the sports industry, the author has developed an scheme (Fig. 1) schematically depicting the laws governing the sports industry.

The Law on Sports determines the procedure for organising sports events. The main document of a competition is the Statute of the Competition, which contains the specified information about the competition. In addition to the provisions of the Law on Sports, another regulatory act to be mentioned is the Law on the European Convention on Spectator Violence and Misbehaviour at Sports Events and in particular at Football Matches. The goal of this law is to prevent and control the problem of spectator violence and misbehaviour at sports events (European Convention on Spectator Violence and Misbehaviour at Sports Events and in Particular at Football Matches). The goal of the Law on Safety of Public Entertainment and Festivity Events is to ensure unimpeded and safe occurrence of public events. This is intended to make sports events open and safe for the public. The law has been passed by the Saeima on 16 June, 2005 (Law on Safety of Public Entertainment and Festivity Events).

Another essential regulatory act is the International Convention against Doping in Sport, which contains provisions that promote and coordinate international cooperation for restricting doping in sports, preventing doping in sports and fighting doping in sports for the purpose of eliminating it completely (International Convention against Doping in Sport).

Regulations of the Cabinet of Ministers are the primary sources of law in Latvia. The Cabinet of Ministers may issue legislation in the form of regulations (Latvian: noteikumi) in the following cases: 1. on the basis of an authorization laid down by statute; 2. to approve an international agreement or draft thereof, denounce an international agreement or suspend its operations, unless the Constitution or the law provides otherwise; 3. if necessary for the application of European Union legislative acts and if the issue in question has not been regulated by statute; these regulations may not impinge on the fundamental rights of private individuals (E-justice, 2016).

Strategic planning documents concerning sports. The Sports Policy Guidelines for the period of 2014 to 2020 (referred to hereinafter as the Guidelines) is a medium-term policy planning document that determines the national policy in sports for the following seven years – two Olympic cycles. The Guidelines encompass the core principles of sports policy, its goals, directions, target groups and priorities, lines of activities and objectives for attaining the goals and solving the problems of sports policy (Sports Policy Guidelines for 2014–2020, 2013), (Sports Policy Guidelines for 2014–2020 - Summary, 2013). The government of Latvia seeks to make the new generation healthy and active, promoting it through regular physical activities. According to the Sports Policy Guidelines and in the author's opinion, the support and promotion of sports and physical activities for different age groups in Latvia is insufficient as of today. The driving motive of the sports policy defined by the Guidelines is „Sports make the quality of life“. Directions of the sports policy defined by the Guidelines: 1) children's and youth sports, 2) sports for everyone, 3) the sport of records, 4) adjusted sports. Within the boundaries of these directions, development of the "Children's and youth sports" and "Sports for everyone" lines of sports policy is deemed a priority. The goal of sports policy defined by the Guidelines is to increase the percentage of inhabitants of Latvia who go in for sports or practice physical or athletic activities No less than 1-2 times a week (Sports Policy Guidelines for 2014–2020–informative part, 2013).

The first goal defined by the Sports Policy Guidelines for the period of 2014 to 2020 is to promote physical activity of the population (especially children and young people). In the author's opinion, an essential contribution to the attainment of this goal would be to study the reasons that have been preventing children and young people from having sufficient physical activity until now.

The sources of funds intended for the implementation of the Guidelines are comprised of government and municipal budget funds, as well as private and other raised funds (including those provided by international sports organisations) (Sports Policy Guidelines for 2014–2020–informational section 2013).

Conclusions, proposals, recommendations

The history of Latvian sports as well as the history of Latvian people was full of search of its true self and struggles for the independency, what of course has a reflection in Latvian legislative acts on sports and explains its possible imperfections.

Promoting a healthy and active lifestyle among different groups of society and organisation of public sports events is the key activities for healthy and sporty society.

This paper makes several central points. **1.** Sports are a growing economic and social phenomenon that greatly conduces the achievement of global and national strategic goals as pertains

to solidarity and well-being. **1.** It is inferred that the sports legislation is too general and non-specific. It has to be improved in order to ensure the development of sports industry. **3.** The sports industry in Latvia is organised and overseen by the Sports Department of the Ministry of Education and Science (currently employs 7 people). The most important administrative bodies are the Latvian Sports Federations Council and the Latvian Olympic Committee. In the authors' opinion, this is not enough to manage the industry successfully and achieve the goals set by the guidelines. The authors draw attention to the consideration that the sports administration and budget would have to pursue the higher achievement of volumes.

In the authors' opinion, the current administration would have to review priorities and develop the in adherence to the following principles: Maximally conduce the increase in physical activities of the population. The means to achieve this objective would be to increase the overall time of physical education classes in schools, train teachers and trainers, support record athletes and teams; It is also essential to broaden the opportunities for people to go in for sports (both paid and free services) and build sports facilities that could house international competitions and used in a multi-functional manner, in particular, also for cultural events; The sports management, legislation and financing system would have to be improved considering the current situation and future trends.

In conclusion, there is a wider implication that can be drawn from this study material.

Bibliography

1. *Anti-Doping Rule Violations (ADRVs) Report 2014* (2016). Available: <https://www.wada-ama.org/sites/default/files/resources/files/wada-2014-advr-report-en.pdf>
2. Charker, A. N. (1999). *Study on National Sports Legislation in Europe*. Strasbourg: Council of Europe Publishing.
3. Christiansen, N. V., Kahlmeier, S., & Racioppi, F. (2014). Sport promotion policies in the European Union: Results of a contents analysis. *Scandinavian Journal of Medicine and Science in Sports*, 24(2), 428–438. <https://doi.org/10.1111/j.1600-0838.2012.01500.x>
4. Code of Sports-related Arbitration (2017): Court of Arbitration for Sport. Available: http://www.tas-cas.org/fileadmin/user_upload/Code_2017_FINAL_en_.pdf
5. Education, Audiovisual and Culture Executive Agency (2017), Erasmus + Sport. Available: <http://eacea.ec.europa.eu/home/erasmus-plus/actions/sport>
6. European Union (2007). European Commission White Paper on Sport, COM/2007/0391 final http://www.aop.pt/upload/tb_content/320160419151552/35716314642829/whitepaperfullen.pdf
7. Gardiner S., O' Leary J., Welch R., *Sports Law*. Forth edition. (2012) pp.364-392.
8. Green S. 'Cheating' (2004) 23(2) *Law & Phil.*, 135–187; Beloff, M. 'Fair play – is there still room for the Corinthian spirit in sport?' (2009) pp. 34–44.
9. Informacija par valsts budzetu un ta sadalijumu 2018. gada (2018). Ministry of Education and Science. Available: <https://www.izm.gov.lv/lv/sports/sporta-budzets/informacija-par-valsts-budzetu-un-ta-sadalijumu-2018-gada>.
10. *International Sports Law* (2019), Oxford bibliographies. Available: <http://www.oxfordbibliographies.com/view/document/obo-9780199796953/obo-9780199796953-0073.xml>
11. Media Center. World Health Organization. Available: <https://www.who.int/mediacentre/news/releases/2003/pr15/en/>
12. Of the Committee of Ministers to Member States on the Revised European Sports Charter. (2001) Council of Europe, Committee of Ministers. Retrieved: <https://rm.coe.int/16804c9dbb>
13. Par naudas balvu pieskirsanu par izcilim sasniegumiem sporta (2018). *Latvijas Vestnesis*: Nr. 250 (6336).
14. Parrish R. (2013). *Sports, law and policy in the European Union*. pp 180-182
15. Public Health Policy Guidelines 2014-2020. Available: <https://likumi.lv/ta/en/en/id/269591-on-the-public-health-policy-guidelines-2014-2020>
16. *Research on the Impact of Large-Scale Sports Events on the Latvian Economy*, IZM, 2016
17. *Sport and Physical Activity*. Special Eurobarometer. European Commission. Retrieved: http://ec.europa.eu/commfrontoffice/publicopinion/archives/ebs/ebs_334_en.pdf
18. *Sport*. European Commission. Available: https://ec.europa.eu/info/topics/sport_en
19. *Sporta politikas pamatnostadnes 2014.-2020. gadam*. (2013). POLSIS: Politikas Planosanas Dokumentu datubaze. Retrieved from <http://polsis.mk.gov.lv/documents/4599>
20. *Sports* (2019). *Latvia.eu*. Available: <http://www.latvia.eu/society/sports>
21. *Sports Law* (2002). *Latvijas Vestnesis*, 165 (2740).

22. Sports. (2019). Ministry of Education and Science. Available: <https://www.izm.gov.lv/en/sports-en>
23. *The legal system in Latvia* (2016). Available: https://e-justice.europa.eu/content_
24. *Veselīgs dzīvesveids* (2014) DNB Latvijas barometrs. Available: https://www.luminor.lv/sites/default/files/docs/preses_relizes/dnb-latvijas-barometrs-petijums-nr69.pdf
25. What is Erasmus +. European Commission. Available: https://ec.europa.eu/programmes/erasmus-plus/about_en
26. World Health Organisation (2009). World Health Statistics. Available: http://www.who.int/whosis/whostat/EN_WHS09_Full.pdf?ua=1
27. Zalcmane K., Kamenecka-Usova M. (2018). The problematics of sports law in Latvia: civil and criminal law statutory acts perspective. *Society. Integration. Education*, Volume 4, pp. 332-346.

ACTIVITIES OF SENIOR COUNCILS IN POLAND

Agnieszka Parlinska¹, PhD, Associate Professor; **Maria Parlinska**², PhD, prof UTH

¹Warsaw University of Life Sciences – SGGW; ²Helena Chodkowska University of Technology and Economics

Abstract. We live in times of unprecedented economic and social changes, as well as accelerated medical progress in the sphere of improving health and extending human life. Although these are changes rated as positive, they also give birth negative consequences for the generation of today's sixty-year-olds. The future demography processes in Poland have similar tendency like in other EU member countries. In many European countries public activation and participation in the commune life is very popular idea. One of the method to activate elderly population is creating the Senior Councils.

The main aim of the research was recognition of the peculiarities of functioning and development of the Senior Councils in Poland. The authors decided to make investigation in this areas taking into consideration changes which took place in the country within 2012-2018. In the research paper the descriptive and comparative methods were used. Development of the Senior Councils is important for the commune authorities create local law adapted to the needs of older people. Members of the Senior Councils have knowledge and life experience that they can share with others.

Key words: aging problems, demography, senior councils, Poland, Active Ageing Index.

JEL code: J10, H89, O35.

Introduction

The progressive aging of society in Poland is already a well-known and statistically proven fact. In year 1988, people over 65 made up 9.8 % of the population, and in 2010 year - 13.6 %, which means an increase of over 1.5 million people. Population forecasts for 2008-2035 years by the Central Statistical Office show that by 2035 the percentage of children under 14 years of age and those people in middle age will be clearly lower than in previous years, while a significant increase in the population aged over 50 - 60 is expected.

The Active Ageing Index (AAI) is a tool to measure the untapped potential of older people for active and healthy ageing at national and subnational levels. (Active Ageing Index Home, 2018) The index has been developed within the framework of the 2012 European Year for Active Ageing and Solidarity between Generations. Launch of AAI also coincided with the 10th anniversary of the 2nd World Assembly on Ageing and the 2nd cycle of review and appraisal of the implementation of the Madrid International Plan of Action on Ageing and its Regional Implementation Strategy (European Year for Active Ageing ...,2012).

One of the foundations on which every civil society is based, there is public participation. The essence of participation lies in active participation citizens in establishing and implementing public policies, joining the process creating planning documents and making key decisions. Participation can be seen as a continuous dialogue with the community and development of such communication mechanisms and joint decision-making that will result in greater transparency of processes, increased openness and mutual trust. The term "participation" derives from the Latin word „particeps", i.e. take part in "participation" in other words to participate in a larger group, formation, project or institution. In the broader sense of the word, it is also the ability to create relationships and interact with others, the ability to work in a group to achieve common goals, perform tasks collectively and solve problems together (Neverauskas and Tijunaitiene, 2007).

The main aim of the research was recognition of the peculiarities of functioning and development of the Senior Councils in Poland. The following problems were examined:

¹ Corresponding author. Agnieszka Parlinska, PhD; ORCID: <https://orcid.org/0000-0001-6640-3097>; Tel.: + 48 22 593 4194; e-mail address: agnieszka_parlinska@sggw.pl

- legal aspects of the Senior Councils in Poland;
- development of the Senior Councils in Poland.

As well the Senior Councils activity was presented on the example of the Senior Council in Stare Babice commune.

The main sources of information were the Central Statistical Office, Ministry of Administration and Digitization and Reports of Stare Babice commune, which were the source of data about seniors in Poland during 2012-2018. The study also made use of interviews with the experts in the social science and data storage statistics. Experts were scientists dealing with demographic problems and social policy. Interviews were conducted in 2015-2017 with elected members of the municipal council and senior council of Stare Babice commune. In addition, the authors undertook the review of literature and legal acts related to the processes. There are also own experience thanks the activity in Stare Babice commune. The presentation of the research results uses descriptive and tabular methods.

Research results and discussion

According to a report prepared by the Central Statistical Office, the Polish society is aging: By 2050, the share of older people will exceed 30 % in rural areas and will approach 35 % in urban areas.

Table 1

The share of the population aged 65 years or more in the population (%) in the years 2013, 2020, 2035 and 2050

Voivodeship	Total				Urban				Rural			
	2013	2020	2035	2050	2013	2020	2035	2050	2013	2020	2035	2050
POLAND	14.7	18.9	24.5	32.7	15.7	20.8	26.3	34.7	13.3	16.1	22.0	30.2
Dolnoslaski	14.9	20.0	25.1	33.5	16.1	21.8	26.8	35.3	12.0	15.9	21.8	30.5
Kujawsko-pomorskie	14.1	18.5	24.5	32.8	15.5	20.8	27.1	35.7	12.0	15.2	21.3	29.4
Lubelskie	15.4	19.3	25.6	34.7	14.9	20.8	28.1	37.6	15.9	18.1	23.7	32.6
Lubuskie	13.4	18.5	24.4	32.9	14.4	20.2	26.0	34.4	11.6	15.6	22.0	30.7
Lodzkie	16.6	20.9	26.0	34.2	17.1	22.6	28.1	36.7	15.6	18.0	23.0	31.0
Malopolskie	14.5	17.7	23.0	31.2	16.2	20.5	25.4	34.1	12.9	15.1	21.1	28.9
Mazowieckie	15.4	19.0	23.1	31.3	16.3	20.4	23.8	32.1	13.9	16.4	21.9	29.7
Opolskie	15.3	19.6	27.3	36.1	16.1	21.6	29.1	38.0	14.5	17.3	25.5	34.3
Podkarpackie	14.0	17.6	24.4	33.5	14.3	19.9	27.4	36.9	13.8	16.0	22.5	31.5
Podlaskie	15.4	18.6	26.1	35.1	13.8	18.4	26.8	35.5	17.7	18.9	25.1	34.4
Pomorskie	13.5	17.7	22.6	30.0	15.6	20.6	25.2	33.0	9.7	12.8	18.7	26.0
Slaskie	15.5	20.0	26.0	34.0	15.9	20.8	26.9	34.9	14.1	17.1	23.4	31.5
Swietokrzyskie	16.1	20.5	26.9	36.0	16.7	23.1	30.5	40.4	15.6	18.4	24.3	33.3
Warminko-mazurskie	12.8	17.4	24.5	32.9	13.8	19.4	26.5	34.8	11.4	14.6	21.8	30.3
Wielkopolskie	13.5	17.5	22.7	30.9	15.0	20.0	25.6	34.4	11.7	14.6	19.9	27.8
Zachodniopomorskie	13.9	19.3	25.2	33.6	15.2	21.3	26.9	35.2	11.1	15.1	22.0	30.5

Source: Population forecast for 2014-2050, (2014) Warsaw, Central Statistical Office

In the scale of the country, the number of this population will increase by 5.4 million. In 2050, the number of people aged 65 and more will represent 179.3 % of the state in 2013 and 224.9 % in rural areas.

Analysing the data in Table 1, it is easy to see: it is estimated that in 2035 the percentage of people aged 65 and more will be 23.2 %⁶, while according to Eurostat's forecasts in 2060, it will exceed 36 % in Poland (Population forecast for 2014-2050, 2014).

Nowadays the local authorities should find the way to recognize and full in the needs of older local population. Significant assistance in these tasks can be met by the Senior Councils. It is important to know the legal possibilities of their creation and functioning on the territory of Poland.

1. Legal aspects of the Senior Council in Poland

The possibility of creating Communal Seniors' Councils in Poland was introduced along with the amendment to the Act on municipal self-government¹. The amendment was adopted by the Sejm in 2013 according to the following regulations:

- the commune promotes intergenerational solidarity and creates conditions for stimulating civic activity of the elderly in the local community,
- the commune council, on its own initiative or at the request of the communities concerned, may establish a municipal council of seniors,
- the council of seniors has consultative, advising and initiative character,
- council of seniors consists of representatives of the elderly and representatives of entities acting for the benefit of the elderly, in particular representatives of non-governmental organizations and entities running universities of the third century,
- the commune council, setting up a council of seniors, gives it a statute determining the mode of election of its members and rules of operation, seeking to use the potential of existing organizations of the elderly and entities acting for the elderly, and ensuring an efficient manner of selecting members of the municipal council of seniors.

The legal regulations in force in Poland provide for many possible forms of active participation of citizens in co-deciding on issues relevant to the local community - this article is particularly concerned with the issue of the institutions of councils for seniors. However, it is necessary to mention other existing forms, especially those that are legally authorized in the Act of 24 April 2003 on public benefit and voluntary work. Knowledge and ability to use these forms are important for non-governmental organizations, because the practice of active use of the participative instruments described by law depends largely on them. Among these forms should be mentioned:

- public benefit activity boards,
- cooperation program of local self-government with non-governmental organizations,
- local initiatives.

The content of these framework provisions is left to the statutes regulating the principles of the functioning of municipal councils of seniors and practice, which in each municipality may be different and depends on the skills and activity of board members, as well as openness to cooperation with this body from local self-government authorities.

The commune council, setting up a council of seniors, gives it a statute determining the mode of election of its members and rules of operation. It has to use the potential of existing organizations of the elderly and entities acting for the elderly, and ensuring an efficient manner of selecting members of the council of seniors.

¹ the Act of 8 March 1990 on municipal self-government (Journal of Laws No. 2016, item 446)

All activities taken by the Seniors' Council are specified in the statute of the given Council. Each Senior Council has the possibility to adjust the scope of its activities to individual preferences and needs in a given municipality.

The Senior Council, as a body supporting the shaping of the senior policy in the commune, should give opinions on documents that affect the situation of seniors such as

- resolutions of the commune council,
- strategies of commune development,
- projects dedicated to seniors, e.g. senior card,
- commune co-operation programs with non-governmental organizations etc.

When acting as an advisor, the Senior Council may:

- create own propositions of solutions in matters relating to seniors,
- produce solutions to problems affecting the elderly in the commune,
- respond to cases reported by seniors, giving them formal run.

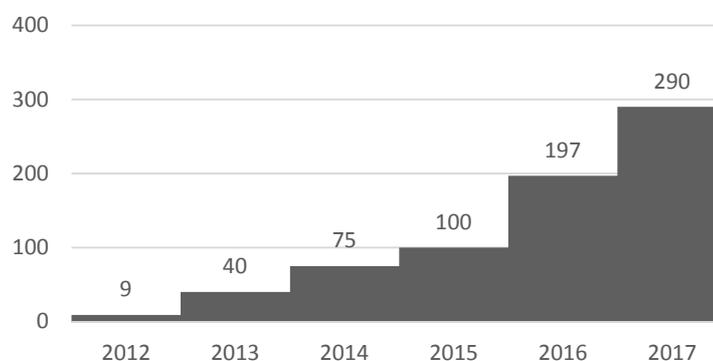
Implementing the initiative function, the Senior Council can initiate new ideas and solutions that aim to improve the situation of older people in the municipality:

- can encourage the municipality to take action for the elderly,
- may also carry out its own projects in cooperation with the commune authorities.

The equivalents of Polish Seniors' Councils function in many countries. Although they differ in name, composition, way of calling and acting, but they associate people of all ages. They are linked to the fact that they work for the benefit of seniors. Seniors citizens' councils are active in: Germany, Italy, Denmark, Great Britain (Seniors' Schools in Great Britain - AGE UK Speaking Up for Our Age) as well in USA. In Germany, local senior councils have been in existence since the 1970s. There are currently around 1,200 of them. Their main tasks are mediation between seniors and policy-makers, and giving opinions on projects of actions that affect the lives of people the elderly.

2. Development of the Senior Councils in Poland

According to the report of the Ministry of Administration and Digitization in 2012 there were 9 Senior Councils in Poland, in 2014 there were already 75 (Borczyk W., Jachimowicz D., Nalepa W. 2014). Since the amendment to the Local Government Act, the number of senior citizens' councils in entire Poland has grown rapidly - from over 40 in 2013 to over 100 in December 2015. At the beginning of 2016, there were 197 Councils in Poland, and at the end of 2016 less than 220. At June 2017 in almost 2.5 thousand Polish municipalities worked 290 Senior Council.



Source: authors' calculation on the base of the data from Ministry of Administration and Digitization

Fig. 1. Number of Senior Councils in Poland during 2012-2017

It's about 50 % increase in relation to the beginning of the previous year. However, they still function in less than one tenth of the Polish commune. Only a handful of them has a senior citizen

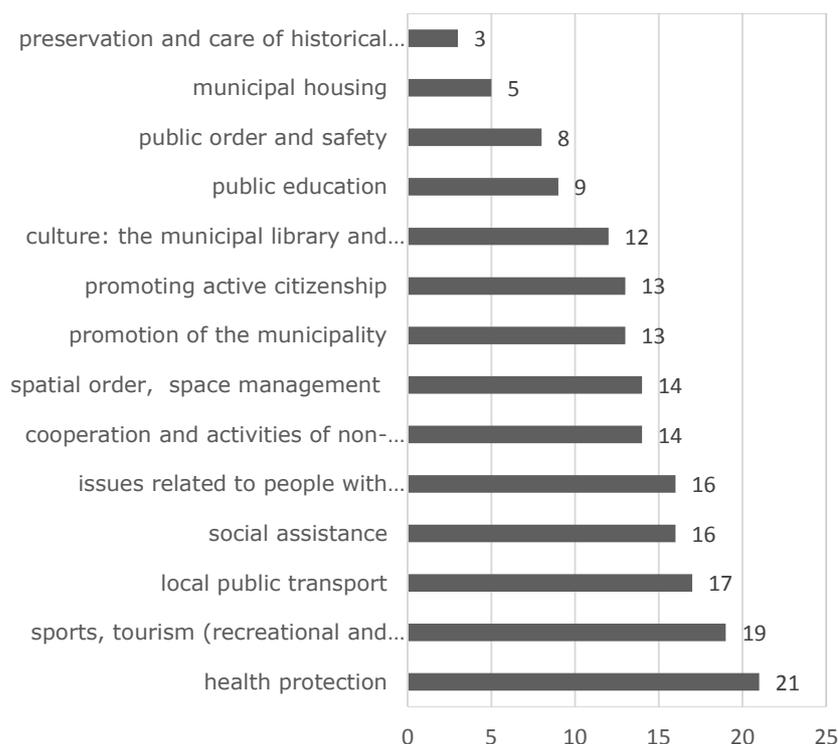
advice today. It should be added that the majority of the residents in the municipalities, villages and small towns, where a large percentage of the elderly live, have not yet included seniors in the decision-making process. In individual voivodeship in Poland, the large disproportions between the number of seniors' councils can be observed (Fig. 2).



Source: Ganeczko A. (2017) Council of Seniors in Poland Legal basis and number, Senior Policy No. 4/2017, Senior Policy <http://polityka.zaczyn.org/polityka-Seniorna-dodatek-o-radach-seniorow>

Fig. 2. Number of municipalities in which Senior Councils are functioning in 2017

The areas of activity of the Senior Councils are diverse and rich. One can observe those areas on the Figure 3. Senior's Councils foster intergenerational solidarity and create conditions to stimulate civic activity of older people in the local community, they have been present in public space for at least several years.



Source: Zoom on senior councils -National Polish study of Senior Councils from all over Poland and cooperation project with partnerships of senior councils and municipal self-governments

Fig. 3. The areas of activity of Seniors' Councils

There was difficult to make precise statistics sometimes, but according to the "Zoom on the Senior Citizens" project (app. 5) online research, in Poland before the introduction of the abovementioned statutory regulation, at least 150 senior citizens' councils were appointed. "ZOOM for Senior Councils" is a nationwide survey of senior councils from all over Poland and a cooperation project with

partnerships of senior councils and municipal governments implemented by the Society of Creative Initiatives "e" in cooperation with Laboratory of Societies and Social Innovation "Stocznia" and the Foundation for local communities „ On the spot "(www.zoomnaradyseniorow.pl).

Many events organised by senior councils take place in the whole country. They are very often organised in cooperation with others nongovernmental organisations. A big event was the meeting on November 30, 2018 at the headquarters of the Mazowieckie Social Policy Centre in Warsaw, which summarized the cooperation of the Mazovian voivodeship self-government with senior communities.

In August 2016, in Jachranka in the commune of Serock the 1st Summer School of Senior Councils was held. It was the first meeting of the Senior's Councils in Poland. It can be said that this form has been a success and has been very well received throughout the entire senior environment. Based on the experiences from the Summer School, an idea was created on the format of one-day trips to the Councils that they will want become the host of such meeting. The point was deepening integration, presentation of the Councils and further training and education activities that have been refined at based on a questionnaire completed after the Summer School. The idea of the Second Flying (Volatile) School was initiated by the Senior's Council of Bielany Warsaw District and the Senior's Council of Stare Babice Commune. That was completely devoted to the topic of Senior Voluntary Service, which both Councils would like to run in their councils. (Ganeczko, 2017).

3. Case study – activity of the Senior Council in Stare Babice commune

The Stare Babice commune is a rural commune in the central part of the Masovian voivodeship in the Warsaw West District. From 16/03/1995, the area of the Stare Babice commune includes 23 places i.e. Babice Nowe, Blizne Jasynskiego, Blizne Laszczynskiego, Borzecin Duzy, Borzecin Maly, Buda, Janow, Koczargi Stare, Koczargi Nowe, Kludyn, Kwirynow, Latchorzew, Lipkow, Lubiczow, Mariew, Stanislawow, Topolin, Wierzbin, Wojcieszyn, Zalesie, Zielonki Wies, Zielonki Parcela and Stare Babice.

The Stare Babice commune covers an area of 62 km². It is located in the immediate vicinity of the western part of left part of Warsaw and borders the districts of Bemowo and Bielany. At the same time, the commune borders with the following municipalities: Ozarow Mazowiecki, LeszNo and Izabelin. The location of the commune on the outskirts of the Kampinos Forest and between two routes of international importance (the Poznan route and the Gdansk route) creates favourable conditions for the development of tourism, leisure and settlement. The location of the commune in the immediate vicinity of Warsaw, on the other hand, makes it a "bedroom of Warsaw" and is one of the factors determining the intensive growth of the number of residents in the commune over the last twenty years.

The structure of the commune, depending on the economic age groups¹, is illustrated in Table 2. In the case of the Stare Babice commune, in the years 1995-2017, an increase number of inhabitants in each of the defined groups is observed. Nevertheless, starting from 2020, the number of inhabitants in post-productive age will be systematically growing, and the growth rate in this age group will be statistically significantly higher than the rate of growth of the population in the pre-working age. It means a much larger share of people over 60/65 in the commune community.

¹ Within this division, three age groups were distinguished: people in the pre-productive age (0-17), people of working age (man – 18-64; women – 18-59) and people in post-productive age. In the case of the post-working age, the border was set at the age of 60 for women and 65 for men as the retirement age.

The number of inhabitants in the commune of Stare Babice according to economic age groups - the data in the years 1995 - 2017 and the forecast for 2018 - 2040

Age	Data in the years					Forecast in the years				
	1995	2000	2005	2010	2015	2020	2025	2030	2035	2040
pre-productive age	2264	2503	2684	3267	3715	4183	4651	5119	5587	6055
working age	5281	6446	8131	9402	9907	10234	10562	10889	11217	11544
post-working age	1878	1984	2132	2723	3387	4109	4831	5553	6275	6997

Source: authors' calculation on based of demographic data from the municipalities of Stare Babice, Koziol, D. Parlinska, M., Parlinska, A., (2018)

Due to the aging problems of the commune the Senior Council of Stare Babice commune was established in December 2015. We should to make remark, that the creation of the Senior Council is only an image-building success. Key to working out solutions that will improve the standard of living for seniors in the municipality is to develop feasible plans operational and pro-annual strategies that will be implemented in rapidly aging municipalities. Such strategies should be developed in a cross-sectoral way, in cooperation with Senior's Councils, local governments, officials, non-governmental organizations. Senior Council in Stare Babice was also working hardly for preparing such strategy last year. The continuation with local government will take place this year.

Table 3

The Expenditure of Stare Babice municipality for seniors in years 2017-2018

The name of the project	Leading institution	2017	2018	2017	2018	2018/ 2017
		PLN		%		
Seniors Club "Hope"	Municipal Social assistance centre	24 907	25 667	38.0	34.3	103,05
Active and cultural Senior	Association of Starobabicki University of the third age	4 500	12 500	6.9	16.7	277,78
Interesting India for seniors	Polish Association Of Carron	3 200	3 200	4.9	4.3	100,00
Sami Swoi	Cultural Association Anchor	9 500	6 500	14.5	8.7	68,42
Seniors in action	KIM Foundation	17 000	17 000	25.9	22.7	100,00
Babiczanie	Cultural Association Anchor	6 500	10 000	9.9	13.4	153,85
Total		65 607	74 867	100,0	100.0	114.11

Source: authors' calculation on the base Reports of Stare Babice commune

The Senior Council supports the municipality's activities to make it friendly for seniors. They are the initiators of many events and workshops organized for senior citizens of the Stare Babice commune. The list of expenses incurred in the last two years for the benefit of seniors is presented in the Table3. Many activities in the commune took place during last 2 years. Comparison between those 2 years easily shows, that continuation will take place. Currently, work is underway on updating the senior policy program and presenting it to councillors for opinion.

Also an important element of many activities is intergenerational integration, that the youngest generation is invited to cooperate. As an example: on the last weekend of September 2018, the poviats day of senior sport was organized at the initiative of the Communal Seniors' Council. Seniors competed in 10 competitions, including throwing a basketball into the basket, throwing a ring or hockey slalom. Co-organizers and judges in sports competitions of seniors were young people from the school in Borzecin. The idea turned out to be a hit and worth continuing in the following years.

Conclusions and recommendations

- 1) In general, the scale of growing number of the Seniors' Councils in Poland still is not satisfactory. The vast majority of older people remain outside its influence.
- 2) The state of social infrastructure used to provide support services and organize activities of older people is unsatisfactory. There is a shortage of staff specialized in working with elderly people with varying degrees of independence, different cultural potential and social capital. These deficiencies are largely supplemented by the enthusiastically active Seniors' Councils.
- 3) The question arises: why Senior Councils are needed? The answer seems to be clear: Senior Councils are a source of knowledge about the situation and problems of seniors in the commune. They help the commune authorities create local law adapted to the needs of older people.
- 4) Senior Councils have knowledge and life experience that they can share with others. They are spokespersons for older people who are struggling with various problems.
- 5) The Councils are an activating institution for seniors, which care for a worthy image of older people. They promote intergenerational cooperation.

Bibliography

1. Active Ageing Index Home (2018) <https://statswiki.unece.org/display/AAI/I.+AAI+in+brief> [online access 01.02.2019].
2. Assumptions of the Long-Term Senioral Policy in Poland for 2014-2020 (Zalozenia Dlugofalowej Polityki Senioralnej w Polsce na lata 2014-2020) –(2014) <https://www.mpips.gov.pl/seniorzyaktywne-starzenie/zalozenia-dlugofalowej-polityki-senioralnej-w-polsce-na-lata-20142020/> [online access 01.02.2018].
3. Borczyk, W., Jachimowicz, D., Nalepa, W., Municipal Council of Seniors in Practice - Selected Problem (Gminne Rady Seniorow w Praktyce- Wybrane Zagadnienia), Nowy Sącz (2014) https://www.federacjautw.pl/images/gminne_rady.pdf [online access 01.03.2018].
4. European Year for Active Ageing and Solidarity Between Generations (2012), <http://europa.eu/ey2012> [online access 01.02.2019].
5. Fiedorow, A. (2016) , ABC Senior Council (ABC Rad Seniorow), Senioral Policy (Polityka Senioralna) No 2/2016- <http://polityka.zaczyn.org/abc-rad-seniorow/> [online access 15.01.2019].
6. Ganeczko, A. (2017) Council of Seniors in Poland. Legal Basis and Number (Rady Seniorow w Polsce Podstawa prawna i liczba), Senioral Policy (Polityka Senioralna) No 4/2017, <http://polityka.zaczyn.org/polityka-senioralna-dodatek-o-radach-seniorow/> [online access 15.12.2018].
7. Kozioł, D. Parlinska, M., Parlinska, A., (2018) Prognoza demograficzna dla gminy Stare Babice do roku 2040 (Demographic Forecast for the Stare Babice Commune up to 2040).
8. Neverauskas, B., Tijunaitiene, R., (2007), Public Participation in City Governance Decision-Making: Theoretical Approach', Engineering Economics, The Economic Conditions of Enterprise Functioning, 4 (54), pp. 27–35.
9. Population Forecast for 2014-2050 (Prognoza ludnosci na lata 2014-2050), (2014) Warszawa GUS,
10. Senior Council. Good practices for Creating and Developing Senior Councils in Poland. The Special Number of the Magazine. Senioral Policy <http://polityka.zaczyn.org/polityka-senioralna-dodatek-o-radach-seniorow/> [online access 01.02.2019]
11. Reports of the Stare Babice Commune. 2017-2018
12. The Act of 8 March 1990 on municipal self-government (Journal of Laws No. 2016, item 446).
13. The Act of 24 April 2003 on public benefit and voluntary work ((Journal of Laws No 96, item 873, as amended),
14. Zoom on Senior Councils ("Zoom na Rady Seniorow") - National Polish Study of Senior Councils from all over Poland and Cooperation Project with Partnerships of Senior Councils and Municipal Self-Governments Implemented by Association Of Creative Initiatives "e" in Cooperation with Lab of Societies and Social Innovation "Shipyard" and Foundation for Local Communities "On-site", <http://zoomnaradyseniorow.pl> [online access 01.02.2019].

LABOUR MARKET EXPECTATIONS OF GENERATION Y

Linda Perkune¹, MBA; Lasma Licite², Dr.oec., associate professor
^{1,2}Latvia University of Life Sciences and Technologies

Abstract. The replacement of each generation brings a major change in society because the employer must be able to adapt to what can be offered and what the required generation of representatives can offer. Generation Y is a generation with birth years of 1982 through 2004. This generation is obsessed with technologies; they change their jobs often looking for better opportunities and seek the meaning of everything they do. In Latvia, Generation Y accounts for 23 % of the total population and 32.1 % of the total number of employed individuals. This indicates that this generation intensively enters the labour market and employers have to deal with the workplace expectations and values of Generation Y. The aim of the research is to examine the labour market expectations and values of Generation Y. To identify them, the authors conducted a survey of 308 Generation Y students at Latvia University of Life Sciences and Technologies. The survey revealed that the key factors affecting the motivation of Generation Y students in Latvia were regular remuneration and a pleasant and safe atmosphere. In the context of the role of a job, building up new knowledge and skills was also important, yet the fact that no explicit hierarchy of relationships existed at the enterprise was the determinant factor contributing to the sense of belonging. The workplace expectations of Generation Y students were considerably affected by their field of studies chosen as well as employment status (employed/unemployed). However, all the students referred to the importance and meaning of the job done as an essential factor.

Key words: Millennials, Generation Y, expectations, labour market.

JEL code: J21, J82.

Introduction

As the amount of information increases, labour market requirements change - a few years ago the labour market situation required those entering the labour market to be highly qualified, have a lot of work experience, knowledge, skills and abilities to be ready to work from any place in the world 24 hours a day. At present, tremendous changes occur in the labour market because Generation Y individuals enter the labour market and strengthen their positions, and their behaviour, expectations and values are extensively discussed in the labour market context (Johnson M. K., 2002; Lee C. S. et al., 2012). This generation has completely changed labour market rules, so potential employees can set their requirements rather than they have to adapt to the existing ones (Jekabsone G., 2018).

In view of a lack of the workforce in Latvia, it is important for entrepreneurs to adapt to the values and expectations of Generation Y. In 2017, according to the Central Statistical Bureau (CSB), Generation Y in particular comprised 23 % of the total population of Latvia; besides, this generation represented 32 % of total employment, and the Figures are expected to increase because Generation Y, which made up 89 % of total students in 2017, intensively joins the labour market.

The present research defines Generation Y as those who were born in the period from 1982 to 2004 (Howe N., Strauss W., 1991). However, it has to be taken into consideration that the values and expectations of Generation Y are considerably affected by the way they were brought up and their lifestyle and age stage. In 2018, Generation Y individuals were aged 14-36, i.e. they represented a broad range of individuals.

In Latvia, Generation Y has been researched by L. Licite and L. Janmere (2017) who analysed the higher education expectations of Generation Y students as well as Z. Rubene (2018) who described Generation Y from various aspects and examined the factors affecting the generation and trends in its development. The values and expectations of Generation Y in the labour market context have

¹ Corresponding author. E-mail address: linda.perkune@llu.lv

² Corresponding author. E-mail address: lasma.licite@llu.lv

been extensively researched by foreign scientists (Gursoy D. et al., 2013; Sherman R. O., 2005; Stewart J. S. et al., 2017). In Latvia, however, there is a lack of research studies on the labour market expectations of Generation Y in particular.

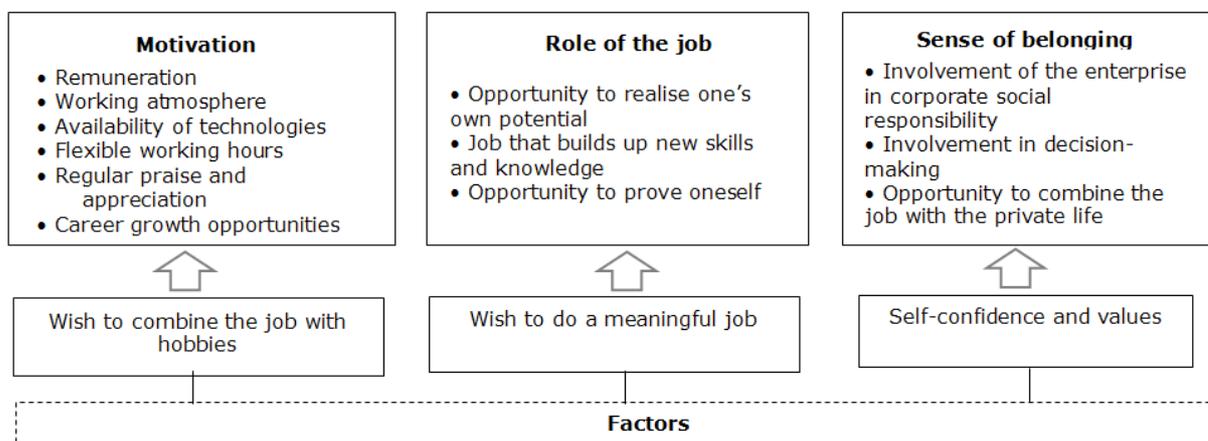
Hypothesis: at the workplace, Generation Y expects competitive remuneration and a motivational working environment. The research **aim** is to examine the labour market expectations and values of Generation Y. To achieve the aim, the following specific research **tasks** were set: 1) to describe Generation Y in the labour market context in Latvia; 2) to conduct a survey to find out the expectations of Generation Y students in labour market.

To achieve the aim and perform the tasks, the research employed several **methods**. The monographic and descriptive methods were used to make a theoretical discussion and interpret the research results based on scientific findings and theories on Generation Y and its labour market expectations. Analysis and synthesis were employed to examine problem elements and identify regularities. Induction was used to make scientific assumptions from individual elements or facts and identify causal associations. Deduction was used for logically systemising and explaining empirical data. To identify the labour market expectations of Generation Y, the authors surveyed 308 students of Latvia University of Life Sciences and Technologies. The survey was conducted from September to November 2018. The target population was Generation Y students aged 18-36 (the average age of the respondents was 21.5 years). The students were random sampled among those studying biosciences (74 students), engineering (118 students) and social sciences (116 students); the sample included both working and non-working students. A statistical analysis method – contingency analysis was applied to analyse the values and expectations of the Generation Y students.

1. Characteristics of Generation Y in the context of the labour market of Latvia

The concept of generations is a way how to describe events and trends occurring in various periods, analyse data as well as explain on-going processes from the perspective of human resources. Nowadays, the population could be divided into five generations (Cort W. R. et al., 2018). According to the scientific literature, Generation Y has the following general characteristics: an ability to perform a number of tasks simultaneously, No acceptance of a hierarchy of relationships as well as self-confidence (Monaco M., Martin M., 2007). Generation Y wishes to do a job with feedback; they have a wish to be leaders and achieve everything fast. They are not ready to work as hard as previous generations did, as their priority is their personal lives and hobbies (Srinivasan V., 2012).

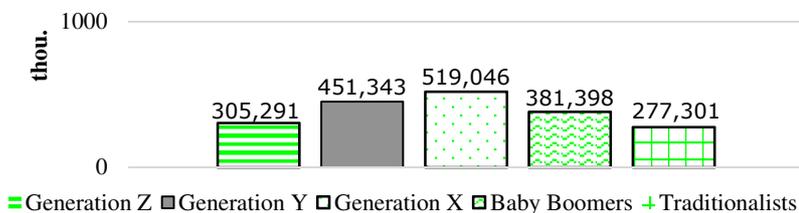
A research study done by Wong I. A. et al. (2017) revealed that at the job, work motivation, work meaning and the sense of belonging were three most important factors for Generation Y (Fig. 1).



Source: authors' construction based on Wong I. A. et al., 2017

Fig. 1. Generation Y values at the workplace

Generation Y individuals usually rarely stay at one job for more than a couple of years (Videjais vecums un..., [s.a.]). This means that it is important for employers to be aware of the labour market expectations of Generation Y in order to create jobs that employees want to keep for a long time. This fact is important because in 2017, according to the CSB, out of 1 934 379 residents of Latvia, 23 % were aged 14-36 (totally 451 343 Generation Y individuals) (Fig. 2) (Videjais vecums un..., [s.a.]). It means that Generation Y is the second largest generation behind Generation X, which gradually replaces Generation X in the labour market.



Source: authors' construction based on Central Statistical Bureau data, 2017

Fig. 2. Breakdown of the population by generation in Latvia in 2017, thou.

It is important not only break the population down by generation but also analyse employment and education indicators by generation. As shown in Table 1, in 2017 in Latvia the economically active population (Generation Y) constituted 31.5 % of the total active population (Ekonomiski aktīvie iedzīvotāji..., [s.a.]). Of the total population, 861.9 thou. were employed, of which 277 thou. or 32 % represented Generation Y. Generation Y comprised 37 % of total unemployment (*Bezdarbnieki pa vecuma...*, [s.a.]). This allows concluding that Generation Y represented a significant proportion of total unemployment; besides, the proportion continues increasing. The calculations of employment were performed in accordance with Section 37 of the Labour Law (in force since 1 June 2020) that stipulates that minors aged 15 and older may be permanently employed, i.e. persons belonging to Generation Y and aged 14 are excluded.

Table 1

Breakdown of the Generation Y workforce in Latvia in 2017, thou.

Status	Generation Y, thou. people	Total, thou. people	Proportion of Generation Y in total population, %
Economically active population	308.5	980.3	31.5
Employed	277.0	861.9	32.1
Unemployed	31.6	85.4	37.0

Source: authors' construction based on Central Statistical Bureau data, 2017

Many employers pointed out that the largest problem related to Generation Y was that they were not reliable, as this generation individuals often changed jobs and did not stay at the job for a long time (Rubene Z., 2018). However, Section 106 of the Constitution of the Republic of Latvia (in force since 1922) states that „everyone has the right to freely choose their employment and workplace according to their abilities and qualifications”.

To save enterprise resources, employers often choose not to remunerate their employees being on study leave, which is allowed by Section 157 of the Labour Law: „An employee, who without discontinuing work, studies at an educational institution of any type, in accordance with a collective agreement or an employment contract shall be granted study leave with or without retention of work remuneration. If a piecework salary has been specified for the employee, study leave shall be granted disbursing average earnings or not disbursing it. An employee shall be granted a study leave of 20 working days for the taking of a State examination or the preparation and defence of a diploma paper with or without retaining the work remuneration. If a piecework salary has been specified for the

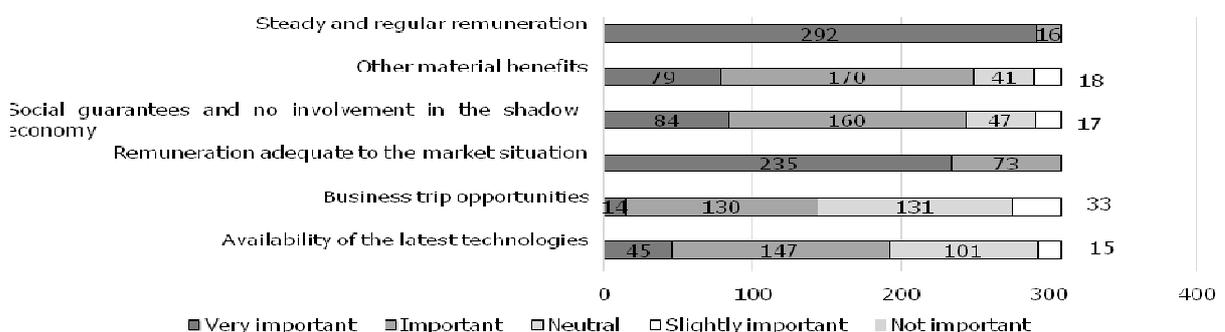
employee, a study leave shall be granted with or without disbursing the average earnings" (Labour Law, 2002). Despite the fact that Paragraph 1 of Section 29 of the Labour Law stipulates that „differential treatment based on the gender of an employee is prohibited when establishing employment legal relationships, as well as during the period of existence of employment legal relationships, in particular when promoting an employee, determining working conditions, work remuneration or occupational training or raising of qualifications, as well as when giving notice of termination of an employment contract" and Paragraph 9 of this section adds that „the provisions of Section 29, insofar as they are not in conflict with the essence of the relevant right, shall also apply to the prohibition of differential treatment based on age (...)", a potential employer may choose to hire another applicant on the pretext that he/she has larger experience (Labour Law, 2002).

Overall, however, an analysis of the legal framework of the Republic of Latvia allows concluding that Generation Y youth are protected by the law, for instance, Section 32 of the Labour Law prescribes: „It is prohibited to indicate age limitations in a job advertisement except in cases where, in accordance with the law, persons of a certain age may not perform relevant work" (Labour Law, 2002).

2. Labour market expectations of Generation Y

To examine the expectations and values of Generation Y at the workplace, the authors conducted a survey. The survey revealed that in planning future careers, financial motivation factors were important or very important to Generation Y students. The key financial motivation factor was steady and regular remuneration that was also adequate to the market situation. Of the total respondents, 94 % considered steady and regular remuneration a very important factor, while remuneration adequate to the market situation was important to 76 % (Fig. 3).

Availability of the latest technologies was important or very important in the choice of a potential job for 62 % of the respondents. Since technologies progress fast, it is understandable that a potential employee wishes that the employer keeps up with innovations, providing an interactive environment and all the amenities ensured by technological progress. It has to be noted that engineering students in particular (88 % of the total engineering respondents) were those who rated this factor as „very important" or „important", which could be explained by the fact that engineering is based on technologic progress that considerably contributes to developing new products or enhancing production processes.

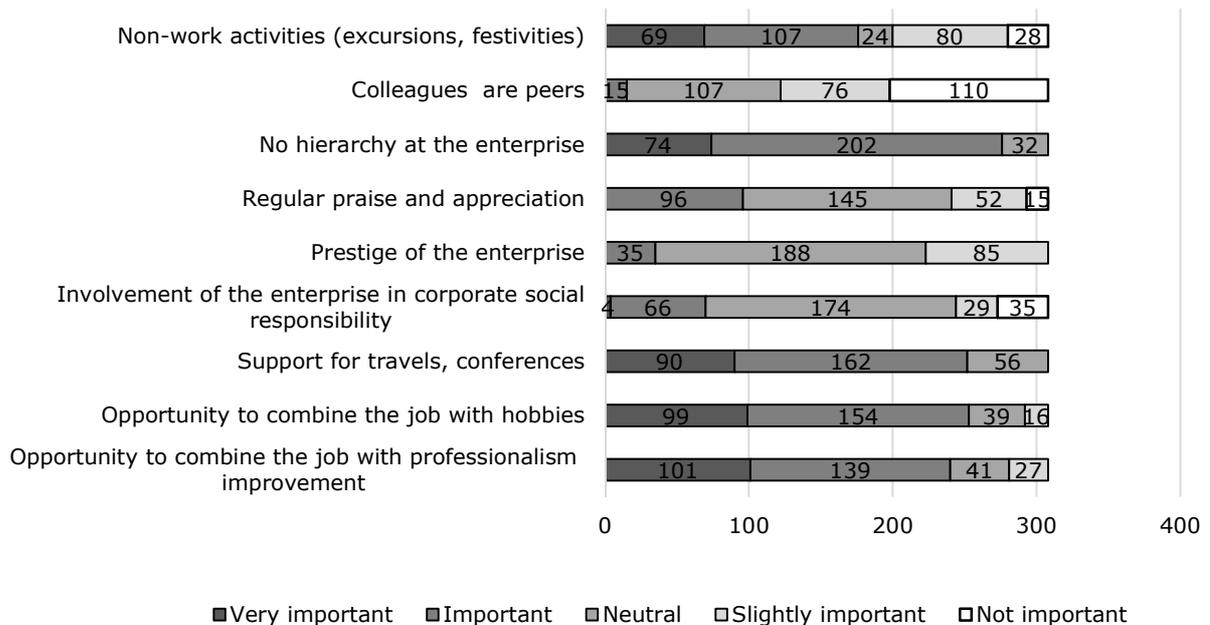


Source: authors' survey.

Fig. 3. Respondents' expectations of financial remuneration at the job

The research examined non-financial motivation factors such as flexible working hours, an opportunity to work from home, an acceptable workload, non-financial bonuses and career opportunities (Fig. 4). The survey revealed that most of the respondents were unanimous in wishing

a pleasant and safe atmosphere at their future workplaces – 98 % rated this factor as „very important” or „important” and only 3 % or 10 students rated it as „neutral”. Despite the fact that a pleasant and safe atmosphere was wished by almost all the respondents, other non-financial bonuses available at the job such as a fitness room or a rest area were rated as „important” or „very important” by only 36 %. Most of the respondents, 64 %, rated them as „neutral”. This might be explained by the wish of Generation Y to use the workplace only as a platform for working rather than spending one’s own free time, preferring resting during a desired free time. It has to be stressed that 52 % of the respondents who gave a „neutral” or „slightly important” rating had employment relationships when they were surveyed.



Source: authors’ survey.

Fig. 4. Respondents’ expectations of non-financial remuneration at the job

A contingency analysis proved that at a confidence level of 95 %, there was a causal association between the factor „rest area, a fitness room or other non-financial bonuses” and student employment status (employed, unemployed), namely, non-financial bonuses were less important to the students who had employment relationships than to non-working ones. This could be explained by the fact that often in daily life, employees have not considered such bonuses or, if the bonuses were available, they would not be important due to the specifics of the job or due to the work schedule.

An opportunity to work from home was rated as „very important” by 54 % of the respondents, while 33 % rated it as „neutral” or „slightly important” (73 % were working students), which could indicate that the working environment was favourable for them. Even though an opportunity to work from home was appreciated by slightly more than half of the respondents, flexible working hours were rated as „very important” or „important” by 77 %, and none of them rated it as „slightly important” or „unimportant”. The importance of this factor could be explained by the wish of Generation Y to combine their jobs with their hobbies and private lives (Cort W. R. et al., 2018).

An analysis of the respondents’ ratings of the factors contributing to the sense of belonging at the workplace showed that non-work activities and an opportunity to combine the job with hobbies were important. Non-work activities (e.g. excursions and festivities celebrated collectively) were important to 35 % of the respondents, yet a large number of the respondents (26 %) rated them as „slightly important”. It has to be noted that 96 % of the respondents who gave „slightly important” ratings

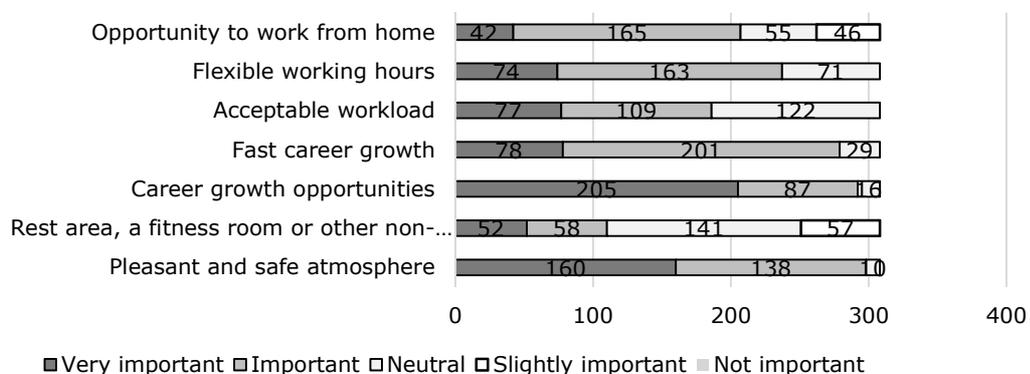
did not have employment relationships, while those who worked when the survey was carried out mainly gave „very important“ or „important“ ratings. This might be explained by the fact that generation Y individuals who worked appreciated the events held by their employers.

More than half of the respondents (57 %) rated the importance of involvement of the enterprise in corporate social responsibility to a potential employee as „neutral“. Only 1.3 % rated it as „very important“. The high percentage of „neutral“ ratings could indicate the fact that the respondents were uninformed or unaware of corporate social responsibility. This means that enterprises should give more information about their social activities to make youth and potential employees aware of their engagement in benefiting the society. To identify whether there is an association between the students' attitude to involvement of the enterprise in corporate social responsibility and the field of studies chosen by the students, the authors did a contingency analysis that proved that at a confidence level of 95 %, there was a causal association between the factor „involvement of the enterprise in corporate social responsibility“ and the fields of studies chosen by the students. The survey revealed that involvement of the enterprise in corporate social responsibility was more important to bioscience students than to other science students.

It was very important or important for 82 % of the respondents whether the potential employer supported travels and participation in conferences and professionalism courses. Such a rating might be explained by the wish of Generation Y individuals to persistently develop themselves as well as the wish of Generation Y youth to travel and seek for new challenges.

It is very important for Generation Y not to have a strong hierarchy of relationships between management and employees at the enterprise, and the survey revealed that the lack of a hierarchy was a very important or important factor for 90 % of the respondents. Besides, those who had employment relationships considered this fact to be very important, as 65 % of them rated it as „very important“, which could be explained by either their dissatisfaction with their jobs and the wish to work at an enterprise with friendly relationships between the employer and the employee or an opposite situation – such relationships already existed at their enterprises.

In contrast to the findings given by theory, the survey revealed that the Generation Y individuals rated regular praise as „neutral“, and only 31 % of the respondents indicated they wished to regularly receive appreciation for well-done work. This could be explained by the mentality or traits and viewpoint of each individual, given the fact that Latvians are considered to be introverted individuals who do not always express their emotions (Ro C., 2018).



Source: authors' survey

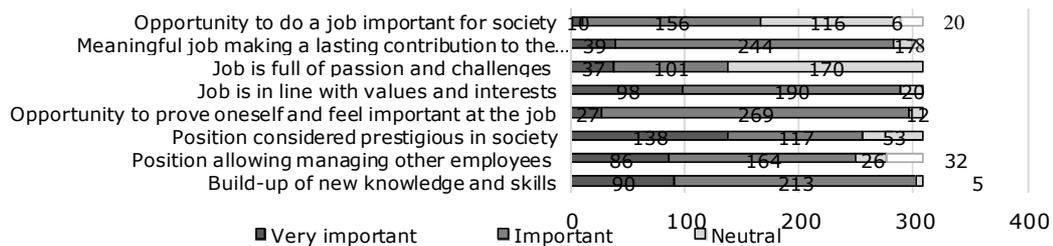
Fig. 5. Generation Y ratings of the factors contributing to the sense of belonging to a job

An analysis of the factors affecting the role of a job showed that it was important for Generation Y to do a meaningful job that was in line with their interests. The only factor that was rated as

„neutral“ by most of the respondents (55 %) was the wish to have a job full of passion and challenges (exactly half of them were working students, which could mean their current jobs were monotonous).

An opportunity to do a job that is important for society was important to 51 % of the respondents, while 8.4 % considered it slightly important or unimportant. Even though only slightly more than half of the respondents wished to do a job that is important for society, a meaningful job making a lasting contribution to the enterprise was very important or important for 79 %. The contingency analysis proved that at a confidence level of 95 %, one could not reject an assumption that doing a meaningful job was important to Generation Y students regardless of their fields of studies and employment status.

The aspects of high self-awareness of Generation Y described in the scientific literature were reflected in the respondents' ratings of the role of a job, namely, it was important for 94 % of them to do a job they were interested in, 96 % wished to feel important at the job; it was very important for 45 % to have a job position being considered prestigious in society, while 53 % wished to have a job where they could manage others and it was very important or important for 98 % to enhance their professionalism at the job. The ratings pointed to the above-described characteristics of Generation Y – their wish to feel important, persistently develop themselves as well as the fact that a considerable proportion of them wished to start up their own businesses, which was evidenced by the high proportion of the respondents wishing to manage others (only 10 % indicated it was unimportant for them to hold a job position allowing managing others).



Source: authors' survey

Fig. 6. Generation Y ratings of the role of employment

One can conclude that the labour market expectations of Generation Y are quite ambitions; besides, the expectations are affected by the field of studies and employment status.

Conclusions and proposals

- 1) In Latvia, Generation Y accounted for 23 % of the total population, 31.5 % of the total economically active population, 32.1 % of the total number of employed individuals and 37.0 % of the total number of unemployed individuals. This indicates that this generation intensively enters the labour market and employers have to deal with the expectations and values of Generation Y at the workplace.
- 2) In Latvia, the key factors affecting the motivation of Generation Y students in Latvia were steady, regular remuneration and a pleasant and safe atmosphere. Building up new knowledge and skills was the most important values in relation to the role of a job, yet the determinant factor contributing to the sense of belonging was a lack of a hierarchy of relationships at the enterprise.
- 3) The workplace expectations of Generation Y students were considerably affected by their fields of studies chosen as well as employment status (employed/unemployed). Involvement of the enterprise in corporate social responsibility was more important to bioscience students, engineering students preferred availability of technologies, while non-financial bonuses (a fitness room and a rest area) were slightly important to working students. A meaningful and important

job was important to Generation Y students regardless of their fields of studies and employment status.

Bibliography

1. *Bezdarbnieki pa vecuma grupam un pec dzimuma* (Unemployed by Age Group and Sex). Retrieved: http://data1.csb.gov.lv/pxweb/lv/sociala/sociala__nodarb__bezdarbs__ikgad/NBG250.px/?rxid=a39c3f49-e95e-43e7-b4f0-dce111b48ba1. Access: 08.02.2019.
2. Cort, W. R., Rachel, S. R., Hannes, Z. (2018). Leadership and Generations at Work: A Critical Review. *The Leadership Quarterly*, No. 29, pp. 44-57.
3. *Ekonomiski aktivie iedzivotaji pa vecuma grupam un pec dzimuma* (Active Population by Age Group and Sex) Retrieved: http://data1.csb.gov.lv/pxweb/lv/sociala/sociala__nodarb__aktivitate__ikgad/NBG060.px/?rxid=a39c3f49-e95e-43e7-b4f0-dce111b48ba1. Access: 08.02.2019.
4. Gursoy, D., Geng – Qing Chi, C., Karadag, E. (2013). Generational Differences in Work Values and Attitude among Frontline and Service Contact Employees. *International Journal of Hospitality Management*, No. 32, pp. 40-48.
5. Howe, N., Strauss, W. (1991). *Generations: The History of America's Future, 1584 to 2069*. New York: Willian Morrow and Company, Inc. p. 544.
6. Jekabsone, G. (2018). *Ka cinities ar bezdarbu darbinieku trukuma apstaklos* (How to Cope with Unemployment in the Absence of Employees). Retrieved: <https://www.ficil.lv/blogs/ka-cinities-ar-bezdarbu-darbinieku-trukuma-apstaklos/apstaklos/>. Access: 08.02.2019.
7. Johnson, M. K. (2002). Social Origins, Adolescent Experiences, and Work Value Trajectories during the Transition to Adulthood. *Social Forces*, Volume 80, pp. 1307-1341.
8. *Labour Law* (2002). Retrieved: <https://likumi.lv/doc.php?id=26019>. Access: 08.02.2019.
9. Lee, C. S., Hung, D. K. M., Ling, T. C. (2012). Work Values of Generation Y Preservice Teachers in Malaysia. *Procedia – Social and Behavioral Sciences*, Volume 65, pp. 704–710.
10. Licite, L., Janmere, L. (2017). Millennial Student Expectations towards Higher Education in Latvia. In: *Engineering for Rural Development*, No. 16. Jelgava: LLU, pp. 1440-1449.
11. Monaco, M., Martin, M. (2007). The Millennial Student: A New Generation of Learners. *Athletic Training Education Journal*, Volume 2, pp. 42-46.
12. Rubene, Z. (2018). Profesore: vai millennium paaudzei ir svariga izglitiba (Professor: Is education important for the millennium generation?). *Latvijas Avize*, February 19. Retrieved: <http://www.la.lv/profesore-vai-millennium-paaudzei-ir-svariga-izglitiba>. Access: 08.02.2019.
13. Ro, C. (2018). *Latvia: Europe's Nation of Introverts*. Retrieved: <http://www.bbc.com/travel/story/20180611-latviaeuropes-nation-of-introverts>. Access: 08.02.2019.
14. Sherman, R. O. (2005). Growing our Future Leaders. *American Nurse*, Volume 2, Issue 1, pp. 125-132
15. Stewart, J. S., Oliver, E. G., Cravens, K. S., Oishi, S. (2017). Managing Millennials: Embracing Generational Differences. *Business Horizons*, Volume 60, pp. 45-54.
16. Srinivasan, V. (2012). Multi Generations in the Workforce: Building Collaboration. *IIMB Management Review*, Volume 24, pp. 48-66.
17. *Videjais vecums un iedzivotaju skaits pec vecuma un dzimuma statistiskajos regionos un republikas pilsetas gada sakuma* (Average Age and Number of Population in Statistical Regions and Cities under State Jurisdiction by Age and Gender; at the Beginning of the Year). Retrieved: https://data1.csb.gov.lv/pxweb/lv/iedz/iedz__iedzrakst/IRG030.px/?rxid=5ab25eea-86df-45f1-ada2-bd7707c55eb7. Access: 08.02.2019.
18. Wong, I. A., Wan, Y. K. P., Gao, J. H. (2017). How to Attract and Retain Generation Y Employees? An Exploration of Career Choice and the Meaning of Work. *Tourism Management Perspectives*, No. 23, pp. 140-150.

IMPORTANCE OF COLLABORATION WITH EMPLOYERS TOWARDS THE RANKINGS OF HIGHER EDUCATION INSTITUTIONS

Evija Rusite¹, Mg.biol., Mg.sc.admin./doctoral student; Biruta Sloka², Dr.oec./Professor
^{1,2}University of Latvia

Abstract. It is impossible for higher education institutions (HEI) to ignore different national and international comparisons, since emergence of global rankings. Involvement in rankings changes and in some aspects improves the performance of higher education institutions. Trying to rise their position in the rankings, HEI are seeking ways, how to improve performance in those areas that are measured by the indicators used for rankings of HEI. The purpose of this study is to search for some possible solutions for more effective research work organization at the universities and correct reflection of achieved results to raise their position in university rankings. Research methods used: analysis of scientific publications on university rankings aspects related to different methodologies and indicators; expert survey on university organisation and used ranking indicators. For expert interviews were invited internationally recognized university management representatives and several administrators at universities in different countries. For different aspect evaluations, there was used evaluation scale 1-10, where 1- do not agree and 10 – fully agree. Expert evaluations were analysed by descriptive statistics indicators and cross-tabulations.

Main results and findings: rankings have significant role in the development of HEI. It is important to define the accessible rankings position in the strategy of HEI. Higher education institutions must determine such goals and results of performance that favour the higher ranking position. For increase of international recognition HEI have to recognise that as well important aspects are the academic and employer reputation surveys in rankings.

Key words: university rankings, performance indicators, employers, experts.

JEL code: I23; O30; O32.

Introduction

It is impossible for higher education institutions (HEI) to ignore different national and international comparisons, since emergence of global rankings. This influences the way, how higher education institutions function and are planning their development. Involvement in rankings changes and in some aspects improves the performance of higher education institutions. Trying to rise their position in the rankings, higher education institutions are seeking ways, how to improve performance in those areas that are measured by the indicators used for rankings of higher education institutions. However, the question is whether devoting by HEI too big attention to the highest ranking positions causes the defining of incorrect priorities of the higher education institutions development and restricts the ensuring of the main activities of the respective HEI.

Many international academic research and investigations have been performed in this field, and the research results usually are used for management decision making on different levels: on university level, on higher education and science management level and on country management level.

Taking into account the above mentioned and extent how essential role ratings have in the forming of the reputation of higher education institutions, the purpose of this study is to search for some possible solutions for more effective research work organization at the universities and correct reflection of achieved results to raise their position in university rankings. Tasks: analyse scientific findings on university ranking aspects; compare scientific findings with international expert evaluation views.

Research methods used: analysis of scientific publications on university rankings aspects related to different methodologies, aspects in university rankings – research results, academic performance,

¹ Evija.Rusite@lu.lv

² Biruta.Sloka@lu.lv

share of academic staff with their qualification levels, scientific citations and importance for employers and labour market development (even often discussed on their level of importance) and indicators; expert survey on university organisation and used ranking indicators aspects supporting university rankings. For expert interviews the authors invited internationally recognized university management representatives and several administrators at universities in different countries. For different aspect evaluations there was used evaluation scale 1-10, where 1- do not agree and 10 – agree in full extent. Expert evaluations were analysed by descriptive statistics indicators – indicators of central tendency or location (arithmetic mean, mode, median) and indicators of variability or dispersion (range, standard deviation, standard error of mean) and cross-tabulations.

Research results and discussion

Theoretical findings in academic research are discussed in scientific community with often raised questions - is it possible to rank universities using fewer indicators? On this often stated question there is performed study on five international university rankings (Dogan, Al, 2019) - the purpose of Dogan and Al paper was to analyse the similarity of intra-indicators used in research-focused international university rankings (Academic Ranking of World Universities (ARWU), NTU University Rankings (NTU) - "Performance Ranking of Scientific Papers for World Universities" is released by National Taiwan University, and is also known as NTU Ranking. NTU Ranking provides overall ranking, rankings by six fields, and rankings by 14 selected subjects, University Rankings by Academic Performance (URAP), Quacquarelli Symonds (QS) and Round University Rankings (RUR)) over several years, and analyse the effect of similar indicators on overall rankings for 2015. The research questions of Dogan and Al research addressed in their study in accordance with these purposes were questions stated often also by other researchers: at what level are the intra-indicators used in international university rankings similar? Is it possible to group intra-indicators according to their similarities? What is the effect of similar intra-indicators on overall rankings? (Dogan G., Al U., 2019). Design/methodology/approach in Dogan and Al research paper was: indicator-based scores of all universities in five research-focused international university rankings. For data obtained in research Dogan and Al have used one of effective multivariate analysis methods for data analysis - multidimensional scaling (MDS) and cosine similarity measure to analyse similarity of indicators and to answer these two research questions mentioned above. Indicator-based scores and overall ranking scores for 2015 were used as data and Spearman correlation test was applied by Dogan and Al to answer the third research question. Main findings of Dogan and Al: results of the analyses show that the intra-indicators used in ARWU, NTU and URAP are highly similar and that they can be grouped according to their similarities (Dogan G, Al U., 2019). Dogan and Al also have examined the effect of similar indicators on 2015 overall ranking lists for these three rankings. NTU and URAP are affected least from the omitted similar indicators, which means it is possible for these two rankings to create very similar overall ranking lists to the existing overall ranking using fewer indicators (Dogan G, Al U., 2019).

Researchers are also interested in deeper academic studies on aspects - do the technical universities exhibit distinct behaviour in global university rankings? A Times Higher Education (THE) case study (Carmen P.-E., Enrique O.-M., 2018) where authors Carmen and Enrique have stressed that Technical Universities (TUs) exhibit a distinct ranking performance in comparison with other universities. In the mentioned paper, Carmen and Enrique have identified 137 TUs included in the Times Higher Education (THE) Ranking (2017 edition) and analysed their scores statistically. The research results of Carmen and Enrique highlighted the existence of clusters of TUs showing a general

high performance in the Industry Income category and, in many cases, a low performance on Research and Teaching (Carmen P.-E., Enrique O.-M., 2018). Finally, the global score weights were simulated by Carmen and Enrique, creating several scenarios that confirmed that the majority of TUs (except those with a world-class status) would increase their final scores if industrial income was accounted for the levels parametrized (Carmen P.E., Enrique O.-M., 2018).

Very often stated question by researchers, policy makers and public administrators: Are university rankings useful to improve research? A systematic review was performed also by Balas and Momani where they have expressed their concerns about reproducibility and impact of research urge improvement initiatives (Balas A.E., Momani S., 2018). Balas and Momani have stressed that current university ranking systems evaluate and compare universities on measures of academic and research performance – those aspects are stressed by many other researchers. Balas and Momani have stressed that although often useful for marketing purposes, the value of ranking systems when examining quality and outcomes is unclear (Balas A.E., Momani S., 2018). The purpose of the Balas and Momani study was to evaluate usefulness of ranking systems and identify opportunities to support research quality and performance improvement. Balas and Momani study's methods are aimed at a systematic review of university ranking systems and the study was conducted to investigate research performance and academic quality measures (Balas A.E., Momani S., 2018).

Eligibility requirements included in Balas and Momani study: inclusion of at least 100 doctoral granting institutions, be currently produced on an ongoing basis and include both global and US universities, publish rank calculation methodology in English and independently calculate ranks. Ranking systems must also include some measures of research outcomes (Balas A.E., Momani S., 2018). Indicators in Balas and Momani study were abstracted and contrasted with basic study quality improvement requirements. Exploration of aggregation methods, validity of research and academic quality indicators, and suitability for quality improvement within ranking systems were also conducted in Balas and Momani study. Results of Balas and Momani study - total of 24 ranking systems were identified and 13 eligible ranking systems were evaluated (Balas A.E., Momani S., 2018). Six of the 13 rankings are 100 % focused on research performance (Balas A.E., Momani S., 2018). Research results indicated that 76 % of the total ranks are attributed to research indicators, with 24 % attributed to academic or teaching quality (Balas A.E., Momani S., 2018). Seven university ranking systems rely on reputation surveys and/or faculty and alumni awards (Balas A.E., Momani S., 2018). Results of Balas and Momani study have indicated that university rankings influence academic choice (for students, for researchers and members of academic staff, for offers in conducting scientific research) and in most of research performance measures are the most weighted indicators for university rankings. There are No generally accepted academic quality indicators in ranking systems (Balas A.E., Momani S., 2018) and this is also one of reasons to have several university ranking systems applied world-wide. Discussion as a result of Balas and Momani study indicated that No single ranking system provides a comprehensive evaluation of research and academic quality. Utilizing a combined approach of the Leiden, Thomson Reuters Most Innovative Universities, and the SCImago ranking systems may provide institutions with a more effective feedback for research improvement (Balas A.E., Momani S., 2018). Rankings which extensively rely on subjective reputation and „luxury“ indicators, such as award winning faculty or alumni who are high ranking executives, are not well suited for academic or research performance improvement initiatives (Balas A.E., Momani S., 2018). Balas and Momani study has stressed that future efforts should better explore measurement of the university research performance through comprehensive

and standardized indicators. Balas and Momani study indicated that their research results could serve as a general literature citation when one or more of university ranking systems are used in efforts to improve academic prominence and research performance (Balas A.E., Momani S., 2018).

Although university rankings are performed internationally, in many countries academic research is conducted to analyse the influence of organisational features in high-ranked universities like in the case of Australia (Uslu B., 2017). Global university rankings influence more and more different aspects at universities and global university rankings are important for decision making on several levels: for student attraction, for organisation of academic work and research (Marginson S., 2007). International research results evaluations for global university rankings are stressed by several researchers (Saunders J., Wong V., 2011). Some other researchers for global university rankings stress student views importance in higher education organization (Sikosek M., Kodriocarrojon B., 2011) and place of respective university in international university rankings (Williams R., Van Dyke N., 2007). Researchers have stressed the importance of obtained university rank in respective global university rankings (Sauder M., Espeland W.N., 2006).

Uslu research has examined the influence of major institutional components, academic support mechanisms and organisational climate on scholarly productivity in high-ranked universities. Qualitative research methods were applied to collect data. Data by researcher Uslu were collected from senior academics working in high-ranked Australian universities. The collected data were examined using thematic descriptive and content analysis techniques (Uslu B., 2017).

The results of Uslu research indicate that academic support practices help to save time by providing excellent knowledge related to new pedagogies and research preparation and by offering project management support. Results also show that a participatory work environment and fair institutional policies and practices generate intrinsic and extrinsic incentives to enhance academic role performance (Uslu B., 2017).

Often asked question is „on being good or being known“ which is also related to university rankings (Rindova V.P., Williamson I.O., Petkova A.P., Sever J.M, 2005) and place of the university in several university rankings systems (Wæraas A., Solbakk M.N., 2009).

Those aspects are stressed also in other researchers' results and practical recommendations for policy decisions at universities and wider (O'Connell C., 2013). Uslu has stressed that to promote their institutional prestige, university managers should operate selective financial and human resource investment strategies as several university ranking systems are using several performance indicators in the evaluations of university performance.

To elevate the ranking of their institutions, they need to establish essential academic support structures and institute multi-directional communication networks with less bureaucracy, simplified hierarchical structures, effective reward systems, well-designed career planning and informative performance reviews (Uslu B., 2017).

Narrow places for university rankings are analysed in details and with strong approach, like finding seven deadly sins of world university ranking: a summary from several papers (Soh K., 2017). Attention to higher education rankings is paid also in developing countries, like Indonesia (Kusumastuti D., Idrus N., 2017) where the researchers indicate possible ways to make first steps for university rankings. Often used approach and asked question – does one size fits all? A different perspective on university rankings has indicated that importance of rankings is not going to reduce the importance (Goglio V., 2016) and how important are those results in research international recognition (Sombatsompop N. et al., 2011).

University rankings as a tool for assessing the quality of education in the context of globalization is on research agenda for many researchers determining and designing policy directions for higher education quality improvement (Avralev N., Efimova I., 2015) and also aspects of university rankings and the reality (Williams R., Van Dyke N., 2008).

Several ranking systems' comparisons with clear question by researcher Soh specializing in university ranking research – „what the overall doesn't tell about world university rankings?“ by examples from different university ranking systems: ARWU, QSWUR, and THEWUR conducted in 2013 (Soh K., 2015).

Researchers have paid attention to inconsistent year-to-year fluctuations limit in global higher education rankings for respective university management and researchers have suggested their findings for deeper use for university management and decision making (Sorz J., Wallner B., Seidler H., Fieder M., 2015). Researchers have analysed often asked questions on global university rankings correspondence to reality and respective consequences (Luca M., Smith J., 2013).

According to numerous international academic researchers, including researchers from University of Chicago Tutterow and Evans, university rankings and metrics have become an increasingly prominent basis of student decisions, generalized university reputation, and the resources universities attract for university activities (Tutterow C., Evans J.A., 2016.). Tutterow and Evans, have performed review of metrics used in rankings of higher education institutions about the influence of ranking on the position and strategic behavior of universities and students.

As it is mentioned in many scientific publications, also in Tutterow and Evans, most quantitative analyses on this topic estimate the influence of change in university rank on performance. University rankings are used to make different models for university competition (Grewal R., Dearden J.A., Lilien G.L., 2008). These studies consistently identify a small, short-lived influence of rank shift on selectivity (e.g., one rank position corresponds to around one percent more student applicants), comparable to ranking effects documented in other domains (Tutterow C., Evans J.A., 2016). Tutterow and Evans have stressed that this understates the larger system-level impact of metrification on universities, students, and the professions that surround them. Tutterow and Evans have explored one system-level transformation likely influenced by the rise of university rankings.

Recent years have witnessed the rise of student enrolment management and independent educational consultation. Researchers Tutterow and Evans have indicated consequences from university ranking to this transformation: in an effort to improve rankings, universities organise more applications from students to reduce student acceptance rate. Tutterow and Evans research results have proved that lower acceptance rates lead to more uncertainty for students about acceptance for studies, leading possible students to apply to more higher education institutions and those applications to several HEI decrease the probability that accepted students will attend the respective university (Tutterow C., Evans J.A., 2016).

Alike conclusions are resulted also in other research results (Dill D.D., Soo M., 2005). As it is mentioned by Tutterow and Ecans - this leads to greater uncertainty about enrolment for students and universities and generates demand for new services to manage it. Reputation of higher education institution on international level motivates also marketing specialists to be involved in promotion of universities (Conard M.J., Conard M.A., 2000). Because these and other system-level transformations are not as cleanly measured as rank position and performance, they have not received the same treatment or modelling attention in higher education despite their importance for understanding and influencing education policy (Tutterow C., Evans J.A., 2016). Very often stated and analysed question

by researchers in many countries are on academic research proportions and learning – teaching proportions at highly ranked universities (Jerrams S., Betts T., Carton J., 2008).

Globalisation of international comparisons and evaluation systems including global university rankings have been recently introduced as mechanisms for assessing overall academic quality, appraising research reputation and as a basis for funding and policy decisions (O'Loughlin D., MacPhail A., 2015).

Research results of researchers from Ireland O'Loughlin and MacPhail have confirmed that consistency of understanding of research reputation also exist among all users of ranking systems, particularly those involved in higher education policy and research strategy decision-making (O'Loughlin D., MacPhail A., 2015). This aspect is very important for university management but also for respective country higher education policy development.

University rankings are discussed more and more on international scientific conferences and meetings, developed in scientific publications to find reasonable arguments and include them for universities management decision making to prepare strategies of universities to make reasonable activities in priorities for universities act in their work and performance to reflect their achieved results of scientific and teaching achievements in respective university international university rankings.

In empirical part of research it was conducted expert survey for evaluation of the significance of the rankings of higher education institutions (HEI) – international experts of higher education were asked to evaluate the analysed aspects in scale 1 - 10, where 1 - fully disagree / absolute insignificant to 10 - fully agree / very significant. Main results of descriptive statistics of evaluations by international experts of higher education on the analysed aspects related to university rankings are included in Table 1.

Table 1

Main indicators of descriptive statistics of international expert evaluations on higher education institutions rankings

	Rankings of HEIs have significant role in the development of HEIs	It is important to define the accessible rankings position in the strategy of HEI			HEI must determine such goals and results of performance that favour the higher ranking position	Devoting of too great attention to the highest ranking positions causes the definition of incorrect priorities of the HEI development and restrict the ensuring of the main activities of HEI	How important should be the academic reputation survey in rankings?	How important should be the employer reputation survey in rankings?
		in the scale of the world	in the regional scale	in the national scale				
Mean	5,57	6,00	5,29	6,43	5,29	8,00	3,71	3,43
Std. Error of Mean	1,110	1,091	1,304	1,043	1,107	1,000	0,808	0,948
Median	6	8	8	8	7	9	3	2
Mode	8	8	8	8	7; 8	10	3	1; 2
Std. Deviation	2,936	2,887	3,450	2,760	2,928	2,646	2,138	2,507
Variance	8,619	8,333	11,905	7,619	8,571	7,000	4,571	6,286
Range	7	7	7	8	7	7	6	6
Minimum	1	1	1	1	1	3	1	1
Maximum	8	8	8	9	8	10	7	7

Evaluation scale 1 - 10, where 1 - fully disagree / absolute insignificant to 10 - fully agree / very significant
 Source: author's calculations based on Evija Rusite conducted international expert survey, n=7;

Data of Table 1 indicate that experts are on the opinion that „Devoting of too great attention to the highest ranking positions causes the definition of incorrect priorities of the HEI development and restrict the ensuring of the main activities of HEI” have the highest evaluations by experts with arithmetic mean 8, median 9 and mode 10 (in evaluation scale 1 - 10 with lowest given evaluation 3 by experts). Next higher evaluations by experts were for „It is important to define the accessible rankings position in the strategy of HEI in the national scale” with arithmetic mean 6,43, median 8 and mode 8; a little lower evaluations by experts were for „It is important to define the accessible rankings position in the strategy of HEI in the scale of the world”.

Experts were very reserved in evaluations of aspect „How important should be the academic reputation survey in rankings?” with arithmetic mean 3,71, median 3 and mode 3 – for this analysed aspect experts had the lower differences in their evaluations as indicators of dispersion were the lowest, but the lowest evaluations were for the analysed aspect „How important should be the employer reputation survey in rankings?” with arithmetic mean 3,43, median 2 and mode 1 and 2.

There were additional comments by experts „Reputation surveys are a just an indicator of how much a HEI „brand” is known (often for reason only historically linked to its quality) and including them in a university ranking perpetuates the same reputation over and over (the ranking in itself creates a reputation). Employers only know the graduated students they employ and it does not make sense to ask them which HEI produce the best ones (and the economy of the country the HEI is in, is the most relevant factor). Besides, existing academic surveys are not scientifically well built (regarding the questionnaire where they ask to name too many institutions and the population surveyed for subject and geographical areas covered in fact). They should be commissioned to a third party than the ranker.” The comments are subjective attitude of experts but the survey was created in accordance of main aspects included in higher education rankings.

Conclusions, proposals, recommendations

- 1) Global university rankings have significant role in the development of higher education institutions. It is important to define the accessible rankings position in the strategy of higher education institution - in the scale of the world, in the regional scale and in the national scale. Higher education institutions must determine such goals and results of performance that favour the higher ranking position.
- 2) University rankings has increasing importance for attraction of students, for research financing competition results even if sometimes for university rankings is not paid enough attention by universities management.
- 3) International experts are on the opinion that „Devoting of too great attention to the highest ranking positions causes the definition of incorrect priorities of the HEI development and restrict the ensuring of the main activities of HEI” have the highest evaluations by experts – those findings could be taken into account by university management.
- 4) Experts of higher education have evaluated very low the importance of the academic reputation survey in rankings and the importance of the employer reputation survey in rankings.
- 5) Higher education institutions have to recognise that very important aspects are the academic and employer reputation surveys in university rankings.

Bibliography

1. Avralev, N., Efimova, I. (2015). University rankings as a tool for assessing the quality of education in the context of globalization. *Asian Social Science*, Volume 11, Issue 10, pp. 292-298.
2. Balas, A.E., Momani, S. (2018). Are university rankings useful to improve research? A systematic review. *PLoS ONE*, Volume 13, Issue 3, Article number e0193762.
3. Carmen, P.-E., Enrique, O.-M. (2018). Do the technical universities exhibit distinct behaviour in global university rankings? A Times Higher Education (THE) case study. *Journal of Engineering and Technology Management*, Volume 48, pp. 97-108.
4. Conard, M.J., Conard, M.A. (2000). An analysis of academic reputation as perceived by consumers of higher education. *Journal of Marketing for Higher Education*, Volume 9, Issue 4, pp. 69-80.
5. Dill, D.D., Soo, M. (2005). Academic quality, league tables, and public policy: A cross-national analysis of university ranking systems. *Higher Education*, Volume 49, Issue 4, pp. 495-533.
6. Dogan, G., Al, U. (2019). Is it possible to rank universities using fewer indicators? A study on five international university rankings, *Aslib Journal of Information Management*, Volume 71, Issue 1, pp. 18-37.
7. Goglio, V. (2016). One size fits all? A different perspective on university rankings. *Journal of Higher Education Policy and Management*, Volume 38, Issue 2, pp. 212-226.
8. Grewal, R., Dearden, J.A., Lilien, G.L (2008). The university rankings game: Modelling the competition among universities for ranking. *American Statistician*, Volume 62, Issue 3, pp. 232-237.
9. Jerrams, S., Betts, T., Carton, J. (2008). Building Sustainable Academic Research in a 'Teaching and Learning' Intensive Environment. *Industry and Higher Education*, Volume 22, Issue 3, pp. 189-194.
10. Kusumastuti, D., Idrus, N. (2017). Nurturing quality of higher education through national ranking: a potential empowerment model for developing countries. *Quality in Higher Education*, Volume 23, Issue 3, pp. 230-248.
11. Luca, M., Smith, J. (2013). Salience in Quality Disclosure: Evidence from the U.S. News College Rankings. *Journal of Economics and Management Strategy*, Volume 22, Issue 1, pp. 58-77.
12. Marginson, S. (2007). Global university rankings: Implications in general and for Australia. *Journal of Higher Education Policy and Management*, Volume 29, Issue 2, pp. 131-142.
13. O'Connell, C. (2013). Research discourses surrounding global university rankings: Exploring the relationship with policy and practice recommendations. *Higher Education*, Volume 65, Issue 6, pp. 709-723.
14. O'Loughlin, D., MacPhail, A. (2015). The rhetoric and reality of research reputation: 'fur coat and no knickers', *Studies in Higher Education*, Volume 40, Issue 5, pp. 806-820.
15. Rindova, V.P., Williamson, I.O., Petkova, A.P., Sever, J.M. (2005). Being good or being known: An empirical examination of the dimensions, antecedents, and consequences of organizational reputation. *Academy of Management Journal*, Volume 48, Issue 6, pp. 1033-1049.
16. Sauder, M., Espeland, W.N. (2006). Strength in numbers? The advantages of multiple rankings. *Indiana Law Journal*, Volume 81, Issue 1, pp. 205-227.
17. Saunders, J., Wong, V. (2011). Manoeuvring towards research decline: The RAE and the decline of Britain's international research standing. *European Journal of Marketing*, Volume 45, Issue 4, pp. 484-512.
18. Sikosek, M., Kodriocarrojon, B. (2011). Student Expectations of higher education institution services in light of service differentiation. *Management*, Volume 6, Issue 3, pp. 303-308.
19. Soh, K. (2017). The seven deadly sins of world university ranking: a summary from several papers. *Journal of Higher Education Policy and Management*, Volume 39, Issue 1, pp. 104-115.
20. Soh, K. (2015). What the Overall doesn't tell about world university rankings: examples from ARWU, QSWUR, and THEWUR in 2013. *Journal of Higher Education Policy and Management*, Volume 37, Issue 3, pp. 295-307.
21. Sombatsompop, N., Premkamolnetr, N., Markpin, T., Ittiritmeechai, S., Wongkaew, C., Yochai, W., Ratchatahirun, P., Beng, L.I. (2011). Viewpoints on synergising ASEAN academic visibilities through research collaboration and the establishment of an ASEAN Citation Index Database. *Asia Pacific Viewpoint*, Volume 52, Issue 2, pp. 207-218.
22. Sorz, J., Wallner, B., Seidler, H., Fieder, M. (2015). Inconsistent year-to-year fluctuations limit the conclusiveness of global higher education rankings for university management. *PeerJ*, Volume 8, Article number 1217.
23. Tutterow, C., Evans, J.A. (2016). Reconciling the small effect of rankings on university performance with the transformational cost of conformity. *Research in the Sociology of Organizations*, Volume 46, pp. 265-301.
24. Uslu, B. (2017). The influence of organisational features in high-ranked universities: the case of Australia. *Journal of Higher Education Policy and Management*, Volume 39, Issue 5, pp. 471-486.
25. Wæraas, A., Solbakk, M.N. (2009). Defining the essence of a university: Lessons from higher education branding. *Higher Education*, Volume 57, Issue 4, pp. 449-462.
26. Williams, R., Van Dyke, N. (2007). Measuring the international standing of universities with an application to Australian universities. *Higher Education*, Volume 53, Issue 6, pp. 819-841.
27. Williams, R., Van Dyke, N. (2008). Reputation and reality: Ranking major disciplines in Australian universities. *Higher Education*, Volume 56, Issue 1, pp. 1-28.

MIGRANT FAMILIES IN A REGIONAL VIEW

Sigita Sulca¹, PhD student; Ance Cerina²

¹University of Latvia, Faculty of Geography and Earth Sciences; ²Central Statistical Bureau of Latvia

Abstract. In Latvia the process of migration has a significant impact on population and its composition. Population decreases, due to most emigrants being of working age and fertile age, when people establish a family. Over the last years, return processes have become more apparent. Since various groups are being involved in migration, this paper focuses on different types of emigrant and remigrant families with children.

The research aims to characterise types of Latvian families with children that have emigrated and returned over the last six years. The results are derived from Population Register data and Central Statistical Bureau (CSB) Population Assessment Method data.

Latest data show that number of women and children among immigrants has increased and this research confirms that women with children are the most prevalent group in both emigration and remigration. The most attractive region for remigrant families is the Riga region.

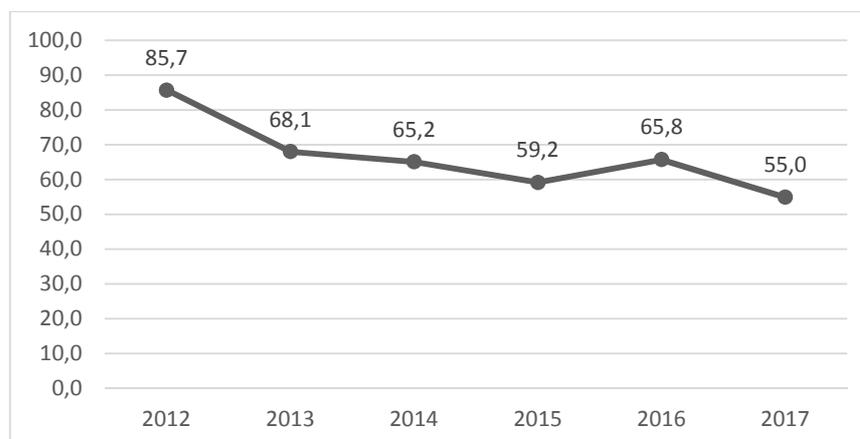
Key words: Emigrants, remigrants, regions, families.

JEL code: R23.

Introduction

Migration significantly affects population size, distribution and composition. Migration processes are influenced by economic and political processes. As the global economic and political situation changes, the nature and types of migration also change. Economic migrant flows are diminishing due to increased welfare, multiple places of residence, studying, as well as identity searches (Brooks R., Waters J., 2011; Holloway Sl., et al., 2012; Cresswell T., 2011; Mierina, I. 2015). Not only the nature of emigration but also the flows and causes of remigration are changing.

Since the early 1990s, Latvia has had a negative net migration. The volume of emigration has stabilised during 2012-2017 and accounts for about 1 % of Latvia's population. Data on Latvian remigrants (citizens, non-citizens and born in Latvia) from 2012 – 2017 (CSB unpublished data) reveal that most are women and the proportion of children aged below 15 is increasing. During this period the amount of immigration has not exceeded 0.5 % of the total population of Latvia. The dynamics of Latvian national's remigrants among immigrants since 2012 range from 85.7 % (2012) to 55 % (2017) and the trend is not upward (Figure 1). Due to high share of remigrants among immigrants, it is necessary to focus on this group.



Source: author's visualization based on Office of Citizenship and Migration Affairs Population register data

Fig. 1. Share of remigrants among immigrants 2012 - 2017, %

¹ Sigita.shultz@gmail.com

² Ance.cerina@csb.gov.lv

The aim of this study is to investigate regional (Statistical regions of Latvia) patterns of emigrant and remigrant families with children using only administrative registers.

This study analyses emigration and remigration patterns with an emphasis on families. Numerous studies in Latvia have focused on various facets of migration, for example, diaspora, migration flows and directions after the EU enlargement (Lulle A., Klave E., 2015; Mierina (ed.), 2015; McCollum et al., 2017). Nevertheless, families with children have never been the main focus of research. Based on that, the main research questions of this study are: 1) To characterise composition of emigrant and remigrant families with children from 2012 to 2017. 2) Analyse the number of children in emigrant and remigrant families in on regional scale. 3) Distribution of emigrant and remigrant families among regions of Latvia.

To describe the concept of remigration in Latvia, different definitions are used, for example, reemigration (Klave E., 2016) and return migration (Ministry of Foreign Affairs, 2014). Remigration is often characterised as the end of the migration process, when the individual returns to his or her country of origin (Oliver – Mensah C., Scholl-Schneider S., 2016, 2).

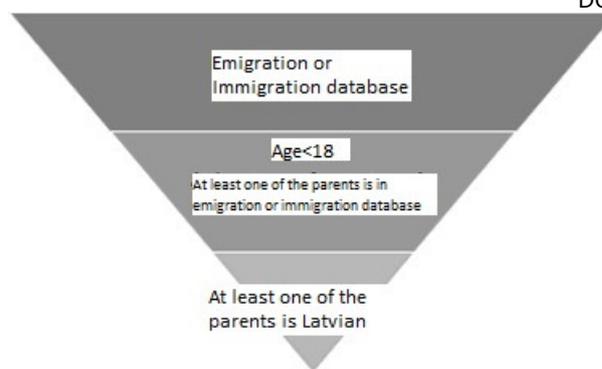
The topicality of remigration in Latvia is increasing every year, since majority of the emigrants are of working age and fertile age. The country is interested in their return (MEPRD, 2018). A special state aid program was launched in 2018 (MEPRD, 2018; Cabinet of Ministers Regulations, 2018) for Latvian nationals who have lived abroad for more than three years or have recently returned. The first results on effect of program on amount of returnees will be available in June 2019.

Data and methods

Data on migrants were derived from Administrative Data Sources for a time span of 2012 to 2017. Data of Population Register of the Office of Citizenship and Migration Affairs (OCMA) included characteristics, such as gender, age, country of birth, marital status, citizenship, declared place of residence and was adjusted according to the method of assessment of declared place of residence. The CSB Population Assessment Method (CSB, 2012) was used to categorize emigrants and returnees as well.

In order to identify the number of children in the families of emigrants and returnees, two criteria of data selection were utilised. Firstly, the age limit of 18 years and, secondly, the condition of at least one parent being a citizen or non-citizen or born in Latvia. Returnees to Latvia were defined using both data from the OCMA Population Register and from the CSB method, including those individuals who had the highest probability of living in Latvia (1); whereas emigrants had the lowest probability (close to 0).

Datasets of emigrants and returnees were divided into subsets for each year (as of 31st December) – Firstly, only Latvian nationals (incl. Latvian citizens, Latvian non-citizens, persons born in Latvia). Secondly, subset - of children aged between 0 – 18 years. Thirdly, parents' personal IDs were checked in the emigrants and immigrants' data set and added to children's data set. The following scheme (Fig. 2) summarises aggregated family types in accordance with characteristics of data.



Mother	Father	Family type
Yes	Yes	Both parents with child
Yes	No	Mother with child
No	Yes	Father with child
No	No	Unaccompanied child*

*Not included in the research

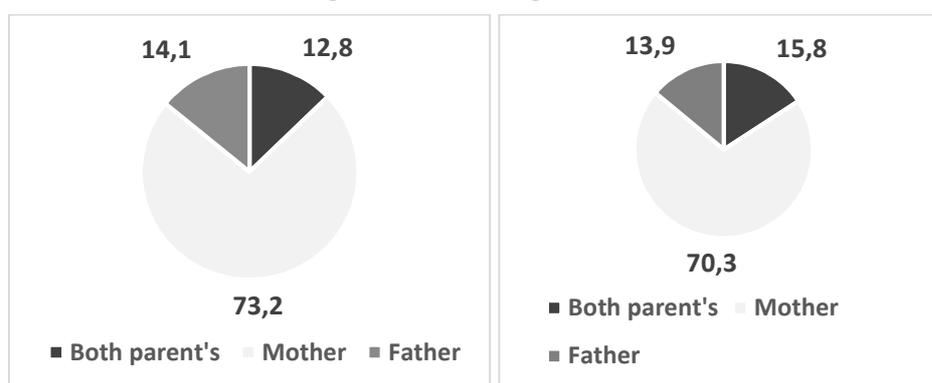
Fig. 2. Scheme of dividing taxonomy of Latvian emigrants and returnees to Latvia

Descriptive statistics were used to characterise the composition of returnee families and their distribution among the regions.

It should be taken into account, using of administrative data is influenced by some specific features - for instance, in case of emigration, part of the population does not change the declared place of residence and does not announce the other address abroad. Moreover, often during the first years after emigration, person is present in other administrative registers of Latvia – they go to the doctor, change documents (driving license, passport), study or still receive benefits or some social services.

Research results and discussion

Latvia has lost more than 125,000 inhabitants due to emigration during the period from 2012 - 2017. 5706 families with children from Latvia (Latvian nationals) emigrated and only 2178 returned during mentioned period. Mother with children is the dominant family type for both emigration and remigration. This family type constitutes more than 70 % of all families (Fig. 3). The share of families with both parents and children in emigration and remigration is similar – around 14 %.



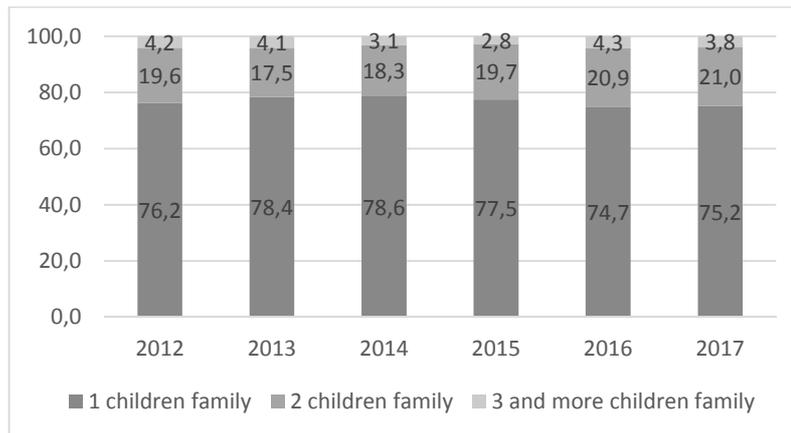
Source: author's visualization based on Office of Citizenship and Migration Affairs Population register data

Fig. 3. Types of emigrant (left) and remigrant (right) families with children 2012 - 2017, (%)

In both cases, the share of women with children is higher than 70 %. It can be assumed that women with children return first. Such assumption confirms that women with children are more prone to make a decision on emigration or return and women take care of children and more often try to be with them.

Concerns about raising school-age children can often be essential when making a decision on migration (emigration or remigration), or they may be the main argument for its timing or postponement (Tomic C. H., Pichler R., 2018). There are various reasons for women remigration, one of them being the fact that living abroad does not improve material conditions and also leads to spending less and less time with family, especially children (Dyer, McDowell, and Batnitzky's (2011, 685), Yeoh, Brenda S. A., and Kamalini Ramdas. 2014).

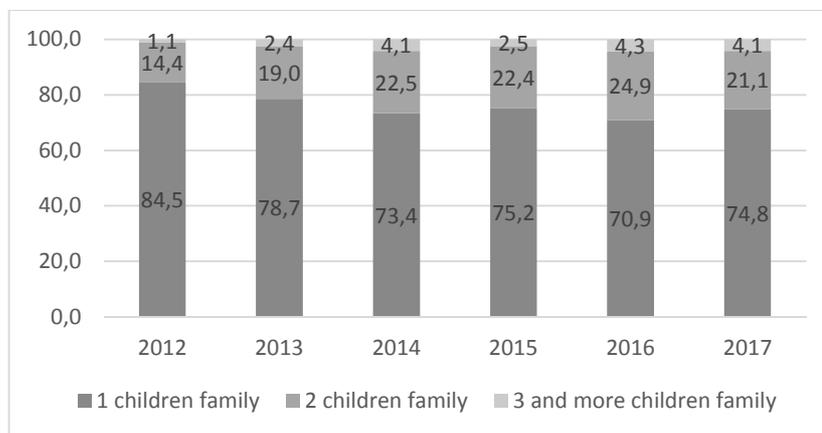
The observation of dynamics of family size from 2012 - 2017 (Figure 4), shows that trends are stable - more than 75 % of all emigrant families of Latvian citizens are families with one child, about 20 % are families of two children and almost 4 % are families with three or more children.



Source: author's visualization based on Office of Citizenship and Migration Affairs Population register data

Fig. 4. Emigrant families with children by size, 2012-2017, %

Compared to 2012, the number of families with one child has decreased, when it comes to the total number of returnees, while the proportion of families with two and more children has increased (Fig. 5).



Source: author's visualization based on Office of Citizenship and Migration Affairs Population register data

Fig. 5. Remigrant families with children by size, 2012-2017, %

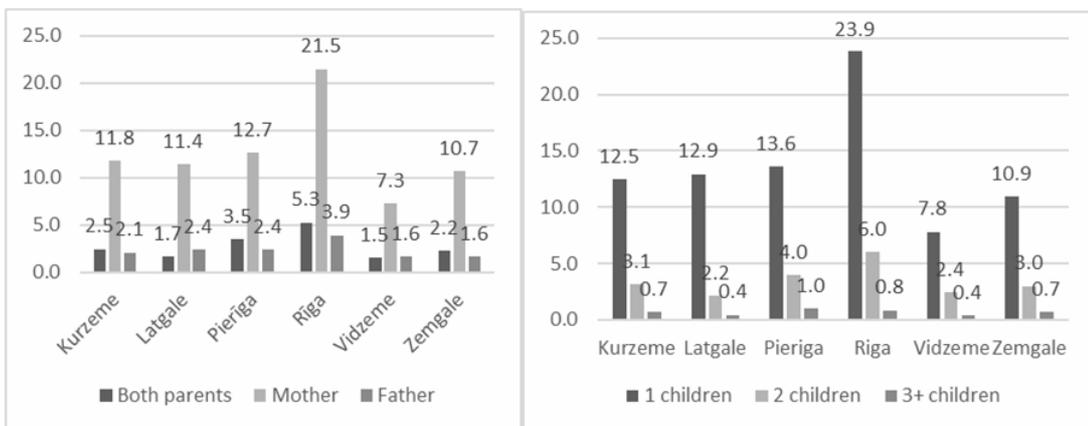
Regarding family size in emigration and remigration, there are tendencies that indicate the largest difference observed (Table 1) relates to families with two children - the proportion of such families among remigrants is more than among emigrants. This applies to emigrant families with both parents and one parent emigrant families. Families with only one child dominate both among emigrants and remigrants, since parents in these families are younger, and, conversely, it is easier (from psychological and emotional standpoint) to make decision of migration. Besides, in material terms, these families are less at risk of poverty. It is a concern that there is a relatively small proportion of large families among the returnees.

Family composition and number of children 2012 – 2017, %

Number of children in family	Emigration			Remigration		
	Both parent's	Mother	Father	Both parent's	Mother	Father
1	72.8	80.5	82.1	67.4	77.0	80.9
2	18.5	16.4	15.1	27.6	20.2	16.8
3+	8.6	3.1	2.8	5.0	2.8	2.3

Source: author's calculations based on Office of Citizenship and Migration Affairs Population register data

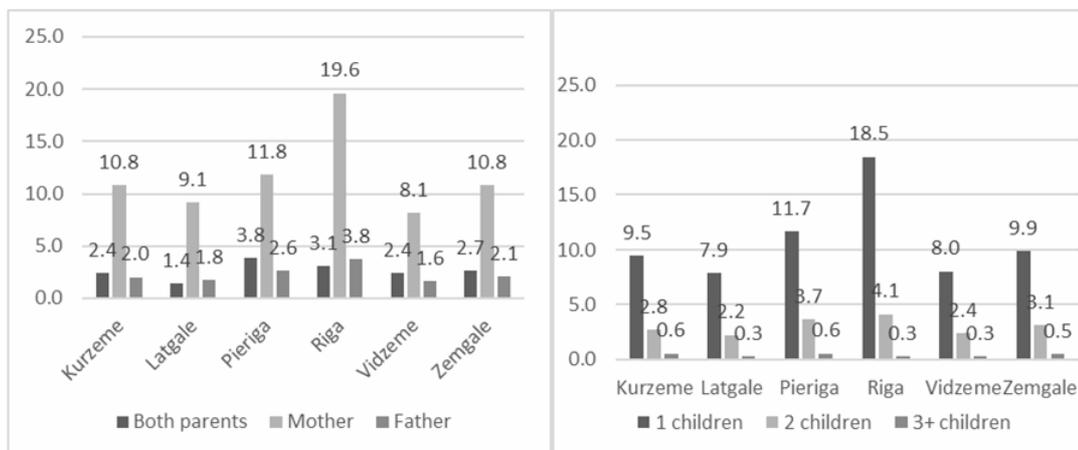
Data on distribution of emigrant families with children among the regions of Latvia shed light on Riga region as the main region of departure for families with children in all family types (Fig 5). Especially of mother and child family – more than 20 % of all emigrant families with children emigrated from Riga region. Data on number of children in emigrant families' shows similar tendency – most of families with children emigrated from Riga region, especially families with one children.



Source: author's visualization based on Office of Citizenship and Migration Affairs Population register data

Fig. 6. Emigrant families with children by type, by number of children and by region 2012 - 2017, %

The lowest proportion of families with children in emigrants is from Vidzeme. Riga region is the leading region regarding remigration of mother and child family type – around 20 % of all remigrant families, which is constituted by mother and child return to Riga region. Latgale and Vidzeme regions are less attractive for remigrants (Fig. 6 and Fig. 7).



Source: author's visualization based on Office of Citizenship and Migration Affairs Population register data

Fig. 7. Remigrant families with children by type, by number of children and by region 2012 - 2017, %

Most often remigrants return to Riga region, typically - families with one child, the second most popular region is Pieriga region.

Conclusions, proposals, recommendations

- 1) Emigration and immigration have stabilised over the past six years, whereas the amount of returnees to Latvia (Latvian nationals) – remigrants in total immigration do not exceed 60 % and the trend is not upward.
- 2) Analysing composition of families by type (for groups such as both parents with children, mother with children and father with children) in migrant data shows that the family type of mother with children, which constitutes more than 70 % of all families, is the most prevalent one.
- 3) The data on emigrant and remigrant families show that one or both parents with one child are more involved in migration processes, due to the fact that parents are often younger, which, in turn, facilitates migration. It can be assumed that families with two or more children rarely decide to emigrate because it is more complicated, both psychologically and financially.
- 4) Distribution of emigrant families among regions is uneven. Riga region is the main region of departure for families with children of all family types. Remigration volumes in the country are generally decreasing, however, there are regions and territories that are more attractive for remigrants, namely Riga and Pieriga. Families with children choose these regions to resume their lives in Latvia, because infrastructure and services meet their requirements. Riga region has the largest share of emigrant and remigrant families of mothers with children. The lowest proportion of families with children in migration is from Vidzeme.
- 5) Analysis of remigrant families confirms that the return of women and children is increasing and that the number of returning families with more than one child is also increasing. For most families, it is important that children acquire education in Latvia, so it can be assumed that families with young children are more likely to return. It is very important for these people to receive support when it comes to making a decision to return, and to help them settle household issues after their return.
- 6) Importance of Riga region as a destination for remigration flows can be witnessed as the women with children is the most prevalent group among immigrants. Therefore, the immigration pattern can be linked with the presence of infrastructure, and the capacity of services suitable for family needs.

Bibliography

1. Brooks, R, Waters, J (2011). Student Mobilities, Migration and the Internationalization of Higher Education. 208 pages. Palgrave MacMillan, Basingstoke 15 Apr 2011. ISBN: 9780230578449. <http://www.palgrave.com/products/title.aspx?pid=345888>. Access: 15.01.2019
2. Cresswell, T., (2011). Mobilities I: Catching Up. Progress in Human Geography. 35. 550-558. 10.1177/0309132510383348. Access: 20.12.2018
3. CSB unpublished data on immigrants by nationality from 2012 to 2017.
4. CSB (2012). Method Used to Produce Population Statistics. Central Statistical Bureau of Latvia Riga, Latvia: https://www.csb.gov.lv/sites/default/files/data/LV/DemStat_Metodologija_LV.pdf. Access: 13.12.2018
5. CSB (2017) Portrait of Emigrant; 2014–2016, Central Statistical Bureau of Latvia: <https://www.csb.gov.lv/en/statistics/statistics-by-theme/population/migration/search-in-theme/342-portrait-emigrant-2014-2016-only-latvian>. Access: 11.01.2019
6. Dyer, S., McDowell, L., Batnitzky, A., (2011). Migrant Work, Precarious Work–life Balance: What the Experiences of Migrant Workers in The Service Sector in Greater London Tell As About The Adult Worker Model. Gender Place and Culture. 18. 685-700. 10.1080/0966369X.2011.601808.
7. Holloway, SL, O'Hara SL and Pimlott-Wilson H (2012). Educational Mobility and The Gendered Geography of Cultural Capital: The Case of International Student Flows Between Central Asia and The UK. Environment and Planning A, 44 (9), pp. 2278-2294

8. IOM (2017) World Migration Report 2018, International Organization for Migration, https://publications.iom.int/system/files/pdf/wmr_2018_en.pdf. Access: 15.01.2019
9. Klave, E., (2016) Reemigrācijas politikas novērtējums: politikas mērķa grupas perspektīva, LU Filozofijas un Socioloģijas institūts p. 1. - 40.
10. Lulle, A., Klave, E., (2015) Radot iespējas attīstībai: diasporas bērnu un jauniešu izglītība, Latvijas Universitātes Diasporas un migrācijas pētījumu centrs, LU Akadēmiskais apgāds p. 174. - 219.
11. Lulle, A., (2018) Mobilities and waiting: experiences of middle-aged Latvian women who emigrated and those who stayed put, *Gender, Place & Culture*, 25:8, 1193-1208, DOI: 10.1080/0966369X.2018.1435512. Access: 13.12.2018
12. McCollum, D., Apsite-Berina, E., Berzins, M., Krisjane, Z. (2017). Overcoming the crisis: the changing profile and trajectories of Latvian migrants. *Journal of Ethnic and Migration Studies*, 43(9), 1508-1525. DOI: 10.1080/1369183X.2016.1232161. Access: 15.01.2019
13. MEPRD (2018). Project „Reģionālais remigrācijas koordinators”: <https://www.paps.lv/> Access: 15.01.2019
14. Mierina, I. (2015). Latvijas emigrantu kopienas: cerību diaspora. Latvijas Universitātes aģentūra "Latvijas Univeristātes Filozofijas un socioloģijas institūts".
15. Ministry of Foreign Affairs, (2014) Rīcības plans Par sadarbību ar Latvijas diasporu 2015.–2017. gadam, Ārlietu ministrija
16. Oliver – Mensah C., Scholl-Schneider S., (2016). Transnational Return? On The Interrelation of Family, Remigration, and Transnationality – An Introduction, *Transnational Social Review*, 6:1 – 2, 2 – 9, DOI: 10.1080/21931674.2016.1186371: <https://doi.org/10.1080/21931674.2016.1186371> Access: 13.12.2018
17. Tomic, C.T., Pichler, R., (2018) Remigration to Post-Socialist Europe: Hopes and Realities of Return, ERSTE Foundation Series, Volume 3).
18. Yeoh, B.S.A., Kamalini, R., (2014). „Gender, Migration, Mobility and Transnationalism.” *Gender, Place & Culture* 21 (10): 1197–1213. doi:10.1080/0966369X.2014.969686. Access: 13.12.2018

CASE STUDY ON COMPETENCE BASED APPROACH IN COURSE "MATHEMATICS FOR ECONOMISTS"

Anna Vintere¹, Mg.Math

Department of Mathematics, Latvia University of Life Sciences and Technologies

Abstract. This paper is the result of scientific analysis and assessment of scientific literature and a number of information sources taking into consideration the author's reflection experience and observations on competency-based approach in higher education seeing competence as key element of sustainable development. The competence to be acquired in the study process is reflected in the learning outcomes that describe three major domains: knowledge (learning to know), skills (learning to do) and competences (learning to be). The aim of the article is to analyse the course "Mathematics for Economists" in relation to the dimensions of competence-based education, to determine the extent to which the course corresponds to the characteristics of education for sustainable development. For that reason, in this article is given short summary on the course "Mathematics for Economists" which include the aim of this course, expected learning outcomes as well as the conception of mathematics studies for economists and business managers and made course analysis by four dimensions: contextual learning, interdisciplinary learning, problem-solving and critical thinking. The results show that the course is an example of good practice in transforming mathematics studies into education for sustainable development.

Key words: higher education, competence, critical thinking, mathematics for economists, problem solving.

JEL code: available on: I210.

Introduction

The competence-based approach in higher education is the main challenge of today and the development trend in higher education in Latvia. Higher education through the competence-based education interact with the labour market as well as respond to the requirements of sustainable development of society.

In Latvia, with term "competence" is understood necessary knowledge, professional experience, comprehension in a specific field of problem, and a skill to use knowledge and experience in a particular action (Par termina kompetence ..., 2009).

The European Commission (EC) documents deal with the issue of competence by identifying different key competences, each of which contributes to a successful life in society (EC, 2006; 2018). Key competences include skills such as critical thinking, problem solving, teamwork, communication and negotiation skills, analytical skills, creativity and intercultural skills (EC, 2018).

One of the most frequently mentioned competencies mentioned above in literature are analytical skills such as critical thinking and problem-solving. In the 2016 World Economic Forum, these competences were identified as one of the ten skills needed for future employment (World Economic Forum, 2016). Also, a study conducted by employers in the United States shows, problem-solving skills and critical thinking are one of the important skills needed by young people entering the labour market (The Conference Board, 2006). In turn, the World Economic Forum 2018 drew attention to the growing demand for specialists with developed logical and analytical thinking as well as increased demand for mathematics education (World Economic Forum, 2018).

Mathematics role in sustainable development is characterized by a number of factors, including, mathematical competence compliance with competencies for sustainable development. The mathematics studies at university develop the cognitive abilities of a person, influence studies of special subjects as well as contribute to the development of professional competence ensuring highly qualified specialists for the knowledge-based, skill and technology-intensive industries. In turn, Tsafe

¹ Corresponding author: tel.: +371 29419351, e-mail address: Anna.Vintere@llu.lv

A.K. (2013) points to the role of mathematics in promoting entrepreneurial skills, thus contributing to poverty alleviation. He points out that using mathematical skills, the entrepreneurs are able to understand and master the commercial skills, bargaining power, exchange rates etc. (Tsafie A.K., 2013).

In view of the above-mentioned aspects, the object of the study is a course "Mathematics for Economists" in the context of education for sustainable development. The aim of the article is to analyse the course "Mathematics for Economists" in relation to the four dimensions of competence-based education: contextual learning, interdisciplinary learning, problem-solving and critical thinking, to determine the extent to which the course corresponds to the characteristics of education for sustainable development.

Methodology

The article is the result of scientific analysis and assessment of scientific literature and a number of information sources taking into consideration the author's reflection experience and observations in connection with the development and implementation of the curriculum in mathematics.

There are a number of studies in the scientific literature that examine competences as key elements of sustainable development. The concept of competence is seen as an essential guide to orientate teaching and learning to sustainable development of society. Education has a responsibility to be in gear with 21st century challenges and aspirations, and foster the right types of values and skills that will lead to sustainable and inclusive growth (UNESCO, 2017). Education for Sustainable Development (ESD) is the education, teaching and learning required to ensure social, economic and ecological wellbeing now and into the future (Sterling S., 2012; UNESCO, 2017). Based on UNESCO (2017) documents, the principles of ESD include: inter-disciplinarity; value-driven; critical thinking and problem solving; participatory decision-making; and applied learning which is relevant and culturally appropriate to local and other contexts. The researches regarding ESD prove that students need to develop sustainable skills: problem solving using holistic and systemic approaches, making critical judgements on real life issues, applying theory to practice and vice versa, and working collaboratively and in interdisciplinary teams (Dawe G., Jucker R. and Martin S., 2005; Parkin S. et al., 2004).

Based on the analysis of scientific literature as well as national and European documents regarding higher education and also sustainable development in the article is made course "Mathematics for Economists" analysis by four dimensions: contextual learning, interdisciplinary learning, problem-solving and critical thinking, which are most often cited in scientific literature as key elements of education for sustainable development.

In this article based on publicly available information is also given short summary on the course "Mathematics for Economists" which include the aim of this course, expected learning outcomes as well as the conception of mathematics studies for economists and business managers.

Research results and discussion

The course "Mathematics for Economists" at the Latvia University of Life Sciences and Technologies is compulsory in two study programs: the professional higher education bachelor study program "Entrepreneurship and Business Management" at the volume of 3 ECTS and the academic education bachelor study program "Economics" at the volume of 6 ECTS. Aim of the course: to acquire mathematical knowledge and practical skills necessary for the acquisition of further special subjects, as well as to get familiar mathematical application in research of various economic relations.

In accordance with Latvian legislation, the competence to be acquired in the study process is usually reflected in the learning outcomes (Augstskolu likums, 2011). According to UNESCO learning outcomes are understood as statements that describe three major domains: knowledge (learning to know), skills (learning to do) and competences (learning to be) (UNESCO, 2015) and this approach through knowing, doing and being reflects the mission of future specialists to prefer the direction of sustainability. The learning outcomes of the course "Mathematics for Economists" also are described indicating the knowledge, skills and competence to be achieved during the studies of this course. The knowledge includes subjects from different part of mathematics: knowledge on elements of linear algebra, limit of function, differential calculus and integral calculations, as well as a critical understanding of their possibilities for solving economic problems.

At Latvia University of Life Sciences and Technologies skills to be acquired by students in the framework of course "Mathematics for Economists" are described by key words: to identify, solve, calculate, find, create, explore, apply, etc. At the end of the course students have to perform operations with matrices; to solve linear equation systems; calculate limit of functions; find a derivative of functions; use derivatives to explore the function; to find the partial derivatives of the two-variable function; find the two-variable function extreme; integrate functions; apply mathematical knowledge in economics, make various financial calculations etc.

According to the European Union documents, the competence-based learning of mathematics as a result of the study process involves eight mathematical competences (Niss M., 2003; OECD, 2009). Seven of them are indicated as a results of the course "Mathematics for Economists": mathematical thinking, handling symbols and formal mathematics language, mathematical problem formulating and solving, reasoning, modelling (ability analyse and build mathematical models concerning other area), aids and tools (ability to make use of and relate to the aids and tools of mathematics, including information technologies), communication (ability to communicate in, with and about mathematics). The development of the eighth competence "representing mathematical entities" is ensured by developing other competencies.

At Latvia University of Life Sciences and Technologies, the content of mathematics programmes is divided into three modules: engineering, bio-sciences, and social sciences. These modules consist of content, skills and application. Content module relates to proofs: from the simplest proofs for engineering to only conclusion or algorithms for social sciences. There are also three level of skills – find, interpret and explain for engineers, solve and explain for bio-sciences and solve by algorithm for social sciences. Application in the engineering speciality is only an illustration, but for social sciences - the entire attention is devoted to the solution of practical problems. Therefore, the main focus of mathematics studies for economists and business managers is to providing conclusions - algorithms of applied nature and entire attention is devoted to the solution of practical problems, so developing the ability to analyse and build mathematical models as well as cope with the mathematical language and its tools.

This conceptual approach to teaching mathematics is in line with the economist profession standard and the business manager's profession standard in Latvia, which determines that these professions require mathematical knowledge for the performance of the basic tasks of professional activity, which is also the above-mentioned aim of this study course. It should be noted that his description justifies the contextual approach of the course. Contextual approach usually is associated by the content-studied with the real-world situations of students. It encourages students to make

connections between the knowledge possessed by its application in their lives. As described above, with this approach, the outcome of learning is expected to be more meaningful for students.

According to the "Learning for a Sustainable Future" (2008), an interdisciplinary approach to teaching blurs the lines between subject boundaries. Interdisciplinarity usually is understood as usage of knowledge and methods of different disciplines and ability to work on complex problem in interdisciplinary context (Lozano et al., 2017). The title "Mathematics for Economists" indicates that this course is interdisciplinary and covers two branches of science: mathematics and economics with a focus on microeconomics and finance. The split of these two sets are: economic functions, market equilibrium, function differentiation and interpretation in economy, the use of a derivative in the studies of economic relationships: elasticity, marginal functions, maximization of the profit and cost minimization, economic-mathematical regularities for the benefit of two farms, indefinite integral application to determine production costs, revenues and profits, definite integral applications for determining resource consumption, output / volume of goods and economic indicators, basis of financial mathematics.

The problem-based learning is one of the most often in scientific literature discussed strategy which responds to many challenges that higher education is facing. A. Steinemann (2003) associates problem-based learning with the development of students' abilities needed for sustainable development such as flexible, integrative, multidisciplinary problem-solving rather than singular solutions. In problem-based learning, there is emphasized the value of working on complex, real-world problems for students to develop knowledge, skills and competencies (Lozano et al., 2017). In the course "Mathematics for Economists", problem-based approach can be viewed by two directions: learning the real world problems that students will encounter as professionals (as described above) as well as building problem-solving skills. Mathematics is seen as one of the main subject for developing problem solving skills. According to Berry (2002), problem solving in mathematics is taught in three ways: pure mathematics investigation activities, mathematical modelling and solving real life problems. The course "Mathematics for Economists" contributes to the development of ability to perform active modelling. Studying mathematics students should be able to develop new mathematical knowledge through problem-solving, solve problems arising in mathematics and other contexts, apply and adapt various appropriate strategies to solve problems and monitor and analyse the problem of mathematical processes (Berry J., 2002). The process of problem solving include "understanding of the problem situation and its step-by-step transformation, based on planning and reasoning" (Finegold D., Notabartolo A.S., 2016). Here is a clear connection between the mathematics problem solving and problem-solving models that include problem analysis, decision making on desired / potential solution, and solution implementation and verification. Problem solving steps in mathematics: identification of the problem, interpretation of the problem (to translate it into mathematical language and select appropriate tools or formulas), problem analysis (apply general problem to a specific situation), modelling the problem solving using the deduction method, solving the problem and checking the answer (Zeidmane A., Rubina T., 2018).

The second most important analytical competence is critical thinking. In the context of sustainable development, critical thinking is understood as ability to challenge norms, practices and opinions. It includes also reflection on one's own values, perceptions and actions, as well as it is understanding of external perspectives (Lozano R. et al., 2017). Critical thinking is very close to problem-solving skills, but more focused on "information identification and interpretation, information analysis and evaluation of evidence and argument" (Firdaus F. et al., 2015). Thinking critically requires students

to acquire, process, interpret, rationalize and critically analyse large volumes of conflicting information to the point of making an informed decision and taking action in a timely fashion (C21, 2012).

There are three components of critical thinking: identification and interpretation of information, information analysis, evaluation of evidence and argument (Zeidmane, Rubina, 2018). In the course "Mathematics for Economists", critical thinking is promoted by solving various tasks, and the results obtained by students must always be interpreted (component of interpretation of information). Component of identification can be characterised by two examples.

- If a student has to calculate a third-order determinant whose row or column contains zero, then they have to critically evaluate which determinant calculation method is used, because in this case it is possible to either expand along the row or column where the zero is located, or based on properties get a second zero in this row or column.
- There is given the case when the factory produces four types of candies. The quantity of ingredients required for the producing of each type of candy also are given. Using the information about quantity of raw materials used for making 1 ton of candies, students have to get solution for two different situations: (1) how much of each ingredients are needed to produce a certain amount of candies (to fulfil the order) and (2) determine how much each type of candy could be produced in order to fully utilize all the given raw materials.

Critical thinking component of information analysis can be characterized by task:

"Given the demand function of the product A , where x – price of the product A , but y – price of the product B . And given the selling prices at the moment. How will change the demand of the product A if: (1) The price of the product A increases by one unit; (2) The price of the product A is increased by 1 %, but the price of the product B does not change; (3) The price of the product B increases by one unit; (4) The price of the product B is increased by 1 %, but the price of the product A does not change?"

Acknowledgement

The paper was supported by grant from Latvia University of Life Sciences and Technologies program's "Strengthening the Scientific Capacity in the Latvia University of Life Sciences and Technologies" no. Z32 entitled "Development of the didactical model for transforming mathematics studies into education for sustainable development".

Conclusions, proposals, recommendations

- 1) The research results show that the course "Mathematics for Economists" at the Latvia University of Life Sciences and Technologies corresponds to the characteristics of education for sustainable development. In the course at least three ESD pedagogical approaches are used: contextual learning, interdisciplinary learning, problem-based learning. The course contributes to the development of analytical skills necessary for sustainable development such as problem solving skills and critical thinking.
- 2) The contextual approach of the course characterizes by the course objectives as well as by the economist profession standard and the business manager's profession standard in Latvia, which determines mathematical competence for these professions.
- 3) "Mathematics for Economists" is interdisciplinary course and covers two branches of science: mathematics and economics with a focus on microeconomics and finance.

- 4) The problem-based approach characterised by working on real-world problems so develop knowledge, skills and competencies necessary for sustainable development. The description of the connection between the mathematics problem solving and different problem-solving models also are given.
- 5) In the course "Mathematics for Economists", critical thinking, which includes identification and interpretation of information, information analysis, evaluation of evidence and argument, is promoted by solving various tasks.
- 6) The course is an example of good practice in transforming mathematics studies into education for sustainable development.
- 7) The study shows that the course "Mathematics for Economists" corresponds to the characteristic of competence-based education.

Bibliography

1. *Augstskolu likums*. (Law of Institutions of Higher Education), 2011, Riga: Saeima.
2. Berry, J. (2002). *Developing Mathematical Modelling Skills: The Role of CAS*. Retrieved: [https://link.springer.com/article/10.1007 %2fbf02655824](https://link.springer.com/article/10.1007%2fbf02655824)
3. C21 Canada (2012). *Shifting Minds: A 21st Century Vision of Public Education for Canada*. Retrieved: www.c21canada.org/wp-content/uploads/2012/11/Shifting-Minds-Revised.pdf
4. Dawe, G., Jucker, R., and Martin, S. (2005). *Sustainable Development in Higher Education: Current Practice and Future Developments*. A report for the Higher Education Academy: York.
5. EC (2006) *Recommendation of the European Parliament and of the Council of 18 December 2006 on key Competences for Lifelong Learning* (2006/962/EC). Official Journal of the European Union, L394, 30 December 2006, pp. 10-18. Retrieved: <http://eur-lex.europa.eu/legal-content/EN/TXT/?uri=celex:32006H0962>
6. EC (2018). Annex to Proposal for a Council Recommendations on Key Competences for Life-long Learning. A *European Reference Framework* (2018) Retrieved: https://eur-lex.europa.eu/resource.html?uri=cellar:395443f6-fb6d-11e7-b8f5-01aa75ed71a1.0001.02/DOC_2&format=PDF
7. Finegold, D., Notabartolo, A.S. (2016). 21st-Century Competencies and Their Impact: An Interdisciplinary Literature Review. *Executive Summary*. Retrieved: https://hewlett.org/wp-content/uploads/2016/11/21st_Century_Competencies_Impact.pdf
8. Firdaus, F., Kailani, I., Bakar, N.B., Bakry, B. (2015). *Developing Critical Thinking Skills of Students in Mathematics Learning*. Journal of Education and Learning, vol.9, No 3, pp.226-236, 2015. Retrieved: https://www.researchgate.net/publication/282526043_Developing_Critical_Thinking_Skills_of_Students_in_Mathematics_Learning
9. Lozano, R., Merrill, M.Y., Sammalisto, K., Ceulemans, K., Lozano F.J. (2017). Connecting Competences and Pedagogical Approaches for Sustainable Development in Higher Education: A Literature Review and Framework Proposal. *Sustainability*, 2017, 9, 1889. www.mdpi.com/journal/sustainability
10. Niss, M. (2003). *Mathematical Competencies and the Learning of Mathematics: The Danish KOM project*. Mediterranean Conference on Mathematics Education, Athens, Greece: Hellenic Mathematical Society and Cyprus Mathematical Society, 2003, pp. 115-124.
11. OECD (2009). *Assessment Framework – Key Competencies in Reading, Mathematics and Science*. Retrieved: www.oecd.org/dataoecd/11/40/44455820.pdf
12. Parkin, S., Johnson, A., Buckland, H. and White, E. (2004). *Learning and Skills for Sustainable Development: Developing a Sustainability Literate Society*. HEPS, London, 2004.
13. *Par termina kompetence izpratni un lietosanu latviesu valoda*. LZA Terminologijas komisijas lemums Nr.84, 2009. (On the usage of the term competence in the Latvian language). Retrieved: <https://likumi.lv/ta/id/203798-par-termina-ikompetencei-izpratni-un-lietosanu-latviesu-valoda>.
14. Steinemann, A. (2003). Implementing Sustainable Development through Problem-based Learning: Pedagogy and Practice. *Journal of Professional Issues in Engineering Education and Practice*, 129, 216-224.
15. Sterling, S. (2012). *The Future Fit Framework - an Introductory Guide to Teaching and Learning for Sustainability in HE*. Higher Education Academy, York.
16. The Conference Board (2006). *Are They Really Ready to Work? Employers' Perspectives on the Basic Knowledge and Applied Skills of New Entrants to the 21st Century U.S. Workforce*. The Conference Board, 2006. Retrieved: <https://files.eric.ed.gov/fulltext/ED519465.pdf>
17. Tsafe A. K. (2013). Mathematics Literacy: An Agent of Poverty Alleviation and National Development. *Journal of Education and Practice*. Vol. 4, No 25, pp. 51- 54. Retrieved: <http://www.iiste.org/Journals/index.php/JEP/issue/view/897>
18. UNESCO (2015). *Level-setting and Recognition of Learning Outcomes. The use of level descriptors in the twenty-first century*. UNESCO, 2015, 203 p. Retrieved: <http://unesdoc.unesco.org/images/0024/002428/242887e.pdf>

19. UNESCO (2017). *Education for Sustainable Development Goals: Learning Objectives*. Retrieved: <https://unesdoc.unesco.org/ark:/48223/pf0000247444>
20. UNESCO (2017). *Textbooks for Sustainable Development*. A Guide to Embedding. UNESCO MGIEP, 186 p. Retrieved: <http://unesdoc.unesco.org/images/0025/002599/259932e.pdf>
21. World Economic Forum (2016) *The Future of Jobs Employment, Skills and Workforce Strategy for the Fourth Industrial Revolution*. Global Challenge Insight Report. Retrieved: http://www3.weforum.org/docs/WEF_Future_of_Jobs.pdf.
22. World Economic Forum (2018). *Creating a Shared Future in a Fractured World*. World Economic Forum Report. Retrieved: http://www3.weforum.org/docs/WEF_AM18_Report.pdf
23. Zeidmane A., Rubina T. (2018). Problem in Development of Problem Solving Skills of Studying Mathematics at the Latvia University of Life Sciences and Technologies. Proceedings of ICERI2018 Conference, 12th-14th November 2018, Seville, Spain, 6181-6188.

HOME ECONOMICS

THE STATISTICAL ANALYSIS OF POLISH FOOD ENTERPRISES: - NONPARAMETRIC APPROACH

Aleksandra Baszczyńska¹, PhD

¹Department of Statistical Methods, Faculty of Economics and Sociology, University of Lodz, Poland

Abstract. Statistical analysis of Polish food enterprises is done to present economic situation of agro-food industry in Poland. In analysis, nonparametric approach is chosen as effective and simple method of studying variables in populations. This approach is widely used, especially when additional information about regarded variable is not available (as often happens in economic researches).

Two nonparametric estimation methods are taken into consideration: kernel density estimation and bootstrap confidence interval. The special emphasis is taken on choosing the proper values of parameters in kernel density estimation and choosing the most effective bootstrap interval among these presented in literature. The study concerns applying basic descriptive statistics and nonparametric estimation of number of employees and revenues total of Polish food enterprises, using kernel method for estimating the density function and bootstrap confidence interval for median of regarded variable. Results and conclusions from the study can be useful for the users of nonparametric methods in economic researches.

The main research aim of the paper is to present and examine some statistical procedures that can be used in the analysis of economic situation of chosen enterprises connected strictly with food production. The good properties of regarded methods allow comparing some regions of country to indicate these regions where there are friendly conditions for the food production enterprises, including the natural character of region (rural or urban area).

Key words: Polish food enterprises, nonparametric methods, kernel density estimation, bootstrap interval.

JEL code: C13, C14, Q10.

Introduction

Nonparametric statistical methods become more and more popular and widely used because of their simplicity and good properties, not only in economic but also in technical and natural researches. Classical statistical methods that are based on assumption that data are generated by known family of distribution (for example family of normal distributions) in most cases cannot be used because of not fulfilling this assumption. In many cases there is no additional information about regarded variables. This information can be connected with knowledge of random variable distribution (exact form of this variable's distribution). When the distribution of underlying observations cannot be taken to be of certain form (for example normal one) the nonparametric (distribution-free) methods are the only ones used in statistical analysis.

In study, two nonparametric methods are chosen and applied. They are both estimation procedures and they are both of general nature. In most cases, the researcher can get, using these methods, sufficient information of regarded phenomenon. Basic characteristics of variables are achievable from this kind of nonparametric analysis. Sometimes they can play the introductory role in wide statistical analysis and the results of applying these methods are the base of further detailed procedures, indicating the essential direction of analysis.

Two nonparametric estimation methods are taken into consideration: kernel density estimation and bootstrap confidence interval for median.

Kernel density estimator is used to observe the distribution of the random variable across its support (Kvam, 2007). A few of basic properties, such as asymmetry, modality, dispersion can be detected in this way. Kernel density estimator is defined in the following way (e.g.: Wand, Jones, 1995; Baszczyńska, 2016; Ghosh, 2018; Gramacki, 2018):

¹ E-mail address: aleksandra.baszczyńska@uni.lodz.pl

$$\hat{f}(x) = \frac{1}{nh_n} \sum_{i=1}^n K\left(\frac{x-x_i}{h_n}\right) \quad (1)$$

where: x_1, \dots, x_n is the realization of the sample X_1, \dots, X_n ; $i = 1, \dots, n$; K is the kernel function and h_n is the smoothing parameter. Kernel function is chosen, in most cases, to be symmetric about zero, unimodal density function, e.g. gaussian kernel, Epanechnikov kernel, triangular kernel, box kernel (e.g. Silverman, 1986; Baszczynska, 2016). Gaussian kernel is density function for normally distributed random variable with mean 0 and variance 1.

Epanechnikov kernel has the form (e.g. Härdle, 1991):

$$K_E(x) = \begin{cases} \frac{3}{4}(1-x^2) & |x| \leq 1 \\ 0 & |x| > 1. \end{cases} \quad (2)$$

Smoothing parameter decides about the spread of kernel and the following conditions are assumed: $h_n \rightarrow 0$, $nh_n \rightarrow \infty$ as $n \rightarrow \infty$. Selectors of the smoothing parameter most often used, are the following (e.g. Baszczynska, 2016): reference rule, over-smoothed rule, least squares cross-validation, biased cross-validation, plug-in selector. Reference rule is based on optimization of asymptotic mean integrated squared error for kernel density estimator with the assumption of the normal density with the same scale as the estimated density. Least squares cross-validation belongs to automatic smoothing parameter selectors and is based on optimization of mean integrated squared error for kernel density estimator with the „leave-one-out” density estimator.

Bootstrap’s statistical procedures are based on the idea of resampling the sample itself with replacement. This technique is used in analysis of estimator’s statistical accuracy, testing hypothesis and in confidence intervals (e.g. Efron, 1993; Shao, Tu, 1995; Davison, Hinkley, 1997; Domanski et al., 1998; Hutson, 1999; Domanski, Pruska, 2000; Chernik, 2008).

Methods for bootstrap confidence intervals for parameter θ are the following (e.g.: Hall, 1988; Baszczynska, Pekasiewicz, 2008; Chernik, LaBudde, 2011):

- normal approximated interval: $[\hat{\theta} - \sigma u_{(1-\alpha)}; \hat{\theta} + \sigma u_{(1-\alpha)}]$, where $u_{(1-\alpha)} = \Phi^{-1}(1-\alpha)$,
- basic percentile method: $[\theta_{(\frac{\alpha}{2})}^*; \theta_{(1-\frac{\alpha}{2})}^*]$, where $\theta_{(1-\frac{\alpha}{2})}^*$ denotes $1-\frac{\alpha}{2}$ percentile of bootstrapped coefficients θ^* ,
- bias corrected percentile method, adjusts for bias in the bootstrap distribution,
- bias corrected and accelerated percentile method,
- Studentized confidence interval: $[\hat{\theta} - \sigma t_{(1-\frac{\alpha}{2})}^*; \hat{\theta} - \sigma t_{(\frac{\alpha}{2})}^*]$, where $t_{(1-\frac{\alpha}{2})}^*$ denotes percentile of the bootstrapped Student's t-test.

Regarded nonparametric methods can be widely applied in statistical analysis of the situation of Polish food enterprises. The food production sector is treated as one of the fastest-growing branches that mostly affect economic development in Poland. The analysis of economic-financial situation of food enterprises should be made using the appropriate statistical methods. Nonparametric procedures seem to be well chosen because of special character of variables considered in analysis of economic phenomenon of this kind. In many cases the researcher is not able to get additional information about variable. It is caused not only by the lack of historical statistical data but also by

situation of an attempt of describing quite new phenomenon or phenomenon with high frequency of changes.

In the study the data of number of employees and revenues total of Polish food enterprises in voivodships in 2017 are used. The data were obtained from data base EMIS using the following criteria:

regions and countries: Poland; sector: food production; companies [access date: 12.12.2018]. In analysis two variables are taken into consideration: number of employees and revenues total in companies in each voivodships in Poland. All calculations are made using software program Matlab 2016b.

Research results and discussion

First stage of statistical analysis is devoted to descriptive statistics. Some chosen descriptive statistics methods are used to get very general information of considered phenomenon. The results are presented in Table 1-2.

Table 1

Results of descriptive statistics for numbers of employees for Polish food enterprises in voivodships

Voivodship	Max	Mean	Coefficient of Variation for Standard Deviation	Median	Coefficient of Variation for Semi-interquartile Range	Skewness
Dolnoslaskie	1207	35.86	0.37	5	0.40	7.40
Kujawsko-Pomorskie	1500	71.33	0.46	19.5	0.69	4.88
Lubelskie	1900	76.57	0.37	10	0.41	5.46
Lubuskie	560	34.96	0.50	10	0.52	4.02
Lodzkie	1300	59.95	0.43	10	0.42	4.71
Malopolskie	4832	65.26	0.23	10	0.46	12.61
Mazowieckie	7000	73.83	0.23	5	0.41	12.39
Opolskie	800	55.71	0.48	10	0.43	4.01
Podkarpackie	550	50.58	0.60	10	0.35	2.84
Podlaskie	3480	98.54	0.27	15	0.60	7.52
Pomorskie	3900	58.50	0.26	10	0.42	13.62
Slaskie	1200	52.46	0.43	10	0.42	4.74
Swietokrzyskie	470	54.71	0.51	10	0.40	2.65
Warminsko-Mazurskie	1600	76.83	0.34	10	0.42	5.00
Wielkopolskie	1840	62.92	0.40	10	0.41	6.08
Zachodniopomorskie	958	46.26	0.46	10	0.41	4.85

Source: author's calculations

**Results of descriptive statistics for revenues total of Polish food enterprises
 in voivodships**

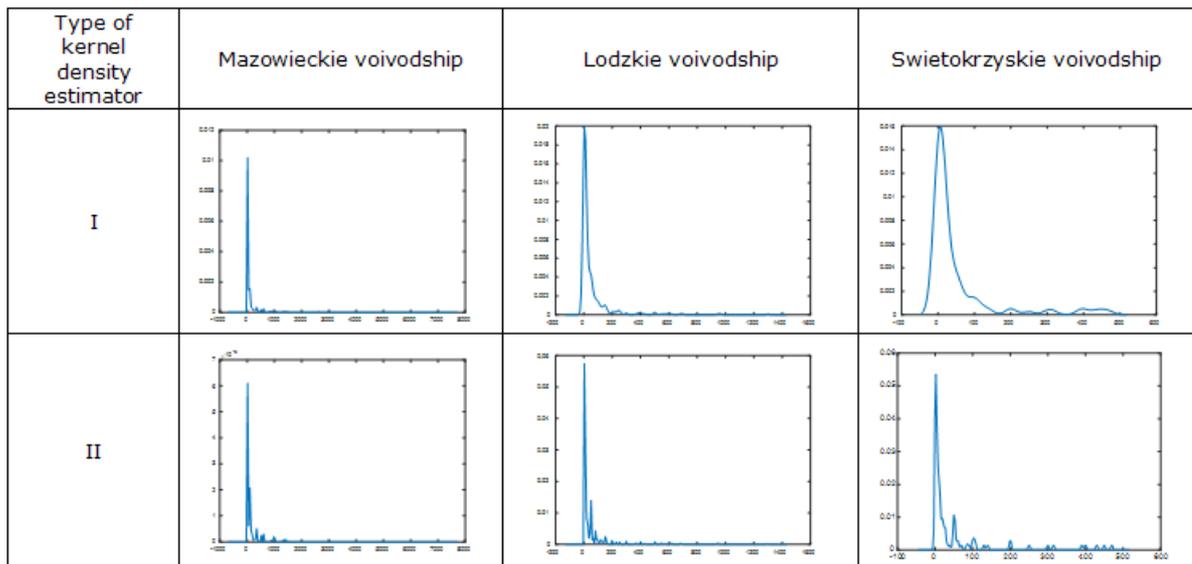
Voivodship	Max (mln zł)	Mean (mln zł)	Coefficient of Variation for Standard Deviation	Median (mln zł)	Coefficient of Variation for Semi- interquartile Range	Skewness
Dolnoslaskie	876.75	39.38	0.37	10.22	0.56	6.02
Kujawsko-Pomorskie	2370.92	74.94	0.27	8.50	0.43	6.71
Lubelskie	596.01	57.44	0.54	21.31	1.08	3.09
Lubuskie	268.63	61.99	0.91	35.96	0.86	1.50
Lodzkie	2151.58	102.77	0.35	20.48	0.62	5.14
Malopolskie	698.33	73.95	0.57	19.05	0.48	2.71
Mazowieckie	4238.11	151.85	0.38	31.45	0.52	6.37
Opolskie	1477.03	87.60	0.31	13.45	0.65	4.28
Podkarpackie	299.540	32.42	0.52	6.43	0.52	2.77
Podlaskie	3420.90	140.95	0.27	13.01	0.54	5.47
Pomorskie	3671.92	75.93	0.24	9.55	0.46	9.18
Slaskie	1039.96	83.73	0.54	25.73	0.70	3.42
Swietokrzyskie	379.40	43.75	0.52	18.16	1.0	3.01
Warminsko- Mazurskie	1226.60	40.29	0.29	5.83	0.46	7.37
Wielkopolskie	1169.12	76.06	0.45	13.95	0.49	3.66
Zachodniopomorskie	448.26	42.38	0.49	9.03	0.43	3.33

Source: author's calculations

The results of applying descriptive statistics show that both in case of number of employees and revenues total we can observe the lack of symmetry of regarded variables. The big differences between values of mean and median nearly for each voivodship and comparing with the maximum values of variable indicate that the assumption of normality, that is necessary in mostly used statistical procedures, cannot be accepted. This indicates that classical parametric approach is inadmissible. So, the next stage of analysis is based on nonparametric approach.

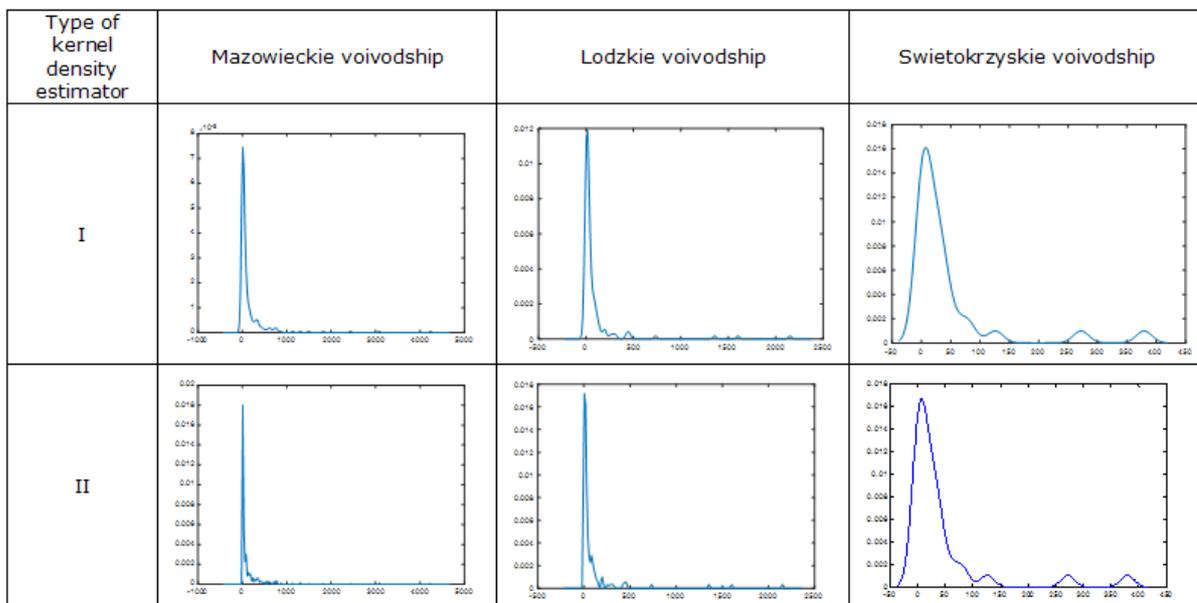
The kernel density estimators are used to catch more detailed analysis. The kernel density estimators for numbers of employees for chosen voivodships are presented in Figure 1. The kernel density estimators for revenues total for chosen voivodships are presented in Figure 2.

In kernel density estimation gaussian kernel and reference rule for choosing the smoothing parameter (type I) and Epanechnikov kernel and least squares cross-validation for choosing the smoothing parameter (type II) are used. In study the kernel density estimators are calculated for all variables in all voivodships. Mazowieckie, Lodzkie and Swietokrzyskie voivodships are chosen just as examples in presenting the results of second stage of statistical analysis.



Source: author's calculations

Fig. 1. Kernel density estimators for numbers of employees in Polish food enterprises



Source: author's calculations

Fig. 2. Kernel density estimators for revenues total in Polish food enterprises

Basing on the results of density estimation it can be stated that regarded variables are characterized strong asymmetry and in most cases unimodality. So, in next stage of statistical analysis – estimating the mean of variable - the decision of using nonclassical measure of central tendency is made. The bootstrap confidence intervals for medians for regarded variables are taken into consideration. The confidence coefficient is set to be 0.95 and the number of repetition is set to be 10000. The following types of bootstrap confidence intervals are presenting: normal approximated interval, basic percentile method, bias corrected percentile method, bias corrected and accelerated percentile method and Studentized confidence interval.

Tables 3 presents results for bootstrap confidence intervals for median of numbers of employees in Polish food enterprises for chosen voivodships.

Bootstrap confidence intervals for median of numbers of employees in Polish food enterprises

Type of bootstrap confidence interval	Mazowieckie voivodship	Lodzkie voivodship	Swietokrzyskie voivodship
Normal approximated interval	(4.91, 5.09)	(8.92, 10.97)	(4.23, 14.28)
Basic percentile method	(4.91, 5.09)	(9.83, 10.09)	(5.00, 18.00)
Bias corrected percentile method	(4.91, 5.09)	(9.83, 10.09)	(5.00, 16.00)
Bias corrected and accelerated percentile method	(4.91, 5.09)	(9.83, 10.09)	(5.00, 16.00)
Studentized confidence interval	(4.91, 5.09)	(9.83, 10.09)	(5.92, 14.18)

Source: author's calculations

It can be noticed that for voivodships characterized by strong asymmetry, the bootstrap confidence interval for median has rather short length of intervals – example: Mazowieckie voivodship. For voivodships characterized by short range of variable, the bootstrap confidence interval for median, in most cases, is characterized by bigger length of intervals with example of Swietokrzyskie.

The results for bootstrap confidence intervals for median of revenues total in Polish food enterprises for chosen voivodships is presented in Table 4.

Table 4

Bootstrap confidence intervals for median of revenues total in Polish food enterprises

Type of bootstrap confidence interval	Mazowieckie voivodship	Lodzkie voivodship	Swietokrzyskie voivodship
Normal approximated interval	(21.64, 41.58)	(13.42, 27.44)	(4.24, 34.50)
Basic percentile method	(20.86, 41.00)	(14.03, 28.25)	(4.57, 32.63)
Bias corrected percentile method	(21.16, 41.00)	(14.03, 28.25)	(4.57, 32.63)
Bias corrected and accelerated percentile method	(20.86, 40.26)	(14.03, 28.74)	(4.57, 32.63)
Studentized confidence interval	(19.12, 40.56)	(11.91, 26.73)	(-9.09, 33.24)

Source: author's calculations

Conclusions, proposals, recommendations

- 1) The quantitative analysis of Polish food enterprises, especially taking into regard employment and financial situation of enterprises, should be done using statistical procedures appropriate to the character of regarded variables. Nonparametric statistical methods can play the significant role in this process.
- 2) The proposed nonparametric approach in analysis of the economic variable, consisting of three stages: general descriptive analysis based rather on order statistics, nonparametric estimation of density function and bootstrap confidence interval for median is simply to use and easy to interpret. It can be used even by researcher without big experience because almost No assumption connected to regarded variables has to be fulfilled.
- 3) Different kernel functions and different values of smoothing parameters in kernel density estimation indicate the same characteristic feature of considered variables. In all regarded cases of applying type II of density estimator (Epanechnikov kernel function and least squares cross-

validation method of choosing the smoothing parameter), the estimator is under-smoothed, which can cause loss of significant information of variable. Even in situations where we have asymmetric distribution of variable the simplest method (gaussian kernel and reference rule) for choosing kernel parameters works quite well.

- 4) The approach of bootstrap confidence intervals gives a lot of information. But it should be noted that when the range of variable is quite big all regarded intervals are the same. It can be treated as drawback of the procedure.
- 5) The shape of the kernel density estimators indicates very clearly the character of region where the food production companies come from. For both rural and urban regions, the modality of kernel density estimators for chosen economic characteristics is of the same type but the asymmetry is quite different.
- 6) It can be also noticed that the length of bootstrap intervals for median (for numbers of employees and for revenues total) is much more bigger for the rural regions.
- 7) Presented statistical methods can be widely applied in comparisons for different countries as well as for regions in one country indicating the needs and possibility of development of analysed regions.

Bibliography

1. Baszczyńska, A. (2016). *Parametr wygładzania w estymacji jądrowej funkcji gęstości dla zmiennych losowych w badaniach ekonomicznych (Smoothing Parameter in Kernel Density Estimation for Random Variables in Economic Researches)*. Wydawnictwo Uniwersytetu Łódzkiego. Łódź. pp. 15-113.
2. Baszczyńska, A., Pekasiewicz, D. (2008). Bootstrap Confidence Intervals for Population Mean in Case of Asymmetric Distributions of Random Variables. *Acta Universitatis Lodzianensis Folia Oeconomica*. No. 216. Wydawnictwo Uniwersytetu Łódzkiego. Łódź. pp. 9-20.
3. Chernik, M. R. (2008). *Bootstrap Methods: A Guide for Practitioners and Researchers*. Hoboken New Jersey: John Wiley & Sons Ltd. pp. 26-78.
4. Chernik, M. R., LaBudde, R. A. (2011). *An Introduction to Bootstrap Methods with Applications to R*. Hoboken New Jersey: John Wiley & Sons Ltd. pp. 76-98.
5. Davison, A. C., Hinkley, D. V. (1997). *Bootstrap Methods and Their Application*. Cambridge University Press. pp. 191-202.
6. Domanski, Cz., Pruska, K. (2000). *Nieklasyczne metody statystyczne*. Polskie Wydawnictwo Ekonomiczne. Warszawa. pp. 260-274.
7. Domanski, Cz., Pruska, K., Wagner, W. (1998). *Wnioskowanie statystyczne przy nieklasycznych założeniach*. Wydawnictwo Uniwersytetu Łódzkiego. Łódź. pp. 109-148.
8. Efron, B., Tibshirani, R. J. (1993). *An Introduction to the Bootstrap*. London: Chapman & Hall. pp. 153-199.
9. Ghosh, S. (2018). *Kernel Smoothing. Principles. Methods and Applications*. Hoboken New Jersey: John Wiley & Sons Ltd. pp. 40-94.
10. Gramacki, A. (2018). *Nonparametric Kernel Density Estimation and Its Computational Aspects*. Studies in Big Data. Volume 37. Springer International Publishing AG 2018. pp. 25-80.
11. Hall, P. (1988). Theoretical Comparison of Bootstrap Confidence Intervals. *The Annals of Statistics*. Volume 16. No. 3. pp. 927-953.
12. Härdle, W. (1991). *Smoothing Techniques. With implementation in S*. New York Berlin Heidelberg London: Springer-Verlag. pp. 44-48.
13. Hutson, A. (1999). Calculating Nonparametric Confidence Intervals for Quantiles Using Fractional Order Statistics. *Journal of Applied Statistics*. 26:3. pp. 343-353.
14. Kvam, P.H., Vidakovic, B. (2007). *Nonparametric Statistics with Applications to Science and Engineering*. Wiley Series in Probability and Statistics. New Jersey Hoboken: John Wiley & Sons. Inc. pp. 205-219.
15. Shao, J., Tu, D. (1995). *The Jackknife and Bootstrap*. New York: Springer-Verlag. pp. 129-140.
16. Silverman, B. (1986). *Density Estimation for Statistics and Data Analysis*. London: Chapman and Hall. pp. 43-61.
17. Wand, M., Jones, C. (1995). *Kernel Smoothing*. London: Chapman and Hall. p. 11.

SUPPLY CHAIN IN THE MILK MARKET IN THE EU COUNTRIES *

Piotr Borawski¹, Associate Professor; **Marta Guth**², PhD, Assistant Professor and **James W. Dunn**³, Emeritus Professor

¹University of Warmia and Mazury in Olsztyn, Poland; ²Poznań University of Economics and Business, Poland; ³Pennsylvania State University, the USA

Abstract. The aim of the paper was to present milk supply chain in Poland on the background of the EU in the years 2004-2017. The authors used tabular and descriptive methods to present the changes in the supply chains. We have measured three stages of supply chain of milk: production, wholesale supply and consumption in the years 2013-2017. The survey proved that the biggest wholesale supply of cow's milk in the EU in 2017 was in Germany (31 939 thousand tons), France (24 539), the Netherlands (14 297) and the United Kingdom (15 134).

Key words: milk market, supply chains, the EU.

JEL code: Q12, Q11.

Introduction

The current socio-economic development is largely determined by supply chains and the associated logistics. There are many definitions of supply chains. According to Dyczkowska (2012), „a supply chain is the cooperation between numerous processing, trade and logistic enterprises and enterprises involved in the flow of products, information, and financial resources”. As reported by Pietrzak et al. (2010), logistics involves the „management of handling and storage operations that are to enable the flow of products from the places of origin to the places of consumption”. It follows from this definition that logistics in the dairy sector also concerns the transport of raw material from an agricultural farm to the points of sale. Logistics in agriculture vary depending on the type of products. It follows from this definition that enterprises should cooperate with one another within the supply chain, so that it could operate efficiently. From the perspective of both an enterprise and an agricultural farm, supply logistics play an important role. This process is related to the timely delivery of raw materials. Both an enterprise and an agricultural farm should maintain the purchase stocks at an appropriate level to enable the production process. Supply logistics comprise a cycle of operations associated with the purchase of products or services needed by an enterprise and conforming to the requirements.

The supply chain is of particular importance on the milk market. Milk is a food product that needs to be stored properly. In Poland, milk may be collected in two ways: either collected directly from a farm or delivered to a collection centre, with the first way being particularly preferred by large farms (Falkowski et al., 2008). In dairy farms, milk is stored in low-temperature milk tanks help prevent the development of microorganisms. Most frequently, milk is collected every second day from agricultural farms in tank trucks specially dedicated to this purpose. Then, milk is transported to processing plants where it is processed. The second way of milk collection was important in times of the centrally planned economy. This was the only way for a farmer to deliver milk to a collection centre operated by a dairy enterprise (Falkowski, 2012).

Production logistics involves the flow of information and materials within the entire production process. According to Dyczkowska (2012), the tasks of „production logistics include organisation, control and planning of the flow of raw materials, parts of cooperative elements, and the materials needed by an enterprise”. Production logistics is aimed at reducing production costs.

* The article was written by the project funded by the National Science Centre allocated on the project OPUS 15: 2018/29/B/HS4/00392.

¹ pboraw@uwm.edu.pl

² marta.guth@ue.poznan.pl

³ jwd6@psu.edu

The aim of distribution logistics is to coordinate processes at each stage of distribution related to the supply of a final product to a consumer via distribution channels. The longer the distribution channels, the longer the duration of delivery of a final product, and the greater the losses of products. Moreover, longer distribution channels result in greater differences in the prices paid by a consumer and received by an agricultural producer. Distribution logistics involves the delivery of the right product within the right time limits to the right customer. In this process, both the customer service process and the flow of information in both directions are important.

Not only do the changes in organisation of supply chains result in an increase in requirements but also create opportunities for gaining access to new markets and vertically organised supply chain systems. In addition, the liberalisation of Polish trade, and the privatisation of milk processing enterprises have opened the Polish dairy sector to greater foreign competition. These actions have contributed to an increase in investment in the Polish dairy sector (Dries et al., 2009). A study of changes in milk supply chains was conducted by Robinowitz and Liu (2014). Its results show that the processing and retail trade create a need for investments in agricultural farms, and affect the retail price of milk. An analysis of prices of products of agricultural origin within the food chain is a complex issue as agricultural raw materials are, as a rule, processed and differentiated through the process of adjustment to the consumers' requirements (Seremak-Bulge, 2006).

The milk product supply chain refers to the complete chain of values, retail sales, with the consumer as the final link. The milk supply chain comprises primary food production, feed component production, cattle feed production, livestock production and milk production, milk processing, wholesale and retail sales, and consumption (Jarzebowski, 2013).

The objective of the research was to recognize the supply chain in milk markets in Poland and other EU countries in the years 2004-17. The authors address the following questions.

1. What are the wholesale deliveries of cow's milk in EU countries?
2. What is the cow's milk production in the EU countries?
3. What are the indicators of changes in milk supplies to dairies in the European Union countries in 2004-2017?
4. What is the number of dairy cows in the European Union?

The authors used data in the years 2013-2017 and descriptive statistical analysis to describe the changes.

Research results and discussion

Our initial analysis presents the cow's milk production in the EU countries. As we can see the highest milk production was observed in 2016 in Germany (36 672 thousand tons), France (24 482 thousand tons), the United Kingdom (14 946 thousand tons), the Netherlands (14 324 thousand tons) and Poland (13 253 thousand tons). These countries have a surplus in milk production and must find consumers in other countries (Borawski, Dunn, 2016).

The overproduction of milk production is a problem that was an effect of good conditions and the Common Agricultural Policy. The quota system was introduced in 2003 and it was the incentive for production increases. Another incentive was the direct support payments linked to milk production. Finally, the quota system ended in 2014 and the support prices for butter and milk powder were eliminated. The EU prepared new incentives for the development of milk production, for example: formal conventions between producers and dairy enterprises, creation of multibranch organizations, negotiation of milk prices, and support of cheese production (Guba, Dabrowski, 2012).

An important factor determining the development of milk production is the number of dairy cows. The number of cows has decreased in the EU. The dairy herd in December 2017 was 23 299 thousand head and was 1 % smaller compared to 2016. The decrease of the dairy herd was particularly in the EU-13 because of restructuring processes. The highest decrease of cows numbers in these countries group in December 2017 compared to 2016 was observed in Bulgaria (6,7 %), Croatia (5,4 %) and Lithuania (4,5 %). The highest increase was in Poland (1,1 %) and Slovenia (0,9 %) in the same period. In the same period the reduction of milk cows in the EU-15 was smaller and accounted 0,9 % (number of dairy cows 18 193 thousand head). The decrease of cow numbers was particularly seen in such countries as: Holland (7,2 %), France and Italy (decrease 1 %) and Germany (0,4 %). In the same period the increase of dairy cows was seen in Ireland (3,7 %), Denmark (1,8 %), Austria (0,6 %) and Great Britain (0,2 %). According to the prognosis of European Commission, the decrease of cow number in 2018 will be smaller and will account to 0,4 % (23 million heads). The decrease of cows was offset by the milk yield which increased to 7074 kilograms per cow in 2017 (Milk market-state and perspectives, 2018). The smaller dairy farms will have problems staying competitive in the milk market. That is why the owners of these farms have to make investments to increase the production and to decrease production costs (Zekalo, 2014).

Milk production is determined by two main factors: cow numbers and milk yield. According to information presented in Table 1, milk production was the highest in 2016 in Germany (32 667 thousand tons), France (24 482), the United Kingdom (14 946), the Netherlands (14 324) and Poland (13 253). These results prove the scope of milk production of the EU. These countries have excess milk and have to find markets for the products in other countries (Borawski and Dunn, 2016; Soczewka and Ginter, 2013).

Milk production increased the most in the years 2013-2016 in Ireland (22,3 %), Germany (17,1 %) and the Netherlands (15,4 %). This was the effect of specialization and concentration by dairy farms in the EU countries. The milk production decreased the most in the same period in: Spain (-30,3 %), Hungary (-23,9 %), Latvia (-15,1 %) and Bulgaria (-11,3 %). According to the European Commission, the milk production in 2017 increased 1,5 % to 165,4 million tons. The increase of milk production was particularly seen in the EU-13 (1,7 % increase) and a little lower in the EU-15 (1,4 %). In 2018, according to the milk production forecast in the EU is an increase of 1,2 % to 167,4 million tons. In the same year, the milk yield per cow in the EU will increase to 7192 kilograms. Milk is the primary source of income for dairy farmers. The economic situation of dairy farms is diversified regionally in the EU. According to Smigla (2014), eastern EU countries such as Poland, Bulgaria and Romania achieved weaker economic results, whereas dairy farmers from western EU achieved higher production and better economic results.

Table 2 presents the wholesale supply of cow's milk in the EU in the years 2013-2017. It decreased in Greece (-5,8 %), Croatia (-5,4 %), Sweden (-1,8 %) and Slovakia (-0,1 %). It increased in the remaining countries of the EU. The biggest wholesale production of cow's milk in 2017 was in Germany (31 939 thousand tons), France (24 539 thousand tons), the United Kingdom (15 134 thousand tons) and the Netherlands (14 297 thousand tons).

Production of cow's milk in the EU (thousand tons)

Country	Production (Thousand tons)		Median	Standard deviation	Coefficient of variation	Skewedness	Kurtosis	Changes 2013-2016 (%)
	2013	2016						
Austria	3 393	3 628	3 526.5	97.3	2.8	-0.27	-1.06	+10.0
Belgium	3 528	3 882	3 816.5	205.8	5.4	-0.33	-1.21	+8.5
Bulgaria	1 149	1 019	1 121.5	71.9	6.4	-0.37	-1.29	-11.3
Cyprus	163	165	164.0	3.8	2.3	0.95	-0.85	+1.2
Croatia	588	671	640.5	51.7	8.1	0.05	-1.71	+14.1
Czech Republic	2 849	3 065	2963.0	107.4	3.6	-0.03	-1.87	+7.6
Denmark	5 082	5 355	5 245.5	128.3	0.0	-0.19	-1.67	+5.0
Estonia	772	783	788.5	20.6	2.6	0.54	-1.09	+1.4
Finland	2 328	2 400	2 399.5	45.9	1.9	-0.58	-0.92	+3.1
France	24 426	24 482	25 087	737.7	2.9	0.05	-1.91	+0.2
Germany	31 324	36 672	32 667	2 322.7	7.0	0.87	-0.84	+17.1
Greece	731	775	746	35.8	4.8	-0.41	-1.33	+6.0
Hungary	1 773	1 349	1 832.5	274.1	15.7	-0.89	-0.88	-23.9
Ireland	5 601	1 624	6 215	595.6	9.5	0.01	-1.78	+22.3
Italy	11 281	10 773	11 190	456.2	4.1	0.44	-1.05	-4.5
Latvia	912	774	942.0	99.8	10.9	-0.75	-1.02	-15.1
Lithuania	1 720	1 624	1 757	95.3	5.3	-0.33	-1.31	-5.6
Netherlands	12 408	14 324	13 097	871.0	6.6	0.34	-1.46	+15.4
Poland	12 718	13 253	13 293	358.5	2.7	-0.69	-0.92	+4.2
Portugal	1 848	1 959	1 948.5	91.2	4.7	0.19	-1.03	+6.0
Romania	3 966	3 954	3 960	309.2	7.6	0.87	-0.83	-0.3
Slovakia	934	957	953	10.3	1.1	-1.04	-0.74	+2.5
Slovenia	596	653	627.5	26.2	4.2	-0.12	-1.64	+9.6
Spain	6 559	4 569	6 515.5	1 054.1	17.2	-1.04	-0.74	-30.3
Sweden	2 870	2 862	2 902	39.4	1.4	-0.02	-1.97	-0.3
United Kingdom	13 943	14 946	15 026	650.3	4.4	-0.76	-0.89	+7.2

Source: authors' calculations based on Milk market. State and perspectives 2017

**Wholesale supply of cow's milk in the European Union in the years 2013-2017
 (thousand tons)**

Country	Wholesale supply (Thousand tons)		Median	Standard deviation	Coefficient of variation	Skewedness	Kurtosis	Changes 2013-2017 (%)
	2013	2017						
Austria	2 933	3 200	3 091	95.94	3.11	-0.41	-0.54	9.1
Belgium	3 474	4 013	3 882	226.72	5.95	-0.59	-1.15	15.5
Bulgaria	495	592	510	38.82	7.37	1.13	-0.28	19.6
Cyprus	157	216	164	25.93	14.47	0.58	-1.40	37.6
Croatia	504	477	504	18.26	3.64	-0.20	-1.29	-5.4
Czech Republic	2 382	2 979	2 500	260.81	9.97	0.52	-1.41	15.1
Denmark	5 025	5 479	5 278	186.02	3.54	-0.07	-1.45	9.0
Estonia	706	727	720	9.61	1.33	-0.34	-1.19	3.0
Finland	2 287	2 366	2 366	43.08	1.83	-1.03	-0.36	3.5
France	24 191	24 539	24 539	553.16	2.16	0.23	-1.70	1.4
Germany	30 301	31 939	31 879	709.4	2.25	-1.13	-0.36	5.4
Greece	652	614	619	16.39	2.63	1.37	0.08	-5.8
Hungary	1 364	1 525	1 525	75.59	5.08	-1.02	-0.52	11.8
Ireland	5 581	7 475	6 585	772.48	11.95	-0.09	-1.37	33.9
Italy	10 397	11 375	10 773	375.30	3.45	-0.32	-1.05	9.4
Latvia	736	813	808	33.30	4.19	-1.45	0.19	10.5
Lithuania	1 339	1 403	1 416	40.38	2.87	-1.05	-0.37	4.8
Netherlands	12 213	14 297	13 331	988.08	7.41	-0.03	-1.71	17.1
Poland	9 921	11 647	10 869	641.73	5.93	-0.20	-0.90	17.4
Portugal	1 777	1 851	1 851	53.86	2.91	0.01	-0.59	4.2
Romania	879	1 028	953	59.64	6.25	-0.01	-1.36	17.0
Slovakia	827	826	827	17.68	2.11	0.87	-0.82	-0.1
Slovenia	517	579	554	26.86	4.87	-0.20	-1.54	12.0
Spain	6 300	7 014	6 720	271.89	4.06	-0.41	-0.93	11.3
Sweden	2 868	2 817	2 868	49.56	1.72	-0.09	-1.41	-1.8
United Kingdom	13 687	15 134	14 829	611.19	4.16	-0.90	-0.59	10.6

Source: authors' calculations based on Milk market. State and perspectives 2017

The smallest wholesale supply of cow's milk in 2017 was found in Cyprus (216 thousand tons), Croatia (377 thousand tons) and Slovenia (579 thousand tons). The wholesale supply of cow's milk decreased in 2017 compared to 2013 in Croatia (-5,4 %), Sweden (-1,8 %) and Slovakia (-0,1 %). It increased in the remaining EU countries. The biggest increase of wholesale supply of cow's milk in the EU in 2017 compared to 2013 was observed in Cyprus (37,6 %), Ireland (33,9 %) and Bulgaria (19,6 %). Coefficient of variation describes changes in the wholesale supply of cow's milk in the EU. The biggest coefficient of variation was observed in Cyprus (14.47 %), Ireland (11.95 %) and the Czech Republic (9.97 %).

Milk production is an important part of the economy because it is profitable and it employs many farmers and their families (Poczta et al., 2008). Another part of the dairy supply chain is the overall dairy industry. The production of dairy products is diversified in the EU countries. A. Parzonko (2013) recognizes that large differences in the level of dairy development in individual countries of the European Union result primarily from their differing level of economic development. The differences between EU-15 countries and the EU-10 countries accessed in 2004 differ greatly. These differences are even deeper for Bulgaria and Romania who joined in 2007. However, these dependencies did not

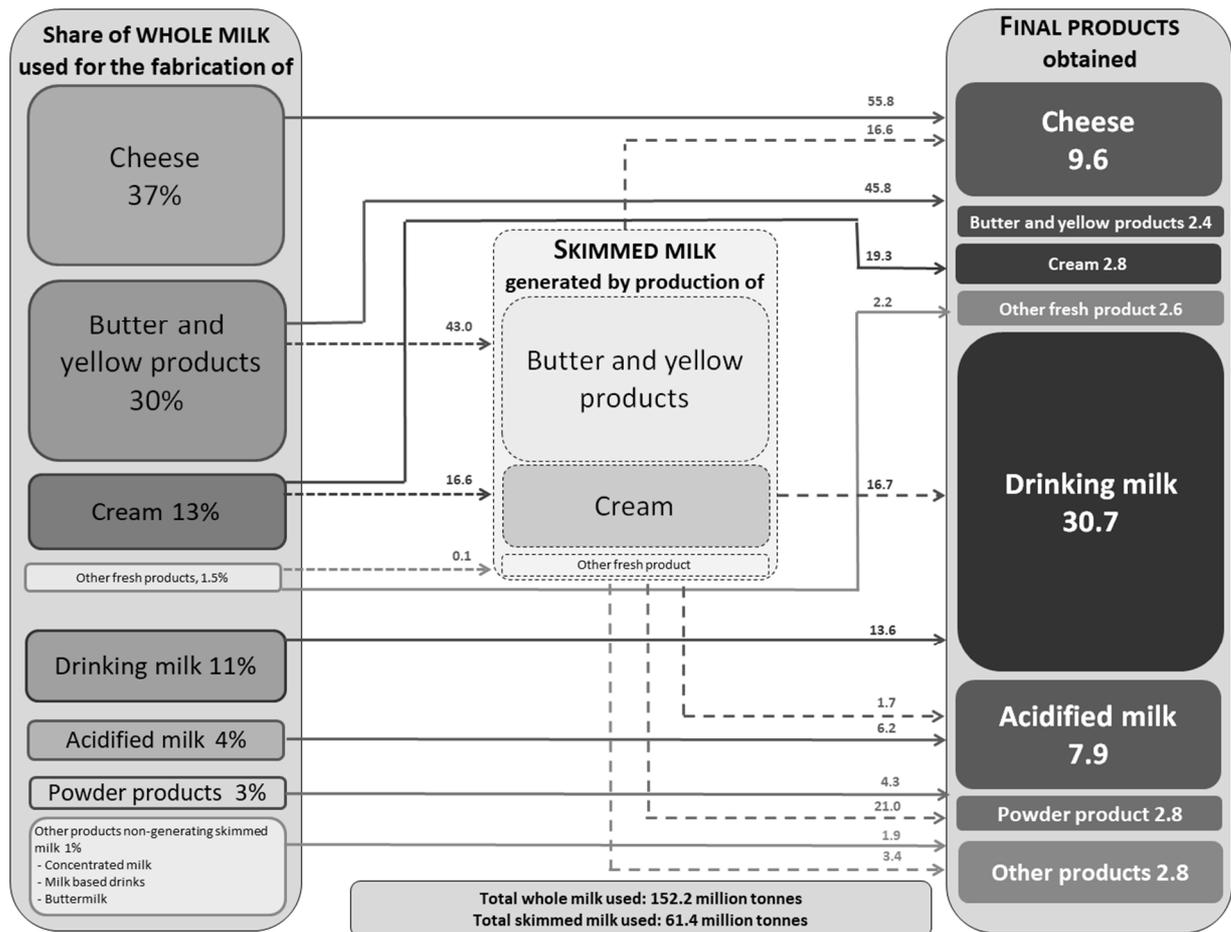
apply to domestic sector leaders who, due to their investments, the implementation of know-how, quality management systems, achieved significantly better results than the average ones.

According to Ihle et al. (2017), the main dairy countries in the EU, based on the annual volume of milk being processed, are Germany and France, where more than 25 million tons of milk are processed each year. More than 10 million tons of milk are processed annually in the United Kingdom, the Netherlands and Italy. Apart from Italy, Spain is the largest dairy producing country in the EU-S (more than 7 million tons). Among EU13 MS, Poland and the Czech Republic have the largest dairy sector (3.5 and 2.5 million tons, respectively). The structure of the processing chain of the EU dairy sector differs substantially between MS and between regions. The dairy processing in EU-N MS is based primarily on large-scale dairy companies that process more than 100,000 tons of milk per year. An exception is Ireland, where large-scale dairies process less than 60 % of the total milk volume. In the EU-S and the EU13 MS, a larger share of milk is processed by medium- or small-scale dairy companies. This structure holds especially in countries such as Bulgaria and Romania, where the sector is dominated by small dairy companies that process less than 50 thousand tons of milk annually.

The dairy industry has an accelerated process of concentrating capital. As a result, the number of milk processing enterprises is decreasing year by year. Large, both cooperative and private dairy companies increase the scale and scope of their commercial offer by purchasing declining, mostly cooperative companies. The concentration ratio of the four largest EU dairy companies increased in the period between 2008 and 2013 from 32 % to 36 % of the total turnover in the dairy sector. Concentration ratios in dairy product markets differ substantially between Member States. They are the highest in the Scandinavian countries with a single dairy company dominating the market: Arla Foods holds between 40 % and 73 % of the market share for different dairy products in Sweden and Denmark; Valio provides 27 % to 52 % of the dairy retail value in Finland (Ihle et al 2017; Niemi, Ahlstedt 2008). The International Dairy Federation predicts that the concentration of structures in milk processing will continue in other Member States. According to the expertise of the International Dairy Federation, in 2013, among 27 milk processing companies in the world, which achieved an annual turnover of USD 3 billion, there were as many as 10 companies from the European Union (13 from all of Europe), the largest of which are: French Lactalis and Danone, with annual turnover of 21.2 billion and 15.7 billion dollars respectively, Dutch Friesland Campina (15.1 billion USD), Danish-Swedish Arla Foods (13.1 billion USD) and German DMK (6.4 billion USD) (Bulletin of International Dairy Federation 476/2014). EU15 dairy companies, such as Danone, Lactalis, Meggle and Hochland, have invested in the dairy markets of the EU13 MS. Nevertheless, important market shares remain with domestic producers (Vindija, Croatia; Madeta, Czech Republic; Mlekpól, Poland). The domestic dairy processor Mlekpól holds a 12 % overall market share in the Polish dairy market.

An important process, taking place in the background of changes in the production structure, that enables cost reduction, is to reduce the amount of raw material used to produce final products. This is mainly the result of technological progress and the introduction of micro- and nanofiltration on an increasingly large scale, which allows for more efficient recovery of whey proteins. In addition, according to J. Seremak-Bulge (2005), striving to increase value added significantly increases the turnover of semi-finished products between enterprises dealing in milk processing and packaging of milk products (including milk powder, cheese, cream). It can be assumed that these trends will additionally increase as capital is consolidated and the production structure is simplified in production plants in order to reduce labour consumption and reduce production costs.

The dynamic development of raw milk production in the world in 1990-2010 also indirectly determined changes in its distribution, which were a response to the changing demand for dairy products. According to Baer-Nawrocka et al. (2012), in relation to 1990, the share of butter in 2010 decreased by 3.4 percentage points, skimmed milk powder by 2.1 percentage points in the use of raw milk as the share of cheeses increased by 1.2 percentage point, and whole milk powder by 1.5 percentage points. The share of fresh products in the distribution of global milk production increased from 74.6 % in 1990 to 77.2 % in 2010 (at the expense of a drop in the share of dairy products from 25.4 % in 1990 to 22.8 % in 2010). In Europe in 2010, fresh products accounted for 66.7 % of the use of raw milk, and fixed products 33.3 %, of which up to 17.1 % was used for cheese production, 8.2 % for butter production, 4.7 % for skimmed milk powder and 3.2 % for whole milk powder. These trends even deepened in 2016 (Figure 1).



Source: https://ec.europa.eu/eurostat/statistics-explained/index.php?title=File:Utilisation_of_milk_and_dairy_products_obtained,_EU-28,_2016-Fig.png

Fig. 1. Utilisation of milk and dairy products obtained, EU-28, 2016

The production of butter in the world after a deep decline in the 1990s (almost 26 %, in Europe 24.5 %) was systematically growing to stabilize between 4.7 and 4.9 million tonnes in the decade 2001-2010. The European Union has over a 41 % share of global production. The second in the order the United States has only 15 % share, and the third New Zealand 8 %. In the European Union, butter production in 2004-2011 decreased slightly, mainly due to low price competitiveness with declining market support. The reform of the Common Agricultural Policy has limited export subsidies, expenditure on intervention purchases and aid for private storage of butter.

Conclusions, proposals, recommendations

- 1) The milk supply chain is a very important part of the agricultural economies of EU countries. The survey proved its development.
- 2) Most milk in the EU countries is delivered by the biggest producers among which are Germany, France, Great Britain, Holland and Poland. The EU is a big producer of milk and a very important player on world markets.
- 3) There is a strong process of capital concentration in milk processing.
- 4) Small milk producers have to improve production and milk yields.

Bibliography

1. Baer-Nawrocka, A., Grochowska, R., Kiryluk-Dryjska, E., Seremak-Bulge, J., Szajner, p. (2012). *Światowy rynek mleka i jego wpływ na polskie mleczarstwo po zniesieniu kwot mlecznych (The Global Milk Market and Its Impact on Polish Dairy Industry after the Abolition of Milk Quotas)*, IERiGZ, Warszawa.
2. Borawski, P., Dunn, J. W. (2016). *Zroźnicowanie produkcji mleka w krajach UE w aspekcie wspólnej polityki rolnej (Differentiation of milk production in European Union countries in the aspect of common agricultural Policy)*. Roczniki Naukowe SERiA, tom XVII, zeszyt 2, 9-15.
3. Dries, L., Germeij, E., Noev N., Swinnen, J. F. M. (2009). *Farmers, Vertical Coordination, and the Restructuring of Polish Supply Chains in Central and Eastern Europe*. World Development 37(11), 1742-1758.
4. Dyczkowska, J. (2012). *Logistyka zaopatrzenia i produkcji-wpływ na logistykę dystrybucji (Supply and production logistics - impact on distribution logistics)*. Prace Naukowe Politechniki Warszawskiej z. 84, s. 19-28.
5. Falkowski, J. (2012). *Dairy Supply Chain Modernisation In Poland: What About Those Not Keeping Pace?*, European Review of Agricultural Economics 39(3), 397-415.
6. Falkowski, J., Malak-Rawlikowska, A., Mielczarek-Andrzejewska, D. (2008). *Dairy Supply Chain Restructuring and Its Impact on farmer's revenues in Poland*. 12th Congress of European Association of Agricultural Economists –EAAE.
7. Guba, W., Dabrowski, J. (2012). *Deregulacja rynku mleka w Unii Europejskiej-skutki i zalecenia dla Polski (Deregulation of the milk market in the European Union - effects and recommendations for Poland)*. Rocz. Nauk Rol., seria G, t. 99, z. 1, 32-42.
8. Ihle, R., et al. (2017). *Research for Agri Committee - The EU Cattle Sector: Challenges and Opportunities - Milk and Meat* Technical Report · February 2017 DOI: 10.2861/85585
9. International Dairy Federation. (2014). *Bulletin of the International Dairy Federation 476/2014, The World Dairy Situation 2014*
10. Jarzebowski, S. (2013). *Analiza łańcucha dostaw produktów mlecznych w kontekście zanieczyszczeń środowiska (Analysis Of The Supply Chain Of Dairy Products In The Context Of Environmental Pollution)*. Zeszyty Naukowe SGGW w Warszawie. Problemy Rolnictwa Światowego 13(28), 95-103.
11. Niemi, J., Ahlstedt, J. ed. (2008). *Finnish Agriculture and Rural Industries 2008*, Agrifood Research Finland. Economic Research, Publication 108a
12. Parzonko, A. (2013), *Globalne i lokalne uwarunkowania rozwoju produkcji mleka (Global And Local Conditions For The Development Of Milk Production)* Wydawnictwo SGGW, Warszawa.
13. Pietrzak, M., Baran, J., Maciejczak, M. (2010). *Zakres i rola logistyki w przedsiębiorstwach mleczarskich (The Scope And Role Of Logistics In Dairy Enterprises)*. Wieś Jutra 1(138), 1-5.
14. Poczta, W., Sadowski, A., Sredzinska, J. (2008). *Rola gospodarstw wielkoobszarowych w rolnictwie Unii Europejskiej (The Role Of Large-Scale Farms In The Agriculture Of The European Union)*. Roczniki Nauk Rolniczych seria G. T. 95, z. 1, 42-56.
15. Rabinowitz, A., N., Liu, Y. (2014). *The Impact Of Regulations Change On Retail Pricing: The New York State Milk Price Gouging Law*. Agricultural and Resource Economics 43(1), 178-192.
16. Rynek mleka. Stan perspektywy (Milk Market. The State And Perspectives). IERiGZ-PIB 2018, Warsaw.
17. Seremak- Bulge, J. ed. (2005). *Rozwój rynku mleczarskiego i zmiany jego funkcjonowania w latach 1990-2005 (Development Of The Dairy Market And Changes In Its Functioning In The Years 1990-2005)*, IERiGZ, Warszawa.
18. Seremak-Bulge, J. ed. (2006). *Ewolucja rynku zbożowego i jej wpływ na proces transmisji cen (The Evolution Of The Grain Market And Its Impact On The Price Transmission Process)*, IERiGZ, Warszawa.
19. Smigla, M. (2014). *Zroźnicowanie produkcji mleka w regionach Unii Europejskiej w latach 2007-2011 (The Diversification Of Milk Production In The Regions Of The European Union In 2007-2011)*. Progress in Economic Sciences 1, 99-110.
20. Soczewka, I., Ginter, A. (2013). *Handel międzynarodowy artykułami rolno-spożywczymi w Polsce w latach 2007-2011 (International Trade In Agricultural Products In Poland Within 2007-2011)*. J. Of Agrib. Rural Devel., 2(28), 225-234.
21. Zekalo, M. (2015). *Economic Results Of Milk Production In Organic And Conventional Specialized Dairy Farms In Poland*. Athens Journal of Business and Economics, January, 63-71.

WORK MOTIVATION AND LABOUR PRODUCTIVITY GROWTH AMONG IT PROFESSIONALS IN CONTEMPORARY LATVIA

Svetlana Gribanova¹, Mg.soc.; **Anna Abeltina**², Dr.oec.
^{1,2}Turība University

Abstract. This paper is dedicated to the research of factors that drive work motivation of Information Technology (further in the text IT) professionals in Latvia and lead to the increase in labour efficiency. Various research works have proved relation of employees' motivation and work performance. However, No previous research was conducted in contemporary Latvia aiming at IT specialists.

The research is based on the results of survey of 1200 IT professionals in Latvia. Besides motivation factors, personal characteristics of Latvian IT professionals was given with the use of adapted Schwarz questionnaire. The data were studied through regression analysis, and factors that influence work motivation and work efficiency growth were found.

Key words: motivation, work efficiency, IT professionals.

JEL code: M15, O15, M12.

Introduction

Sustainable growth of Latvian economy in the era of new technologies demands the increase in labour productivity. Skilled labour force becomes one of the main drivers of economy together with technological development. IT specialists combine these two drivers. Their participation in developed economies increases each year. Despite the terrific growth in number of IT specialists in the EU by 36.1 % from 2007 to 2017, Latvia has one of the lowest shares of IT specialists in the total employment - only 2.3 % (Eurostat, 2018).

The goal of motivation is building an environment in which employees would strive to achieve goals by the most efficient way (Deci, E. L., Ryan, R. M., 2000). Various research works have proved that motivation of specialists in different sectors vary (Chaix-Couturier et al., 2000; Chowdhury, 2008; Drake, 2017;). It can be explained by different qualities essential for jobs and values of employees. This is why focusing on IT specialists has scientific and practical interest.

Theoretical framework

Theories concerning work motivation have a long history and evolved during the last century. For a long time, it was believed that the only motivating factor for an effective performance was financial reward. The founder of the school of scientific management Frederick Taylor has developed a system of employees work organization that was based on interconnection between labour productivity and payment (Glaser, M., 1991). However, Mayo and Hawthorne experiments discovered significant influence of psychological factors on work performance (Trahair, R., Zaleznik, A., 2005). Over time different psychological theories of motivation appeared. They tried to study the structure of motivation process and motivation factors from various points of view (Kasser, T., Ryan, R. M., 1993).

Motivation process can be generally described through defining basic concepts applied for its explanation: needs, motives and goals (Frager R., 1976; Frager R., Maslow A., 1987).

Motivation process in real life is much more complicated. Motives that drive human behaviours are unstable and complicated. They are formed under the influence of system of internal and external factors such as talent, education, social status, financial status, public opinion and many others. Therefore, it is very difficult to predict human behaviour as a respond to different motivation factors.

One of the main indicators of companies' efficiency is labour productivity. This indicator shows the efficiency of labour inputs. The effect caused by labour productivity growth influences the increase in employees' wages.

Labour productivity is an economic category that characterizes the efficiency of employees actions and results in the value of goods produced by an employee (Meyer, p. 2005).

Contemporary Latvia struggles low labour productivity in comparison with other developed countries. Factors that influence labour productivity include low efficiency of labour organization that doesn't meet expectations about comfortable working environment which is important for modern professional (Znotina D., Jermolajeva E., 2012).

The readiness of the employees to do their job is one of the most significant factors, which guarantees efficiency of performance of the company. Therefore, it is significant to understand what makes the employee work efficiently. Despite the fact that motivation is mostly subjective factor, performance is objective one. The connection between motivation and productivity is well explored in international economic sciences (Monese, Thwala, 2011, Jarkas, Bitar, 2012, Khan, Saleem, Umer, 2011).

Data and methods

The aim of the research was to analyse the labour motifs and stimuli for more efficient work of IT professionals. The tasks included determination of motivating stimuli; determination of factors, which might influence productivity of IT professionals (meaning factors, which, in their opinion, cause their will to perform better); analysis of value structure of IT professionals; creation of models which demonstrate how stimuli for increased productivity depend on motivating factors and value orientations of IT professionals.

Theoretical approaches and analysis of already conducted research works allowed formulating several hypotheses:

H1: Material stimuli are more effective for the married people and people with children;

H2: Material stimuli are more relevant for people whose values are more connected with material wellbeing and hedonistic value setting;

H3: Type of work influences on type of stimuli for improving work productivity. Individuals doing creative job (creating new programs, solving complex tasks), will work more effective if the work process gives the opportunity for self-actualization. Technical professionals (people working with hardware, not creating new products) will work better with the help of material stimuli.

H4: The fear of losing the job influences employees with traditional or conservative value setting, and those having children.

It is also possible to assume that the professionals who value flexible working schedule, independence in decision-making process and who value professional growth, are responsible people. Therefore, their sense of responsibility can be used as effective driving force for their productivity increase.

Current research applied quantitative paradigm of data collection and analysis. Data collection was conducted by a random sample with the use of online survey. The survey was programmed with Sawtooth software by professional programmer. The invitation to the survey was sent to 4225 respondents through emails and was available in personal accounts. In total, 1637 respondents took part in the survey and 1200 questionnaires were found analysable. The analysis was performed with the use of SPSS software.

Database was analysed with the use of multiple linear regression analysis method. The analysis was aimed to create models that would connect work efficiency, work motivation and values of IT professionals. As the result, models which allowed to build an effective system of work motivation based on psychological, axiological and professional features of employees were proposed.

During the survey, 1200 respondents whose professional activity is associated with IT technologies were polled. Of them, 27 % were female and 73 % male. Age distribution of the sample population is presented in Figure 1. Collected data show that majority of Latvian IT specialists belong to the middle age group. It is possible to assume that significant part of young professionals work outside Latvia.

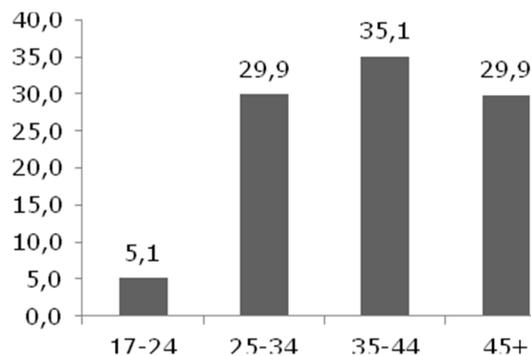


Fig. 1. **Age distribution**

The majority of IT specialists that participated in the survey lived in Riga (68 %), 30 % - in other cities of Latvia and about 2 % - in rural areas.

Approximately half of the respondents were employed in Latvian companies, 44 % - in international companies and other 6 % - in Latvian companies that had branches in other countries.

It is important to note that according to research results presented in Figure 2 absolute majority of surveyed professionals (over 70 %) believed that profession of IT specialist was considered prestigious and well paid. Only 2 % respondents considered work in IT industry to be not prestigious and around 16 % treated it as any other work. Thereby IT specialists as a part of creative class in Latvia were satisfied with their job and social status.

This logical deduction is confirmed by the analysis of respondents' answers to the question if they planned to change their job. As many as 72 % of IT specialists in Latvia stated that they did not plan to change their work in a short-run and only 16 % considered changing work then.

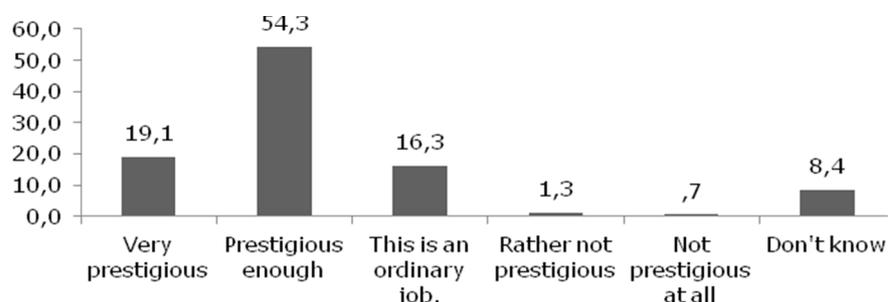


Fig. 2. **Attitude to IT work prestige**

Question: „From your point of view is it prestigious to be IT specialist in Latvia now”

Dependent variable in regression models is stimulus for labour efficiency growth. Independent variables are work motivation and values. Control variables are age, gender, satisfaction by income, work characteristics, presence of partner and amount of children and respondents' agency, or his/her confidence in his/her ability to control his/her life.

Work motivation of IT professionals in contemporary Latvia

Work motivation is a latent variable that cannot be estimated and analysed by a direct question. In this regard, factor analysis method is applied in current research to study work motivation of IT specialists. Factor analysis was conducted by principal components method with their further rotation by Varimax method. This method of factor analysis allows to select factors that will not correlate with each other and explained the existing variance.

In order to have an ability to estimate work motivation using factor analysis, the survey included a block of questions that tested attitude of respondents. This block of questions aimed to find out what should work look like to be attractive for respondents. Following statements representing job characteristics were offered: 1) Having a complicated work that can bring satisfaction for your achievements; 2) Having an opportunity to improve your qualification; 3) Having good work conditions (good aeration, lighting, work space); 4) Having an opportunity to decide independently how to do your work; 5) Having an opportunity to realize your skills and perks fully; 6) Having a work that leaves enough time for personal life.

Factor analysis helped to identify three factors that characterize work motivation of IT specialists.

First factor is „Freedom and independence” that includes following characteristics:

- Having an opportunity to decide independently how to do your work;
- Having a work that leaves enough time for personal life.

This motivation factor assumes that employee has freedom to allocate his time and define how to do his work by himself. External control minimization and availability of their own time are very important factors characterizing quality of life of creative class. Therefore, this factor explains 25 % of the overall variance in work motivation.

Second factor is „Professionalism and self-actualization”. It is characterized by the following statements:

- Having a complicated work that can bring satisfaction for your achievements;
- Having an opportunity to realize your skills and perks fully.

This type of work motivation is associated with professional ambitions satisfaction and self-realization in profession. In IT industry, high professionalism usually ensures successful career that assumes prestige and high income. This factor explains 15 % of the overall variance in work motivation.

Third factor combines the following statements:

- Having an opportunity to improve your qualification;
- Having good work conditions (good aeration, lighting, work space).

This type of motivation is „Survival” when job is appreciated due to its ability to give a chance for gaining new skills and knowledge that will let to change work in future and to have work conditions that create comfortable and safe environment.

Selected factors were computed for each respondent. Values were saved in the data base in order to be used in building the model that will connect work motivation and stimuli for labour efficiency.

Stimuli of labour efficiency growth detection

Since stimuli that lead to the increase in efficiency growth of work of IT specialists are also latent variables, their detection and estimation was also based on the factor analysis conducted by the method of principal components.

For this purpose, the question „Were there situations when you worked particularly well and fast? What factors made you work more effectively than usual?“ was included in the questionnaire. This question suggested a choice of the following factors: great financial rewards, interesting complicated creative task, chance for career growth, clarity and lucidity of goals and desired result, high importance and prestige of the task, the respect of the team, approval of managers, crisis situation, understanding of responsibility, fear to be fired or lose the award, fear of not approval by team and management

Factor analysis allowed selecting five factors that describe stimuli that make IT professionals work more effectively.

First factor is „Financial stimulus“. It includes such indicators as:

- Great financial rewards;
- Chance for career growth.

Thereby stimuli can be viewed either as a lump sum reward or as a career growth opportunity that also leads to the increase of financial prosperity.

Second factor consists of statements related to employees' responsibility for the results of their work. This stimulus can be named as „Responsibility“. It includes the following characteristics:

- Clarity and lucidity of goals and desired result;
- Crisis situation, understanding of responsibility.

Thus, it is possible to conclude that beside career growth and financial stimuli, effective work may be caused by crisis situation in case when an employee understands how to solve it and he is the only one who is able to solve it.

Third factor describes stimuli for creative people. It includes the respect of the team and managerial improvement. Doing something better than others, doing something that cannot be done by other team members is a very important stimulus for those who try to realize themselves professionally. This stimulus can be named „Increasing credibility“.

Another stimulus for higher work efficiency is fear to be fired or lose the award and fear of disapproval by team and management. Despite the fact that this stimulus is based on negative emotions, it explains only 10 % of variance of factors that influence the growth in work efficiency.

Values of IT professionals

Values are an essential part of personality. They affect personal estimation of most life situations and define behaviour including economic behaviour. Values show directivity of the human aimed at reaching of certain goals

Current research applies Schwarz technique to estimate values. For this purpose, questions from Schwarz questionnaire were included into survey (Schwartz, 1990). The respondents were asked to determine to which extent the below statements are relevant to themselves.

Questions to estimate values of IT professionals

Questions	Very much like me	Like me	Some-what like me	A little like me	Not like me	Not like me at all
Thinking up new ideas and being creative is important to him. He likes to do things in his own original way.	1	2	3	4	5	6
It is important to him to be rich. He wants to have a lot of money and expensive things.	1	2	3	4	5	6
It is important to him to live in secure surroundings. He avoids anything that might endanger his safety.	1	2	3	4	5	6
He seeks every chance he can to have fun. It is important to him to do things that give him pleasure.	1	2	3	4	5	6
It's very important to him to help the people around him. He wants to care for their well-being.	1	2	3	4	5	6
Being very successful is important to him. He likes to impress other people.	1	2	3	4	5	6
He likes to take risks. He is always looking for adventures.	1	2	3	4	5	6
It is important to him always to behave properly. He wants to avoid doing anything people would say is wrong.	1	2	3	4	5	6
He strongly believes that people should care for nature. Looking after the environment is important to him.	1	2	3	4	5	6
He thinks it is best to do things in traditional ways. It is important to him to keep up the customs he has learned.	1	2	3	4	5	6

Source: Schwarts, 1990

After the survey was conducted, factor analysis and Schwarz method were applied to select values inherent to IT specialists in Latvia.

Hedonism

- It is important to him to be rich. He wants to have a lot of money and expensive things.
- He seeks every chance he can to have fun. It is important to him to do things that give him pleasure.
- Being very successful is important to him. He likes to impress other people.

Motivational goal of this type is defined as pleasure and enjoying life.

Universalism

- Thinking up new ideas and being creative is important to him. He likes to do things in his own original way.
- It's very important to him to help the people around him. He wants to care for their well-being.
- He strongly believes that people should care for nature. Looking after the environment is important to him.

Motivational goal of this type is tolerance, understanding, protection of well-being of all people and nature.

Traditions

- It is important to him always to behave properly. He wants to avoid doing anything people would say is wrong.
- He thinks it is best to do things in traditional ways. It is important to him to keep up the customs he has learned.
- It is important to him to live in secure surroundings. He avoids anything that might endanger his safety.

Motivational goal of this type is respect, acceptance and following the traditions and customs that exist in culture (respecting traditions, humility, piety, acceptance of one's fate, moderation).

Regression model that connects opportunities for work efficiency growth and employees' values takes for a dependent variable values of factors received as the result of factor analysis in order to select and evaluate stimuli for effective work. Thus, regression model is built for each stimulus. First model defines in what cases financial rewards are effective, while the second one shows for what type of employees it is effective to address to employees' responsibility, but the third model identifies efficiency of using employees' ambitions and the fourth one shows when fear is the most effective stimulus.

All models use values of the factors that identify and estimate work motivation („Freedom and independence“, „Professionalism and self-actualization“ and „Survival) and values (Hedonism, Universalism and Traditions) as independent variables.

As control variables' models use such variables as gender (a dummy variable 1 stands for male gender), number of children, satisfaction by income and work characteristics of respondents.

Work characteristics were estimated by responses on the question „Choose main tasks that you solve in your current working place“: 1) Execution of work connected with equipment maintenance such as installation, repair, adjustment; 2) Checking work of programs/codes/applications/equipment; 3) Search and elimination of errors; 4) Creating new product (codes, programs) or design; 5) Solving problems connected with creation of new algorithms and programs; 6) Process optimization; 7) Finding new ways and approaches to problem solving.

Respondents whose work is mostly associated with equipment maintenance, checking work of programs/codes/applications/equipment and search and elimination of errors belong to technical specialists. Those who create new products (codes, programs) or solve problems connected with creation of new algorithms and programs belong to creative professionals. And finally, specialists who are engaged in process optimization and finding new ways and approaches to problem solving belong to super-creative core of professionals.

Regression analysis results

Table 2 presents four regression models that show connection between each of four stimuli for effective work with identified work motives, values, work characteristics, social and demographical characteristics of respondents.

Models of labour productivity growth

Variables	Model 1. Financial rewards	Model 2. Ambitions	Model 3. Responsibility	Model 4. Fear
(Constant)	-,173	,260	,346	,567
Age	-,005	-,009***	-,003	-,007***
Gender (1-male)	-,122	,008	-,106	-,047
Presence of partner	,237***	-,123	,027	,005
Number of children	,017	,061	,040	,063***
Agency	,006	,019	-,047***	-,043***
Satisfaction by income	,015	-,012	,019	,012
Work motivation				
Freedom and independence	,029	,015	,092***	,041
Professionalism and self-actualization	-,076***	,049	,085***	,028
Survival	-,006	,075***	,032	,046
Values				
Hedonism	-,176***	-,024	,025	-,034
Universalism	-,013	-,073***	-,129***	,083***
Traditions	,038	-,133***	,038***	-,065***
Work characteristics				
Technical specialists	-,009	,021	,049	-,002
Creative professionals	-,066***	,019	-,017	-,013***
Super-creative core of professionals	,042	,010	,037	-,036

First model analyses efficiency of financial rewards. Regression analysis results show that efficiency of financial stimuli is mostly correlated with family status, presence of constant partner or spouse. It is family status, but not presence of children or age, that makes respondents care about income. Moreover, financial rewards are effective for those IT specialists whose values are hedonism - wish to enjoy life. Obviously, contemporary professionals' pleasures are associated with material prosperity. Financial stimuli efficiency has negative correlation with work characteristics of „creative professionals“. This means that for this group of professionals current stimulus is not effective.

Job that allows to realize one's ambitions (model 2) makes younger people work better as it has negative correlation with age variable. It influences those who appreciate the ability to increase their professional qualification in order to get more prestigious work later.

Noteworthy, this stimulus has significant link with two value variables - universalism and traditions. This link has same direction. Thus, possibility to realize ambitions attract both employees who are focused on approval from society and employees that care not only about their private but about public benefits, try to be useful for other people, society and nature.

Third model shows in what situations it makes sense to appeal to employees' responsibility in order to make him work more effectively. This stimulus can be effectively used when an employee has a low degree of agency when a person believes that there is not much depending on him or her personally, his life is governed by other people. Responsibility stimulus is important for those who appropriate work that brings freedom and independence and for those who value professional realization, who don't care about traditions but care about being useful for society. This type of people share universalism values.

Fear as a stimulus (model 4) is effective for young employees that have children, those who respect traditions and follow social rules but not for those who care about environment. This stimulus has a significant negative linkage with work characteristics of creative professionals. So, it is not effective to apply this stimulus for this type of employees.

The research results have confirmed the hypotheses stated. The stimuli for increased work productivity have strong static bond with values and motivators of IT professionals. Material stimuli are not effective for people who create new creative products, for those who want the world to be better place. These stimuli work better with people sharing hedonistic values, having stable job more of a hardware service area or routine tasks.

Young and creative people perform better if they have ambitious tasks and goals combined with sense of responsibility instead of full control.

Conclusion

Research results show that IT professionals in Latvia belong to different generations. However, only the youngest employees have particular stimuli for labour productivity growth. Employees belonging to other age groups are not a significant variable.

Noteworthy, young IT professionals cannot be observed as a homogeneous group. Among them the authors distinguished IT specialists that can be named creative professionals. Their work is connected with creating new products, processes and algorithms. For this subgroup financial stimuli such as lump sum rewards, promises of career promotion and threats of dismissal are not effective.

Economic behaviour of young IT specialists may evolve when their marital status changes or children get born. However, values have greater influence on their motivation. People focused on hedonistic values such as wealth, success and pleasure are ready to perform better for financial rewards. People that try to follow traditions and avoid behaviour that is not approved by other people can be influenced by threats of dismissal and supervisor disapproval.

For all the IT specialists regardless of age and work characteristics important motivation factors are professional realization and freedom and independence, ability to define how to do their work and when to work. As a consequence of this type of motivation effective stimuli for labour productivity growth are awareness of task importance, understanding responsibility between colleagues and respect from co-workers. Unfortunately, the variety of nonfinancial stimuli and negative influence of enforcement are rarely realized by employers. It creates unfavourable work environment, decreases work efficiency and leads to dismissal of the most talented IT specialists.

One of the most important findings of the research is absence of gender differences both in work motivation and labour efficiency stimuluses. This suggests that gender differences are levelled among IT professionals. For modern Latvian women employed in IT industry professional realization, freedom and independence, respect from co-workers are as important as for men. Women are also attracted by complicated ambitious tasks, opportunity to do something important and extraordinary.

Hence professionals employed in IT industry build a new professional environment in Latvia which is characterized by meritocracy, equality, professionalism, freedom and independence. This environment demands new motivational systems of management. Presumably, this professional culture will diffuse to other professional groups and lead to significant changes in Latvian society.

References

1. Chaix-Couturier, C., Durand-Zaleski, I., Jolly, D., Durieux, p. (2000). Effects of Financial Incentives on Medical Practice: Results from a Systematic Review of the Literature and Methodological Issues. *Int J Qual Health Care*, 12, pp. 133-42.
2. Chowdhury, M. (2008). Enhancing Motivation and Work Performance of the Salespeople: The Impact of Supervisors' Behavior. *African Journal of Business Management*. 1.pp. 238-243
3. Eurostat (2018). Proportion of ICT Specialists in Total Employment, 2017. Retrieved December 20, 2018 from https://ec.europa.eu/eurostat/statistics-explained/index.php/ICT_specialists_in_employment
4. Drake, K. (2017). The Motivation to Stay Motivated/ Nursing Management (Springhouse), Volume 48, Issue 12. pp. 56-65. doi: 10.1097/01.NUMA.0000526921.77464.16
5. Deci, E. L., & Ryan, R. M. The „What” and „Why” of Goal Pursuits: Human Needs and the Self-determination of Behavior. *Psychological Inquiry*, 2000, 11, pp. 227-268.
6. Frager, R., Fadiman J. *Personality and Personal Growth*, Harper & Row, 1976.
7. Frager, R., Maslow A. *Motivation and Personality*, Pearson Longman, 1987.
8. Glaser, M., Tailoring Performance Measurement to Fit the Organization: From Generic to Germane, *Public Productivity & Management Review*, 1991, Vol. 14, No. 3, pp. 303-319.
9. Jarkas, A.M. and C.G. Bitar, Factors Affecting Construction Labor Productivity in Kuwait. *Journal of Construction Engineering and Management*, 138(7), pp.811-820., 2012.
10. Khan, F. Saleem, and M. Umer, „Effectiveness of Worker Motivational Techniques on Construction Project Safety, Productivity and Quality Performance,” in Proc. 6th International Conf. on Construction in the 21st Century (CITC-VI): Construction Challenges in the New Decade, Kuala Lumpur, Malaysia, July 5-7, 2011.
11. Kasser, T., Ryan, R. M. A Dark Side of the American Dream: Correlates of Financial Success as a Central Life Aspiration. *Journal of Personality and Social Psychology*, 1993, 65, pp. 410-422
12. Meyer, p. Preliminary Estimates of Multifactor Productivity Growth. *Monthly Labor Review*, June 2005, pp. 32-43.
13. Monese, L.N. and W.D. Thwala, Motivation as a Tool to Improve Productivity on the Construction Site. Available at: [Accessed 19 March 2015]. 2014.
14. Schwartz, S. H. Towards a Theory of the Universal Structure and Content of Values: Extension and Cross-cultural Replications / S. H. Schwartz, W. Bilsky // *Journal of Personality and Social Psychology*.1990, № 3, pp. 878-891.
15. Trahair, R., Zaleznik, A. *Elton Mayo: The Humanist Temper*. Transaction Publishers, 2005.
16. Znotina, D., Jermolajeva, E. Labour Productivity in the Regions of Latvia, *European Integration Studies*. 2011. No 5, pp. 1-7.

QUALITY EVALUATION SCHEMES FOR AGRICULTURAL PRODUCTS AND FOODSTUFFS IN POLAND IN PREVIOUS AND PRESENT FINANCIAL PERSPECTIVE OF EU

Antoni Mickiewicz¹, Bartosz Mickiewicz² and Wojciech Gotkiewicz³

¹Professor emeritus; ²West Pomeranian University of Technology in Szczecin, Faculty of Economics; ³University of Warmia and Mazury in Olsztyn, Faculty of Environmental Management and Agriculture

Abstract: The study presents quality schemes for agricultural products and foodstuffs that have been developed since the EU was founded. The schemes were based on the need to strive for diversification of agricultural production, to identify ways to increase the market value of products, while protecting consumers against inaccurate information on the ways and methods of production. The implementation of schemes has been described in the Polish context and on the example of two measures included in the next financial perspectives. The RDP 2007-2013 has been identified as using financial instruments at a low level. It means that the beneficiaries are not interested in activities related to the quality of agricultural products. In addition, the implementing body (ARR – Agricultural Market Agency) has not taken advantage of all the opportunities for encouraging beneficiaries to switch to quality production. The call for applications within the RDP 2014-2020 suggests a possibility of failure to meet specific indicators at the level of 25.9 thousand, due to the adopted criteria and difficulties in accessing the support.

Keywords: quality of agricultural production, financial perspective, financial instruments, participation of beneficiaries.

JEL code: Q18.

Introduction

Quality schemes for agricultural products and foodstuffs have taken on a completely new meaning upon the increase of agricultural productivity and saturation of agricultural markets. As a result, consumers began to look for diversified agricultural products, especially those that were produced using traditional methods. It turned out that the promotion of products having specific characteristics brings significant benefits to the rural economy, especially in less-favoured or remote areas, both by increasing farmers' incomes and by keeping the rural community in rural areas. In addition, the promotion of diversity and quality was a source of farmers' competitive advantage. It was a priority that the consumers were properly informed about the features of agricultural products and how they were produced through information on product labels. The main goal of the EU was to ensure agricultural production at a high level of food safety, which should be implemented at all stages of the food chain. This, in turn, was a guarantee of a high level of consumer and environmental protection, accompanied by the increase in the competitiveness of the food industry (Mickiewicz A. 2011).

The subject, purpose and scope of research

For many years, Poland has shown a high food deficit, hence so little attention having been paid to quality. It is true that the 1970s saw the first discussions about food safety in the country, but it was not reflected in applying the standards or the conditions of production at all stages of the food chain. The Polish market of products characterized by high quality agricultural production has been developing only for several years (the period after Poland's accession to the EU can be seen as a turning point). As a result of signing the Treaty of Accession, Poland implemented all legal acts related to the common agricultural policy, including those concerning the development of quality schemes for agricultural products and foodstuffs (Chylek E., 2012).

¹ Żołnierska 47, 71-210 Szczecin, antoni.mickiewicz@zut.edu.pl

² Żołnierska 47, 71-210 Szczecin, bartosz.mickiewicz@zut.edu.pl

³ Oczapowskiego 2, 10-719 Olsztyn, wgot@uwm.edu.pl

The main purpose of the study was to present European regulations on food quality schemes, that regulate all issues related to the protection of designations of origin and geographical indications, labelling and distribution of traditional agricultural products. The Rural Development Programme for 2007-2013 included an analysis of two measures that had been addressed to beneficiaries willing to strengthen their position on the market by promoting their traditional products. The RDP 2014-2020, on the other hand, included a characterization of two measures related to the support for accession to quality schemes and the support of producer groups in the field of information and promotion.

The study was based on European and national regulations, rural development programmes, the management information system of the Agency for Restructuring and Modernisation of Agriculture (Polish: ARiMR), and publications in this field. The research was carried out as part of statutory research conducted at the Faculty of Economics at the West Pomeranian University of Technology in Szczecin in 2018.

European regulations on quality schemes for agricultural products and foodstuffs

The institutional and organizational framework for the quality of agricultural products was created by the European Community issuing further guidelines defining the objectives and directions of changes in agricultural policy in this area. First of all, it was stressed that the quality policy for agricultural products is part of the Common Agricultural Policy. This policy gives EU producers a competitive advantage and contributes to the protection of cultural heritage. These features are a result of the skills and determination of EU farmers and producers who preserve their traditions, while taking into account the latest changes in production methods and raw materials. It was found that consumers display a growing demand for high-quality products that are produced using traditional methods. Therefore, the quality policy aims to preserve the diversity of agricultural production and also increases the demand for agricultural products or foodstuffs having specific characteristics, in particular related to their geographical origin (Chyek E., 2012).

Since the 1980s, EU regulations have provided for a scheme for the protection of designations of origin and geographical indications for agricultural products and foodstuffs. In 1992, the EU adopted a harmonized regulatory framework to allow the registration of valued names of agricultural products and foodstuffs produced according to specifications in a given geographical area. The scheme of the guaranteed traditional specialties included a register of names of traditional specialties that are a derivative of the traditional composition or use of traditional production method (Council Regulation, 1992).

EU regulations lay down food and food safety requirements at all stages of production, including rules to ensure fair trade practices and information given to consumers. The agricultural product quality policy should therefore provide producers with the appropriate instruments to more effectively label and promote those of their products that have specific features, while protecting those producers against unfair practices.

The promotion and improvement of quality schemes in agriculture was announced in 'Europe 2020: A strategy for smart, sustainable and inclusive growth'. The strategy includes goals of creating a competitive economy based on knowledge and innovation, and supporting a high-employment economy that ensures social and territorial cohesion. The quality policy for agricultural products provides producers equipped with the right instruments to more effectively identify and promote those of their products that have specific characteristics, while protecting those producers against unfair practices (Regulation of the European Parliament and of the Council, 2010).

Quality schemes are usually divided into two types: those based on certification and those based on labelling. Certification of products comes down to the possibility of awarding products with certificates confirming that a given product has a certain added value. The labelled products, on the other hand, must come from certified organic farms. Such label guarantees that the product meets the requirements of official supervision, comes directly from the manufacturer or has been prepared in a closed package and ensures that at least 95 % of the product's ingredients have been produced organically. The European Union guarantees the credibility of organic farming products, regardless of where they are produced. A regional product of known origin receives a registration to support the manufacturers of products related to a given geographical area (Dobieszynski, 2013).

In order to maintain the diversity of agricultural products and ensure a balance between demand and supply, the European Union has introduced a nomenclature that is protected due to its origin or place of production. Protected Designation of Origin (PDO) is the name of a region (place) whose quality or properties are determined by the geographical environment. An additional requirement includes production and processing within the specific geographical area. Protected Geographical Indication (PGI), on the other hand, is the name of a region or a specific place (country) which has a specific quality, goodwill or other characteristic property, attributable to its geographical origin. Another legal act introduced the Traditional Specialities Guaranteed (TSG) which applies to a traditional agricultural product or foodstuff recognized by the community due to its specific character by being registered in the EU. Organic farming label has been introduced as well – it relates to the use of production methods compatible with the principles of organic production, based on the general system of farm management and food production, along with environmentally beneficial practices. Integrated production (IP), on the other hand, aims to protect plants while taking into account the cultivation system, the expectations of consumers and meeting high quality requirements (Regulation of the European Parliament and of the Council, 2012).

At the national level, the food quality scheme focuses on integrated production (IP), the scheme of traditional specialities guaranteed (TSG), and organic farming products. The Ministry of Agriculture adopted a national scheme of food quality, including „Jakosc i Tradycja” („Quality and Tradition”) developed by the Polish Chamber of Regional and Local Products and the Union of the Provinces of the Republic of Poland, which is a system that uses only raw materials of traceable origin and components free from GMO. The Quality Meat Program (QMP) scheme developed by the Polish Association of Beef Cattle Producers is a system that guarantees the properties of a given production process. The Quality Assurance for Food Products (QAFP) scheme developed by the Union of Producers and Employers of the Meat Industry applies to multiple types of products: pork, poultry and cold cuts made of poultry, pork, and beef. The Pork Quality System (PQS) developed by the Polish Pig Breeders and Producers Association "POLSUS" and the "Polish Meat" Union imposes an obligation that guarantees characteristics features of a given production process on livestock producers (RDP, 2007).

Efficient schemes are mostly based on proper registration and control of protected products. Food quality schemes can be divided into community schemes (operating in all European Union member states) and national schemes (operating only in Poland). The European Union has two basic schemes of food labelling, promotion and protection: 1. an EU protection scheme for regional and traditional products, 2. an EU scheme for organic farming products. In Poland, trademarks and certification are approved by a commission under the competent minister in charge of the agricultural market.

Measure: participation of farmers in food quality schemes (RDP 2007-2013)

The concept of making a Polish farmer more involved was reflected in a measure of Priority Axis 1 of the RDP 2007-2013. The measure was addressed only to those participants of the food quality scheme who actively participated in the production of high-quality agricultural products for consumption. The mechanism enabled agricultural manufacturers producing agricultural products within specific food quality scheme to recover the costs incurred for the inspections carried out on their farms. In addition, the measure allowed to obtain certificates confirming the quality of manufactured products, as well as cost reimbursement for premiums for producer groups, if the producers were associated (RDP, 2007).

The measure was aimed at improving the quality of production and agricultural products intended for human consumption, increasing the consumption of high quality food and supporting the farmers producing high quality food. The objective of the measure was implemented through financial support for farmers participating in food quality schemes. Beneficiaries could participate both in the Community system and the national system. The RDP 2007-2013 assumed that 69 thousand beneficiaries would participate in the measure. According to the information of the ARiMR Management Information System, the beneficiaries submitted 32.3 thousand applications, and 26.7 thousand (82.7 %) of them were successful.

Table 1

Participation of farmers in the food quality scheme (RDP 2007-2013)

Province	Number of applications submitted	Number of decisions issued	Amount of payments made (in thousand PLN)
Dolnoslaskie	1,161	922	1,421.6
Kujawsko-pomorskie	434	336	470.7
Lubelskie	3,253	2,793	5,521.8
Lubuskie	1,014	897	1,753.3
Lodzkie	1,070	903	1,865.90
Malopolskie	3,071	2510	1,134.6
Mazowieckie	5,024	4,205	8,831.3
Opolskie	78	69	1105.5
Podkarpackie	2,544	2,100	4,400.80
Podlaskie	4,301	3,771	7,440.5
Pomorskie	720	554	1,224.40
Slaskie	264	199	268.4
Swietokrzyskie	2,084	1,838	4,175.5
Warminsko-mazurskie	3,991	3,235	4,848.2
Wielkopolskie	759	575	934,6.8
Zachodniopomorskie	2511	1,845	2,896.21
Total	32,279	26,752	51298.5

Source: ARiMR Management Information System

The amount of payments made (51,298.5 thousand) allowed to provide each beneficiary with support amounting to PLN 1,372.3.

The indicative budget of the RDP 2007-2013 initially planned the amount of 100 million euro for the measure in question. As a result of the evaluations carried out by the programme monitoring committee of the Ministry of Agriculture and Rural Development, the funds were not spent as intended and the original objectives were amended. As a result, the level of support dropped to EUR 14 million, which was enough to cover the costs of payments made. According to the ECB (PLN 4.2 per euro), we will get EUR 12.4 million, i.e. the support was implemented at the level of 88.6 % and

compared to the original objective – at the level of 12.4 %. Such low level of use of financial instruments shows that the beneficiaries are not interested in activities related to the quality of agricultural products. Furthermore, the implementing entity (Agricultural Market Agency) has not made every effort to encourage beneficiaries to switch to quality production.

Measures of the quality scheme for agricultural products and foodstuffs (RDP 2014-2020)

The measures contained in RDP 2014-2020 relating to the quality scheme for agricultural products are a continuation of the measure contained in the previous financial perspective. The decision about the further implementation of financial assistance addressed to the participants of quality schemes was based on the fact that the Polish market of products with confirmed high and above-standard production quality was at a low level of development (RDP, 2014).

The scheme is aimed at improving the quality of production and agricultural products intended for human consumption, increasing the consumption of high quality food and supporting farmers producing high quality food. The objective of the measure was implemented through financial support for farmers participating in food quality schemes. The support is granted to the beneficiaries when they join a scheme for the first time and for a period not longer than five years.

Participation in a quality scheme involves additional costs resulting from the need to introduce necessary changes to the farm and making it open for any necessary inspections, in accordance with the scheme standards. The support was motivational and aimed at facilitating production in new conditions required by a specific quality scheme. The support was also aimed at allowing for the additional production costs to be covered until they are reflected in the higher prices of products on the market. The aid takes the form of a refund within 3 years of joining the quality scheme. It includes costs incurred when joining the quality scheme and an annual premium for participation in the scheme.

The amount of support was set at the maximum level of PLN 3,200 per year for products specified by the EU and at a maximum of PLN 3,000 for products within the organic farming scheme. The national scheme, on the other hand, provided for the support between PLN 1470 per year ('Quality and Tradition') and PLN 2,750 per year (IP). The catalogue of expenditures from the previous perspective has been expanded with the purchase of specialist publications and traps related to production within integrated crop production.

The measure "Quality schemes for agricultural products and foodstuffs" is implemented through two sub-measures, namely: 1. Support for new participants of quality schemes that aim to increase farmers' participation in national quality schemes, 2. Support for information and promotion activities of promotional teams consisting of at least two producers. The support is motivational and aims to facilitate production in the new conditions required by a specific quality scheme. Preferential treatment applies to farms up to 5 ha, where fixed costs resulting from participation in quality schemes constitute a great financial burden. The aid is granted to an active farmer who participates in quality schemes, manufactures products intended for human consumption (directly or after being processed) and meets other specific conditions (Regulation of the Ministry of Agriculture and Rural Development, 2015).

Participation of agricultural producer groups in the agricultural product quality schemes (2014-2020)

Province	Number of applications submitted	Number of decisions issued	Amount of payments made (in thousand PLN)
Dolnoslaskie	41	7	54,6
Kujawsko-pomorskie	111	39	269,0
Lubelskie	249	34	290,6
Lubuskie	24	4	32,2
Lodzkie	144	40	304,5
Malopolskie	182	13	112,2
Mazowieckie	761	350	2 874,3
Opolskie	10	2	18,1
Podkarpackie	91	14	124,4
Podlaskie	76	19	165,7
Pomorskie	23	1	17,2
Slaskie	17	0	0.00
Swietokrzyskie	230	87	722,8
Warminsko-mazurskie	115	47	326,7
Wielkopolskie	158	64	428,4
Zachodniopomorskie	46	17	150,0
Total	2278	739	5872,6

Source: ARiMR Management Information System

According to the RDP 2014-2020, the above measures, which cannot be completed before 2023, have covered 25.9 thousand beneficiaries. The approved EU funds are implemented in accordance with the principle of shared management between the Member States and the European Union. The EAFRD share was set at 63.6 %, which requires a 36.4 % increase in the involvement of the Treasury. According to the budget of the RDP 2014-2020, the EAFRD's resources were set at 21.0 million euro, and the overall level of the indicative budget – at 33.0 million euro, representing 0.2 % of the total support instruments of the rural development programme (RDP, 2014).

Summary

The strategy adopted to support the quality of agricultural products in the EU sought to pay attention to new aspects of food production and safety. It meant getting back to traditional production methods that now are in the minority, while farmers get added value which is rewarded with a specific price. Concepts such as 'traditional food', 'organic food', 'local' or 'regional products' gain new importance. In this case, it means the restoration of forgotten flavours, aromas, appearance or shape and a production that uses local raw materials and old methods. Traditional production is done on a small scale, based on local ingredients, old machines or devices, in a non-industrial way. Traditional production is in opposition to mass unified production carried out by large manufacturing plants.

Through their activities and participation in quality schemes of agricultural products, beneficiaries were given the opportunity to inform consumers about the specific features of their products, the place of production and specifications of the product. The measure allowed to obtain certificates confirming the quality of manufactured products, and to refund the costs of premiums for producer groups.

It should be said, however, that the level of interest of Polish farmers in quality schemes for agricultural products is insufficient. The RDP 2007-2013 analysis showed a low level of use of financial instruments. This means that the beneficiaries are not interested in activities relating to the quality

of agricultural products, including obtaining funds. In addition, the implementing entity (Agricultural Market Agency) did not take advantage of all the opportunities for encouraging beneficiaries to switch to quality production. On the other hand, the current course of the call for applications within the RDP 2014-2020 shows that there is a risk that particular indicators will not be performed at the level of 25.9 thousand, due to the adopted criteria and difficulties in accessing the support. This way, the programme might need to be modified in the next financial perspective, which should already be one of the topics for discussion on the future agricultural budget of the European Union.

Literature

1. Chylek, E. *Uwarunkowania innowacyjnego rozwoju sektora rolno-żywnościowego i obszarów wiejskich w ramach polityki rolnej (Determinants of innovative development of the agri-food sector and rural areas as part of agricultural policy)*. (2012). Agencja Reklamowo-Wydawnicza Arkadiusz Grzegorzczak, Warsaw, pp. 84-92
2. Dobieżyński, K. *Ewolucja podejścia do jakości żywności oraz podstawowe cechy systemów jakości produktów rolnych i środków spożywczych w Unii Europejskiej (The evolution of the approach to food quality and the basic features of quality systems for agricultural products and foodstuffs in the European Union)*. Zeszyty Naukowe. (2013). SGGW No 3, Warsaw, pp. 54-67
3. Mickiewicz, A. *Doradztwo w ocenie użytkowników rolniczych gospodarstw rodzinnych regionu zachodniopomorskiego (Extension service in the assessment of agricultural users of family farms in the West Pomeranian region)*. (2011). Agrobiznes – problemy negocjacji z Unią Europejską. Wyd. Adam Marszałek, Toruń, pp. 64-73.
4. *Rural Development Program (2007)*, Ministry of Agriculture and Rural Development, Warsaw.
5. *Rural Development Program (2014)*, Ministry of Agriculture and Rural Development, Warsaw.
6. *Regulation of the Minister of Agriculture and Rural Development of 8 June 2009 on specific conditions and procedure for granting and payment of financial support within the „Information and promotion activities” measure covered by the Rural Development Programme for 2007-2013 (2009)*. Ministry of Agriculture and Rural Development, Warsaw.
7. *Regulation of the Minister of Agriculture and Rural Development of 6 August 2015 on specific conditions and procedure for granting, payment and reimbursement of financial support within the sub-measure „Support for accession to quality schemes” covered by the Rural Development Programme for 2014-2020. (2015)*. Ministry of Agriculture and Rural Development, Warsaw.
8. *Council Regulation (EEC) No 2082/92 of 14 July 1992 on certificates of specific character for agricultural products and foodstuffs (1992)*. European Commission. Brussels.
9. *Council Regulation (EC) No 510/2006 of 20 March 2006 on the protection of geographical indications and designations of origin for agricultural products and foodstuffs (2006)*. European Commission. Brussels.
10. *Regulation (EU) No 1151/2012 of the European Parliament and of the Council of 21 November 2012 r. on quality schemes for agricultural products and foodstuffs (2012)*. European Commission. Brussels.
11. *Proposal for a Regulation of the European Parliament and of the Council on quality assurance schemes for agricultural products (2010)*. European Commission. Brussels.

FEATURES OF THE FUNCTIONING OF NATIONAL PENSION SYSTEMS OF EASTERN EUROPE AND UKRAINE IN THE MODERN CONDITIONS

Agnieszka Parlinska¹, PhD; Volodymyr Rudyk², PhD

¹Warsaw University of Life Sciences (WULS – SGGW); ²Podilsky State Agrarian Technical University

Abstract. Due to the global trends, an increasing proportion of older people, a decline in fertility and hence a reduction in the population, European countries are forced to pursue pension reforms aimed at achieving social and economic goals. The countries of Eastern Europe as well as Ukraine began reforming their national pension systems in the 1990s of the twentieth century. In accordance with the current pension legislation in all these countries, multi-tier pension systems are envisaged.

The objective of this paper is to introduce the peculiarities of functioning of the national pension systems of Eastern European and Ukrainian countries in the context of global challenges in the demographic and social spheres. The analysis of the literature and comparative analysis of the main parametric indicators in pension system reformation were the research methods used in the paper. Special attention has been paid to determine the priorities for further development of national pension systems.

Key words: demographic problems, national pension system, social insurance.

JEL code: J11, H55.

Introduction

Global trends, which are manifested today in the demographic sphere, are characterized by processes of aging of the population. For most European countries, the demographic situation, in addition to increasing the proportion of older people, is characterized by a decline in fertility, and hence a reduction in the population.

In 2017, nearly one fifth (19 %) of the EU population was 65 years of age or older. The proportion of people aged 80 and over should increase more than double by 2080 to reach 13 % of the population (Population Structure and ..., 2018). As a result, the proportion of people of working age decreases, and the relative number of those who retired is expanding. This leads to an increase in the financial burden on the able-bodied population, which must provide the social expenditures necessary for citizens of retirement age to meet their vital needs. This causes also negatively affect the economic mechanisms of the functioning of pension systems of states. In order to solve the problems of pensions, European countries are forced to pursue pension reforms aimed at achieving social and economic goals that are universally recognized in a civilized society: creating objective economic conditions to guarantee decent living standards for every person in an incapacitated period.

For a reform of the Ukrainian national pension system, comparative analysis of pension models of Eastern European countries is especially relevant. They have also faced a demographic crisis and are taking steps to reform their national pension systems. Eurointegration processes in Ukraine require orientation of pension model to achieve a high level of social standards in the pension sector, which are trying to form the countries of Eastern Europe. At the same time, it should be noted that when comparing with the experience of Eastern European countries, it is necessary to take into account a set of practical features of their national pension systems.

The aim of the research is to review the peculiarities of functioning of national pension systems of Eastern Europe and Ukraine in the context of global challenges in the demographic and social sphere. The comparative analysis of the main parametric indicators in national pension systems changes was provided. The rating of quality of life and well-being of the elderly people was calculated e.t.: material security, health status, employment and education favourable environment. The

¹ Agnieszka Parlinska, PhD; ORCID: <https://orcid.org/0000-0001-6640-3097>; Tel.: + 48 22 593 4194; e-mail: agnieszka_parlinska@sggw.pl

² Volodymyr Rudyk, PhD; ORCID: <https://orcid.org/0000-0001-9011-4543> ; mail: rudyk_vk@meta.ua;

priorities for further development of national pension systems was determined as well. Data and information were taken from the literature, the statistics of the World Bank and the OECD.

Literature overview

Under the current conditions, major international institutions, such as the United Nations, the International Labour Organization (ILO), the OECD, the World Bank, take major part in the formation and reform of national pension systems of European countries, including Eastern Europe and Ukraine. At their initiative, the main strategies, concepts, programs of the development of national pension systems are developed, taking into account the global risks facing society. The IMF, together with the World Bank and other international financial institutions, provides financial assistance for pension reforms to Eastern Europe and Ukraine. The legal framework developed by the above-mentioned international organizations is a guideline and the main reason for implementing practical steps in the reform of the pensions sector. (Convention of the Organization ..., 1960; World Bank Statistics ..., 2018; Convention of the International ..., 1952)

The International Labour Organization for a long time plays a key role in international regulation of processes development of pension and social security systems. Therefore, in 1952 the ILO Convention approved minimum social security standards (Convention of the International ..., 1952), which must be respected by countries in the construction of their pension systems. It is this international document that defines social insurance as one of the main sources of the social protection system and the pension system. In this connection, the calculation of pension payments with the size of the previous earnings, the length of the insurance period and the amount of insurance premiums paid is logically related. It should be noted that Ukraine, on 6 June 2017, ratified this ILO Convention, having undertaken to fulfil its requirements.

In 2002, the Second World Assembly on Aging, sponsored by the United Nations, approved the Madrid International Plan of Action on Aging. The ultimate goal of its implementation is the transition from "aging society" to "a society of equal opportunities for people of all ages" (Annex II. Of the Madrid International, ...2002).

Nowadays, one of the main documents defining the institutional approach to speeding up the process of social reforms in the EU is the strategic document "European Social Rights Support" adopted in April 2017 by the European Commission (Establishing a European Pillar ..., 2017). One of the key goals of this document is to bring the parameters of social protection of the EU member states closer together. This also applies to Eastern European countries. Today, this gap between them and the developed Western European countries is quite large and this problem needs to be addressed.

Research results and discussion

The countries of Eastern Europe, as well as Ukraine, began reforming their national pension systems in the 1990s of the twentieth century. In accordance with the current pension legislation in all these countries, multi-tier pension systems are envisaged. It should be noted that Eastern European countries have been using the three-tiered pension model that they introduced in the early 2000s for a long time. Practical use in Ukraine is still only the first and third pillars of the national pension system. The full introduction of the second level has been constantly carried over and now the government is planning only in 2021 (European Experience of ..., 2017).

The reason for the reform of the national pension systems of the countries of Eastern Europe since the mid-1990s was that the joint pension systems of these countries were already unable to

provide a sufficient level of pension provision for citizens. Poland became one of the first pension reform in Eastern Europe in 1998. Its successful implementation helped the country to cope with the global economic crisis painlessly. The peculiarity of the Polish pension system is that people born before 1949 receive a pension under the so-called "old rules" and its size does not depend on the amount of insurance premiums paid. Since then, several stages of the pension reform have taken place. The new pension legislation was approved in 2011. It provided for the creation of new first-level sub-accounts financed by insurance premiums, which were previously paid to the second level.

In 2014, another law was adopted that introduced changes to the functioning of the second pillar of the national pension system in Poland. According to this law, the second level for all new participants in the labour activity has become voluntary, as well as the third. Active second-tier members may also opt-out of it, then all their funds accumulated on individual accounts will be transferred to the first level of insurance (European Experience of ..., 2017). The third level of insurance is voluntary. It covers professional pension systems, individual retirement accounts and individual pension account security. (Parlinska A., 2011) At the present stage of the pension reform in Poland, changes were made to the size of the retirement age. From 1 October 2017, rules are being revised to reduce the retirement age of men to 65 and women to 60 years. Earlier, it gradually grew up to 67 years for both sexes (Social Security in Poland, 2017).

Table 1

Countries with the highest rates of population decline in 2015-2050

Countries	Population, thousand persons		Changing the number	
	2015	2050	Persons	%
Bulgaria	7 150	5 154	-1 996	-27.9
Romania	19 511	15 207	-4 304	-22.1
Ukraine	44 824	35117	-9 707	-21.7
Bosnia and Herzegovina	3 810	3 069	-741	-19.4
Latvia	1 971	1 593	-378	-19.2
Lithuania	2 878	2 375	-503	-17.5
Serbia	8 851	7 331	-1 520	-17.2
Croatia	4 240	3 554	-686	-16.2
Hungary	9 855	8 318	-1 537	-15.6
Poland	38 612	33 136	-5 476	-14.2
Estonia	1 313	1 129	-184	-14.0

Source: authors' calculation on the base World Population Prospects: The 2015 Revision, Key Findings and Advance Tables. - New York: United Nations, Department of Economic and Social Affairs (2015)

The countries of Eastern Europe and Ukraine, in the face of a rather high level of aging in Europe, noticed the problems with a sharp decline in the population. Compared to Western European and Scandinavian countries, they currently have and are predicting a much higher rate of population decline (Table 1). According to scientists, it is precisely in those countries where the population is aging and decreasing, the greatest problems with social protection of retirement age citizens will arise (When Should the State Pension ..., 2010). The highest rates of population decline are projected in Bulgaria, Romania and Ukraine. By 2050, the number of citizens in these countries by calculation may decrease by 27.9 %, 22.1 %, and 21.7 %, respectively. This state of affairs in the pension sector prompts governments in these countries to carry out the next stages of pension reform.

In Bulgaria, in recent years, there have been two stages of the pension reform, which envisaged an increase in retirement age, and reduction of privileged persons in various sectors of the economy. In 2015, the reform of the pension sector was partially frozen. Today, implementation of the next

stage of the reform of the national pension system is taking place. Among the key issues is the question of changing the retirement age and increasing the length of insurance experience. This issue pays considerable attention to the implementation of the current stage of pension reform in Ukraine. In Bulgaria, it is planned that the retirement age for men and women will be equal and in 2037, should reach 65 years. Regarding the amount of insurance experience, it will gradually increase until it reaches 40 years for men and 37 for women in 2027. According to experts, citizens who have a longer working period before retirement will receive a higher rate, and consequently, a higher pension. Thus, the government plans to achieve two effects: on the one hand, to encourage citizens to work longer, on the other - to stimulate the full legalization of business and tax payments. As a result, both factors will affect the increase in the number of jobs in the Bulgarian economy (The World's Pension Systems ..., 2015).

Table 2

The rating of quality of life and well-being of the elderly people of countries of Eastern Europe and Ukraine (2015)

Countries	General		Material security		Health status		Employment and education		Favourable environment	
	Rating	Significance	Rating	Significance	Rating	Significance	Rating	Significance	Rating	Significance
Czech Republic	22	65.6	12	81.8	47	56.1	17	54.4	50	65.8
Estonia	23	64.9	44	70.7	55	50.0	6	64.8	39	68.1
Slovenia	26	60.6	25	77.7	38	63.2	79	23.9	7	79.2
Poland	32	57.4	26	77.6	48	55.3	52	31.1	37	69.2
Latvia	35	55.2	34	74.5	66	44.1	15	57.0	68	60.1
Hungary	39	52.2	38	73.2	57	47.4	41	35.8	60	63.1
Slovakia	40	52.1	21	78.7	53	28.2	28	45.6	80	58.5
Romania	45	50.8	22	78.4	64	44.9	46	34.1	64	62.0
Bulgaria	49	49.7	46	67.9	68	40.0	27	47.5	69	59.8
Croatia	61	44.0	67	50.5	49	55.3	56	30.0	72	58.9
Lithuania	63	43.2	53	63.8	65	44.2	21	50.0	90	52.6
Serbia	66	41.7	49	65.8	62	45.3	80	21	67	60.2
Montenegro	68	39.7	61	56.3	56	49.1	82	20.6	70	58.9
Ukraine	73	37.0	42	70.9	85	27.3	44	34.8	85	54.8

Source: authors' calculation on the base *Global AgeWatch Index 2015: Insight Report Summary* - https://www.ageinternational.org.uk/Documents/Global_AgeWatch_Index_2015_HelpAge.pdf.

Romania also has a three-tier pension model. The research results show, that the pension reform is being implemented successfully in this country. Along with the joint pension system, the second and third levels are being developed, which are based on the use of accumulative pension programs. Pension funds of the second and third levels have become the largest national institutional investors and leading stock market participants, as evidenced by the results of the analysis published by the Association of Pension Funds of Romania ARARR. In 2015, seven funds at Level II and ten funds at Level III manage assets with an aggregate value of almost 5 billion EUR (Romanian Pension Fund ..., 2015).

In describing the functioning of national pension systems in Eastern Europe and Ukraine, according to experts from the Razumkov Center, it is important to assess the level of social security and welfare of people of retirement age (Pishchulina O. ,2017). One of the main indicators of this level assessment is the Global Quality of Life and Elder Life Index. Since 2013, it is determined by

the international non-governmental organization "HelpAge International" in association with the UN Population Fund (HelpAge International ... , 2015)

According to the results of such an assessment among East European countries in 2015, the quality of life and well-being of elderly people is highest in the Czech Republic, in the second place - Estonia, in the third - in Slovenia (Table 2). It is worth noting that the Czech Republic is among those twenty countries in the world with the highest global index. For Ukraine this indicator is rather low, and in general in the world rating in 2015 it occupied only 73rd place (Pishchulina O. ,2017).

This indicates that the pension system of Ukrainian pensioners today is not sufficiently developed and effective, thus not providing them with a decent standard of living, proper social standards and opportunities for social realization.

Conclusions

Summarizing the above research, it should be noted that all without exception, the countries of Eastern Europe and Ukraine, are at the stage of reforming their national pension systems. The main factors contributing to the reform of pension systems are demographic processes that take place in society. They are characterized by a decrease in fertility, an increase in the proportion of older people and as a result of the aging population.

For Eastern European countries and Ukraine, the peculiarity is that along with the aging of the population at a rather rapid pace, in comparison with Western European countries, its reduction is projected. Such trends affect the deterioration of the financial position of national pension systems and the ability of the state to meet its obligations to citizens of retirement age. Therefore, the governments of the countries in the given region of Europe are constantly looking for options for solving issues in the pension sector, through holding the next stages of the pension reform. The ultimate goal of pension reform is to increase the social standards of citizens of retirement age to the accepted international standards.

Studies show that the national pension system of Ukraine is in a state of serious crisis. It manifests itself at a low level of pensions, the lack of proper differentiation in the size of retirement benefits, depending on the length of service, the deficit of the Pension Fund budget, and, consequently, the significant attraction of funds from the state budget. Therefore, further reformation of the state pension system is an objective necessity and one of its main tasks on the path to European integration.

Bibliography

1. Annex II. The Madrid International Plan of Action on Aging 2002. Report of the Second World Assembly on Aging. Madrid, April 8-12, 2002, UN, Retrieved: http://www.un.org/ru/documents/decl_conv/declarations/pdf. Access: 10.11.2018.
2. Convention of the International Labor Organization "On Minimum Social Security" of June 28, 1952, No. 102. - Retrieved: www.kiev.gov.ua. Access: 20.10.2018.
3. Convention of the Organization for Economic Co-operation and Development of December 14, (1960). Retrieved: <http://www.oecd.org/daf/corporate/principles>. Access: 10.11.2018.
4. Establishing a European Pillar of Social Rights. Commission Staff Working Document SWD (2017) 201 final, Brussels: European Commission, 07/26/2017, 77p. - Retrieved: <http://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:52017SC0201&from=EN>. Access: 20.10.2018.
5. Global AgeWatch Index 2015: Insight report summary (2015). Retrieved: https://cdn.uclouvain.be/public/Exports%20reddot/aisbl-generations/documents/DocPart_Etud_GlobalAgeWatchIndex_2015.pdf. Access: 15.01.2019.
6. HelpAge International: The Quality Of Life Index For The Elderly In The World In 2015(2015). Analytical portal "Humanitarian Technologies", Retrieved: <http://gtmarket.ru/news/2015/09/28/7245>.Access: 15.01.2019.
7. Parlinska A., Rozwoj rynku pracowniczych programów emerytalnych, (Development Of Occupational Pension Schemes' Market), (2011), No 167, Prace Naukowe Uniwersytetu Ekonomicznego we Wrocławiu, pp. 265-277.

8. Pensiyna Reforma: Pershi Doslidzhennya Naslidkiv (Pension Reform: First Impact Studies) (2017). Retrieved: <http://www.atomprofspilka.info/public/lrr556677>. Access: 15.01.2019.
9. Pensiyni Systemy Svitu: Vid Kryz Do Reform (The World's Pension Systems: From Crises to Reforms) (2015). Retrieved: <http://cost.ua/news/165-pension-crisis>. Access: 15.01.2019.
10. Pishchulina O. (2017). Financial, Social And Legal Aspects Of Pension Reform In Ukraine. World Experience And Ukrainian Realities .// O. Pischulina, O. Koval, T. Burlay. - K .: Razumkov Center: "Zapovit" Publishing House - 2017. 453c.
11. Population Structure and Ageing, Eurostat (2018). Retrieved: https://ec.europa.eu/eurostat/statistics-explained/index.php/Population_structure_and_ageing Access:15.01.2019.
12. Romanian Pension Fund Investment In Bucharest Stock Exchange Tops €800m (2015). Retrieved: <https://www.ipe.com/countries/cee/romanian-pension-fund-investment-in-bucharest-stock-exchange-tops-800m/10007882.article>. Access: 15.01.2019.
13. Social Security in Poland, (2017). ZUS, Retrieved: <http://www.zus.pl/documents/10182/167615/Social+Security+in+Poland/71ffe1b1-c142-48fa-a67b-0c7e1cec6eb6>. Access: 15.01.2019.
14. When Should the State Pension Age Increase To 66? A Call for Evidence (2010). Retrieved: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/184776/spa-inc-to-66-call-for-evidence.pdf. Access: 15.01.2019.
15. World Bank Statistics. Retrieved: <http://www5.worldbank.org/eca/russian/data/>. Access: 20.10.2018.
16. World Population Prospects: The 2015 Revision, Key Findings and Advance Tables. New York: United Nations, Department of Economic and Social Affairs, (2015), Retrieved: https://esa.un.org/unpd/wpp/publications/files/key_findings_wpp_2015.pdf. Access: 20.03.2018.
17. Yevropeys' kyy Dosvid Pensiynykh Reform (European Experience of Pension Reform) (2017). Retrieved: <http://www.uezd.com.ua/evropejskyj-dosvid-pensijnyh-reform/>. Access: 15.01.2019.

JOB COUNSELING A TOOL FOR SOCIAL INCLUSION: EMPIRICAL RESEARCH IN POLAND

Mariola Szewczyk-Jarocka, doctor

Faculty of Economics and Information Technology, The State University of Applied Sciences in Plock, Poland

Abstract. The main purpose of the considerations presented in the article is to determine the benefits that are conducive to the social inclusion of the unemployed, most often socially excluded people using job counselling. Questionnaire surveys, according to the interview questionnaire, were carried out on a population of 350 respondents in 2018. The research shows that there is a statistically significant relationship between the use of job counseling and the length of the registration period in the labour office. Among people who were registered for at least 3 months, there were more people who used job counseling. Choosing or changing a profession (approximately 41 % of respondents' answers) and completing professional qualifications (slightly more than 43 % of responses) are the most often indicated benefits. There was a statistically significant relationship between gender and the indication of career planning. Men declared this answer more often.

Key words: job counseling, social inclusion, benefits from job counseling.

JEL code: E24, E26, J46.

Introduction

Social inclusion enables excluded people to enter the registered labour market.

The most important motives for undertaking the research subject include the following premises:

- willingness to verify the widespread belief that job counseling is an instrument of social inclusion,
- lack of comprehensive research on the phenomenon of social inclusion.

Taking into account the above premises, the main purpose of the considerations presented in the article is to determine whether unemployed people use job counseling.

The research task was to assess what benefits the job counseling provides.

The gathering of information regarding social inclusion was primarily based on the empirical study designed and conducted by the author.

The following specific objectives have been adopted for such a general research framework:

1. determining if the unemployed have used job counselling;
2. understanding the benefits that job counseling provides.

The conclusions from the empirical study, supported by the information obtained from secondary sources used in the article, made it possible to verify the following hypotheses:

H1: The use of job counseling depends on the length of the registration period at the Municipal Labour Office in Plock;

H2: Planning a career is the main benefit from the use of the job counseling indicated by the surveyed men.

Research results and discussion

Based on the data collected during the research, the author attempted to get the answer to the research questions.

- Did socially excluded people use the job counseling?
- What benefits does the job counseling provide?

The literature on the subject and author's research carried out as a part of the research grant - the "Cooperation with universities" project was used to implement the presented research task. Statistical tests and descriptive methods were used. The author presented the results in tabular form and charts.

Organization of the research

Analysed data

Questionnaire surveys by interview questionnaire were conducted in 2018 on a population of 350 respondents (195 people surveyed using paper questionnaires and 155 people surveyed using a questionnaire posted on the Internet).

Plan of statistical analyses

The analyses covered the distribution of responses to survey questions in the entire sample and verification of the statistical significance of the relationship between the responses given and such variables as: gender, age, education and length of registration in the Municipal Labour Office. As a statistical significance threshold - a value of 0.05 was conventionally assumed. Statistical significance was examined based on the values of the likelihood quotient, which is used to analyse the relationships between categorical variables, i.e. those that divide the subjects into groups in a situation where some of the categories distinguished are not very numerous.

Respondents

The research was conducted among 350 respondents, 226 women (64.6 %) and 124 men (35.4 %). Two hundred and seventy-four residents of Plock (78.3 %) and 73 residents of the outskirts of Plock (20.9 %).

The concept of social inclusion

According to J. Grotowska - Leder, K. Faliszek, the process of getting out of social exclusion is called social inclusion (...), that is, creating people who are threatened with social exclusion with opportunities and adequate resources needed for full participation in economic, cultural and social life and achieving a standard of living as normal in a given society (Grotowska - Leder, Faliszek, 2005: (63)). In order to give this process logic, it should be considered in three dimensions: political, economic and civic (Woodward, Kohli, 2003: (1-4)).

Inclusion activities carried out in three above mentioned dimensions mean the implementation in practice of multi-sectoral social policy (Grewinski, 2009).

Following B. Szatur - Jaworska, according to the contemporary concept of social policy, social inclusion is the process of "including" marginalized people in the so-called the stream of life through full participation in social life (Szatur - Jaworska, 2005).

According to B. Broda-Wysocki, the definitions of social inclusion put an important emphasis on external impact in relation to excluded individuals or groups. They call for "creating opportunities" or "community actions". The assumption here is that social inclusion is a deliberate, deliberately undertaken action of organized entities. On the basis of recognizing various reasons for social exclusion, various social inclusion strategies are also formulated. There are different strategies: reproductive, palliative, preventive and emancipation (Broda - Wysocki, 2012: (178)).

The role of a job

A job is one of the concepts of economic theory. Through work, man shapes himself and acquires skills (Lange, 1978: (16)). The job is approached as coercive, but also as well as through creative expression (Nowak, 2011: (235-236)).

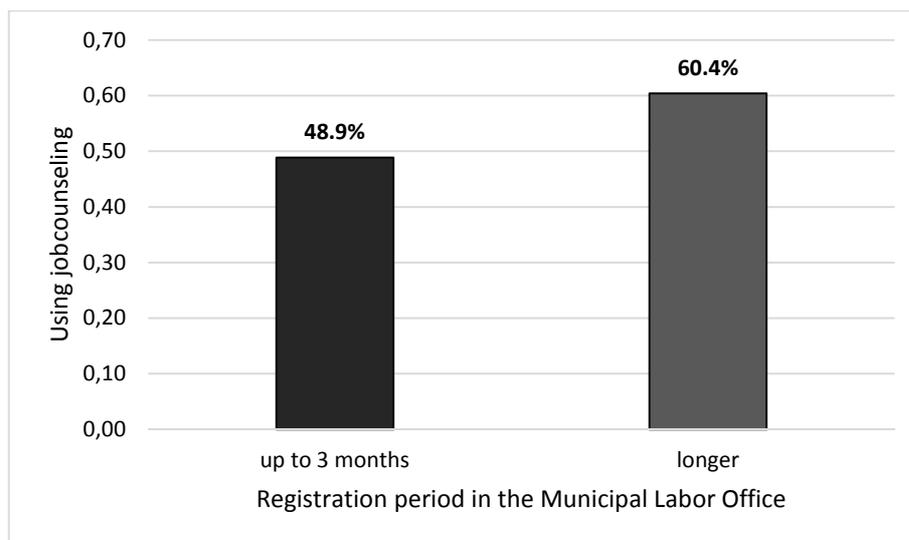
In macroeconomic terms, we treat work as a resource of production function factors alongside capital (Fihel, Piętko, 2007: (34)) and technology (Baily, Friedmann, 1991: (688-689)).

The consciousness of human labour was recently created, because earlier humanity treated it as an element of survival (Orczyk, 2004: (15-16)). Thanks to economic benefits, work has improved the quality of life (Sobczak, 2016: (60 and further)).

Job counseling as a tool for social inclusion (empirical research)

According to the survey, 177 persons surveyed (50.6 %) benefited from the job counselling at the Municipal Labour Office in Plock.

There was No statistically significant relationship between the use of the job counseling and the gender of the respondents, $\lambda(1)=0.01$, $p>0.05$ education, $\lambda(2)=0.10$, $p>0.05$, or age, $\lambda(1)=0.31$, $p>0.05$. However, a statistically significant relationship was obtained between the use of the job counseling and the length of the registration period in the labour office, $\lambda(1)=4.16$, $p<0.05$.



Source: Author's study based on surveys

Fig. 1. Using career counseling depending on the length of the registration period at the Municipal Labour Office in Plock

Among persons who were registered for at least 3 months, there were more respondents who used the job counseling (Figure 1).

Table 1 presents the frequency distribution for the indicated benefits of the job counseling.

Table 1

Indicated benefits of job counseling

Advantages	n	%
choosing or changing a profession	143	40.9
planning a career	87	24.9
completing professional qualifications	152	43.4
defining your professional competences	133	38.0
planning professional development	79	22.6

n - number of respondents; % - the percentage of the group

Source: Author's study based on surveys

Most often the benefit indicated by the survey was the choice or change of the profession (about 41 % of respondents' answers) and the completion of professional qualifications (slightly over 43 % of responses).

Table 2 presents the values of the likelihood ratio, by means of which the dependencies between the number of respondents, education, age and period of registration in the Municipal Labour Office in Plock were analysed, and the indicated benefits and the values of the strength of the Cramer's V measure.

Table 2

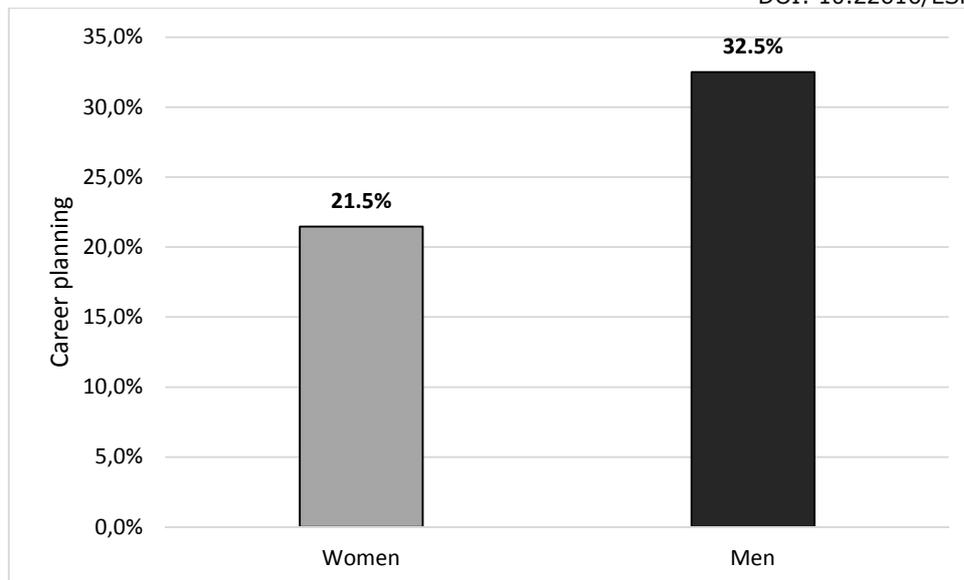
Analysis of the relationship between the gender of the respondents, age, education, registration period in the Municipal Labour Office in Plock, and the benefits indicated

	Advantages	λ	<i>df</i>	<i>p</i>	<i>V</i>
Gender	choosing or changing a profession	0.66	1	0.415	0.04
	planning a career	4.98	1	0.026	0.12
	completing professional qualifications	1.46	1	0.227	0.07
	defining your professional competences	0.04	1	0.847	0.01
	planning professional development	0.14	1	0.705	0.02
Education	choosing or changing a profession	8.56	2	0.014	0.16
	planning a career	5.85	2	0.054	0.13
	completing professional qualifications	1.12	2	0.572	0.06
	defining your professional competences	0.24	2	0.885	0.03
	planning professional development	0.21	2	0.902	0.02
Age	choosing or changing a profession	0.01	1	0.949	0.00
	planning a career	0.24	1	0.623	0.03
	completing professional qualifications	0.31	1	0.575	0.03
	defining your professional competences	2.55	1	0.110	0.09
	planning professional development	0.06	1	0.814	0.01
Registration period	choosing or changing a profession	0.05	1	0.829	0.01
	planning a career	0.01	1	0.928	0.00
	completing professional qualifications	0.42	1	0.519	0.04
	defining your professional competences	0.05	1	0.826	0.01
	planning professional development	2.57	1	0.109	0.09

λ - value of the likelihood ratio; *df* - the number of degrees of freedom; *p* - statistical significance; *V* - the value of Cramer's V measure

Source: Author's study based on surveys

A statistically significant relationship between gender and career planning was obtained. This benefit was more often indicated by men (Figure 2).



Source: Author's study based on surveys

Fig. 2. Indicated career planning in a group of women and in a group of men

Conclusions, proposals, recommendations

The job counseling is an important element in helping the unemployed find employment. The unemployed do use the job counseling.

The research shows that between the use of the job counseling and the length of the registration period in the labour office there is a statistically significant relationship ($\lambda(1)=4.16, p<0.05$). Among people who were registered for at least 3 months there were more people who used the job counseling.

The most frequently mentioned were the benefits of using the job counseling, i.e. the choice or change of the profession (about 41 % of respondents' answers) and the completion of professional qualifications (slightly more than 43 % of responses).

In addition, a statistically significant relationship was found between gender and the job counseling ($\lambda(1)=4.98, p<0.05$). Men declared this answer more often.

Bibliography

1. Baily, M.N., Friedmann, p. (1991). *Macroeconomics, Financial Markets, and the International Sector*. Richard D. Irwin, Inc., Boston.
2. Broda-Wysocki, p. (2012). *Wykluczenie i inkluzja społeczna. Paradygmaty i próby definicji (Exclusion and social inclusion. Paradigms and attempts at definitions)*, Warszawa (Warsaw), IPISS (Institute of Labour and Social Studies).
3. Fihel, A., Pietka, E. (2007). *Funkcjonowanie polskich migrantów na brytyjskim rynku pracy (Functioning of Polish migrants on the British labor market)*. CMR Working Papers. Warszawa (Warsaw). UW (Warsaw University)
4. Gerwinski, M. (2009). *Wielosektorowa polityka społeczna. O przeobrażeniach Państwa opiekuńczego (Multi-sectoral social policy. On the transformations of your welfare state)*, Warszawa (Warsaw), WWSP TWP (The Higher School of Pedagogy of the Society of Public Knowledge in Warsaw).
5. Grotowska – Leder, J., Faliszek, K. (Ed.) (2005). *Ekskluzja i inkluzja społeczna. Diagnoza – uwarunkowania – kierunku działań (Exclusion and social inclusion. Diagnosis - conditions - direction of activities)*, Torun , Wydawnictwo Edukacyjne (Educational Publisher) AKAPIT-DTP .
6. Lange, O. (1978). *Ekonomia polityczna (Political economics)*. Tom I i II (Volume I and II). Warszawa (Warsaw). PWN (Polish Scientific Publishers).
7. Nowaka, K. (2011). *Status pojęcia pracy w teorii krytycznej i teorii ekonomii (The status of the concept of work in critical theory and economic theory)*, WNIF UAM w Poznaniu (University of Adam Mickiewicz in Poznan).
8. Orczyk, J. (2004). *Przemiany pracy na obecnym etapie rozwoju gospodarczego (Changes in labor at the current stage of economic development)* (in:) Golinowska S., Boni M (ed.). *W trosce o pracę . Raport o rozwoju społecznym (For the sake of work. Report on social development)* Polska (Poland) 2004. Warszawa (Warsaw). Program Narodów Zjednoczonych ds. Rozwoju (United Nations Development Program).

9. Sobczak, M. J. (2016). *Wykluczenie społeczne i inkluzja społeczna z wykorzystaniem podmiotów ekonomii społecznej w Polsce na przykładzie województwa łódzkiego (Social exclusion and social inclusion with the use of social economy entities in Poland on the example of the Lodz province)*, Lodz , Wydawnictwo Uniwersytetu Łódzkiego (Lodz University Publisher).
10. Szatur – Jaworska, B. (2005). *Uwagi o ekskluzji i inkluzji na przykładzie polityki społecznej wobec ludzi starszych (Comments on exclusion and inclusion on the example of social policy towards older people)* (in:) Grotowska – Leder J., Faliszek K. (Ed.) (2005). *Ekskluzja i inkluzja społeczna. Diagnoza – uwarunkowania – kierunku działań (Exclusion and social inclusion. Diagnosis - conditions - direction of activities)*, Torun , Wydawnictwo Edukacyjne (Educational Publisher) AKAPIT-DTP.
11. Woodward, A., Kohli, M. (2003). *Inclusion and Exclusion in European Societies*, London-New York, Routledge.

CONCENTRATION PROCESSES IN THE MEAT SECTOR IN POLAND

Elzbieta Jadwiga Szymanska¹, economist/ PhD, Associate Professor
Warsaw University of Life Sciences – SGGW

Abstract. The aim of the analysis was to identify the concentration processes in the meat sector in Poland in the years 2015-2018. The main source of information was the Thomson Reuters base, which was the source of data on the mergers and acquisitions in the meat sector in Poland. The study also made use of some press interviews with the experts in the meat industry and data storage statistics. The analysis show that structure of operators in the meat market in Poland is very fragmented. The small scale of production limits the competitiveness of operators in the country and abroad. In this situation, concentration processes take place on the market. They take different forms and types. In particular, the share of large foreign companies with a global scale of operations increases. Foreign capital is attracted by relatively low production costs, high quality meat and stable markets. The entry of foreign companies on the Polish market was countered by the concentration of domestic enterprises. In the future concentration processes in the meat industry should have a greater coverage of supply chains. All in all, the global measure of the market efficiency, as well as the competitiveness, will be the functioning of the entire supply chain rather than individual elements.

Key words: meat sector, concentration processes, merger, acquisition, Poland.

JEL code: L14, P13, Q13.

Introduction

Production and processing of meat is the largest sector of Polish food economy. In 2017, the production of livestock for slaughter amounted to 6857 thou. tons and accounted for 28.4 % of global agricultural production and 35.4 % of commodity production (Small..., 2018). Poland is a significant producer of meat in the European Union. In 2016, it was the largest producer of poultry, 4th pork producer and 7th beef producer. However, the meat sector is characterized by considerable fragmentation of pork producers and companies involved in livestock slaughter and meat processing. Based on the data of Polish CSO (GUS) and IAFE (IERiGZ) it is estimated that currently there are about 1250 companies operating in the meat processing industry. In this group 1100 plants are engaged in the processing of red meat, and there are 170 operators processing poultry meat. About 40 % of the companies are small firms employing less than 9 employees (Rawa, 2017a). The small scale of production reduces the competitiveness of these operators in the country and abroad. In the last period, however, the meat market undergoes important changes. Production is in the process of concentration, which is manifested by the acquisition of Polish companies by foreign and domestic strategic, financial or industry investors. This is encouraged by the growing consumption of meat and a stable economic situation in the country.

The phenomenon of economic concentration is analysed from the market or company perspective. Market concentration determines the degree of dominance of one company in a given market. The essence of this kind of concentration is the increased share of products of a company or group in the relevant market. A relevant market means the market of goods, which, considering their intended use, price and features are regarded by the buyers as substitutes (Czerwonka, 2003). In this sense, the process of concentration can lead to a monopoly (Wawrzyniak, 2000, p.27)

The aim of the concentrations between undertakings is to increase competitiveness of enterprises primarily through the increase of production scale and exploiting economies of scale (horizontal concentration) or by taking over other production downstream products: raw materials extraction,

¹ Corresponding author. Tel.: + 48 22 593 4227; fax: + 48 22 593 4248.
e-mail address: elzbieta-szymanska@sggw.pl

processing activities, up to sales (vertical concentration). This results in the increased levels of concentration of production, property and capital.

Concentrations between undertakings is a natural economic phenomenon, in principle non-interfering with the competition in the market. As a result, operators have the opportunity to strengthen their market position, e.g. by increasing their market share or extending the offer to new markets. This kind of process can also have numerous positive effects on the functioning of the entire economy and on all consumers, e.g. due to the increased availability, innovation and variety of their products. It can also lead to the restructuring of loss-making business or respond to the competition from other companies with a high potential. The aim of the analysis was to identify the concentration processes in the meat sector in Poland in the years 2015-2018.

Materials and methods

The main source of information was the Thomson Reuters base, which was the source of data on the mergers and acquisitions in the meat sector in Poland in the years 2015-2018. The study also made use of some press interviews with the experts in the meat industry and data storage statistics. In addition, the author undertook the review of literature related to the concentration processes. On the basis the author correlated the forms and types of concentrations processes between undertakings, along with the reasons lying behind them and the effects. In addition, the paper analyses the most important transactions in the meat market in Poland. On the ground of the analysis a set of conclusions have been made. The presentation of the research results uses descriptive and tabular methods.

Research results and discussion

Concentrations between undertakings in the market can take many forms. The most important are (Mergers..., 2009):

- a merger - a combination of at least two companies into one. It consists of one company being absorbed by another e.g. as a result of transfer of all assets of one company to another in return for shares which the acquiring company issues to the shareholders of the company being acquired or through the creation of a completely new company out of the combined companies. The combining entities then lose their current legal status and formally cease to exist;
- the acquisition of control - one company obtaining the possibility to exercise decisive influence on economic activity of another, so far independent entity. Most often it occurs as a result of the takeover of majority share;
- creation of a joint undertaking called a joint venture by two or more independent companies while maintaining the companies' current capacities;
- A business acquiring a part or entirety of the assets of another undertaking.

Considering the potential impact on competition in the market the following types of concentration can be distinguished (Mergers..., 2009):

- horizontal concentration - a transaction in which participate the operators already active in this industry. As a result, it may lead to the creation of an entity with significant market power or to the market activity of a few remaining undertakings which cease to compete and settle for the existing status quo;
- vertical concentration - a transaction between undertakings operating at different levels of the product marketing (e.g. between a producer and a distributor). A potential threat to the competition in this situation may be hindering the competitors' access to the products or services

offered by the undertaking participating in the concentration, operating at a lower or higher level of trade;

- a conglomerate - a transaction in which there are neither horizontal nor vertical links between its participants. Their products or services are generally complementary to each other and purchased by consumers in view of similar use. A possible consequence of such a concentration may be the emergence of the so-called product tying, i.e. subordinating the purchase of one product to buying other products, as well as the possibility to offer several products at competitive prices.

In the literature, there is also a concept of spatial concentration, that is concentration of production units and undertakings in a particular location. This may result from the need to locate the business near the stocks of raw materials, cooperate with other enterprises or to exploit special conditions of economic zones or technology parks (Haus, 2000, p. 67).

Concentrations between undertakings entails the necessity to manage larger and larger organizations and concentration of power. The interconnectedness of operators contributes to the optimization of activities. It also leads to the reduction of unnecessary production factors, the companies' specialization and focus on core competencies. In many cases, it is then possible to minimize costs, increase the scope of activity and economic strength, as well as to achieve synergy effects (Management..., 2004, p. 213-214).

The reasons behind the mergers and acquisitions can be defined in terms of strategies and policies adopted by the acquiring company (Table 1). Frequently a decision to take this form of development is prompted by the need to increase the company's position in the market and by the prospect of achieving a higher profit out of the combined businesses. One way to classify these guiding policies is to group them based on technical and operational criteria (here these reasons relate mainly to the increase of management efficiency and the effects of operational synergy, such as economies of scale), on market and marketing criteria (these reasons relate to the increased participation in the existing markets and entering new markets), on financial criteria (relating to the reduction of financial costs, tax benefits and the acquisition of surplus cash) and on managerial reasons (which relate to the growth of wages and strengthening of the executives' prestige). The reasons for which combining transactions are made can be divided into economic or non-economic ones. Often, the companies conclude transactions in order to achieve a synergy by way of improving management efficiency, obtaining more efficient management and the use of additional growth potential. Increasing the management efficiency is most often the result of restructuring leading to cost savings. Mergers and acquisitions are also supposed to bring savings by eliminating overlapping areas and some job positions or to get rid of redundant assets and increase the revenue (the scale of sales grows, the number of distribution channels increases) (Rozwadowska, 2012, p. 23).

The reasons behind the mergers and acquisitions can also be divided into offensive and defensive ones. Offensive reasons are conducive to the acquisition of a large number of companies operating in different segments of the market in the shortest possible time. The purpose of this type of acquisition is to increase the selling markets and reduce production costs, while defensive reasons help the company defend its position against the increasing competition, protect its export markets, allow the transfer of technology and allow for bypassing trade barriers (Szczepankowski, 2000, p. 111).

Motives of mergers and acquisitions

On the side of the acquiring entity	On the side of the acquired entity
Technical and operational themes: <ul style="list-style-type: none"> • increasing the efficiency of management, • obtaining more effective management, • restructuring, strengthening of control, • operational synergy. 	Strategic themes: <ul style="list-style-type: none"> • getting rid of unnecessary assets, • acquiring a business partner, • protection against hostile takeover, • improving the competitive position.
Market and marketing themes: <ul style="list-style-type: none"> • increasing market share, • entering the new market, • developing the product range, securing the supply of raw materials, • ensuring effective distribution of own products, • eliminating competition, • diversification of business risk. 	Market and marketing themes: <ul style="list-style-type: none"> • securing the supply of raw materials, • ensuring effective distribution of own products, • access to the buyer's know-how, • using the strength of the parent brand.
Financial themes: <ul style="list-style-type: none"> • reduction of financial costs, • tax benefits, • increasing creditworthiness, • reducing transaction costs, • increase in the value of shares on the capital market. 	Financial themes: <ul style="list-style-type: none"> • loss cover, • increasing the debt capacity, • raising capital for investments.
Managerial themes: <ul style="list-style-type: none"> • increase in remuneration and prestige of the management, • increasing the freedom of action, • reducing the risk of management, • new management positions. 	Managerial themes: <ul style="list-style-type: none"> • the separation of the company may lead to the creation of new management positions, • managers may want to become independent.

Source: author's study based on Rozwadowska, 2012, s. 25; Ambukita, 2014, s. 719

In some cases, an incentive for mergers and acquisitions can be a desire to obtain a more efficient management or to remove inefficient management. A frequently cited reason for mergers and acquisitions are the prospects of the post-merger increase of the company's value, which is expected to result from the economies of scale, diversification of risk, strengthening of the market position etc. The reasons for consolidation are numerous (market and marketing ones, technical, operational, financial and those related to investment), whereby all of them are becoming more and more complex and variable as they depend on the area of the undertaking's operation and the extent to which the consolidations are conducted) (Szczepankowski, 2000, p. 110).

In the meat industry the main causes of concentrations between undertakings are:

- the difficulty to find successors who would like to operate in such a difficult environment as the meat market;
- limited financial resources to bear the costs associated with further investments. Some companies are already heavily burdened with loans due to the financing of already completed investments in increasing the production volume and in new technologies. Their aim was to meet the demands of the market and the EU requirements;

Polish trade situation, particularly an increased number of supermarkets and discount stores, and their growing impact. Increasingly strong price pressure forces the meat plants to strengthen their position in relation to these entities and the retailers whose share in the sales is still large. According to a recent survey by GfK, specialized meat and cold cuts stores, as well as traditional sales points, accounted for the sale of 53 % of meat and 47 % of cold cuts (Rawa, 2017b);

- temporary increase in the raw material prices, the exchange rates and import of livestock, meat and meat products from other countries. The synergy effect achieved as a result of mergers and acquisitions and pertaining to the area of know-how, the offer, operational efficiency and the company image allows for limiting negative effects of these phenomena;

- livestock diseases such as avian influenza in poultry flocks, mad cow disease (BSE) in cattle and African swine fever (ASF) in herds of pigs. The ensuing restrictive policy of veterinary authorities currently puts many plants at risk of bankruptcy;
- increasingly strong competition in the EU, which is the main market for the Polish meat.

At present, some enterprises have higher production capacity than sales capacity, and some do not produce or sell as much as they should due to shortage of raw material. In this situation most companies, trying to adapt to new conditions, change the organization of work and reduce further investments.

The merger process entails some specific problems that arise from the development of the company, prospecting certain benefits, which do not reflect reality, the lack of experience in managing a large company, the need to change the organizational culture of combined entities and the necessity to reduce employment. One of the key problems, however, is still the quality of the legal system in which businesses operate (Szymanska, 2018).

The recent years have shown that the fastest concentration occurred in those undertakings that were engaged in livestock slaughtering and carcass cutting. This is a segment of relatively low margins, which makes it very sensitive to adverse changes in the market. In addition, particularly in the case of plants engaged in the slaughter of pigs and cutting of pig carcasses, this is a highly fragmented segment. Only additional activities of the small slaughterhouses allow these companies to remain on the market.

Production of meat is characterized by a slower pace of concentration. In this respect it is the changes in the trade that play a decisive role. In connection with the emergence of large chain stores on the market, the most valued are these meat plants which are able to meet the demands of the retailer in terms of quality and quantity of the meat products. This situation has a particular impact on the operation of medium-sized companies which in order to stay on the market must increase the scale of production or seek a niche market for their products.

The increasingly visible trend in the meat market is also vertical integration, which means building up the entire production chain, from feed and livestock production through slaughtering, processing and, to some extent, trade e.g. in the company's own warehouses. Such processes are particularly advanced in the poultry sector.

The most common forms of concentration are mergers and acquisitions. In 2017 the Chinese holding WH Group took over all Poland-based plants belonging to the Pini Group. In June it was confirmed that the Pini Poland, Royal Chicken and Hamburger Pini companies had been bought out and, as announced in August, 66.5 % of shares in Pini Polonia, to which the modern slaughterhouse in KutNo belongs, had been purchased accordingly. The Pini plants complement the production structure that the WH Group operates in Poland, indirectly through the acquisition of control over the company Smithfield Foods in 2013. This American company controls the activities of such companies as: Animex Foods, Agri Plus and Agri Plus Pasze (Feed Division). In total, the holding WH Group employs 9 thou. workers in Poland and cooperates with 2.3 thou pig farmers.

Summary of selected merger and acquisition transactions in the pork meat industry in Poland in 2015-2018

The acquiring company	The country of the transferee	The aim of the acquisition	Date	Package of shares in %
Sokołów S.A. (Danish Crown AS)	Polska	Grupa Miesna Gzella	30.05.2018	100
WH Group Ltd	Hong Kong	Pini Polonia Sp. z o.o.	11.08.2017	100
Animex Foods Sp. z o.o. Sp. K. (Smithfield Foods)	Polska	Pini Group – Meat Processing Facilities	01.06.2017	100
Cargill, Inc., w Polsce Cargill Poland Sp. z o.o.	USA	Grupa Konspol	28,12,2018	100
Charoen Pokphand Foods PCL	Tajlandia	SuperDrob Zakłady Drobiarsko – Miesne S.A.	30.12.2016	33.0
Plukon Food Group BV (Gilde Buy Out Partners BV)	Holandia	L&B Wyrebski Sp. z o.o.	31.07.2018	60.0
Drosed S.A. (Societe LDC)	Polska	Drop S.A.	04.03.2015	97.8

Source: Multanski 2018

Another example of concentration with foreign shareholding is the Danish Crown Group from Denmark which, as the owner of the Sokołów S.A. company, purchased in May 2018 100 % of shares in Gzella Meat Group which consists of three companies: Gzella Osie, Gzella Net and Gzella Logistic. In this way the Danish Crown Group took control of one of the most modern meat processing plants in Europe, with the production capacity of more than 6 thou. tons of meat per month, plus the logistics facilities and the country's largest network of specialized Deli Meat stores.

Its share in the Polish market has also the American company Cargill, which is a global leader in the sectors of agriculture, food production and food processing. Based on the agreement signed on December 28, 2018, the company took over the entities operating within the Konspol Group: Pasz Konspol (feed producer) Konspol Bis (modern chicken slaughterhouse) Konspol Holding (chicken processing plant) and Trans Konspol company that provides logistics facilities.

On the poultry market, the foreign holding Plukon Food Group acquired in July 2018 the control of 60 % of L&B -Wyrebski sp. z o.o. with its registered office in Gruszczyce, the company that is engaged in slaughtering, production and sale of poultry meat. Plukon Group is a Dutch-Belgian-German corporation operating in the meat sector, one of the largest producers and processors of poultry meat in Northern and Central Europe. In connection with the new majority shareholder the company L&B - Wyrebski sp. z o.o. changed its name to Plukon Sieradz.

Another important player in the poultry market is the French group LDC, which pursues an active policy of acquisitions of medium-sized enterprises. In Poland, through its subsidiary - Drosed S.A., which is one of the largest producers of poultry and poultry products in the country, it took over in 2015 the company Drop S.A., also one of the largest and most modern companies in the poultry sector in Poland.

The company which also participates in the concentration process in the Polish meat market is Charoen Pokphand Foods from Thailand, one of the leading producers, processors and exporters of meat in South-east Asia and one of the world leaders in the production of livestock feed. In 2016, the company has bought a package of 33 % shares of the company Superdrob. The acquired company is a large modern enterprise in the poultry meat sector, supplying the major retail chains in Poland and Europe. Whereas on 02 January 2019 Superdrob S.A. took over the company Integra sp. z o.o., being in charge of hatcheries and poultry breeder farms.

The entry of foreign companies on the Polish market was countered by the concentration of domestic enterprises. A good example of this process is BruNo Tassi Group which combines, among

others, three major Polish companies in the meat industry: Madej Wrobel, Peklimar oraz Unimies. Another example of the in-market concentration is Cedrob Group, which owns the company Gobarto and meat plants Zakłady Miesne Silesia.

Table 2

Summary of selected merger and acquisition transactions in the poultry meat industry in Poland in 2015-2018

The acquiring company	The country of the transferee	The aim of the acquisition	Date	Package of shares in %
Omega Holding Sp. z o.o. (BruNo Tassi Group)	Polska	Madej Wrobel Sp. z o.o.	27.04.2017	100
Zakłady Miesne Peklimer S.A. (BruNo Tassi Group)	Polska	Unimies Sp. z o.o.	08.06.2016	100
Zakłady Miesne Polonus Sp. z o.o. Sp. K. (BruNo Tassi Group)	Polska	Peklimar Sp. z o.o.	04.05.2015	100
Goparto S.A. (Cedrob S.A)	Polska	Exdrob-Ferma sp. z o.o.	20.11.2018	100
Goparto S.A. (Cedrob S.A)	Polska	Zakłady miesne Silesia S.A.	25.09.2017	100
Goparto S.A. (Cedrob S.A)	Polska	JAMA Sp. z o.o.	27.04.2017	100
Cedrob S.A.	Polska	Goparto S.A.	20.01.2017	16.98
Cedrob S.A.	Polska	Polski Koncern Miesny Duda S.A.	10.07.2015	33.01

Source: Multanski 2018

Further concentration processes are feared especially by the owners of small and medium-sized enterprises and suppliers of raw materials. In their view, such processes can lead to oligopolistic practices, price fixing, the largest players dictating the terms to the entire industry and reducing the traditional appeal and specificity of Polish cold cuts. To prevent such occurrences, the concentration processes in the meat industry should be carefully monitored.

Conclusions, proposals, recommendations

On the ground of these analysis a set of conclusions can be made.

- 1) The structure of operators in the meat market in Poland is very fragmented. Out of approximately 1250 meat processing companies 40 % represent small firms employing less than 9 employees. This is probably due to the late introduction of the market economy in Poland and the business owners' attachment to property. The small scale of production limits the competitiveness of operators in the country and abroad.
- 2) Concentration is a natural process in a free market economy and it also concerns the meat sector in Poland. It is mainly driven by the need to increase the company's market position and the prospects of achieving a higher profit from combining different operators. In economic practice it takes different forms and types depending on market conditions and the situation of the merging companies.
- 3) The meat sector in Poland shows an increasing shareholding of large foreign companies operating on a global scale. Foreign capital is attracted by relatively low production costs, high quality meat and stable markets. At the same time there can be observed an increased concentration of Polish companies that want to compete on the European and global market. However, small and medium-sized holdings are concerned about the concentration processes as their own negotiating position gets weakened.
- 4) In the future concentration processes in the meat industry should have a greater coverage of supply chains. Such a policy was adopted, among others, by WH Group company. All in all, the global measure of the market efficiency, as well as the competitiveness, will be the functioning of

the entire supply chain rather than individual elements or the quality or price factors considered separately, although the later are also very important parameters.

Bibliography

1. Ambukita, E. (2014). Fuzje i przejecia jako strategia rozwoju przedsiębiorstwa – aspekty teoretyczne, Zeszyty Naukowe Uniwersytetu Szczecińskiego, Finanse, Rynki Finansowe, Ubezpieczenia nr 67, (Mergers and acquisitions as a business development strategy - theoretical aspects), Scientific Papers of the University of Szczecin Finance, Financial Markets, Insurance, No. 67, pp. 715–723; www.wneiz.pl/frfu.
2. Czerwonka, L. (2003). Ochrona konkurencji. Dostosowania Polski do rozwiązań Unii Europejskiej. [w:] Nieefektywność rynku w teorii i praktyce, red. T. Kaminska, T. Katowski (Protection of competition. Poland's adaptation to European Union solutions. In: Kaminska T., Katowski T. (eds): Market inefficiency in theory and practice.) Publisher of the University of Gdansk, Sopot.
3. Fuzje i przejecia. Urząd Ochrony Konkurencji Konsumentów. (Mergers and acquisitions. The office of Competition and Consumer Protection). Warsaw 2009.
4. Haus, B. (2000). Formy koncentracji w przemyśle, [w:] Grupy kapitałowe w Polsce, red. M. Romanowska, M. Trocki, B. Wawrzyniak (Forms of concentration in industry, In: Romanowska M., Trocki M., Wawrzyniak B., (eds.): Capital groups in Poland), Difin Publishing House, Warsaw.
5. Leksykon zarządzania. (Management lexicon) Difin Publishing House, Warsaw 2004.
6. Mały rocznik statystyczny Polski, GUS. (Small Statistical Yearbook of the Republic of Poland, Central Statistical Office, Warsaw 2018.
7. Multanski, J. (2018). Konsolidacja i problemy w branży mięsnej. Analizy i raporty (Consolidation and problems in the meat industry. Analyses and reports). <https://cmt-advisory.pl/pl/konsolidacja-i-problemy-w-branzji-miesnej-analiza>. Access: 01.08.2018.
8. Rawa, Ł. (2017a). Nadchodzi duże zmiany w branży mięsnej – wywiad z dyrektorem BZ WBK (Big changes are coming in the meat industry - an interview with the director of BZ WBK), <https://www.wiadomoscihandlowe.pl/artykuly/nadchodzi-duze-zmiany-w-branzji-miesnej-wywiad-z-dy,39874>. Access: 02.08.2018.
9. Rawa, Ł. (2017b). Branża mięsna się łączy. Co to oznacza dla handlu? (The meat industry is connected. What does this mean for trade?) <https://www.wiadomoscihandlowe.pl/artykuly/branza-miesna-sie-laczy-co-to-oznacza-dla-handlu,42462>. Access: 20.08.2018.
10. Rozwadowska, B. (2012). Fuzje i przejecia. Dlaczego koncza sie (nie) powodzeniem. (Mergers and acquisitions. Why they end with (not) successful) Studio EMKA Publishing House, Warsaw.
11. Szczepankowski, P.J. (2000). Fuzje i przejecia, Techniki oceny opłacalności i sposoby finansowania, Wydawnictwo Naukowe PWN, Warszawa. Mergers and acquisitions, Techniques of cost-effectiveness assessment and financing methods, PWN Scientific Publisher, Warsaw.
12. Szymanska, E.J. (2018). Konsolidacja w branży mięsnej – przyczyny i skutki. Roczniki Naukowe Stowarzyszenia Ekonomistów Rolnictwa i Agrobiznesu. (Consolidation in the meat industry - causes and effects). Scientific Annals of the Association of Agricultural and Agribusiness Economists. Tom XX, No 5, pp. 218-223.
13. Wawrzyniak, B. (2000). Koncentracja w gospodarce jako światowa tendencja w zarządzaniu globalnym, [w:] Grupy kapitałowe w Polsce, red. M. Romanowska, M. Trocki, B. Wawrzyniak (Concentration in the economy as a global tendency in global management, In: Romanowska M., Trocki M., Wawrzyniak B. (eds): Capital groups in Poland), Difin Publishing House, Warsaw.

FINANCE AND TAXES

INVESTMENT OF THE FINANCIAL INSTRUMENTS AND THEIR INFLUENCE ON THE EXCHANGE STOCK MARKET DEVELOPMENT

George Abuselidze¹, Doctor of Economics/ Professor; **Anna Slobodanyk**², PhD in Economics
¹Batumi Shota Rustaveli State University, Georgia; ²National University of Life and Environmental Sciences of
Ukraine, Ukraine

Abstract. The formation of recently developed capital markets and expansion of investment alternatives inspires the investors to apply for the challenging investment strategies or search new alternatives for their capital investment. The paper states that among many other investment alternatives, stock market has a number of advantages, namely - the transparent procedure of the exchange market pricing and a variety of trade instruments allowing the potential investor to invest the capital in order to gain profit on a constant basis and in general to create an investment plan completely satisfying the requirements for material security, for financial independence achievement, or for creating own retirement account. The paper reveals that the prospect of profit completely levels risk of loss, despite short-term corrections of securities market and the crisis periods due to the fact that the growing trend proceeds much longer in relation to so-called "waves of corrections" and lasts about 10-12 years, it is in turn connected with business cycles which are overestimated on the stock market acting as the economy indicator in general. It is evident that investment operations in the stock market certainly make profit in the long term, however on the condition of investment portfolio active management it is possible to achieve significantly more profitability if correspondingly they will use speculative operations on shorter periods of time (from 1 week to several months) that is aimed to combine several tools in the trade strategy for maximizing potential profit and minimizing the possible risks. The authors proved that due to options it is possible to reach 30-40 % of annual portfolio profitability on condition of their proper use. Speculative strategies combining purchase and sale of several types of options enable to define the limit of possible risks and potential profit.

Key words: Exchange stock market, financial instruments, investments, investment strategy, investment portfolio, option, speculative strategy.

JEL code: D51, D53, E22, E44, G11.

Introduction

Over the past decade, in many countries of the world, the centralized economy was succeeded by democracy and the system of a free entrepreneurship. New capital markets are emerging and investment alternatives are expanding. Despite all the changes, investors want to gain a large profit, but do not wish to expose themselves to the associated risk, this in turn creates the necessity of application of more sophisticated investment strategies or provokes to search for new alternatives to the usual options in order to invest their capital. Investors often worry about the risk of losing their entire investment. Closures of exchange-traded funds, like the closures of mutual funds, are not uncommon. Anywhere from 50 to 80 exchange-traded funds close each year (Madhavan, 2016).

An investor can thoughtlessly reject important classes of investment assets, bonds or stocks, even if this particular asset class plays an important role in the development of the best strategy for achieving the goals. Return on assets and risk assessment, which is used both in ordinary and alternative investments policy is to be perspective as well as effective and reflect connection of basic economic risks with regard to assets (Abuselidze et al., 2018). Therefore, the structure of the portfolios of many investors precisely reflects their level of comfort and investment advantages, but is far from the necessary achievement of the stated financial objectives. The challenges of the 21st century stock market require from investors or investment advisers something more than a current assessment of a client' state of affairs, namely the development of corresponding strategies, because in most cases the client does not have conceptual knowledge or sufficient competence to understand the necessity to follow the received recommendations in his/her own interests. The rational use of

¹ Corresponding author. E-mail address: abuseri@mail.ru , george.abuselidze@bsu.edu.ge ; <http://orcid.org/0000-0002-5834-1233>

² E-mail address: slobodanykann@gmail.com ; <http://orcid.org/0000-0001-6437-0033>

resources and a sufficient level of education promotes a potential investor to create a stable source of the passive return through investment operations carried out on the stock market.

The actuality of the article is justification of the value of the investment operations and the study of their state and development. The preference is given to the securities instead of the practical means of investing (Abuselidze G., 2013). The investment process ensures the stability of the securities market which plays a significant role in the development of the financial market in general, which in turn is an indicator of the state of the entire economy. According to Bayadyan and Baghdasaryan (2017, p.92) the development of the capital market is an important factor affecting the potential for economic development and sustainable economic growth in the EAEU countries. The term "Capital Market" refers only to financial capital. That is why Capital Markets are always financial markets, not subjective markets (Juurikkala, 2012, p. 88). According to Khan et al. (2018) the stock market is a strong indication for economic conditions of a country. Stock exchange provides a neutral ground for brokers and companies to invest. Mobilization of investments is one of the actual leverages for progress of national economy (Abuselidze, 2018).

Research results and discussion

There are many reasons encouraging a person to make investment, the most important being the necessity for a large amount of money to ensure his/her old age. Our investments form the basis promoting our future purchasing ability. Unsuccessful investments of course can lead to negative return and decrease future purchasing ability.

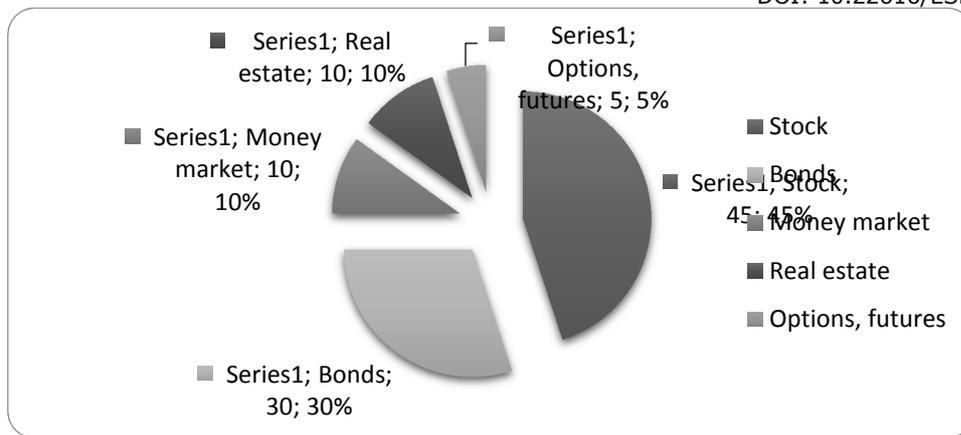
In the broadest sense, the word "investment" is the investment (attraction) of own capital into investment of the objects in order to obtain the long term profit. According to the interpretation of William Sharpe, a professor of Stanford University, an investment is a rejection of a certain value of an asset just for the benefit of its future greater potential value. He also interprets the concept of investment as follows—a set of procedures encouraging an investor to make a decision about the asset investment, how large the investment should be and the specific moment they should be carried out (Sharpe et al., 2001).

The investment process begins with the investment plan preparation stating the objectives and describing the strategy for their achievement. Before directing free funds to fulfil your plan, you should be assured that there is a reserve fund intended to cover unforeseen expenses, for example, in case of emergency medical care, job loss, damage or loss of your own property. It is advisable to invest the funds of your own reserve fund into liquid assets that can be quickly converted into money in case of necessity without significant losses. Liquid assets include all money market instruments and bank deposits (Rezgo, Ketova, 2005).

By creating a reserve fund, you can start the formation of a long term investment.

5 steps to create an investment plan:

- • define your financial objectives;
- • distribute your assets;
- • develop an investment strategy;
- • choose investment tools;
- • evaluate your investment portfolio.



Source: author's calculations based on Faerber (2006)

Fig. 1. An example of the assets distribution in the portfolio

Investors having more time (30 years and more) can invest in shares and other assets growing in the price. Investors of pre-retirement age should direct a considerable part of their capital into bonds or other risk-free or low-risk assets to maintain their standard of living and a smaller portion of the capital into riskier assets, such as stocks in order to provide the growth of the portfolio. According to Lettau and Madhavan (2018, p. 151), exchange-traded products provide exposure to a wide range of asset classes (for example, equities, fixed income commodities, and currencies), strategies (for example, passive index, model-based, and active), and regions.

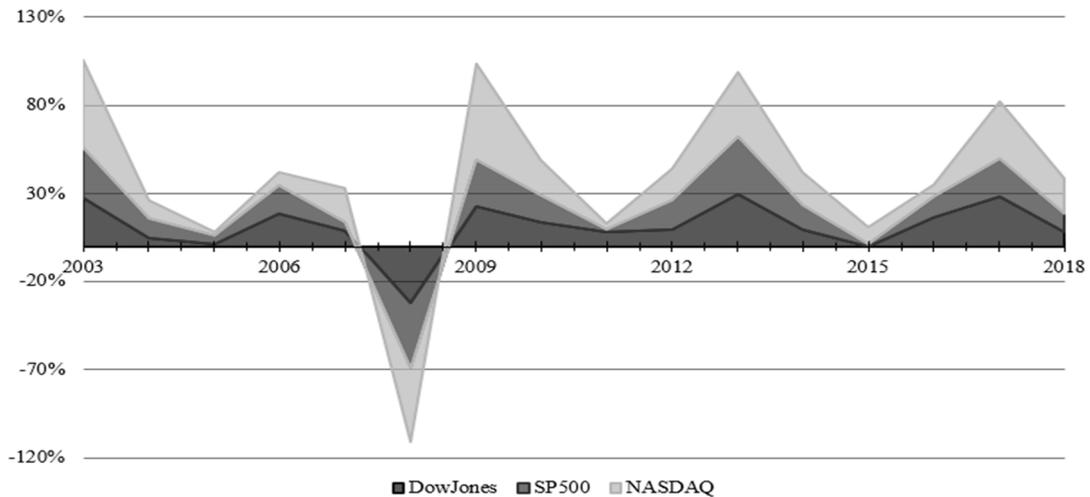
If an investor is focused on the long-term ownership of an asset, then he should give preference to passive investment. In turn, an active investment strategy is the implementation of trading operations on a permanent basis throughout the investment period to generate more return compared to the average market indicators. The choice of investment strategy depends on market efficiency assessment - that is, how efficiently the stock and bond markets handle information affecting the value of assets. The choice of investment strategy depends on market performance evaluation - that is, how effectively the stock and bond markets process information affects the value of assets.

Passive investors choose a diversified portfolio including shares related to various sectors of the economy, such as the technology sector, industrial, financial raw materials and many others. An active investor forms a portfolio, evaluating the fundamental indicators of companies from various sectors of the economy, in order to find and purchase undervalued shares and then sell them after reaching their fair value price (Markowitz, 1952).

Liquid assets can be quickly converted without significant losses when converted into money. These include: US Treasury bills, commercial bills, bank acceptances, money market mutual funds, short-term deposit certificates, bank deposits. They are ideal for investments aimed at creating a reserve fund. It is worth to evaluate your portfolio periodically since all the changes that occur in life may create the need of amendments to the current structure of the investment portfolio. In addition, economic and market fluctuations can affect asset allocation. You should also take into account the changes that occur in companies whose securities are in your portfolio, since such changes can lead to changes in the market value of the shares (Brinson et al., 1995).

In order to see the clear example of the stock market development, it is better to focus on the United States. The American stock market is the world leader in this industry and therefore it acts as a driving force if the markets begin to grow or fall into crisis.

The profitability of the NASDAQ technology index is higher than the profitability of S & P and DowJones. This is due to the fact that this index includes shares of the largest non-financial companies, a significant share of which is occupied by technology companies, showing higher than the average market return from the beginning of the 21st century. However, the high return of this index is accompanied by its greater volatility, that is, the level of risk/return is higher here than in S & P and DowJones.



Source: author's calculations based on Futures industry association (2018)

Fig. 2. Profitability of the major stock indexes of the USA

The results of research, made on the factual basis of the American stock market, showed that there are different interdependencies between returns and risks of financial assets at different investment horizons which differ significantly in terms of types of assets (stocks, bonds, treasury bills), as well as duration of the investment horizon. The studies of Zakharkin et al. (2018) show that with an increase of the investment horizon, the volatility of stocks significantly decreases, making them more attractive for investors as compared with bonds. The volatility of European stock markets was researched by B. Harrison, W. Moore (2012), D. Gjika, R. Horvath (2013), J. Okičić (2014), A. Hepsag (2016), B. Yavas and L. Dedi (2016).

Stock markets provide a better platform to people as compared to traditional banking investments. People can invest their money and can get a huge profit if they invest sensibly. According to Khan et al. (2018), stock investments return more profit than bank deposits and bonds. Bonds occupy an equally important niche in the securities market. The use of bonds is associated with lower risks than when using bank lending. The company undertakes to pay interest and the body of the loan until the bankruptcy moment. If company affairs go wrong, the investor will be affected by the reduction in the value of shares and the termination of dividend payments. Payments on the bonds are made until the company bankruptcy declaration. Due to the high interest payment guarantee, their returns are lower in stocks. An investor, wanting to gain a greater profit than from a bank deposit or bond purchase, boldly declares that stocks are a suitable tool for making profits. The ratio of the risk and return allows him to make a long term profit.

After drawing up the financial plan, the investor needs to develop his investment portfolio (Fig. 3). Portfolio formation depends on your preferences and risk inclination. So, there are 3 main types of investment portfolios depending on the risk level of the investor:

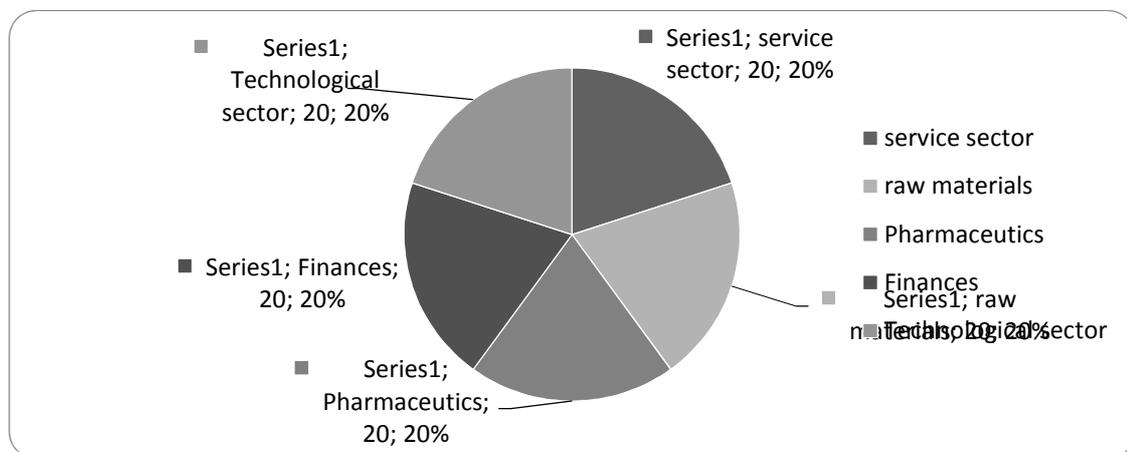
- • • Conservative;
- • • Moderate;
- • • Aggressive (highly risky).

The first step is to create an investment portfolio. The name „portfolio“ implies choosing a certain number of trading instruments for mutual compensation of possible risks and an increase in potential return (stocks, bonds, indices, ETFs).

The investor can combine a set of instruments, as well as their share in the portfolio structure, depending on his/her personal preferences and risk inclination.

The second stage is portfolio diversification (asset allocation). For example, if you created it exclusively from stocks, then you should select companies from different sectors of the economy:

- finance;
- pharmaceuticals;
- technology sector;
- services sector;
- power system,
- others.



Source: author's calculations based on Ellman (2011).

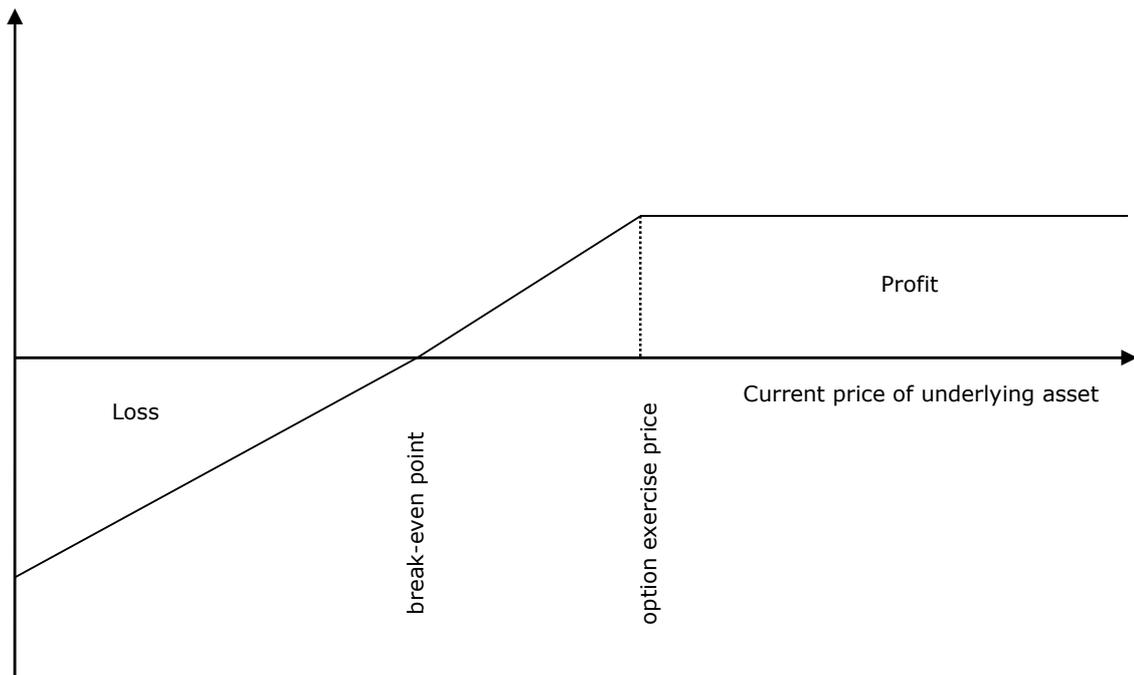
Fig. 3. Example of a diversified portfolio

By investing in stocks, adhering to the strategy „buy and hold“, you can gain profit from the dividend paid by the company or from the value growth of the shares you purchased in the long term. However, the options for making money in the securities market do not finish there. An investor can gain much more from investments if he combines several trading instruments in his investment strategy.

One of such strategies is "Covered Call" - a covered Call option. This trading strategy combines the purchase of shares for long-term ownership and the parallel sale of "Covered Call" options on these shares. Options in money (call option price is below the current price of the underlying asset) can be compared with an insurance policy (Kratte, 2015).

Although this is a free insurance policy (paid by the buyer of the option), it somewhat levels the possibility of increasing the value of the shares, but provides an additional "airbag" when it decreases (Fig. 4). Situations favourable for the potential sale of options in money:

1. extremely volatile market;
2. technical analysis of stocks shows mixed performance;
3. rising, but unstable schedule.



Source: author's calculations based on Cohen (2005)

Fig. 4. Selling a call option in „money“

The reasons for selling covered options are as follow.

- 1) Selling a call option is the most profitable of all the moderately risky strategies that investors use in the stock market.
- 2) Selling call options effectively works under any market conditions, it can be bullish, bearish or neutral trend. But it is worth remembering, if the market is directed at a certain trend, then with a strong uptrend it is better to own a share, with a strong downtrend it is better to change the asset at all, the best option for this strategy is a low volatile bullish market.
- 3) You can generate profits without much effort. All you need is a computer, appropriate skills, discipline, and a spirit for success.
- 4) You can efficiently use the profit. Funds received from the sale of options are deposited to your account on the day of the transaction or the next - depending on the working conditions with the broker.
- 5) You can control the ratio of profit and risk through the use of exit strategies. There are many ways of control when dealing with the sale of options, and you can use all their advantages.
- 6) You can create a breakeven point below the current price of the asset you own. We can recall an example of using an option sales strategy. The premium insurance is a "safety cushion" for your assets in case of a small drawdown.
- 7) You, as the seller of the options and the owner of the shares, reserve the opportunity to receive dividends.
- 8) Passive portfolio management occasionally, provides a return above the average market. Selling Covered Calls gives you the opportunity to beat the market.

Investment operations on the stock market certainly bring long term profit. However, if you actively manage your investment portfolio, you can achieve a significantly higher average return by using speculative operations on shorter time intervals (from 1 week to several months) in parallel,

which aims to combine several instruments in your trading strategy to maximize potential returns and minimize possible risks. A clear example of such a combination is the purchase of shares and bonds as two instruments mutually compensating risks due to their negative correlation as well as the parallel sale of Call options on the acquired assets with the recommended deadlines of 20-30 days. This strategy will allow to use the whole capital and at the same time increase the potential return of the investment portfolio, and due to the negative correlation between asset classes such as stocks and bonds, as well as due to the functionality of options, the investor has the opportunity to manage its risks.

Conclusions, proposals, recommendations

- 1) Portfolio Structure of many investors accurately reflects their level of comfort and investment advantages, but is far from the one that is necessary to achieve the stated financial objectives. With the rational use of resources and a sufficient level of education, a potential investor can create a stable source of the passive return through investment operations carried out on the stock market.
- 2) The investment process begins with an investment plan stating the objectives and describing a strategy for their achievement. Before directing free funds to implement your plan, you should be sure that there is a reserve fund intended to cover unforeseen expenses that arise, for example, in case of emergency medical care, job loss, damage or loss of your own property. It is advisable to invest your own reserve fund into liquid assets, that can be quickly converted into money in case of necessity without significant losses.
- 3) Passive investors choose a diversified portfolio, that is, one that includes stocks related to various sectors of the economy, such as the technology sector, industrial, financial raw materials, among others. An active investor forms a portfolio, evaluating the fundamentals of companies from different sectors of the economy, in order to find and buy undervalued stocks and then sell them after reaching their fair value price.
- 4) After drawing up the financial plan, the investor develops his investment portfolio. Portfolio formation depends on the preferences and risk inclination, the choice of a certain number of trading instruments for mutual compensation of possible risks and an increase in potential return (stocks, bonds, indices, ETFs).
- 5) By investing in stocks, adhering to the strategy of „buy and hold“, you can gain profit from the dividends paid by the company or from the increased price of the long term purchased shares. However, the options for making money in the securities market do not finish there. An investor can get much more if he combines several trading instruments in his investment strategy. One of these strategies is „Covered Call“ - Covered Call Option. This trading strategy combines the purchase of shares for the long-term ownership and the parallel sale of Call options on these shares. In addition, a strong advantage of options among other stock instruments is that it is not necessary to anticipate the future price trend, you can gain profit in any market conditions, turning the mathematical expectation of the options return in your favour.

Bibliography

1. Abuselidze, G., Beridze, L. 2018. The Role of Alternative Investments in the Development of Capital Markets: in Terms of the Transformation of Georgia with the EU. In Stanikkova, M., L. Melecky, E. Kovarova and K. Dvorokova (eds.). Proceedings of the 4th International Conference on European Integration 2018. Ostrava: VŠB - Technical University of Ostrava, 2018, pp. 29-41. ISBN 978-80-248-4169-4. ISSN 2571-029X.
2. Abuselidze, G. (2018). Georgia's capital market: Functioning Problems and Development Directions in Association with EU. Journal of Applied Economic Sciences, Volume XIII, Winter, 7(61).

3. Abuselidze, G. (2013). Undeveloped equity market as a factor preventing foreign investments (Georgia as an example). *Ekonomichnyy analiz*, 12(1).
4. Bayadyan, A., Baghdasaryan, A. (2017). Problems of Development and Integration of the Securities Market in the Countries of the EAEU. *VESTNIK MEZHDUNARODNYKH ORGANIZATSII-INTERNATIONAL ORGANISATIONS RESEARCH JOURNAL*. 12(4), pp. 91-108.
5. Brinson, G. P., Hood, L. R., Beebower, G. L. (1995). Determinants of portfolio performance. *Financial Analysts Journal*, 51(1), pp. 133-138.
6. Cohen, G. (2005), *The Bible of Options Strategies*, Pearson Education, New Jersey, USA.
7. Ellman, A. (2011). *Complete Encyclopaedia for Covered Call Writing*, ISBN: 978-1937183066.
8. Faerber, E., (2006). *All About Investing: The Easy Way to Get Started*
<https://www.litmir.me/bd/?b=431030>.
9. Futures industry association (2018), «exchange volume» available at: <https://fia.org/categories/exchange-volume> (accessed).
10. Gjika, D., Horvath, R. (2013, July). Stock market comovements in Central Europe: Evidence from the asymmetric DCC model. *Economic Modelling*, p.33, pp. 55-64.
<https://doi.org/10.1016/j.econmod.2013.03.015>.
11. Harrison, B., & Moore, W. (2012). Forecasting Stock Market Volatility in Central and Eastern European Countries. *Journal of Forecasting*, 31(6), pp. 490-503. <https://doi.org/10.1002/for.1214>.
12. Hepsag, A. (2016). Asymmetric stochastic volatility in central and eastern European stock markets. *Theoretical and Applied Economics*, 607(2), pp. 135-144. Retrieved from <http://store.ectap.ro/articole/1187.pdf>.
13. Juurikkala, O. (2012). The Behavioural Paradox: Why Investor Irrationality calls for Lighter and Simpler Financial Regulation, *Fordham Journal of Corporate & Financial Law*, Vol. XVIII, pp. 33-93.
14. Khan, U., Aadil, F., Ghazanfar, M., Khan, S., Metawa, N., Muhammad, K., ... Nam, Y. (2018). A Robust Regression-Based Stock Exchange Forecasting and Determination of Correlation between Stock Markets. *Sustainability*, 10(10), 3702. doi.org/10.3390/su10103702.
15. Kratter, M.R. (2015). *Covered Calls Made Easy: Generate Monthly Cash Flow by Selling Options* Kindle Edition by Matthew R. Kratter.
16. Lettau, M., Madhavan, A. (2018). Exchange-Traded Funds 101 for Economists, *Journal of Economic Perspectives*, 32(1), pp. 135-154. DOI: 10.1257/jep.32.1.135.
17. Madhavan, A. (2016). *Exchange-Traded Funds and the New Dynamics of Investing*. Oxford University Press: New York, NY.
18. Markowitz, H. (1952). Portfolio selection. *The journal of finance*, 7(1), pp. 77-91.
19. Okičić, J. (2014). An Empirical Analysis of Stock Returns and Volatility: The Case of Stock Markets from Central and Eastern Europe. *South East European Journal of Economics and Business*, 9(1), 7-15.
<https://doi.org/10.2478/jeb-2014-0005>.
20. Rezgo, G. Y., Ketova, I. A. (2005). *Birzhevoe delo [Exchange business]*. Moscow: Finansyi i statistika.
21. Sharpe, W. F., Alexander, G. J., Bailey, J. (2001). *Investitsii [Investments]*. Moscow, INFRA-M Publ, 1035. (Alexander, G. J., Sharpe, W. F., & Bailey, J. V. (2001). *Fundamentals of investments*. Pearson College Division.).
22. Yavas, B. F., Dedi, L. (2016). An investigation of return and volatility linkages among equity markets: A study of selected European and emerging countries. *Research in International Business and Finance*, 37, pp. 583-596. <https://doi.org/10.1016/j.ribaf.2016.01.025>.
23. Zakharkin, O., Zakharkina, L., Antoniuk, N. (2018). A comparative analysis of stock market volatility depending on investment time horizon. *ECONOMIC ANNALS-XXI*, 167(9-10), pp. 49-52.
<https://doi.org/10.21003/ea.V167-10>.

THE ROLE OF THE STATE IN THE DEVELOPMENT OF HOUSING LOAN MARKET IN POLAND AND UKRAINE

Milena Bera¹, PhD; Monika Spiewak - Szyjka², PhD

^{1,2}West Pomeranian University of Technology in Szczecin, Faculty of Economics

Abstract. The real estate financing market in Poland and Ukraine changed substantially between the years 2006 and 2017. The changes were highly dynamic. This publication analyses both common and different features of the housing market in Poland and Ukraine; it also studies housing property markets in terms of housing financing in Poland and Ukraine. The current state of affairs on the residential real estate financing market has been presented from the point of view of an average Polish and Ukrainian citizen – a buyer of the real estate and a borrower. In order to preserve topicality, the analysis has focused on how these markets behaved in the last few years but the situation in previous years has also been taken into account.

Key words: real estate market, housing loan market, Poland, Ukraine, state support program.

JEL code: R38.

Introduction

Each state has the responsibility of satisfying the housing needs of its citizens in line with its own preferences and economic opportunities. The assessment of the effectiveness of government instruments for supporting housing is not based only on the analysis of the amount of allocated financial resources, but also on their effectiveness (i.e. the number of housing investments, the level of existing resources maintenance) and economic and social purposefulness.

In the years 2006 - 2017, the real estate financing market in Poland and Ukraine has changed a lot. These changes were characterized by high dynamics.

The aim of this publication is to analyze common and different characteristics of the housing market in Poland and Ukraine, residential real estate markets in terms of housing loans in Poland and Ukraine.

The current state of the residential real estate financing market was presented from the point of view of the average young Pole and the Ukrainian - the buyer of the real estate and the borrower. The analysis of the most important government programs in Poland and Ukraine, supporting the purchase of real estate for young Poles and Ukrainians was made. To keep the publication current, the focus was on analyzing the last few years of functioning of these markets, taking into account the situation in previous years.

The publication uses the method of in-depth analysis of source materials: documents, reports and statistical data.

Problems, purpose and scope of the study

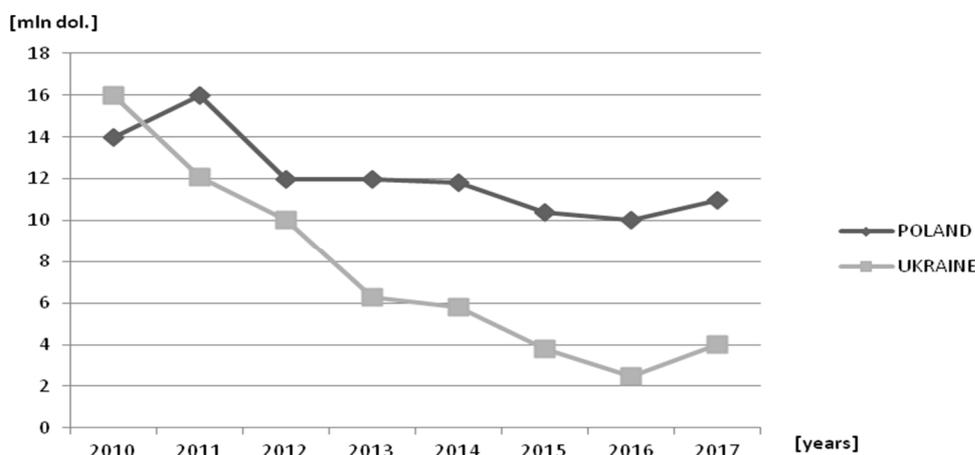
A bank loan is an important instrument in the development of the residential real estate market. The creditworthiness of Poles was positively affected due to low interest rates and the increase in households' incomes within 2014 – 2017. The group of potential borrowers was growing year after year. The year 2017 turned out to be record-breaking for both the housing market and the credit market. Banks granted over 190,000 housing loans with a total value of PLN 44 billion, which was the best result in the banking sector for six years.

The situation was entirely different in Ukraine. The number of those willing to obtain a bank loan was decreasing throughout the years of 2014 – 2016, because of the increase in the interest rates

¹ Milena Bera. Tel.: +48 9144 96980; fax: +48 9144 96980.
E-mail address: milena.bera@zut.edu.pl

² Monika Spiewak - Szyjka. Tel.: +48 9144 96980; fax: +48 9144 96980.
E-mail address: monika.spiewak-szyjka@zut.edu.pl

on housing loans. A slight revival of the market occurred at the time when loan rates were lowered in 2017.



Source: authors' study based on data from the National Bank of Ukraine, [https://bank.gov.ua/control/uk ...](https://bank.gov.ua/control/uk...), (date of access: 20/03/2017) and the Report on Housing Loans and Transaction Prices of Real Estate AMRON-SARFiN 4/2016, no. 30, (2017). Polish Banks Association, Warszawa, pp.7

Fig. 1. Value of newly-granted housing loans in Poland and Ukraine (million USD)

According to a study carried out in 2014 by the National Bank of Poland, out of 12.1 % of households that declared indebtedness with housing loans, 10.8 % financed their new dwelling, and 1.6 % - another owned real property. Borrowed capital is often used by the public not only to meet their own housing needs but also for speculative purposes. Some individual clients used loans to purchase a real property for rent. Low loan instalments enabled the rental income to cover not only the loan instalment but also other personal expenses (Kowalczyk-Rolczynska P., 2011). Such situations could be observed especially in large cities, where many students live and, consequently, where there is a high demand for flats to rent. In Ukraine, the situation on the housing rental market has improved in recent years, but it has not been influenced by positive changes in the economy. The internal migration of Ukrainians from the eastern regions is the reason for the increase in the demand for real estate.

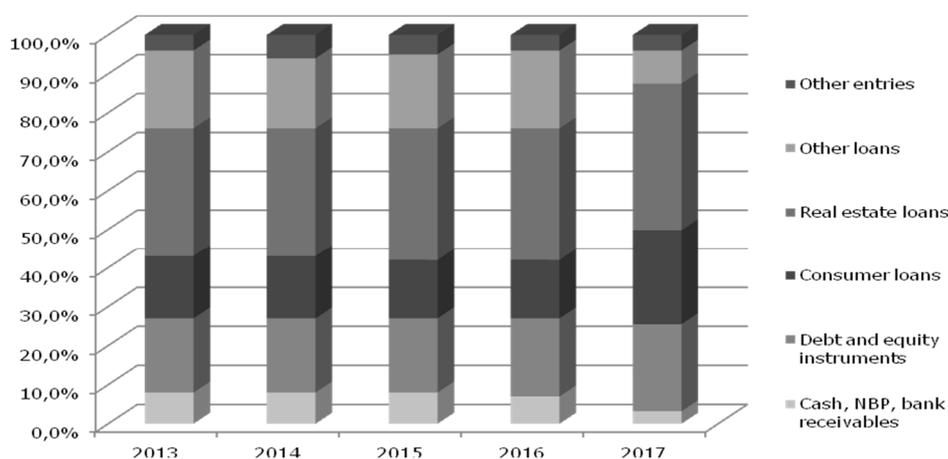
The active behavior of Poles in the housing market leads to record sales results, which encourages developers to further investments. In 2016, 1 622 727 new apartments were built in Poland, which is 10 % more than in 2015. The construction of 173 932 flats commenced and 12 % more building permits were issued for 211 565 new apartments. These were the best results since 2008 (Report on Housing Loans ..., 2016). When compared to Poland, the number of permits issued for the construction of new apartments in Ukraine in the same period was low and amounted to 650 permits. While maintaining the same pace of construction on the primary real estate market, the balance between demand and supply will not be sustained.

Housing loans are the basis for retail cross-selling for most banks currently operating on the market. The offer now includes not only an account holding, a bank card or an overdraft facility but also a housing loan itself. It seems only natural that clients look for a loan in their bank first. That is why it is difficult for mortgage banks to acquire new customers and operate on the market with such extensive networks of universal banks in operation.

The most significant share of the assets structure of Polish banks, which is presented in Figure 2 below, the loans remain the most significant item, amounting to 70.5 % in 2017. The percentage of housing loans was much higher than that of consumer loans. As can be seen, there were No major

changes in the assets structure between 2013 and 2017. The share of housing loans fell by around 0.5 % in 2014, but the growth could already be noticed in 2017.

Polish banks tightened the criteria of granting housing loans in 2016. The government actions and, especially, the adoption of the Banking Tax Act in January 2016 negatively affected the development of the loan market in Poland. As a result, bank charges and mortgage margins increased (Report Situation on the Loan Market. ..., 2016). Adjustment of the borrower's income, taking into account the retirement age during the loan period and the update of the parameters used to assess creditworthiness are other factors that influenced the supply of loans.



Source: authors' study based on the Report on the Condition of Banks in 2013-2016, (2017).Office of the Polish Financial Supervision Authority, Warsaw, pp. 43

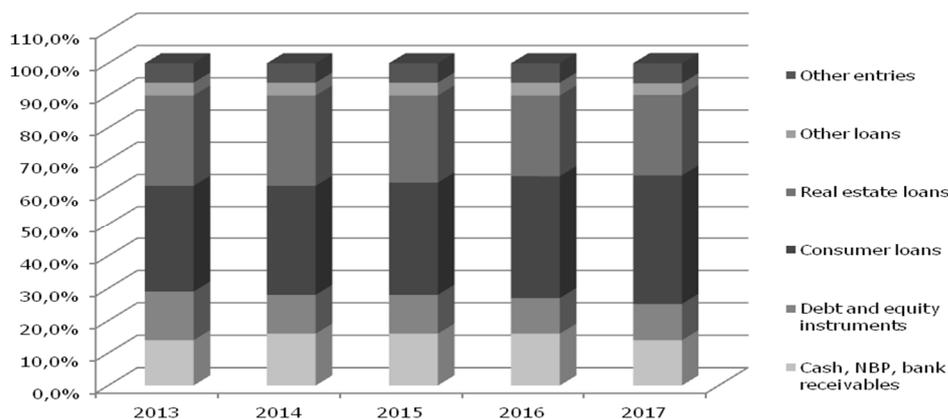
Fig. 2. The structure of bank assets in Poland in 2013 - 2017 (%)

At the end of 2017, the claims on account of housing loans granted to households amounted to 58.7 % of all bank claims from this customer category. The reduction of this indicator amounted to 5.6 percentage points within a year, which can be considered a large change. A year earlier, there had only been a slight change in the significance of the claims but in both these years the above-mentioned changes in the current exchange rates of foreign currencies had a significant impact on the results. The claims on housing loans from households accounted for 37.7 % of receivables from non-financial entities at the end of 2017. This share was lower by 3.7 percentage points a year earlier.

In 2015, the banking sector of Ukraine operated in very difficult and unstable conditions. Ridding this sector of insolvent banks was the main task for the National Bank. As a result, the number of banks decreased from 147 to 117 (status on January 1, 2016). The process continues and further 62 banks are under liquidation. The foreign interest in the share capital of operating banks is 39.4 %, the state interest – 38 %. The five largest banks held 54 % of all assets of the sector (National Bank of Ukraine ..., 2017).

The Figure below shows the asset structure of Ukrainian banks in 2013 – 2017. The distribution of the bank assets in the compared countries differed.

The loans granted to households and legal entities constituted the largest proportion of 64 % - 66 %. Consumer loans accounted for 40 % in the bank's loan portfolio last year. Throughout 2013 – 2017, the share of housing loans decreased continuously and reached the level of 25 %.



Source: authors' study based on data on the National Bank of Ukraine, Condition of Banks in 2013 - 2016, Retrieved: www.bank.gov.ua . Access: 07.04.2017.

Fig. 3. The structure of bank assets in Ukraine in 2013 - 2017 (%)

The household loan portfolio continues to grow at a fast rate. In April 2018, net hryvnia household loans were up by 39 % yoy. The uptrend persisted unchecked, despite the growth decelerating at the start of the year due to statistical effects. The household loan portfolio in all currencies could have generated stronger growth if it were not for the repayment and writing-off of old foreign currency loans. Practically all of these loans remain NPLs. This situation will not change unless legislation is passed to tackle the problem of foreign currency mortgages, and the moratorium on foreclosing on the collateral for such loans is lifted. By the end of 2017 and in Q1 2018, all the banks that were able to enter the consumer lending market had done so. About half of all financial institutions ramped up retail lending in Q1 2018. The concentration of retail loans is rather high, with five banks accounting for 65 % of the sector's total portfolio. Concentration is at its highest in the car loan sector, where five banks account for 80 % of the market. As more banks are offering real estate loans, the concentration of such loans is decreasing (National Bank of Ukraine ..., 2018).

Instruments of housing development in Poland

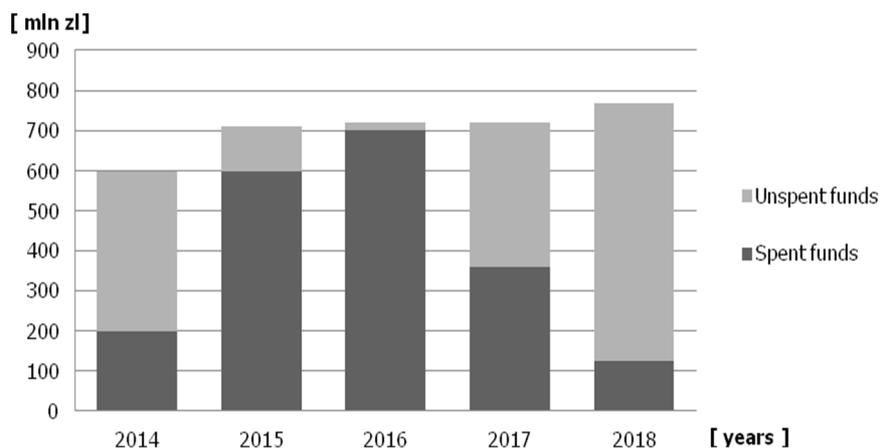
The public authorities of each country are obliged to pursue policies that support citizens in resolving housing issues. The objectives and forms of state investment in the Polish housing market change over time. Poland implements the following instruments of housing development: the National Housing Program, Apartment for the Young program, building society books, social housing, housing cooperatives and housing allowances (Ministry of Infrastructure and Construction, 2017).

The program called "Apartment for the Young" (AfY) was introduced in January 2014 as a form of government support for young people to solve housing shortage in Poland. The assistance under the "AfY" is based on co-financing of own contributions in order to obtain housing loans. The families in which a third child appears can also get assistance in the form of an early partial repayment of the loan principal. The people who begin building their own dwelling (a flat or a single-family house) can obtain a partial VAT refund on building materials.

The conditions for co-financing include, inter alia (Law, 2004):

- not having another flat (also in the past) – does not apply to persons/families with three children;
- age - up to 35 years of age (the age of the younger spouse) – does not apply to persons/families with three children;
- loan amount – at least 50 % of the flat value; for the period of at least 15 years; the housing loan agreement in Polish currency;

The „AfY” program became operational in the beginning of 2014 and the banks accepted more than 4 300 applications in the first quarter of that year. As many as 13 968 loan agreements with a total value of more than PLN 2.6 billion were signed till the end of 2014. The program gained even more popularity at the start of 2015. The amendment to the act, which extended the scope of the program to the secondary market, triggered an avalanche of applications for the co-financing of own contributions. December 2015 was a record month in this respect; Bank Gospodarstwa Krajowego received more than 6 500 applications with the total amount of PLN 172.05 million. On March 15, 2016, BGK announced the cessation of accepting applications for subsidies from the pool of funds anticipated for 2016, and it did the same on 5 July – for 2017. Since that moment, the subsidies became obtainable only in 2018. Throughout the years of 2014 – 2016, 76 160 applications were submitted through banks by residents and 74 759 loan agreements were signed with a total value of PLN 13.151 billion.



Source: authors' study based on the Report on Housing Loans and Transaction Prices of Real Estate AMRON-SARFiN 4/2016, no. 30, (2017). Polish Banks Association, Warszawa, pp 14

Fig. 4. The use of the annual limit of funds planned for granting financial support under the "AfY" program (PLN million)

As the data presented in Figure 4 demonstrate, only 34.5 % of the allocated funds were used in 2014 but, as the program implementation unfolded, that value increased up to 84.7 % in 2015 and up to 96.1 % in 2016. 48.6 % of funds were reserved at the end of the previous year and 18.1 % – in 2017.

The average area of a flat purchased under the program was 53.71 m² and for a single-family house – 86.48 m²; the average price of a flat was PLN 219 700 and for a house – PLN 290 100.

The distribution of subsidy funds varied highly between regions. Within the first year, half of the funds went to the Masovian, Greater Poland and Pomeranian voivodeships. The other half was shared by the remaining thirteen voivodeships. The situation remained unchanged until the fourth quarter of 2017 – the three voivodeships received more than 52 % of all the funds.

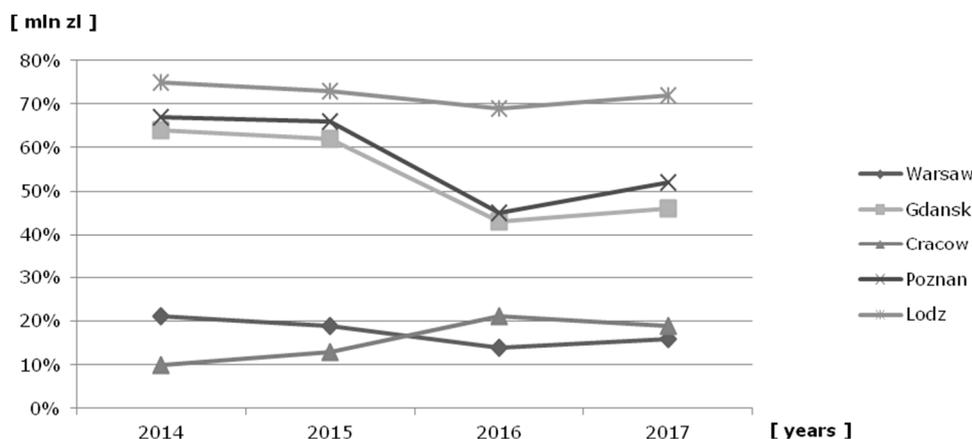
The comparison of average transaction prices of flats in 2014 – 2017 and price limits of the largest cities in Poland

Town/Price		I quarter 2014 [zł/m ²]	IV quarter 2014 [zł/m ²]	IV quarter 2015		IV quarter 2016		IV quarter 2017	
				Primary market [zł/m ²]	Secondary market [zł/ m ²]	Primary market [zł/ m ²]	Secondary market [zł/ m ²]	Primary market [zł/ m ²]	Secondary market [zł/ m ²]
Warsaw	Average	7145	7204	7411	7213	7429	7563	7751	7 915
	Limit	5865	6583	6417	5251	6433	5263	6264	5 125
Gdansk	Average	5297	5226	5479	5115	5785	5654	6829	6 337
	Limit	5682	5426	5234	4283	5094	4168	5337	4 367
Krakow	Average	6052	6118	6250	5920	6349	6288	6755	6 276
	Limit	4894	5083	5247	4293	5247	4293	5344	4 373
Poznan	Average	5417	5701	5816	5075	6089	5494	6382	5 550
	Limit	5605	5916	5925	4847	5711	4672	5728	4 686
Lodz	Average	3612	4321	4225	3322	4677	3619	5148	3 784
	Limit	5031	4718	4330	3543	4200	3437	4191	3 429

Source: authors' study based on the Report on Housing Loans and Real Estate Transaction Prices in 2014,2015,2016 AMRON - SARFiN, (2015,2016,2017). No. 22, pp. 16 , No. 26, pp. 18 / No. 30, pp. 16 Polish Bank Association, Warszawa

In the fourth quarter of 2017, the maximum price per square meter of a floor area of a flat or a house covered by the "Apartment for the Young" program was reduced for Warsaw (by PLN 140.58 on the primary market and PLN 115.01 on the secondary market) and Wroclaw (by 27.50 PLN on the primary market and by PLN 22.50 on the secondary market). On the other hand, transaction price limits were raised in Krakow, Lodz and Poznan – by PLN 84.15, PLN 36.30 and PLN 4.95 on the primary market and PLN 68.85, PLN 29.70 and PLN 3.75 on the secondary market respectively.

The data contained in Table 1 show that, out of all Polish cities, the inhabitants of Lodz found themselves in the best situation because as many as 86 % of apartments for sale were within the limit of PLN 5031/m² at the beginning of the program in 2014. Gdansk occupied the second position, as 66 % of the apartments in the city could be purchased with government subsidies; the price of 1m² was PLN 5297, and the limit was PLN 5682. Poznan was ranked third, since 50 % of the total number of transactions concluded on the primary market was within the limit; the average price of 1m² was PLN 5417. The residents of Krakow turned out to be at the worst disadvantage, as the average price of 1m² was PLN 6052 and the limit under the program was PLN 4894/m². As for Warsaw, 15 % of the apartments could be purchased with state funding. The average price of 1m² was PLN 7215 and the limit stood at PLN 6127.



Source: authors' study based on the Report on Housing Loans and Real Estate Transaction Prices in 2014, 2015, 2016 AMRON - SARFiN, (2015, 2016, 2017). Polish Bank Association, Warsaw, No. 22, pp. 16, No. 26, pp. 18, No. 30, pp. 16

Fig. 5. Dwellings within the limits of "AfY" program on the primary market in selected cities in the years of 2014 – 2017 (%)

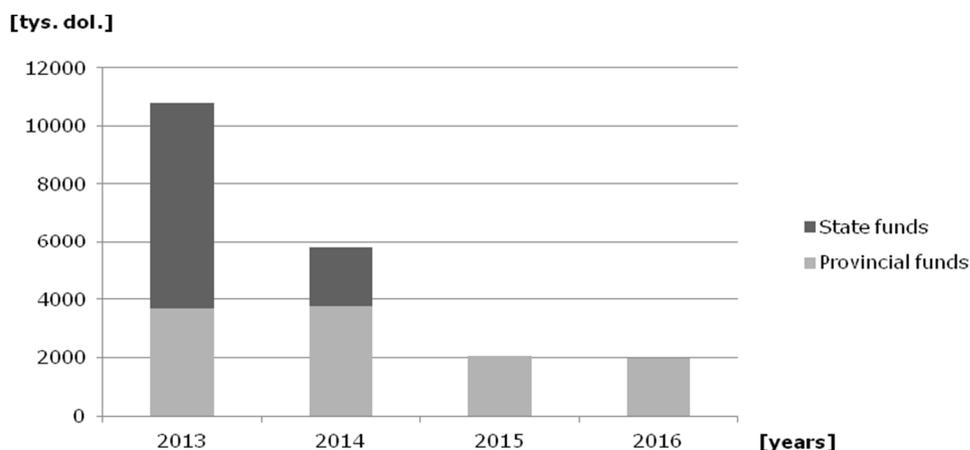
Isolation of transactions concerning the apartments, the price and floor area of which met "Flat for the Young" Program conditions and which were concluded in the first quarter of 2017, enabled defining the opportunities for partaking in the Program in individual Polish cities. The largest percentage of transactions that met the terms of the Program was noted in Lodz – 72 % of all the transactions recorded on the primary market and 63 % on the secondary market. The potential buyers of flats in Poznan and Gdansk were slightly worse as, respectively, 52 % and 46 % of transactions concluded on the primary market and 26 % and 22 % of transactions on the secondary market concerned flats with a unit price below the set limits. As regards the availability of the premises that met the program conditions, the worst situation was in Warsaw – 16 % of all the transactions concluded on the primary market and only 4 % of the apartments sold on the secondary market met the requirements of the program.

According to the data revealed in Figure 5, the city of Lodz remained in the first position in 2015 due to the number of apartments within the set limit with the result of 73 % of apartments on the primary market and 82 % – on the secondary market. Krakow (with 13 % on the primary market) and Warsaw (with 7 % on the secondary market) ranked last. The situation in Krakow improved in the fourth quarter of 2016, when 21 % of the apartments could already be bought with the use of co-financing under the analysed government program. In Warsaw, however, the situation deteriorated and the number of flats within the limit was only 14 % on the primary market, and 6 % – on the secondary market. At the end of 2017, the residents of Lodz could count on the subsidies under the program for only 60 % of all the apartments on the secondary market.

The implementation of the "Apartment for the Young" program affected the prices on the housing market. The impact was rather marginal in the cities where the price-per-1m² limit was relatively low in comparison to the market prices (Warsaw and Krakow). The prices were mainly driven by the supply-demand relationship. The few flats that qualified for the subsidy found their buyers very quickly in such markets. In these cities – because of the program – the apartment prices decreased in order to adjust to the limit; that is the reason why the number of people who bought apartments at the price that was within the limit and did not need the subsidy increased substantially.

Instruments of housing development in Ukraine

Housing support programs also operate in Ukraine. The Support Fund for Youth Housing was established by private housing estates in 1992 in order to meet the objectives. The Fund became a state organization in 1997; it is supervised by the Ministry of the Family and it operates by means of the state budget and voivodeship budgets.



Source: authors' study based on the Report on the Results of Activities of the State Support Fund for Youth Housing in years 2014-2015, (2016). PFWMBM, Kiev, p. 9

Fig. 6. The structure of financial resources of the preferential loan program in 2013 – 2016 (thou. USD)

The data contained in Figure 6 above show that the pool of funds allocated to co-financing young people decreased in 2015 and 2016 to 20 % when compared to 2013. The state's participation also decreased over these years to reach the level of USD 0 in 2015 and 2016 and was fully replaced by the voivodeship budgets. In 2015, over USD 10 million were invested in housing construction, out of which 76 % was from voivodeship budgets and 24 % – citizens' contributions.

The activities undertaken by the state and aimed at providing youth with their own apartment declined. The number of people who benefited from the program decreased threefold. This was mainly due to the limited resources earmarked for supporting programs. Poor financing of the banking sector was the reason why the number of buildings constructed in 2015 decreased by 35 as compared to the previous year; in 2016 only 31 buildings were built.

Table 2

Effects of the implementation of the government support program in the field of residential construction in Ukraine in 2014 – 2016

Item to compare / Year	2014	2015	2016
Number of families covered by the program	1729	584	454
Number of buildings put into use	73	38	31
Number of flats / Total area	7080 / 483.8 thou. m ²	4933 / 347.5 thou. m ²	4152 / 295.4 thou. m ²

Source: authors' study based on the Report on the Results of Activities of the State Support Fund for Youth Housing in 2014-2015, (2016). PFWMBM, Kiev, pp. 10

In 2014 – 2016, 142 residential buildings were put into use within the residential construction program (73 in 2014, 38 in 2015 and 31 in 2016). The total number of those apartments amounted to 12 013, (7 080 in 2014 and 4 933 in 2015). In 2014, 203 flats were sold to households in the form of preferential loans under the government program; in 2015 - 171 flats. As at 17.05.2017, the number of submitted questionnaires concerning the receipt of a long-term preferential housing loan was 7 713, out of which 6 743 questionnaires met all the program requirements. The total number

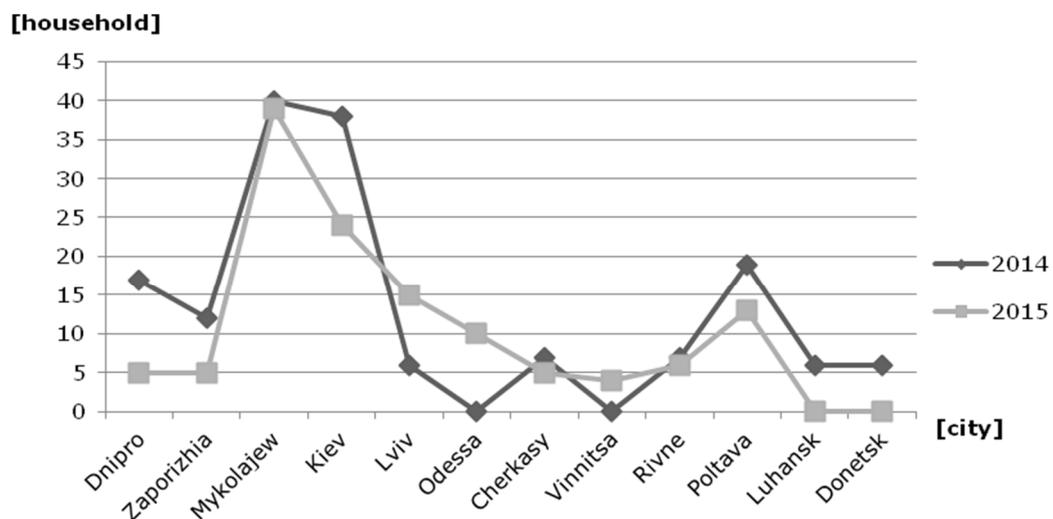
of long-term preferential loans concluded between the Fund and citizens amounted to 374 for a total amount of about USD 13 million. In 2014, 203 loans for the amount of USD 5.2 million were granted, whereas in 2015 – 171 loans for USD 7.8 million.

The cost structure of the granted loans was as follows:

- USD 1.5 million – state budget;
- USD 6.25 million – budgets of voivodeships;
- USD 5.25 million – own costs of the State Support Fund for Youth Housing.

The cities of Mykolajev, Kiev, Lviv and Poltava are the leaders in Ukrainian cities with respect to the size of the families who received apartments under the analyzed project. The situation remained unchanged until 2016.

The data contained in Figure 7 show that in cities such as Odessa and Vinnytsia the number of families increased, whereas in Kiev, Dnipra, Zaporozhye and Poltava, the situation was reverse. In 2015, the program was not implemented in the cities of Lugansk and Donetsk as the anti-terrorist operation was being carried out there at the time.



Source: authors' study based on the Report on the Results of Activities of the State Support Fund for Youth Housing in years 2014 – 2015, (2016). PFWMBM, Kiev, p. 11

Fig. 7. The number of households which entered into the long-term preferential loan scheme in selected cities of Ukraine in 2014 – 2015

According to the data gathered by the information-analytical portal "Stolicznaja Niedwizymosc", there was a slight increase in the prices of new apartments and a drop in the prices on the secondary market in Kiev in March 2017. In particular, the average prices of apartments on the primary market increased by 0.1 % to UAH 23,340 per 1m² in March 2017 in comparison to those in February 2017 but they decreased by 1.3 % when compared to March 2016. The largest increase in the average prices on the primary market referred to the case of "premium" class apartments (increase by 1.2 % to UAH 46.39 thou. per 1 m²) and "comfort" class apartments (increase by 1 % to UAH 21.89 thou. per 1m²). A slight increase in the prices was also noticed in the segment of "economy" class apartments (increase by 0.9 % to UAH 16.78 thou. per 1m²) and "business" class apartments (increase by 0.02 % to UAH 29.91 thou. for 1 m²). The biggest increase in the house prices was recorded in such regions of Kiev as Darnytsia, Podilski and Solomenski, and the largest drop in the prices in the regions of Dniprowski, Obołonski and Swiatoszyński.7.

Average housing prices on the secondary market decreased by 1.6 % to UAH 34.42 thou. per 1m² in March 2017 in comparison to the prices in February 2017. The average price of a 1-room flat

in Kiev accounted for UAH 31.37 thou. per 1m² in March 2017 (a decrease by 2.5 % when compared to February 2017), 2-room flat – UAH 35.54 thou. per 1m² (decrease by 1.6 %), 3-room flat – UAH 35.25 thou. per 1m² (decrease by 0.9 %), 4-room flat – UAH 39.11 thou. per 1m² (decrease by 1 %).

Concluding remarks

The research shows that:

- 1) There were many potential buyers of residential real estate both in Poland and Ukraine in the analysed period of time. The majority of the people, however, were unable to finance the purchase of real estate with their own funds – the only option was to take out a housing loan.
- 2) The demand for housing loans in the analysed period was higher in Poland than in Ukraine. The main reason for that was a different level of remuneration in both these countries. Ukrainians were afraid of the unstable economic situation. The demand side was represented by the people who received remuneration in foreign currencies. It was connected with a very high interest rate on housing loans. In Poland, the housing loans were more popular and – most importantly – more accessible. The „AfY” program was successfully implemented in Poland. It was the most popular program among Poles under the age of 35. The program implementation influenced the prices on the housing market. In some Polish cities, the "AfY" program contributed to the reduction of home prices on the market. The research carried out for the purposes of this article has shown that the government support program for the purchase of apartments was successfully completed in Poland.
- 3) While analyzing the results of the implementation of the Ukrainian state housing loan support program, it can be concluded that 738 preferential long-term loans for young families were granted in 2014 – 2016 for a total amount of USD 336.3 million including: in 2014 – 253 long-term preferential loans for young families of up to UAH 84 million, in 2015 - 231 preferential loan in the amount of UAH 123.7 million, in 2016 – 254 preferential loans in the amount of UAH 128.6 million. At the expense of the state budget, 74 preferential loans were granted in 2014 to the amount of UAH 24.3 million; at the expense of local budgets – 435 preferential loans for a total amount of 195 600 000 (out of which 116 loans for a total amount of UAH 36 600 000 in 2014, 140 loans for a total of UAH 64 700 000 in 2015 and 179 loans worth USD 94.3 million in 2016).
- 4) Therefore, neither the expected results of the national program implementation nor the funds for providing housing for young people were achieved in the years of 2014 – 2016. The main strategic objectives of the state program, namely, providing affordable housing for young families and creating conditions for the development of building for the youth remained unfulfilled. The program was not effective enough and had no impact on the residential real estate market; it did not bring the expected outcomes because of its limited budget and it contributed to the program beneficiaries' purchase of their own apartments on a minor scale only. The program was constantly underfunded by both the state budget and the local budgets since the very beginning of its implementation. As at 01.01.2017, according to the data of the State Youth and Family Service, the service of long-term government loans aimed at young families and single young citizens accounted for only 8.7 % of the assumed Program indicators in 2013 – 2017.

Bibliography

1. Annual Report 2016, (2017). National Bank of Ukraine, Kiev, pp.58.
2. Financial Stability Report 2018, (2018). National Bank of Ukraine, Kiev, pp.36.
3. Kowalczyk-Rolczynska P., (2011). Analysis of the Housing Loan Market in Poland, Scientific Papers of the College of Banking in Wroclaw, No 20/2011, Wroclaw, pp.223.
4. Law of 27 September 2013 on State Aid for the Purchase of the First Flat by Young People (Journal of Laws 2013 item 1304), art. 4 – 6.
5. Louzonis T., Investing in the Ukrainian property market, Retrieved: www.stolicznajanedwizymosc.ue. Access: 21.05.2017.
6. Ministry of Infrastructure and Construction, Retrieved: <http://www.mib.gov.pl/2-Politykamieszkaniaowa>. Access: 21.05.2017.
7. National Bank of Ukraine, Retrieved: www.bank.gov.ua. Access: 21.05.2017.
8. National Bank of Ukraine, Condition of Banks in 2013 - 2016, Retrieved: www.bank.gov.ua. Access: 07.04.2017.
9. Report on Housing Loans and Real Estate Transaction Prices AMRON - SARFiN 4/2016, no. 30, (2017). Polish Bank Association, Poland, pp.14 - 17.
10. Report Situation on the Loan Market. The results of the Survey for Credit Committee Chairpersons IV Quarter 2016, (2016), Financial Stability Department, Warsaw, pp.7.
11. Report on the Condition of Banks in 2013-2016, (2017). Office of the Polish Financial Supervision Authority, Warsaw, pp.43.
12. Report on Housing Loans and Real Estate Transaction Prices in 2014/2015/2016 AMRON - SARFiN, (2015,2016,2017). No. 22, pp. 16 , No. 26, pp. 18, No. 30, pp. 16, Polish Bank Association, Warszawa
13. Report on the Results of Activities of the State Support Fund for Youth Housing in years 2014 – 2015, (2016). PFWMBM, Kiev, p. 9 - 11

SUPPORT FOR THE AGRICULTURAL INVESTMENT IN POLAND – DOMESTIC VERSUS CAP

Alina Danilowska¹, associate professor

¹Warsaw University of Life Sciences-SGGW, Department of Economics and Economic Policy, Poland

Abstract. Although Poland's accession to the European Union (EU) in 2004 has offered the great opportunities for the modernization of the Polish agriculture in the form of access to vast range of support under Common Agricultural Policy, the state aid existing before accession was not abandoned. The aim of the paper is to assess the scope and size of the domestic support for the investment in agriculture in the context of the support for such activity under the EU Rural Development Programs (RDPs) in years 2004-2017. The examination revealed that in the period of Poland's membership in the EU, the state credit aid system has conducted operations on slightly changed rules, however, in 2015 the scope of the credit support was reduced noticeably. The comparison of the number of beneficiaries and value of the state credit aid and aid under RDPs during three financial perspectives indicates the very important relative role of preferential credits in financing the modernisation of the Polish agriculture. Nearly one quarter of market oriented agricultural holdings used preferential credits in years 2004-2017, while the small and semi subsistence farms were important group of beneficiaries of RDP. Although the difference between the nature of the state and EU aids (repayable credits and subsidised expenditures) they complemented each other. The decrease in the preferential credit lines and following fall in the number of credits, suggest that the role of the preferential credits in modernisation and restructuring of the agriculture will fall unavoidably.

Key words: subsidised credits, agricultural holdings, Common Agricultural Policy, state aid.

JEL code: Q14 Q18.

Introduction

Poland's accession to the European Union (EU) in 2004 has offered great opportunities for the modernization of the Polish agriculture as agriculture has gained access to the vast range of support under Common Agricultural Policy (CAP). However, the existing before accession forms of backing the modernisation were not abandoned. In result, since 2004, the agriculture has had possibility to benefit from two sources of the help - domestic and the EU's.

The justification of the public support for the agriculture is a well-recognised issue. Examination of the intervention basis from historical perspective indicates that the list of reasons for support for agriculture as a sector of economy or its particular areas have been extending gradually. What more, the regional differences in that area are noticed? For example, Moor (1987) indicates that the intervention in agriculture in United States in Great Depression 1929-1933² was based on the idea of equity of a fair distribution of wealth. Many Authors consider interventions as a response to the characteristics and impacts of the so called „farm problem“ that is complex phenomenon including such features of agricultural activity like for example price and income inelastic demand, small producer operations, climate conditions and other uncontrollable factors, buyers concentration and many others (Jelic M.A. et al, 2014, Brodeur C., Clerson F. (2015). Now days public support for agriculture is often seen as a solution of the problems generated by market failures like externalities, public goods and transaction costs (Marsh J., 1992, Romstad E. 2002, Jongeneel R.A., Ge L., 2010, Hagedorn K., 2008, Vanni F., 2014). Danilowska A., 2015). Many authors use the approach of the New Political Economy and see the support system as a result of the interactions between economic and political agents and rent seeking behaviour (Paapi F.U., Henning C., 1999, Nedergaard F.U., 2006, Zawojka A., 2011, Hvid, A., 2014, Poczta-Wajda A., 2016). As Katto-Andrighetto J. et al.

¹ Tel.: +48 22 5934039; fax: +48 22 5934031, E-mail address:alina_danilowska@sggw.pl

² The year of the start of a major intervention by the federal government into agriculture

(2017) noticed „public support reflects a political choice that is influenced by many factors such as the overall political and economic situation of a country, the balance of political forces at a given moment, broader societal choices and perceptions regarding food production, or the relative power of influence of civil society movements and professional lobbies”.

The aim of the research is to assess the scope and size of the domestic aid for the investment in agriculture in the context of the support for such activity under EU Rural Development Programs in years 2004-2017.

In the paper, the hypothesis „The domestic support for investment in agriculture has continue to be important for agriculture modernisation and restructuring after Poland’s accession to EU” is verified.

The research concerns some problems (i) the evolution of the domestic support in Poland after Poland’s accession to EU, (ii) the scope and value of the domestic aid for agriculture versus EU one.

Materials and methods

The Agency for Restructuring and Modernisation of the Agriculture (ARMA) is the main source of information and data. It is responsible for implementation of instruments offered under Common Agricultural Policy (CAP) as well as providing the support from national funds.

To achieve the paper’s aim the comparative method was applied.

In the paper expressions „agricultural holding” and „farm” are used interchangeably.

Research results and discussion

The government aid for agriculture before 2004 in Poland

With the accession to the EU, the Polish agriculture has gained access to different measures offered under CAP. They have enlarged the range of support forms the Polish farmers were offered before 2004. It is worth to underline that the domestic aid had long tradition in Poland. It existed during the communistic period as well, and next, it was used during transition to market economy quite early as in April of 1990. It took form of subsidised bank credits granted to farmers for financing the purchase of current means of production and some kinds of investment.

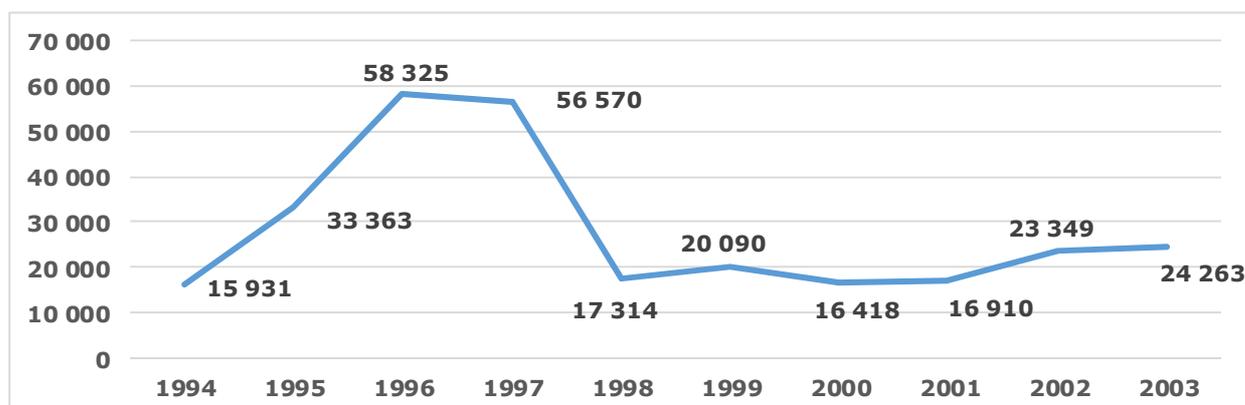
In 1994, the system of the government aid for modernisation and restructuring of the agriculture was brought into operation. For management of the system the state agency - Agency of Restructuring and Modernisation of Agriculture was established. The credits, so called preferential credits, with subsidy to interest rate were the main form of the support. The credits were granted by banks that signed agreement with ARMA from their own funds and on their own risk. Although the credits for current means of production were continued¹, the strong emphasis on support for the investment was given. Credits were allowed within lines of credits limits. There were three the most popular ones: basic investment credit line, line for young farmers and line for land purchase. The credit lines varied by targets, eligible agents and the level of subsidies. The scope of the credits was nearly all-encompassing. They were available for very vast range of investment in agriculture and for investment in some food industries. It stemmed from the agricultural policy that was trying to help to overcome the relative technological disadvantage of the Polish agriculture and unfavourable farm structure². Beside regular subsidised credits for investment, the system encompassed the investment and current credits for overcoming effects of natural disasters. The credits were available to agricultural holdings (individual farmers, agricultural enterprises) and to enterprises operating in

¹ The ARMA was responsible for organisational issues connected to granting the working credits on behalf Ministry of Agriculture.

² In 1990 the number of private farms was amounted to 2 138 thousand, the average area of agricultural land per farm was 6.3 ha. 52.8% of the farms owned less than 5 ha of land and only 6.1% more than 15 ha (Central Statistical Office, 1991).

food industries. The terms of subsidised credits were very advantageous comparing to market terms of commercial credits especially in the 90ties (Danilowska A., 2004). To restrain banks from charging very high interest rate the cap on the interest rate was introduced linked to central bank discount rate by multiplier. In the beginning, it was set up at 1.5, but it was changed several times. Borrowers paid only 0.5 bank interest rate in the case of basic investment credits, and 0.25 central bank discount rate in the case of credits for purchase of agricultural land or granted for farmers less than 40 years old.

The number of the granted subsidised investment credits varied year to year (Fig. 1). In the beginning it rose quickly from nearly 16 000 in the first year to 58 325 two years later, in 1997 it fell slightly to 56 570 and next in 1998 it dived to 17 314 because of the reduction of the credit line number and the funds for new credits. During the following five years it fluctuated noticeably and in 2003 got 24 263.



Source: author's calculations based on Annual Reports of ARMA

Fig. 1. Number of preferential investment credits granted to farmers in 1994-2003

In total, during 1994-2003 283 533 preferential investment credits were granted to farmers. Taking into consideration that in 2002 the total number of farms conducting activity in Poland was amounted at 2 172 205 (Eurostat, 2002) and the examined period is 10 years long, the number of credits is not stunning. But assuming that only about 750 000 market oriented farmers (FADN, 2004) were interested in such credits the evaluation of their role changes for much more positive. It is worth to mention that during the years 1994-2003 hundreds of thousands subsidised agricultural working credits were granted every year in parallel.

The government aid for agriculture after accession to the EU

For the first three years after accession to the EU, the preferential investment credit system continued to operate on the unchanged terms on the basis so-called „existing aid”. The scope of the investment credits was even boarded as two new credit lines were introduced.

Since May of 2007, the system was adjusted to the Community guidelines for State aid in the agricultural and forest sectors 2007 to 2013 (European Commission, 2006). Although the reduction of the number of credit lines from thirteen to nine took place, the scope of credits remained nearly the same as the most popular credit lines sustained operations. What more, gradually in the following years new credit lines were set up again, however, they did not draw much attention of potential borrowers. The terms of credits changed slightly. A new regulation introduced the ratio of intensity of support¹. The limit of maximum value of subsidies was set up at a 40-75 % of credit value. The

¹ The maximum level of subsidies per agent.

level depended on the kind of investment credit line. In 2010, a new credit tool was introduced. It was the credit with the repayment of the part of credit capital by state.

In 2015, Agency implemented new rules for the operating of subsidised credit system that were adjusted to New perspective of domestic support for 2015-2020 and new regulations of EU on de minimis support in agriculture (European Commission 2013; European Commission 2014). The number of credit lines was decreased to five. Four of them was connected to agriculture, one to food processing. The interest rate cap was tied to WIBIOR¹ and its maximal level was set up at WIBOR + 2.5 percentage points but not less than 3 %. The interest rates for the borrowers were unified at 0.67WIBOR regardless the credit line². In 2017 the credits were granted under six credit lines. Two of them were designed for typical agricultural investment, one for food processing, two for overcoming the effects of natural disasters and one for repayment liabilities of agricultural enterprises –producers of milk, fruits since August 7th to April 30th 2016.

Credit state aid for investment in agriculture and CAP support

Agriculture of the EU members gets support within of Common Agricultural Policy. Since accession, the Polish farmers has been enabled to participate in measures offered during three financial perspectives: 2004-2006³, 2007-2013 and 2014-2020. Subsidies to the expenditures for indicated activities are the main form of the support.

In financial perspective 2004-2006 agriculture in Poland were offered aid within Rural Development Programme for 2004-2006 (RDP 2004-2006) and Sectoral Operational Programme (SOP). Under RDP 2004-2006, the Polish agricultural holdings were eligible to two groups of measures: (i) the same measures like in „old“ EU members (15): support for agricultural holdings in less favoured areas (LFA), structural pensions, support for agricultural-environmental activities and improving animal health and welfare, afforestation of agricultural land, (ii) measures designed for new EU members: support to semi-subsistence farms, support to group of producers, support for adjustment of agricultural holdings to the EU standards, technical support. These measures concerned different important issues but generally supported very limited scope of investment in agriculture. Only the support to semi-subsistence farms and for adjustment of agricultural holdings to the EU standards could be treated as an aid for investment.

Contrary to RDP 2004-2006, the Sectoral Operational Program (SOP) - „Restructuring and Modernization of the Food Sector and Rural Development“ had pro-investment character. Program offered measures like: investment in agricultural holdings, setting up of young farmers, improving processing and marketing of agricultural products, diversification of agricultural activities and activities close to agriculture to provide multiple activities or alternative incomes, development and improvement of the infrastructure related to agriculture. Two first measures were strictly devoted for modernisation and restructuring the agricultural holdings whereas others supported this process indirectly.

In 2004-2006, alongside the support from aforementioned measures farmers could applied for subsidised investment credits from lines: Basic investment credits (IP), Credits to young farmers (MR), Credits for purchase of agricultural land (KZ), Credits for launching or enlargement of family farm (GR), Credits for farm establishing or equipment within the Ministry of Agriculture program of

¹ WIBOR – Warsaw Interbank Offered Rate.

² Except the credits for overcoming the effects of serious natural disasters. In this case the interest rate is established at 1.5%.

³ Poland joined the EU during the financial perspective 2000-2006.

settlement on state land (OR), Credits for new technologies (NT) (Table 2), and some credit lines for food processing. The first three were quite popular, the importance of the others was marginal.

Table 1

Number and value of investment subsidised investment credits versus number and value of subsidised investment projects in agriculture under RDP 2007-2013 (December 2014)

Specification	Number	Value ¹ (000'000 PLN)
Preferential credits	63 952	6 286
RDP 2004-2006:		
• support to semi-subsistence farms	157 600	1 316
• support for adjustment of agricultural holdings to the EU standards	71 300	2 430
SOP:		
• investment in agricultural holdings	24 231	2 491
• setting up of young farmers	14 151	701
• TOTAL	267 282	6 945

¹ in the case of preferential credits the value of granted credits in nominal terms

Source: Annual Reports on Activity of the ARMA (2004-2007). ARMA. Warsaw 2005-2008.

As data in the Table 1 indicate, the agricultural holdings were very interested in the support under SOP and RDP 2004-2006, especially in the support for semi-subsistence farms. It stemmed from the very advantageous terms of that measure. Such farms were generally less interested in preferential credits with the necessity of the repayment of capital. Although the number of preferential credits was four times lower, the value of the credits were only 10 % lower. So the credits were the valuable source of the investment financing equal CAP investment measures.

Table 2

Credit lines supporting agricultural land purchase available in consecutive subs financial perspectives

Credit line	2004-2006			2007-2013							2014-2020			
	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
IP	x	x	x	x	x	x	x	x	x	x	x	x	x	x
KZ	x	x	x	x	x	x	x	x	x	x	x	x	x	x
MR	x	x	x	x	x	x	x	x	x	x	x			
GR	x	x	x	x	x	x	x	x	x	x	x			
OR	x	x	x	x	x	x	x							
NT	x	x	x	x	x	x	x	x	x	x	x			
CSK ²							x	x	x	x	x	x		

¹ IP - Basic investment credits, since 2015 acronym RR; KZ - Credits for land purchasing, since 2015 acronym Z; MR - Credits to young farmers, GR - Credits for launching or enlargement of family farm, OR - Credits for farm establishing or equipment in the frame of Ministry of Agriculture program of settlement on state land, NI - credits for new technologies, CSK - Credits with the repayment of part of capital, since 2015 acronym MRcsk

² since 2015 available only to young farmers for land purchase

Source: author's research based on Annual Reports of ARMA

In next financial perspective 2007-2013, the system of CAP was reformed and the support for the agriculture was arranged under the Rural Development Programme for 2007-2013 (RDP 2007-2013). It offered 21 measures under four axes but as in the financial perspective 2004-2006, the direct support for the investment in agriculture was offered only by some measures like: „Setting up young farmers“, „Modernization of farms“ and „Farmers' participation in the quality food systems“. They

were quite similar to measures from the former financial perspective. The scope of the aims of investment that could be subsidised under these measures was rather vast.

In 2007-2013, agricultural holdings were offered the same credit lines like before (Table 2). Moreover, in 2010 as aforementioned credit with subsidy to the repayment of the capital was introduced.

Table 3

Number and value of investment subsidised investment credits versus number and value of subsidised investment projects in agriculture under RDP 2007-2013 (December 2014)

Specification	Number	Value ¹ (thousand PLN)
Preferential credits	98 578	18 518.4
RDP 2007-2013		
• setting up young farmers,	31 024	2 381.5
• modernization of farms,	66 077	9 464.7
• participating farmers in the quality food systems	26 527	51.9
TOTAL	123 628	11 898.1

¹ in the case of preferential credits, the value of granted credits in nominal terms

Source: Annual Reports on Activity of the ARMA (2007-2014). ARMA. Warsaw 2008-2015.

The comparison of the number and values of subsidised credits with the number and value of projects under RDP 2007-2013 highlights the very important role of the credits in examined years. Although their number was lower than number of projects supported under RDP 2007-2013, the value was about 55 % higher. It was a result of the very broad scope of the credits that could finance nearly every kind of investment. It is worth to mentioned that such important investment like the purchase of agricultural land could be financed only by credits.

In current financial perspective 2014-2020, the Polish RDP 2014-2020 14 measures are envisaged for six priorities. The measure M04 - Investments in physical assets directed for modernization and farm restructuring has the highest proportion in the total indicative planed expenditure (the EAFRD support and the national contribution) amounted at 25 % (The European..., 2015). Under this measure the operations „modernization of farms“, „investment in farms located on Areas of Natural Constrains“, „investment in farms located on Areas of Natura 2000“ are of strict investment character, whereas in measure M05- Damage/restoration/prevention actions operation „restoration of agricultural production capability“. Moreover, under measure M06 „Farm & business development“ the sub measures „start-up aid for young farmers“ and „restructuring of small farms“ can be treated as support for investment in agriculture.

In the first year of the financial perspective 2014-2020, the system of preferential credit offered the same credit lines as in former perspectives. As aforementioned, in 2015 the new regulation was introduced and the number of preferential investment credit lines were abandoned. Agricultural holdings can obtain the investment subsidised credit only under lines: basic investment and land purchase.

Number and value of investment subsidised investment credits versus number and value of subsidised investment projects in agriculture under RDP 2014-2020 in years 2014-2017 (December 2017)

Specification	Number	Value ¹ (000'000 PLN)
Preferential credits	14 867	4 696
RDP 2014-2020:		
• farm modernization	13 526	2 813.6
• investment in farms located on Nitrate Vulnerable Zones	102	4.0
• investment in farms located on Natura 2000 areas	0	0.0
• restoration of agricultural production capability	242	7.2
• start-up aid young farmers	8 863	886.3
• restructuring of small farms	8 451	507.1
• TOTAL	31 184	4 218.2

¹ in the case of preferential credits, the value of granted credits in nominal terms

Source: Annual Reports on Activity of the ARMA (2004-2007). ARMA. Warsaw 2005-2008.

The radical reduction of possibility to use the preferential credits for financing the investment in agriculture caused the immense decrease in the number and the value of subsidised credits granted by banks during 2014-2017 (Table 4). But what is remarkable, the value of the credits is higher than the value of achieved agreements within the enlisted in the Table 4 measures (operations).

The comparative statistics of the interest of agricultural agents in the preferential investment credits and participation of farmers in investment measures offered under SOP and Rural Development Programmes in 2004-2017 is shown in Table 5. Data concern only indicated measures.

Table 5

Number and value of investment subsidised investment credits versus number and value of subsidised investment projects in agriculture under RDP in 2004-2017

Specification	Number	Value ¹ (thousand PLN)
Preferential credits	177 397	29 500.4
SOP, RDP 2004-2006, 2007-2013, 2014-2020	298 466	23 061

¹ in the case of preferential credits the value of granted credits in nominal terms

Source: Annual Reports on Activity of the ARMA (2004-2007). ARMA. Warsaw 2005-2008.

The data show that although the total number of preferential investment credits is much lower in comparison with number of the subsidised projects within the EU measures, the total value of the granted credits is higher noticeably. It illustrates the importance of the state aid for investment in agriculture during examined period. However, as data for current financial perspective suggest, the role of the preferential credits falls gradually mainly due to reduction of the credit lines.

Conclusions

- 1) In the examined years 2004-2017, the Polish farmers were given support from the state and within the CAP. The tools, terms and scope of the support from these two sources were different.
- 2) The state credit aid system in years of Poland's membership in the EU has been nearly similar like credit support before 2004, however, since 2015 the scope of the credit aid has been reduced noticeably.
- 3) The comparison of the number and value of the aid given within state credit aid system and RDP during three financial perspectives indicates the very important relative role of preferential credits in financing the modernisation of the Polish agriculture.

- 4) Nearly one quarter of market oriented agricultural holdings used preferential credits in years 2004-2017 while, the small and semi subsistence farms were important group of beneficiaries of RDP.
- 5) Although the substantial difference between the nature of the state and EU aids (repayable credits and subsidised expenditures), they complemented each other.
- 6) The decrease in the number of preferential credit lines and fall in the number of granted credits suggest that the role of the preferential credits in modernisation and restructuring of the agriculture will fall unavoidably.

Bibliography

1. ARMA. (1995-2018). *Annual Reports on Activity of the ARMA*. (1994-2001). Warsaw.
2. Brodeur, C., Clerson, F. (2015). *Is Government Intervention in Agriculture Still Relevant in the 21st Century? Final Report*. Groupe AGECO, Quebec, p, 54.
3. Central Statistical Office. (1991). *Statistical Yearbook 1991*. Warsaw, p.596.
4. Danilowska, A. (2004). Agricultural Credit Market in Poland – Experiences in Market Economy, *Studies on the Agricultural and Food Sector in Central and Eastern Europe*. Volume 25. „*The Role of Agriculture in the Central and Eastern European Rural Development: Engine of Change or Social Buffer?*?. IAMO. Halle, pp. 101-118.
5. Danilowska, A. (2015). Provision of Public Goods by Agriculture in Poland. *Economic Science for Rural Development*, Volume 37, pp. 142-151.
6. European Commission. (2006). *Community guidelines for State aid in the agriculture and forestry sector 2007 to 2013*. Retrieved: <https://publications.europa.eu/en/publication-detail/-/publication/e3a5a48b-ee54-4847-bad0-4ef947599d85/language-en>. Access: 12.01.2019.
7. European Commission. (2013). *Commission Regulation (EU) No 1408/2013 of 18 December 2013 on the Application of Articles 107 and 108 of the Treaty on the Functioning of the European Union to de minimis Aid in the Agriculture Sector*. Retrieved: <https://publications.europa.eu/en/publication-detail/-/publication/a2525e65-6c74-11e3-9afb-01aa75ed71a1/language-en>. Access: 12.01.2019.
8. European Commission. (2014). *Commission Regulation (EU) No 702/2014 of 25 June 2014 declaring certain categories of aid in the agricultural and forestry sectors and in rural areas compatible with the internal market in application of Articles 107 and 108 of the Treaty on the Functioning of the European Union*. Retrieved: <https://publications.europa.eu/en/publication-detail/-/publication/c011ecad-0102-11e4-831f-01aa75ed71a1/language-en>. Access: 12.01.2019.
9. Eurostat. (2019). *Agricultural Census in Poland*. Retrieved: https://ec.europa.eu/eurostat/statistics-explained/index.php?title=Archive:Agricultural_census_in_Poland. Access: 8.01.2019.
10. FADN. (2004). *The Results Obtained by Individual Agricultural Holdings Conducting Accountancy in the Year 2003*, Warsaw, p. 48. Retrieved: http://fadn.pl/wp-content/uploads/2013/06/wyniki_2003_ang_011.pdf. Access: 5.01.2019.
11. Hagedorn, K. (2008). Particular Requirements for Institutional Analysis in Nature-Related Sectors, *European Review of Agricultural Economics*, Volume 35 (3), pp. 357-384.
12. Hvid, A. (2014). Agricultural Rent-seeking in Developing Countries: an Empirical Investigation, *Journal Applied Economics Letters*, Volume 21, Issue 14, pp. 951-954.
13. Jelic, M.A., Durovic, J.M., Radojicic, M., Radojicic, J. (2014). Reasons for Government Intervention in Agriculture, *Annals of the University of Oradea Fascicle of Management and Technological Engineering*, Issue 3, pp.174-179.
14. Jongeneel, R.A., Ge, L. (2010). *Farmers' Behavior and the Provision of Public Goods: Towards an Analytical Framework*. Wageningen, Statutory Research Tasks Unit for Nature & the Environment (WOT Natuur & Milieu), WOTwerkdokument 203, p. 64.
15. Katto-Andrighetto, J., Bowen, D., Varini, F., D'Amico, S., Kirchner, C. (2017). *Guidelines for Public Support to Organic Agriculture*, IFOAM-Organics International. Retrieved: https://www.ifoam.bio/sites/default/files/policy_toolkit_main_report.pdf. Access: 10.01.2019.
16. Marsh, J. (1992). *Agricultural Policy Reform and Public Goods*. OCDE/GD(92)56, Paris. Retrieved: [http://www.oecd.org/officialdocuments/publicdisplaydocumentpdf/?cote=OCDE/GD\(92\)56&docLanguage=en](http://www.oecd.org/officialdocuments/publicdisplaydocumentpdf/?cote=OCDE/GD(92)56&docLanguage=en). Access: 3.01.2019.
17. Moor, T.G. (1987). *Farm Policy: Justifications, Failures and the Need for Reform*, Federal Reserve Bank of St. Louis. Retrieved: https://files.stlouisfed.org/files/htdocs/publications/review/87/10/Farm_Oct1987.pdf. Access: 5.01.2019.
18. Nedergaard, p. (2006). Market Failures and Government Failures: A Theoretical Model of the Common Agricultural Policy. *Public Choice*, Volume 127, Issue 3-4, pp. 85-405.
19. Paapi, F.U., Henning, C. (1999). Organization of Influence on the EC's Common Agricultural Policy: A Network Approach. *European Journal of Political Research*, Volume 36, pp. 257-281.
20. Poczta-Wajda, A. (2016). Interest Groups and Rent Seeking in Agriculture – a Theoretical Approach, [in:] B. Czyzewski (Ed.), *Political Rents of European Farmers in the Sustainable Development Paradigm International, National and Regional Perspective*, PWN, Warsaw, pp.48-58.

21. Romstad, E. (2002). *Policies for Promoting Public Goods in Agriculture*. Xth EAAE Congress. Zaragoza 28-31 August 2002. Retrieved: <http://agecon.lib.umn.edu>. Access: 10.01.2019.
22. The European Network for Rural Development. (2015). *2014-2020 Rural Development Programme: Key Facts & Figures POLAND*. Retrieved: https://enrd.ec.europa.eu/sites/enrd/files/pl_rdp_qnt_summary_v1_2.pdf. Access: 15.01.2019.
23. Vanni, F. (2014). *Agricultural Public Goods. The Role of Collective Action*. Springer, p 150.
24. Zawajska, A. (2011). Rent-Seeking and Lobbying in the EU's Common Agricultural Policy, *Roczniki Nauk Rolniczych (Annals of Agricultural Sciences)*, Volume 98, Issue 3, pp. 63-72.

ESTIMATION OF CAPITAL OF AGRO-INDUSTRIAL ENTERPRISES AS AN ECONOMIC RESOURCE

Nadiia Davydenko¹ Prof. dr. hab.; Olha Kliuchka² PhD; **Julia Kulbach**² PhD student

¹National University of Life and Environmental Science of Ukraine; ²University of State Fiscal Service of Ukraine

Abstract. Modern management of agroholding is based not only on the management of its economic activity but capital management in order to maximize it as well. The possibility of a systematic calculation of the aggregate capital value for the purpose of strategic management gives a clear understanding of the correct way of further development in which the company is located. Therefore, the purpose of the article is to determine the amount of aggregate capital, its structure in leading agroholdings of Ukraine, and on the basis of analytical studies of the development of proposals for the possibility of increasing the aggregate capital value. The achievement of the research goal was based on a systematic approach and a comparative economic analysis. During the study quantitative and structural analysis of processes and phenomena was applied.

The study made it possible to establish that for 2010 - 2017 there is a clear tendency to increase the size of aggregate capital of agroholdings, what is connected with the growth of the volume of own capital. The share of equity in agroholdings increased due to the growth in the amount of reserve capital and retained earnings. The practical value of the results obtained is determined by the fact that the conclusions and proposals can be used to more accurately and objectively calculate the value of enterprises, which in turn can become the basis for making optimal financial decision. This material can be used to make strategic management decisions by managers of agricultural holdings.

Keywords: capital, total capital, structure of capital, equity, profitability.

JEL code: D23, Q13, Q14

Introduction

Taking into account Ukraine's aspiration to become a part of the EU, and in conditions of European integration and free trade, products of domestic producers of agricultural products should be high-quality and competitive. Under such conditions, the effective operation of agroholdings isn't possible without increasing the equity capital and attracting it from the outside. After all, market value, financial stability and solvency of the enterprise, the level of risk of investment activity of enterprises depends on the efficient management of capital.

The category "capital" is one of the fundamental and rather complex, and its content has been developed in the scientific works of O. Bem-Bawerk, M. Blaug, F. Wieser, C. Wicksell, K. Marx, C. Menger, W. Petty, D. Ricardo, A. Smith, D. Hicks and others. In the writings of the above authors, the basic categories of the studied scientific issues are considered, the classification of capital expands, the methodological bases of its evaluation are improved, the mechanisms for ensuring the efficiency of the formation and use of capital are developed. At the same time, conceptual questions regarding the basic economic logic of determining the effectiveness of capital management and its evaluation are considered fragmentary.

An assessment of the capital structure is one of the most important and complex tasks that are being solved in the financing process. An immediate response to changes in the external and internal environments requires a significant upgrade of many management functions. In this connection, the role of analysis is growing first of all.

The analysis allows determining the optimal structure of enterprise capital. At the same time, the interaction of the subjects of a market economy is primarily due to economic interest - an increase in the economic efficiency of the activity. After all, the most effective management of financial resources can be achieved using a policy of asset financing, the main objectives of which is to increase their profitability. Much of the theoretical development of the analysis of the structure of capital, as a branch of knowledge, does not take into account combinatorial methods for analysing both

empirical and static data, eliminating the disadvantages of historical analysis. The relevance of the problem identified the purpose and objectives of this article.

Therefore, the purpose of the article is to determine the amount of aggregate capital, its structure in leading agroholdings of Ukraine, and on the basis of analytical studies of the development of proposals for the possibility of increasing the aggregate capital value.

Main research objectives:

- to determine the dynamics of the aggregate capital amount of leading agriholdings in Ukraine and to determine the reasons that led to changes in its value;
- analyse the shares of the main components of the aggregate capital of agricultural holdings;
- analyse the efficiency of using agroholdings of the total capital.

Information sources: scientific articles available in international editions, annual financial reports of leading agroholdings of Ukraine.

Based on the financial statements of Ukraine's agroholdings, the dynamics of aggregate capital, its structure, and the profitability of equity capital of leading agroholdings were calculated.

The achievement of the research goal was based on a systematic approach and a comparative economic analysis. During the study quantitative and structural analysis of processes and phenomena was applied.

Questions of the assessment of capital and its importance for the effective operation of agricultural holdings were considered in the works of N.O. Kurovskaya (Kurovskaya N., 2014), who explores the essence and theoretical methodological substantiation of the formation of agricultural enterprises capital. Nazarenko I. M. and Orehova A.I. (2015) explore the current state of capital provision of agricultural enterprises in Ukraine and its structure. O.O. Lelyuk examines the main criteria for optimizing the capital structure of agrarian enterprises (Lelyuk O., 2010). We consider this issue to be very relevant and necessary for further research.

Research results and discussion

Successful activity of business entities in any type of ownership depends on the availability of capital and the efficiency of its use, after all, capital is the basis of the production process since it determines the financial potential. Capital is a basic component of the success of any business, provided that the main purpose of the business is long-term economic growth.

The size of capital is not only a formal criterion for assessing enterprise sustainability but also a subjective characteristic of owners' confidence in their business since they have invested in their own funds (Nazarenko I., Orehova A., 2015). All this gives us reason to say once again that the issue of capital adequacy is relevant.

So as to determine the real volume of aggregate capital, we propose to consider the dynamics of the aggregate capital of Ukrainian agroholdings in the dynamics in order to find out the main trends (Table 1).

The data in Table 1 gives reason to assert that in 2014 all investigated agroholdings increased the amount of aggregate capital, which testifies to their successful and productive activity. The turning points were 2014 and 2015 - the time of severe economic upheavals in Ukraine, which negatively affected the value of the aggregate capital of all leading agroholding.

**The dynamics of the aggregate capital of Ukrainian agroholdings
 in 2010-2017 (millions of \$)**

Years		Kernel	Astarta	Milkiland	Avangard	IMC	MHP
	2010	1124.8	352.6	267.9	1079.0	87.4	1574.0
	2011	1572.6	567.9	327.7	1305.7	138.7	1944.4
	2012	2119.0	636.4	324.4	1578.3	244.5	2488.1
	2013	2366.9	693.0	336.5	1818.9	361.9	2768.1
	2014	1919.0	506.5	239.9	1038.3	183.8	2293.5
	2015	1465.6	491.6	186.6	624.1	174.6	2075.7
	2016	1509.3	574.6	168.5	529.5	158.9	2075.9
	2017	2009.1	533.3	160.4	512.8	180.1	2278.1
Conditional divergence, %	2017/2016	33.1	-7.2	-4.8	-3.2	13.3	9.7
	2017/2010	78.6	51.2	-40.1	-52.5	106.0	44.7

Source: author's calculations based on financial statements of agroholdings

In particular, Milkiland and Avangard reduced their equity by more than 60 %, Kernel reduced its equity by almost 14 %, and MHP by about 30 %. Another situation is observed in the Astarta holding company, which has an increase in own capital by 9 %, but at the same time the size of the current obligations of the holding is growing by 34 %, accordingly, this is not enough to cover the reduction of long-term obligations by 73 %. The volume of obligations of "IMC" decreased by 55 %, so this agroholding was the most successful of the sample.

Starting from 2016, the dynamics of aggregate capital shows an increase, what indicates an improvement in the level of financial stability in agroholdings: «Kernel» - by 33 %, «IMC» - by 13 %, «MHP» - by 9.74 %, by increasing equity and long-term liabilities.

However, we are convinced that the efficiency of an enterprise depends on the rational use of available capital. After all, following certain proportions of equity and borrowed capital, it is possible to ensure the solvency of the enterprise, the necessary level of financial independence and profitability (Koshelyok V., Tereschenko O., 2016).

Therefore, we will further analyze the structure of equity and borrowed capital on the basis of the financial statements of leading agroholdings (Table 2).

As we see, according to Table 2, the structure of capital of leading agroholdings in Ukraine has changed. Thus, «Astarta», «Milkiland», «IMC», «MHP» increased their share of equity by 2017. Equity of the share capital of Astarta Agroholding increased by 24 % due to the growth in retained earnings. In "Milkiland", reserve capital increased by 14.7 %. an increase in the amount of equity capital "IMC" is associated with the implementation of the "Plan for stimulating management", in which the issue of shares led to an increase in authorized capital by \$ 3 million. The equity growth in "MHP" is due to an increase in retained earnings almost by 30 % and a reserve capital by 16 %.

For a more detailed assessment of the capital of leading Ukrainian agroholdings, we propose to analyse the efficiency of the use of aggregate capital, as an important indicator in determining the financial condition of the enterprise is the indicator of profitability. Profitability as a general indicator of the economic efficiency of agricultural production reflects the efficiency of the resources consumed by the industry.

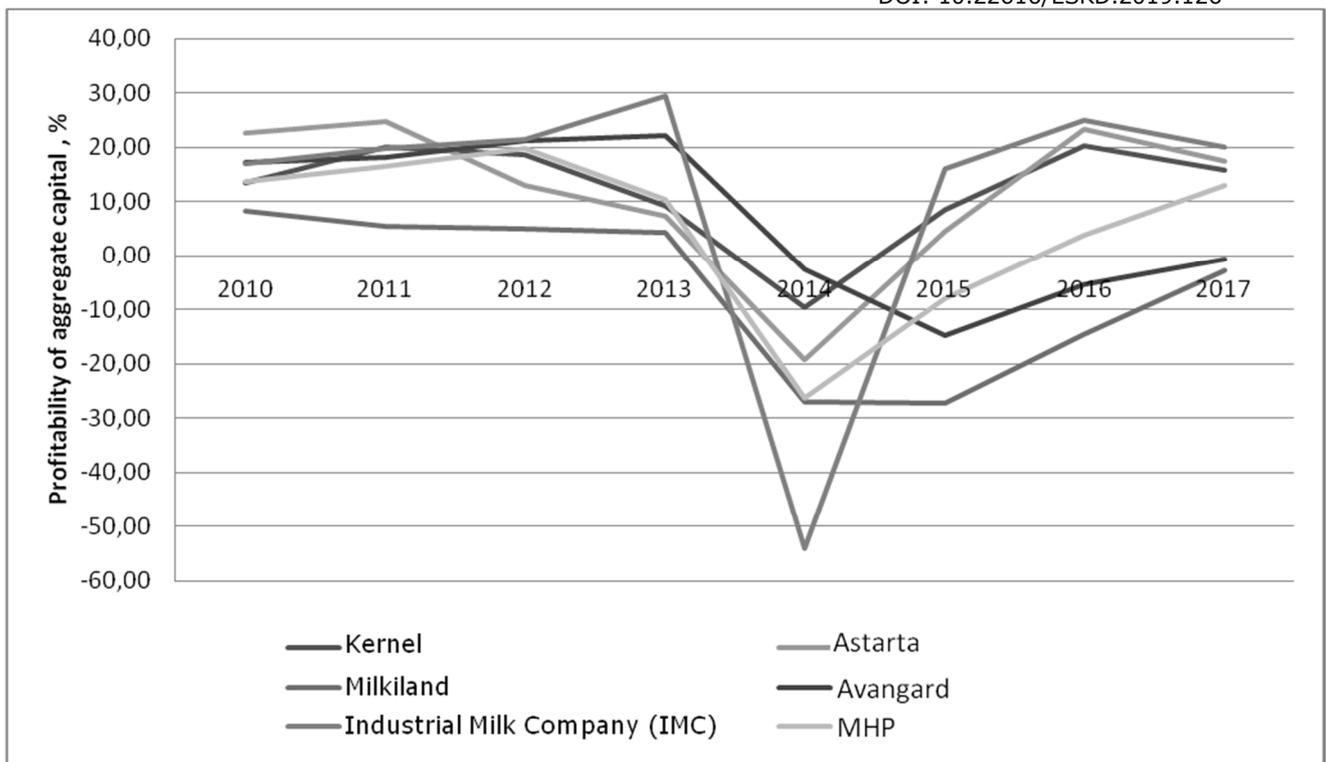
**Analysis of the structure of the capital of agricultural holdings
 in 2010-2017, %**

Indicator	Years								Conditional divergence	
	2010	2011	2012	2013	2014	2015	2016	2017	2017/ 2016	2017/ 2010
Kernel										
Equity capital	53.8	63.4	57.1	57.1	53.7	60.8	66.1	57.6	-8.4	3.8
Borrowed capital	46.2	36.6	42.9	42.9	46.3	39.2	33.9	42.4	8.4	-3.8
Long-term liabilities	14.9	11.5	21.7	13.1	15.2	8.0	9.2	27.8	18.5	12.8
Astarta										
Equity capital	59.3	54.1	51.5	53.5	43.5	48.9	61.5	65.2	3.7	5.9
Borrowed capital	40.7	45.9	48.5	46.5	56.5	51.1	38.5	34.8	-3.7	-5.9
Long-term liabilities	19.3	22.6	26.9	19.2	24.4	6.7	12.9	11.1	-1.9	-8.3
Milkiland										
Equity capital	45.9	50.6	55.1	52.1	39.4	19.3	4.1	8.1	4.0	-37.8
Borrowed capital	54.1	49.4	44.9	47.9	60.6	80.7	95.9	91.9	-4.0	37.8
Long-term liabilities	31.5	22.6	24.0	15.5	10.0	10.8	16.0	15.4	-0.7	-16.1
Avangard										
Equity capital	69.2	71.9	74.0	79.6	62.2	37.7	26.2	16.5	-9.7	-52.7
Borrowed capital	30.8	28.1	26.0	20.4	37.8	62.3	73.8	83.5	9.7	52.7
Long-term liabilities	22.0	16.8	13.1	14.5	7.9	47.8	65.0	14.4	-50.6	-7.7
IMC										
Equity capital	76.9	78.6	52.4	42.5	14.8	34.4	40.9	57.8	16.8	-19.1
Borrowed capital	23.1	21.4	47.6	57.5	85.2	65.6	59.1	42.2	-16.8	19.1
Long-term liabilities	13.7	12.4	19.7	14.1	38.4	25.5	36.3	17.2	-19.1	3.4
MHP										
Equity capital	42.6	47.6	48.2	45.1	41.2	32.4	33.4	43.3	9.9	0.7
Borrowed capital	57.4	52.4	51.8	54.9	58.8	67.6	66.6	56.7	-9.9	-0.7
Long-term liabilities	42.0	36.6	33.0	43.0	40.1	49.6	48.3	50.0	1.8	8.0

Source: author's calculations based on financial statements of agroholdings

Figure 1 shows the dynamics of the profitability indicator of aggregate capital of agroholdings for 2010-2017.

It shows approximately the same trend in all investigated agroholdings. Profitability of aggregate capital tends to decrease since 2013, due to the reduction of net profit, in 2014 all investigated agroholdings were loss-making, so the profitability of all leading agroholdings was negative. In 2015, the situation was better, aggregate capital of agricultural holdings has been used more effectively.



Source: author's calculations based on financial statements of agroholdings

Fig. 1. **Dynamic of profitability of aggregate capital of the Ukrainian agroholdings since 2010 to 2017**

At the end of 2017, three agroholdings achieved a growth in the return on aggregate capital, in particular, Milkiland increased the indicator by 11.8 %, the net loss of the holding fell by 81 %, due to the fact that Milkiland concentrated its efforts on the sale of dairy products with high added value, as well as new export markets.

The profitability of the aggregate capital of the agroholding Avangard increased by 4.6 % and amounted to -0.7 %, while the Avangard holding managed to reduce its net loss by 87 %. The operational activity of the "Avangard" agroholding was positively influenced by the seasonal growth in demand and prices for eggs in Ukraine, optimization of the cost price by updating the livestock, which led to increased productivity. The profitability of MHP's aggregate capital increased by 9.2 %, what is the result of the profitable activity of the company. Thus, according to the financial statement of agroholdings in 2017, it received 204 million dollars of net profit, what is by 3.4 times more than in 2016.

However, a number of investigated agroholdings reduced the profitability of aggregate capital by reducing the amount of net profit, including Kernel by 4.2 %, IMS by 5 %, Astarta by 5.9 %, what indicates an ineffective policy of managing capital in a post-crisis period and needs to develop proposals to address identified gaps.

Conclusions, proposals, recommendations

- 1) The conducted research gives grounds to assert that the value of aggregate capital of agroholdings is gaining a tendency to increase. It is established that this is due to an increase in the volume of equity. Starting from 2016, the dynamics of aggregate capital shows an increase, what indicates an improvement in the level of financial stability in agroholdings: «Kernel» - by 33 %, «IMC» - by 13 %, «MHP» - by 9.74 %.
- 2) Most of the leading Ukrainian agroholdings have increased their share of equity, while in half of them, the share of equity in the aggregate structure is more than 50 %. This indicates that the

leading Ukrainian agroholdings use mostly internal sources of financing, in particular, retained earnings and reserve capital. We believe that this aspect is positive because it indicates an increase in the level of financial independence and the stability of agroholdings.

3) However, for those agroholdings that have reduced the profitability of equity, we recommend the following measures:

- it is expedient for financial managers to consider the possibility of using along with internal and external sources of funding because attracting debt capital will significantly increase the financial potential of the enterprise due to the formation of an additional volume of assets;
- carry out continuous monitoring of the structure of the holding's capital in order to achieve the optimal balance between own and borrowed capital and maintain this ratio at the appropriate level.

The results of the analysis of the structure of the capital of agricultural holdings in Ukraine make it possible to assess the financial risk of attracting external sources of capital, establish a profile of the term of payments (regulation of dividend payments), refinancing the risks associated with the structure of debt, as well as the duration and ratio of short-term and long-term indebtedness.

Bibliography

1. Davydenko N.M. (2012). Financial Management. Kiev.
2. Kirsanova T., Kolyada N. (2010). Enterprise Equity Management System. Sumy State Bulletin the University. Series: Economics.1, Volume 2, pp. 58-63.
3. Kurovskaya N. (2014). Formation of Capital in the Process of Securing Financial Activity of Agricultural Enterprises. Bulletin of ZNAMEU.1-2 (43), Volume 2, pp. 170-176.
4. Lelyuk O. (2010). Optimization of the Capital Structure of Agrarian Enterprises. Agrosvit, Volume 21, pp. 36-41.
5. Moskalenko V., Plastun O. (2013). Comprehensive Assessment of the Financial Condition of the Company as a Basis for Diagnosing its Bankruptcy. Actual Problems of the Economy, Volume 6, pp. 181-191.
6. Nazarenko I., Orekhov A. (2015). Analysis of the Current State of Provision of Capital to Agricultural Enterprises in Ukraine. Scientific Herald of Uzhhorod National University, Vol. 4, pp. 56-61.
7. Walleys V., Tereshchenko O. (2016). Optimization of the Ratio of Own and Borrowed Capital of the Enterprise. Scientific Herald of Kherson State University, Volume 21, ch.1, pp. 116-121.

PRO-EUROPEAN ORIENTATION OF UKRAINE: ADAPTATION OF THE AGRICULTURAL POLICY OF UKRAINE TO THE CONDITIONS AND REQUIREMENTS OF THE EUROPEAN UNION

Nadiia Davydenko¹ Prof. dr hab.; **Olena Lemishko**¹ PhD
¹National University of Life and Environmental Sciences of Ukraine

Abstract. This paper provides adaptation of the agricultural policy of Ukraine to the conditions and requirements of the EU. It was revealed that stable GDP growth of Ukraine in the period from 2014 to 2017 was provided by the agricultural sector of the economy: in 2017 its share in the formation of the country's GDP was 17 %. The dynamics of values and structural proportions of governmental support of agriculture was analysed, which showed that for the period of 2007 - 2017 the actual amount of financial resources aimed at implementation of governmental supportive measures of agriculture was 86.5 % of the planned. The paper proves that the defining criterion for the effectiveness of state support is the stable growth of the macroeconomic indicators of the agricultural sector. Diagnostics of the effectiveness of state support shows that the state policy instruments of the financial policy did not contribute to a stable increase in the production of agricultural products, as the dynamics of the growth of gross agricultural production for the period of 2007 - 2017 was not stable.

In this paper the authors determined the main reasons of Ukraine's considerable lag from EU countries on social development indices in the agricultural sector. It was established that the EU experience on functioning of market socially oriented economy and state regulation of economic processes is necessary to extrapolate on functioning of agricultural sector of Ukraine. The proposed decision is to develop fundamental reforms of the State policy on development of agricultural sector of economy, to modernize the State agricultural policy and its institutional provision in accordance with the requirements of EU legislation; Economic model of agricultural sector development should be reoriented from export of raw materials on model of stimulation of the export of produced agricultural products; in the period of adaptation of agriculture of Ukraine to the requirements of EU budgetary support of agriculture must be changed from 1.0 % to 3.0 % of gross domestic product of the country.

Key words: the state agricultural policy; the common agricultural policy of the European Union; values and structural proportions of state support of agriculture of Ukraine.

JEL code: F36, G18, H5, Q14

Introduction

Pro-European orientation of Ukraine encourages the adaptation of the national agricultural sector of the economy to the conditions and requirements of the European Union. Priorities of the State agricultural policy aim at integration of agricultural sector of economy into European structure. The advantages of the integration consist in the creation of reliable mechanisms of economic stability, financial security and sustainable development of agriculture. Theoretical and methodological approaches of the European integration of the agricultural sector of Ukraine's economy were formed in the works of prominent Ukrainian scientists such as M. Demyanenko, Yuriy Gubunya, S. Kvasha, S. Piassetska-Ustych .

Focusing on the problems of development of Ukrainian agriculture in the context of European integration processes, Ukrainian scientists approved the necessity of systematic approach and complexity on determination of instruments of State Agricultural policy.

Studies of foreign scientist such as J. Peterson., B. Ballas, C. Pentland, M. Tracey, L. Lindbergh, J. Tinbergen have formed a significant basis of knowledge on the European integration perspectives through the development of the legal framework of European integration processes, mechanisms for its implementation and coordination of macroeconomic policy in the global economy.

At the same time in Ukraine there is No systematic research on adaptation of the Agricultural policy of Ukraine to the conditions and requirements of the European Union. The indicators of financial resources, which are aimed at realization of measures of State support of Ukrainian agriculture and their relations with the relevant EU indices, are undefined and discussed. Proceeding from the

foregoing, the aim of the article is to analyse the European tendencies on State regulation of economic processes and identify opportunities to extrapolate them on the functioning of the agricultural sector of Ukraine.

Research results and discussion

The State agricultural policy aims to support the profitability of agricultural producers and the stable economic situation in the industry, as well as providing security and competitive producers in the international labour division (M. Demyanenko, 2007). From the position of review of existing tendencies, consisting in state financing of the agricultural sector of Ukraine, analysis of the dynamics of values and structural proportions of state support showed that the level of financing of state supportive measures in agriculture in 2007 and 2017 were 95.9 % and 92.9 %, that characterizes the high level of its implementation (Table 1).

Table 1

The dynamics of State support for agriculture of Ukraine

Indicator	At the end of the year							
	2007	2009	2011	2013	2014	2015	2016	2017
The level of financing of State agricultural support, %	95.98	87.72	70.85	82.48	86.65	81.51	103.64	92.93
Specific weight of state budget expenditures in production volume of gross agricultural production, %	4.67	3.17	3.55	2.92	2.19	0.89	0.86	3.60
Amount of state support for 1 hectare of agricultural lands, UAH	192.98	151.11	192.79	173.23	132.52	51.16	52.74	217.9
.Budget expenditures per unit of total capital (1 UAH) Of agricultural enterprises, UAH	0.89	0.04	0.03	0.02	0.01	0.01	0.01	0.01
Budget expenditures per unit of net profit (1 UAH) Of agricultural enterprises, UAH	0.27	-0.44	0.32	0.48	0.26	0.02	0.03	0.13

Source: author's calculations

In 2008 – 2015, the level of implementation of State supportive measures in agriculture was satisfactory (81,5 % – 86,6 %), but in 2011 – 2012 the level of implementation of State supportive measures in agriculture was unsatisfactory (70.8 % and 70.5 %). On average, for the period 2007 – 2017, the actual volume of financial resources aimed at realization of agricultural measures of state support was 86.5 % from planned. In this case, according to functional classification, the share of budget financing of agriculture in the national public spending in 2017 was only 1.3 %. Despite a low share of the budget financing of agriculture, the steady growth of Ukraine's GDP in the period 2014 – 2017 is provided by the agricultural sector : in 2017 its share in the formation of GDP of the country was 17 % (2014-10 %, 2016-11.7 %). Implementation of the State agricultural policy of Ukraine provides financial leverage of direct and indirect influence: budget financing, crediting, taxation, etc. The implementation of the common agricultural policy of the European Union also takes place due to the weighted tax and credit policy, but the special role is to introduce instruments for the restriction of the market self-regulation mechanism (grants, quotas, pricing tools, etc.). In fact, 85-90 % of the total amount of EU budget funding is the price support of agriculture. It should be emphasized that, despite the relatively limited contribution of agriculture in the formation of GDP of EU countries (2 % – 5 %), the level of financing of the common agricultural policy of the EU is 40 - 45 % of the European Union's budget.

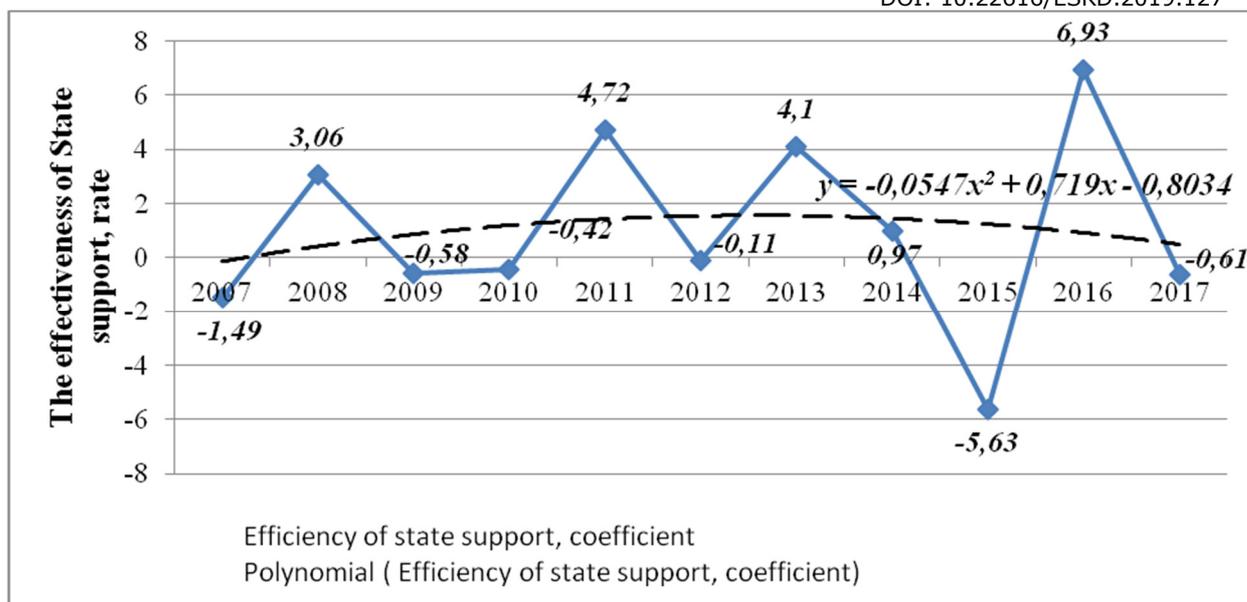
The low share of Ukraine's budget expenditures aimed at the development of agriculture leads to a chronic underfinancing of agricultural sector. Amount of state support for 1 hectare of agricultural lands in 2007 was 193 uah/1ha, in 2017 – 218gr/ha (in equivalent – 7 euro/1ga), that is, for ten years increase was only in 1.13 times (it should be noted that during this period the total area of agricultural lands decreased by 161 thousand hectares) (Table 1). State support in EU countries is from 200 to 1400 euro/ha.

The specific weight of state budget expenditures in production volume of gross agricultural production has decreased steadily – from 4.7 % in 2007 to 3.6 % in 2017. However, during this period, as the positive change can be considered the change of the functional vector of state budget funds: in 2007 – 2010 financing of services, financial support of measures in the agriculture, provision of the Agricultural Fund activity and other indirect support which was 60 % of budget support, respectively, the share of support of agricultural producers was only 30 % – 40 %. In 2017, the financial support of agricultural producers was 77.0 % of the total budget funds among which: general management and management in agriculture – 2.2 %; Financial support for agriculture by the reduction of loans – 5.5 %; Research, applied scientific developments, performance of works according to state target programs and state order – 3.0 %; Financial support for agriculture and industrial complex – 1.2 %; Organization and regulation of agricultural institutions' activities and provision of agricultural fund activity – 2.4 %; State support for the development of hops, the laying of young gardens, vineyards and their supervision – 5.6 %; State support of livestock industry – 3.1 %; Financial support for agricultural producers – 77.0 %.

The defining criterion of efficiency of state support is stable growth of macroeconomic indicators of agricultural industry. Diagnosis of the effectiveness of state support showed that the governmental financial policy leverages did not promote the stable increase of agricultural production. Dynamics of production of gross agricultural production for the period 2007 – 2017 was not stable (Fig. 1), respectively, the level of effectiveness of state support ranged from (-5.63 %) in 2015 to 6.93 % in 2016. In 2017, this indicator was (-0.61 %). Analysis of the European model of Agriculture (Defra (2011A), Greer, Alan and Tom Hind (2012), Roederer-Rynning, Christilla (2010)) makes it possible to conclude that the priority of the common agricultural policy of the European Union is a sustainable development of the agricultural sector, solving the complex of social tasks and also active implementation of nature-protection measures.

Ukraine is far behind the EU countries on social development indicators in the agricultural sector of the economy. The primary causes of such lag are: insufficient institutional provision of state policy on sustainable agricultural development, including rural areas; lack of necessary funding sources; non-balance of coordination mechanism and proper monitoring of the use of budget funds, aimed at social development of the villages, etc.

Taking into account that Ukraine concerning natural-climatic conditions and soil quality belongs to one of the most favourable agricultural country among European countries (S. Piasetska-Ustych, 2016), the urgent issue is the problem of state provision for creation in Ukraine the adaptive agro-ecosystem.



Source: author's calculations

Fig. 1. The effectiveness of state support of agriculture of Ukraine (approximation-polynomial second degree)

Adaptation of the national agricultural sector of the economy to the conditions and requirements of the EU is subordinated to the strategy of creating a reliable partnership between the EU and Ukraine in the trade in agricultural and food products. According to the economical results of 2016, the EU countries took second place in the regional structure of agricultural production: foreign trade turnover between Ukraine and EU countries was \$6 182.9 million, from which Ukrainian products export-\$4 242.4 million. In this case, the key export products were: cereals - \$1 279.5 million; Oil-\$1, 185 million; Oil-bearing crop seeds-\$587.5 million. Import of agricultural and food products from the EU countries to Ukraine -\$1 940.5 million. This tendency is extremely important not only for Ukraine, being a state oriented on export of agricultural products, and also for the European Union in the context of raising its status on the global market.

Conclusions, proposals, recommendations

Adaptation of the state agricultural policy of Ukraine to the conditions and requirements of the EU subordinated to the search of the totality of methodological principles, forms and methods of State support for the improvement of agricultural efficiency in the simultaneous promotion of sustainable development in the countryside, and preserving the ecological agricultural potential, in accordance with EU standards. The European model of agriculture has proved to be productive both in economic and social direction. EU experience on functioning of market socially oriented economy and state regulation of economic processes is necessary to extrapolate on functioning of agricultural sector of Ukraine. We believe that it is necessary: firstly, to develop fundamental reforms of the state policy on development of agricultural sector, to implement a set of state measures that ensure effective functioning of finance and financial system; modernize the state agricultural policy and its institutional support in accordance with the requirements of EU legislation; secondly, the economic model of agricultural sector development should be reoriented from export of raw materials on model of stimulation of the export of produced agricultural products; and thirdly, in the period of adaptation of Ukrainian agriculture to European Union requirements, budgetary support of agriculture should increase from 1.0 % to 3.0 % of gross domestic product of the country. The basis of European implementation of Ukraine should be a socially oriented market economy. The key

requirement in this direction is to develop conceptual approaches for financial influence on value and structural proportions of agricultural functioning. That actualizes the need for further research related to the development and implementation of the state agricultural policy and the development of modern and sustainable agricultural production in accordance with EU standards.

Bibliography

1. Balassa, B. (1961). *The Theory of Economic Integration*. London.
2. DEFRA (2011a) CAP Reform post 2013: Defra Discussion Paper on the Impact in England of the EU Commission Regulatory Proposals for the Common Agricultural Policy Reform, post 2013. December 2011.
3. Demyanenko, M. 2007. Financial Problems of the Formation and Development of the Agrarian Market, *Economics of Agroindustrial Complex*. 5, pp.4-18.
4. Greer, A. and Hind, T. (2012) *The Lisbon Treaty, Agricultural Decision-making and the Reform of the CAP: An Analysis of the Nature and Impact of Co-decision, Politics and Society* 31 (4):pp. 331-41.
5. Hubeni, Yu. (2002). *Agrarian Reform in the Czech Republic: From the "Velvet Revolution" to European Integration. An Example Worthy of Imitation*. Lviv, Ukr. Technologies.
6. Kvasha S. M. *The European direction - in Figures and facts - [Electronic resource]*. - Access mode: <http://agro-business.com.ua>
7. Lemishko, O. (2018). *Philosophical Methodology in Research of Capital Reproduction Financial Policy*, *Scientific Bulletin Polesie*. 2 (14). pp. 121-128.
8. Lindberg, L. N. (1970). *Europe's Would-be Polity. Patterns of Change in the European Community*. Englewood Cliffs, Prentice Hall.
9. Pentland, C. (1973). *International Theory and European Integration*. London, Faber&Faber Ltd.
10. Peterson, J. (1995). *Decision-making in the European Union: Towards a Framework for Analysis*. *Journal of European Public Policy* 2(1): pp. 69-93.
11. Pyasetsky-Ustich, S. (2016). *Genesis of the Common Agricultural Policy of the EU: Perspectives and Risks for Ukraine*, *Scientific Bulletin of the International Humanitarian University. Series: Economics and Management*. 16. pp. 23-28.
12. Roederer-Rynning, C. (2010) *The Common Agricultural Policy: the Fortress Challenged*, in Helen Wallace, Mark Pollack and Alastair Young (Eds.), *Policy-Making in the European Union* (6th ed.). Oxford: Oxford University Press, pp. 181-206.
13. State Statistics Service of Ukraine - [Electronic resource]. - Access mode: <http://www.ukrstat.gov.ua>
14. Tracy, M. (1995). *Agriculture and Food in the Economies of Developed Countries: an Introduction to Theory, Practice and Politics*. SPb, School of Economics
15. Zinchuk, T. (2008). *European Integration: Problems of Adaptation of the Agrarian Sector of the Economy*. Zhitomir: State University "State. agroecol un-t".

INVESTMENT ATTRACTIVENESS OF AGRICULTURAL ENTERPRISES

Nadiia Davydenko¹ Prof. dr hab.; Halyna Skrypnyk² PhD and Zoya Titenko³ PhD
^{1,2,3}National University of Life and Environmental Science of Ukraine

Abstract. In today's economic development, attracting investment is one of the main ways and sources of development and expansion of agrarian enterprises. Investments play the most important role in the formation of enterprise resources. Therefore, the most important for a business entity is the creation of favourable conditions for investing by investors. The basis for an investor's investment decision is the level of investment attractiveness of an enterprise. For this purpose, analysts of farms should be able to professionally and accurately calculate the investment attractiveness of an enterprise based on the rating of the issuer, based on the definition of the financial state and the method of integrated assessment. The application of this approach allows the quick access to the prospects of investing funds and the reliability of the work of investment objects. At the same time, the investment potential of enterprises and investment risks are expressed as an integral indicator, which allows to estimate the investment attractiveness of enterprises. To test the results of the research, three joint-stock agricultural companies have been selected, located in different regions, the companies do not have the same investment climate and specialize in the cultivation of cereals and industrial crops. Based on the calculation of financial indicators, we have determined their investment attractiveness.

The proposed methodology for assessing the investment attractiveness of agricultural enterprises, which consists of calculating the integral indicator, will allow to explore all aspects of the activity and take into account a significant set of indicators. The mathematical tools of this technique will allow to standardize the indicators and reduce them to a homogeneous value, and ultimately rank the evaluated enterprises by the level of investment attractiveness. The practical application of the above recommendations will increase the objectivity of assessing the investment attractiveness of agricultural enterprises, will enable the investor to prove the expediency of investing in a particular country, region, industry or enterprise.

Key words: investment climate, investment attractiveness, agricultural enterprises, rating assessment, integral assessment.

JEL code: G31, L53, Q13, R51

Introduction

The purpose of the study is to substantiate and improve the methodological approaches to determining the investment attractiveness of agrarian enterprises, which corresponded to the needs of potential investors regarding the prospects of capital investment.

The main objectives of the study are: the disclosure of scientific approaches to the definition of investment attractiveness of enterprises; analysis of investment attractiveness of the region; rating of enterprises, based on the definition of financial condition; an integrated assessment of the investment attractiveness of agrarian enterprises, using an integrated approach taking into account a certain set of indicators.

Information sources: scientific articles available in international editions, annual financial reports of agrarian enterprises of Ukraine.

The most important task of the modern innovation policy of agricultural enterprises is to increase their investment attractiveness and to build a holistic financial support system for these purposes, which should be based on widespread attraction and the most efficient use of financial resources with diverse sources of origin. Investment attractiveness of enterprises is an integral characteristic from the point of perspective of their development, expansion of production and marketing parameters, strengthening the position on the market, the efficiency of the use of assets and their liquidity, solvency and financial sustainability, business activity, which in general can provide the appropriate level of competitiveness of object of management in the market. Particularly acute, the problem of increasing the investment attractiveness of the agricultural sector of the Ukrainian economy, which

is significantly lagging behind in technical and technological development, has a number of peculiarities that determine the necessity of accelerating investment processes: the unsatisfactory state of the material and technical base, its inconsistency with the level of scientific and technological progress, market instability of agricultural products, financial problems of enterprises, low profitability of production. Therefore, the problems of determining the investment attractiveness of agricultural enterprises of Ukraine are now quite relevant, strategic in the light of the need for the future economic breakthrough of the agricultural economy and its output on a fundamentally new development trajectory.

Research results and discussion

Formation of the investment attractiveness of an agricultural enterprise, that is, ensuring the availability of such characteristics that determine the urgency of the issue of investment with the appropriate prospect of their return and multiplication, is a process that requires specific management influence.

The object of management is the financial and economic activity of the enterprise in terms of its results, which determine the attractiveness of the enterprise for investing and the factors that influence the obtaining of these results.

Proceeding from the principle of systemacity and complexity, the study of the investment attractiveness of agricultural enterprises requires the use of systematic approach, that is, in order to analyse the investment attractiveness of agricultural enterprises. Firstly, it is necessary to give a general description of the investment climate of the country and region to which the enterprise belongs, and secondly to analyse the level of development of the agricultural sector, and then consider the main indicators of the work of agricultural enterprises, which affect their investment attractiveness. Some scholars, in particular, Blank I. (2004), Koyda V., Lepekiko T. (2008), and Gaidutsky A. (2004) believe that "investment attractiveness" is an integral characteristic of the enterprise in terms of the efficiency of the use of assets and their liquidity, I will have solvency and financial stability. In turn, Bocharov V. (2000), Stechko D. (2001), and Chornaya L. (2008), in their works, consider "investment attractiveness" as a qualitative characteristic of the investment climate. A slightly different view is expressed by Napadovskaya I. (2005) and Asaul A. (2004), they represent "investment attractiveness" as a set of conditions that influence the formation of an investment climate.

We believe that each of the above definitions allows you to highlight only a part of the relationships and characteristics inherent in the investment attractiveness at the level of the individual entity.

In our opinion, a more complete and refined concept of investment attractiveness is the following definition: investment attractiveness of the enterprise - is an integral characteristic of the company as a future investment object, taking into account the combination of factors of external and internal influence, prospects of development and the possibility of attracting investment resources.

In domestic practice, it is possible to distinguish the following methods for assessing the investment attractiveness of enterprises:

- the method of rating company's valuation based on the data of financial statements, which provides an assessment of the financial condition of the enterprise, which assesses solvency, financial stability, profitability and business activity of the enterprise;
- integral assessment of investment attractiveness, approved by the order of the Agency For The Prevention Of Bankruptcy Of Enterprises And Organizations. It involves defining an integral indicator of the investment attractiveness of the enterprise, which includes: integral indicator of property

status, financial stability, profitability, business activity, asset liquidity, as well as market activity of the invested object.

We will conduct a study on the investment attractiveness of the enterprises on the example of three agricultural enterprises from different regions of Ukraine with different indicators of the financial state: PJSC „Iskra”, PJSC "Im. Shevchenko" and PJSC "Kagarlyzke". For a more accurate and unbiased assessment, we have compared the agricultural enterprises of one organizational and legal form, called private joint-stock companies (Table 1).

Table 1

Receipt and development of investments in the studied regions of Ukraine

Region	Volume of developed investments in the region		Investigated enterprise
	thousand UAH	in % to the total volume	
Sumy region	2726306	39.2	PJSC «Iskra»
Cherkasy region	3178515	39.0	PJSC «Imeni Shevchenko»
Kyiv region	4662796	13.5	PJSC «Kagarlyzke»

Source: author's calculations

The investment attractiveness of a particular company depends directly on the investment climate and investment potential of the region. Determining the investment attractiveness of the region is important for many structures. To predict the investment attractiveness of the whole region, the rating agency "Euro-Rating" annually makes the rating of investment efficiency of the regions of Ukraine. Below we have considered the rating of the studied areas (Table 2).

Table 2

Ratings of investment efficiency of the studied regions of Ukraine

Region	1 half of 2017		2 half of 2017		1 half of 2018		2 half of 2018	
	Rating	Point	Rating	Point	Rating	Point	Rating	Point
Kyiv region	ineC	173	ineC	179	ineA	203	ineA	234
Sumy region	ineE	122	ineC	170	ineG	72	ineF	101
Cherkasy region	ineD	153	ineC	173	neD	159	neD	147

Source: author's calculations

According to rating data, there is an improvement in the investment attractiveness of the Kyiv region. Negative aspect is the reduction of the attractiveness of the Sumy region from ineE to ineF and Cherkasy from ineC to ineD. The most attractive region is the Kyiv, and the least attractive - the Sumy region. This is due to certain factors that influence the formation of investment potential, namely the level of attractiveness of the priority sectoral industries, the state and dynamics of the investment market.

Based on the indicators of financial reporting, we will determine the investment attractiveness of agricultural enterprises (Table 3). The financial condition of the investigated enterprises is different. The worst indicators are in PJSC "Iskra". An enterprise is not financially sustainable and is unprofitable. The net loss in 2017 amounted to almost UAH 47 million. The company should urgently hold a series of measures to prevent the bankruptcy proceedings.

Better indicators are at PJSC "Kagarlyzke". The enterprise is financially sustainable and solvent. The negative aspect is the availability of 2 million UAH loss in 2017, however, with proper fiscal policy, the company will be able to have the net profit.

**Rating estimation of investment attractiveness of agricultural enterprises,
 2017**

Indicator	PJSC «Iskra»	PJSC «Imeni Shevchenko»	PJSC «Kagarlyzke»
Total liquidity ratio	0.2	25.2	4.0
Quick liquidity ratio	0.03	24.4	3.3
Absolute liquidity ratio	0.01	0.1	-
The coefficient of financial stability	-0.5	1.0	0.8
Coefficient of financial risk (financial leverage)	-3.1	0.04	0.3
Total solvency ratio	0.7	26.4	4.1
Current solvency ratio	0.01	0.1	-
Asset turnover rate	0.5	0.2	0.5
Reserve turnover rate	9.1	10.8	15.1
Cost-effectiveness of production, %	-11.9	107.0	-5.6
Return on assets, %	-3.8	32.1	-2.2
Return on equity capital, %	-5.4	33.5	-2.7
Place in rating	3	1	2
Estimation of financial condition	unprofitable, unsatisfactory state	Liquid, financially sustainable	satisfactory, financially sustainable

Source: author's calculations

The best financial condition of the research results is in PJSC "Im. Shevchenko". The company is solvent, liquid and financially sustainable. The net profit in 2017 amounted to about 32 million UAH, and the return on equity was 33 %.

We will evaluate the investment attractiveness of the investigated enterprises by the integral indicator of the investment attractiveness of the enterprise.

This methodology for an integrated assessment of the investment attractiveness of enterprises and organizations involves the calculation of 6 groups of indicators: valuation of property status; assessment of financial stability (solvency); liquidity assessment of assets; assessment of profitability; assessment of business activity; evaluation of market activity by the formula:

$$I = \sum f_{jms} + f_{jfs} + f_{jpr} + f_{jda} + f_{jla} + f_{jra} \quad (1)$$

I – integral indicator of investment attractiveness of the enterprise, *f_{jms}*, *f_{jfs}*, *f_{jpr}*, *f_{jda}*, *f_{jla}*, *f_{jra}* – weight coefficients of integral indicators of property status, financial stability, profitability, business activity, asset liquidity, market activity of the invested object.

Estimation of investment attractiveness by the integral estimation method

Enterprise	The amount of points	Method of calculation	Result
PJSC «Iskra»	21.68	$I=4.95-26.52+27.38-9.63+37.71-12.21$	Investment attractiveness is low. An enterprise does not pay dividends. In order to attract investors, the economy needs to carry out a number of measures for the financial rehabilitation of the enterprise
PJSC «Imeni Shevchenko»	242.77	$I=11.11+61.71+143.43-4.26+41.21-10.41$	The enterprise is an investment attractive. High indicators of financial condition, stable income level enable to attract not only domestic but also foreign investments
PJSC «Kagarlyzke»	87.89	$I= 9.05+14.20+15.29-9.63+69.38-10.43$	Investment attractiveness of enterprises at an adequate level. The investment of funds will allow the company to exit in the next reporting period to a positive financial result

Source: author's calculations

As a result of the analysis, the investment attractiveness of PJSC "Im. Shevchenko" with a score of 242,77 points is on the first place. The second place goes to PJSC "Kagarlyzke" with the result of 87,89 points. And the worst result has PJSC "Iskra" with only 21,68 points. That is, for the investor the best decision is to invest in the company PJSC "Im. Shevchenko".

Conclusions, proposals, recommendations

- 1) The main identifier of the appropriateness of investing funds for an investor is the investment attractiveness of the enterprise. It means the characteristics of the future investment object from the standpoint of assessing its financial status, competitiveness, image and other factors of external and internal influence, which are crucial for the investor. The investment attractiveness of a particular company depends directly on the investment climate and investment potential in the region. Investigating the investment attractiveness of regions according to the region's rating, points out that the most attractive region is the Kiev, less attractive - Cherkassy and least attractive - Sumy region.
- 2) In assessing the investment attractiveness of the issuer's rating, we note that the financial status of the investigated enterprises is different. The worst performance is in the Iskra PJSC, which is located in the Sumy region. The enterprise is unsatisfactory and is unprofitable. Somewhat better indicators at PJSC "Kagarlyk", which is located in the Kyiv region and has a satisfactory financial condition. The best financial condition of the research results is PJSC "Im. Shevchenko", which is located in Cherkasy region. The company is solvent, liquid and financially sustainable.
- 3) In assessing the investment attractiveness of farms by the integrated analysis method, the investment attractiveness of PJSC Iskra, the investment attractiveness at PJSC Kagarlyk, and the most attractive are PJSC "Im. Shevchenko". Analysing the foregoing, we note that both methods of assessing the investment attractiveness of agrarian enterprises have shown the same results. Except internal factors, the investment attractiveness is influenced by external ones, namely the location in the respective region. As a result, the enterprise of PJSC "Iskra", which is in the least attractive region - Sumy region, has the smallest investment attractiveness.
- 4) The analysis of the investment attractiveness of the region and enterprises by the issuer's rating and the integral assessment method is important for the external investor as the probability of making false investment decisions is rather high. Based on the analysis of investment attractiveness, it is possible to prove to the investor the expediency of investing in a particular

region, enterprise. The extent to which this assessment is objectively and comprehensively carried out, and consequently, the proper follow-up of the feasibility of investing depends on the final result that the investor will receive.

Bibliography

1. Bocharov V. (2000). Investment Management. St. Petersburg.
2. Blank I. (2004). Investment Management Company. Kiev.
3. Gaiducky A. (2004). Methodological Aspects of the Investment Attractiveness of the Economy. Regional Economy. 4. p. 81-86.
4. Napadovskaya I. (2005). Theoretical and Methodological Aspects of Research of Investment Attractiveness of Ukraine. Herald DonDouet. 4. p. 55-61.
5. Koyda V., Lepekiko T., Koydu O. (2008). Fundamentals of Investment Management. Kiev.
6. Stechko D. (2001). Placement of Productive Forces and Regionalistics. Kiev.
7. Chorna L. (2008). Effective Strategy to Achieve the Investment Attractiveness of the Enterprise. Investments: Practice and Experience. Volume 24. p. 4-6.
8. Asaul A. (2004). Systematization of Factors Characterizing the Investment Attractiveness of the Regions. Regional Economy. 2. p. 53 - 62.
9. On Approval of the Methodology of Integral Assessment of Investment Attractiveness of Enterprises and Organizations: Order of the Agency for the Prevention of Bankruptcy of Enterprises and Organizations of 31.03.1998 - [Electronic Resource] - Access Mode: <https://zakon.rada.gov.ua/laws/show / z0214-98>
10. The Official Website of the EuroRating Rating Agency. - [Electronic resource] - Access mode: <http://euro-rating.com.ua/regiony/rejting-list/rejting-list-oblastej/>

THE SPATIAL DIFFERENTIATION OF DEVELOPMENT AND THE LEVEL OF THE FINANCIAL SITUATION OF RURAL COMMUNES OF THE SWIETOKRZYSKIE VOIVODESHIP

Pawel Dziekanski¹, PhD; Elwira Lesna-Wierszolowicz², PhD

¹Institute of Law, Economics and Administration, Jan Kochanowski University in Kielce, Poland; ²West Pomeranian University of Technology in Szczecin, Poland

Abstract. A commune is a system in which various types of relationships between individuals and groups take place. It is bound by law to provide specific services and tasks. This requires the use of certain economic, infrastructure and financial resources. Finances are therefore the basis for the implementation of public tasks and determine the conditions for local economic development. The aim of the article is to analyse the spatial disproportions of communes' development in relation to their financial situation with the use of a synthetic measure (TOPSIS) in 2012, 2014, 2017. As part of the research, data from the Regional Data Bank of the Central Statistical Office and the regional accounting office were used, which allowed to build a synthetic measure of development and financial situation. The financial situation determines the scope and level of public services and tasks performed by rural communes. It is also one of the elements of creating opportunities or barriers to the competitiveness of rural communes. As part of the research, data from the Regional Data Bank of the Central Statistical Office and the regional accounting office were used, which allowed to build a synthetic measure of development and financial situation. The financial situation determines the scope and level of public services and tasks performed by rural communes. It is also one of the elements of creating opportunities or barriers to the competitiveness of rural communes. The value of the development measure fluctuated in 2012 from 0.38 to 0.54; in 2017 from 0.37 to 0.63. The best units (Strawczyn, Morawica, Sitkowka-Nowiny) in the studied area are characterized by a high position within the financial situation and good industrial function, which is supported by a well-developed infrastructure and social. These are units for which the agricultural function disappears and the industrial function significantly develops.

Key words: financial situation, development process, rural commune, Swietokrzyskie Voivodeship.

JEL code: H70, H71, H72, P25, R13.

Introduction

Nowadays, the region is perceived as a zone subsystem with a spatial character. The creation of specific structures is associated with the process of organizing space, consisting in placing in it individual elements (economic, social, technical) building a given system, determining their interrelationships and relations with the natural environment (Korenik S., 1999, 51).

Ensuring a balance of economic, social and environmental goals aimed at long-term development means basing the functioning of local and regional systems on the principle of sustainable and sustainable development, should be the goal of decisions of local authorities. The use of endogenous factors in this process leads to the improvement of the general well-being of the inhabitants (Prus P., Drzazdzynska K., 2017). Local development is a multidimensional concept and is perceived as quantitative and qualitative changes taking place in the social and economic functioning of local government units (Markowski T., 2008, 9).

The financial situation includes not only the financial position, but also the self-government's ability to continue providing services and repaying liabilities. It is a component of the competitiveness and responsibility of local authorities for the development and satisfaction of the needs of its inhabitants. The assessment of the financial standing of local government units allows to determine not only the efficiency of the functioning of these units, ie the ability to meet their obligations, but also the opportunity to improve the quality standard of services they provide to local communities (Dziekanski P., 2016).

¹ pdzikan@interia.eu

² elwira.lesna@zut.edu.pl

Data / Methods

The aim of the article is to analyse the spatial disproportions in the development of rural communes in relation to their financial situation using the synthetic measure (TOPSIS). The analyses were carried out in the system of 70 rural communes in the Swietokrzyskie Voivodeship. The source material was data from the Regional Audit Chamber (Kielce branch) and the Local Data Base of the Central Statistical Office for 2012, 2014 and 2017. In the context of evaluation of development in rural communes of the Swietokrzyskie voivodship, social, economic, infrastructural and financial variables were adopted as partial measures.

In order to determine the measure of synthetic development, the following procedure was used (Dziekanski P., 2016, 2018).

1) Selection of variables describing the development and financial situation of rural communes. Variables characterized by low spatial variability and high correlation of variables were removed from the study (according to the inverted matrix method, (Malina A., 2004, 96-67).

2) The selected variables were subjected to the zero-uniformization procedure using the following formulas:

for the stimulant
$$z_{ij} = \frac{x_{ij} - \min_i x_{ij}}{\max_i x_{ij} - \min_i x_{ij}}, \text{ where } x_i \in S \quad (1),$$

for destimulants
$$z_{ij} = \frac{\max_i x_{ij} - x_{ij}}{\max_i x_{ij} - \min_i x_{ij}}, \text{ where } x_i \in D \quad (2),$$

where: S-stimulant, D-destimulant; $i = 1, 2 \dots n$; $j = 1, 2 \dots n$, x_{ij} - means the value of the j -th characteristic for the studied unit, max - the maximum value of the j -th feature, min - the minimal value of the j -th feature (Dziekanski P., 2016; Mioduchowska-Jaroszewicz E., 2013, 127-140; Mlodak A., 2006).

3) A synthetic measure of development and financial situation was determined using the TOPSIS method. The value of the synthetic measure was determined for individual examined objects based on the formula (3):

$$q_i = \frac{d_i^-}{d_i^- + d_i^+}, \text{ gdzie } 0 \leq q_i \leq 1, i = 1, 2, \dots, n; \quad (3),$$

where: d_i^- - means the distance from the anti-pattern, d_i^+ - the distance from the pattern (Wysocki F., 2010, 156-157). The indicator (3) assumes a value between [0,1]. A higher value of the indicator (close to one) means a more favourable situation of the object, a lower (near zero) weaker value (Glowicka-Woloszyn R., Wysocki F., 2016).

4) The area of rural communes in the Swietokrzyskie Voivodeship was divided into 4 quartile groups. The size of the indicator in the first group means the best unit, in the last group – the worst. The correlation between the results obtained was also verified based on the correlation coefficient (Dziekanski P., Wyszowski A., 2018, 219-238; Wysocki F., Lira J., 2005).

Research results and discussion

Regions have become subjects of economic processes. They set the policy framework, presenting and implementing the interests of the communities concerned, taking into account local resources. Socio-economic development is a complex phenomenon and difficult to unequivocally and objectively evaluate. The environment and the economy form a network of interconnections and, acting for the benefit of the community, are interdependent and should be considered together (Zakrzewska-Poltorak A., 2011).

The development of the local government unit is spatially polarized. The actions implemented by rural communes are a combination of interrelated factors that create a multidimensional space. As Adamowicz (2003) points out, the course of basic economic processes at the local scale is shaped by

the general economic and social system or the development policy carried out by local authorities. There are traditional factors such as: location, material resources, infrastructure, people resources, financial capital that affect the local development process. Financial resources are essential for the optimal functioning of local governments. Without sufficient levels of autonomy and resources, individuals will not be able to operate effectively. Inadequate tax structure, insufficient financial equalization system, lack of correlation between normative and actual expenditures as a result will reduce the role of local officials in the process of implementing local economic policy (Oplotnik Z., Brezovnik B., 2004).

It is worth noting that the analyses carried out by Dziekanski (2016, 2018), Churski and co-authors (2013) and Stanny (2013) show that the most important development factor, next to the location in the socio-economic space, are the local finances. Douglas and Gaddie (2002) indicate that they shape the possibilities of timely meeting financial obligations and ensuring continuity in providing services to the local community. The financial situation of rural communes is the probability that local governments will fulfil current and future financial obligations. It is also the ability to carry out public tasks (current needs of communities and development activities of rural communes) and stimulate development processes (Satola L., 2015).

Each territorial self-government unit has a range of tasks defined by law, as well as a pool of available financial resources that should secure their implementation. Satisfying the collective needs of local communities, increasing the investment attractiveness of the local government depends largely on the possessed income, both own and foreign (Bieniasz et al., 2013, 25-42).

In the Swietokrzyskie Voivodeship we can observe a clear division into the industrial north of the region and the agricultural south and east (with a gardening and fruit-growing element). The voivodeship's industry was shaped in close connection with the existing resources of rock, chemical and energy resources. The metallurgical, machine and food industries also play an important role.

A synthetic measure of the development of rural communes in the Swietokrzyskie Voivodeship in relation to the measure of financial situation is presented in Table 1. It indicates a different level of surveyed units and changes in affiliation to the quartile group of rural municipalities over time. Evaluation of the relationship between development and financial situation is important both for the investor seeking location for the company and may have practical significance for both the authorities of the unit and the central authorities. The value of the analysed measures is shaped by economic character of the unit (industrial, agricultural), financial independence, level of own income, local taxes or expenditures, infrastructure and demographic potential.

The value of the development measure fluctuated in 2012 from 0.38 (Blizyn, the weakest unit, financial group A) to 0.54 (Morawica, the best unit, financial group A). In 2017, the rural community of Nagłowice turned out to be the weakest (0.37, financial group D), while the best was Sitkowka-Nowiny (0.63, financial group A). In the analyzed period, the rural commune of Strawczyn (financial situation group A) turned out to be strong. The dominant units (eg Sitkowka-Nowiny, Morawica, Strawczyn) have a service-industrial character, which is supported by well-developed infrastructure and social. They are also the leading units according to the financial situation, and their location in the vicinity of the largest centre (Kielce, the capital of the region), at the same time enhancing the changes of structures and functions performed by them for the benefit of greater multi-functionality.

Classification of rural communes in the Swietokrzyskie voivodeship according to the measure of synthetic development in 2012, 2014 and 2017

Gr	The name of the commune	2012		The name of the commune	2014		The name of the commune	2017	
		TOPSIS _R	TOPSIS _F		TOPSIS _R	TOPSIS _F		TOPSIS _R	TOPSIS _F
A	Morawica	0.54	A	Strawczyn	0.56	C	Sitkowka-Nowiny	0.63	A
	Sitkowka-Nowiny	0.53	A	Morawica	0.55	A	Morawica	0.58	A
	Miedziana Gora	0.51	B	Sitkowka-Nowiny	0.55	A	Strawczyn	0.56	A
	Samborzec	0.45	B	Rakow	0.47	B	Piekoszow	0.49	B
B	Skarzysko Koscielne	0.45	C	Ruda Maleniecka	0.47	D	Wislica	0.49	D
	Rytwiany	0.44	C	Blizyn	0.46	D	Blizyn	0.48	D
	Sobkow	0.44	C	Bodzechow	0.46	A	Falkow	0.48	A
	Szydłow	0.44	A	Kluczewsko	0.46	A	Gowarczow	0.48	A
C	Tarlow	0.43	C	Sobkow	0.45	B	Wodzislaw	0.46	C
	Wojciechowice	0.43	B	Tarlow	0.45	C	Zlota	0.46	B
	Falkow	0.42	A	Gorno	0.44	B	Baltow	0.45	C
	Imielno	0.42	C	Obrazow	0.44	A	Laczna	0.45	C
D	Lagow	0.42	B	Radoszyce	0.44	B	Michalow	0.45	A
	Sadowie	0.39	B	Lagow	0.42	C	Tuczepy	0.44	B
	Mniow	0.39	D	Wojciechowice	0.42	B	Wasniow	0.44	B
	Blizyn	0.38	C	Baltow	0.41	B	Backowice	0.43	A

Gr - quartile group; A - very good, B - good, C - weak, D - bad; TOPSIS_R development synthetic measure; TOPSIS_F financial situation synthetic measure

Source: author's calculations based on Local Data Bank of the Central Statistical Office

Table 2

Diversification of the measure of synthetic development and financial situation of rural communes in the Swietokrzyskie Voivodeship in 2012, 2014 and 2017

Measures of differentiation	TOPSIS _R			TOPSIS _F		
	2012	2014	2017	2012	2014	2017
Standard deviation	0.04	0.04	0.04	0.06	0.05	0.07
Max	0.54	0.56	0.63	0.04	0.04	0.03
Min	0.32	0.33	0.37	0.49	0.51	0.67
Average	0.42	0.45	0.47	0.17	0.19	0.16
Gap	0.22	0.23	0.26	0.26	0.28	0.29
Quartile range	0.06	0.05	0.05	0.21	0.24	0.25
Coefficient of variation	0.10	0.09	0.09	0.25	0.26	0.29
Asymmetry	0.37	0.25	0.81	0.30	0.31	0.32

Source: author's calculations based on Local Data Bank of the Central Statistical Office

Diversification of rural communes in the Swietokrzyskie Voivodeship in the analysed area of development and financial situation is stable. This is indicated both by the standard deviation (0.04 in 2012, 2014, 2017 according to the development measure, 0.06, 0.05, 0.07 according to the financial situation measure) and the coefficient of variation (0.10, 0.09, 0.09 for the measure of development, 0.22, 0.20, 0.24 for the measure of financial situation). The increase in variation between rural communes in the Swietokrzyskie Voivodeship is indicated by the range, which for both

analyzed measures increases (0.22, 0.23, 0.26 for the development measure, 0.32, 0.32, 0.51 for the measure of financial situation, Table 2).

In the group of rural communes, in the Swietokrzyskie Voivodeship there is a positive correlation dependence between the synthetic measure of development and the measure of financial situation in subsequent years. The correlation value between the indicated measures was 0.219 (in 2012), 0.373 (in 2014) and 0.588 (in 2015). In the analysed period, we were dealing with convergence, and the spatial differentiation according to the examined measures was quite sTable (Table 3).

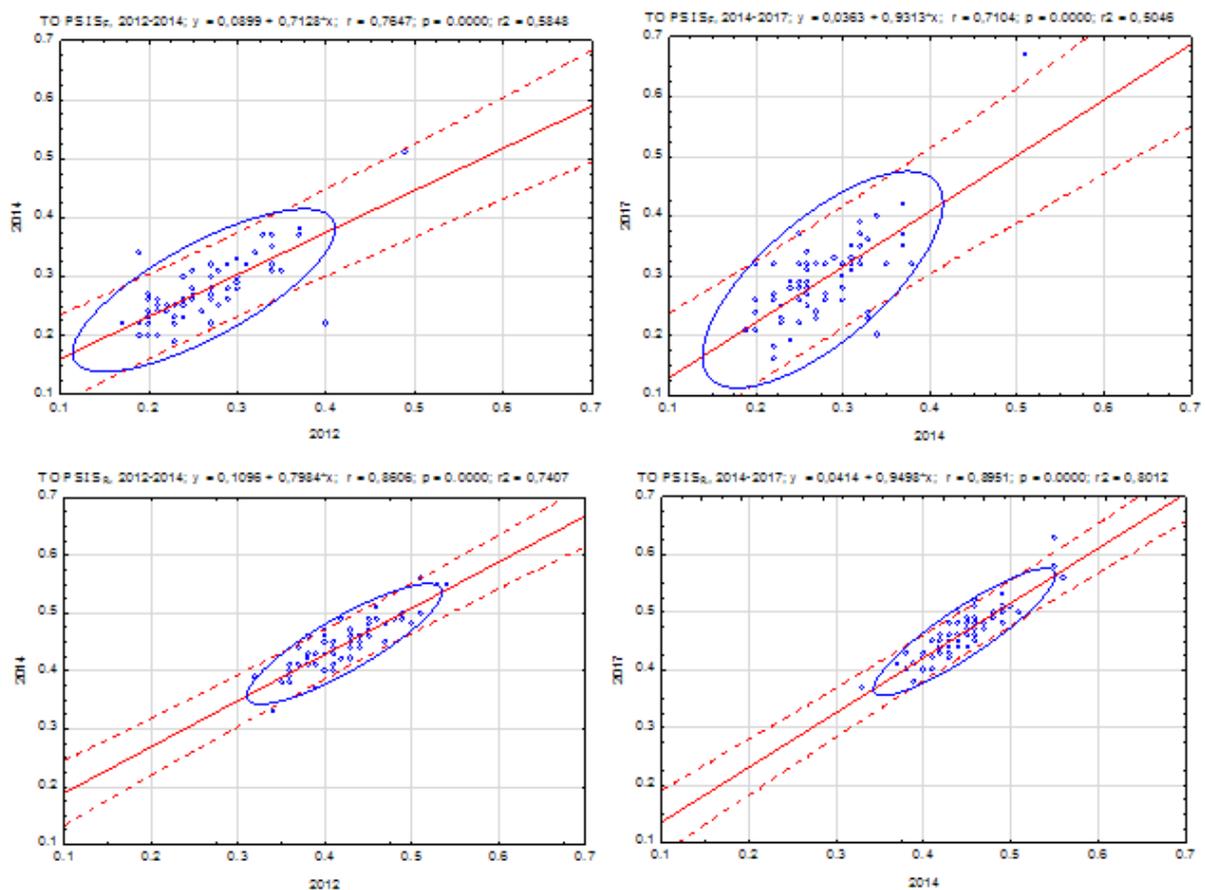
Table 3

Correlation of measures of development and financial situation of rural communes in the Swietokrzyskie Voivodeship (in 2012, 2014, 2017)

Synthetic measure / correlation year	correlation coefficient			
	gamma	Spermana	tau Kendalla	Pearsona
TOPSIS _R 2012-2014	0.730	0.825	0.685	0.861
TOPSIS _R 2014-2017	0.789	0.872	0.736	0.895
TOPSIS _R TOPSIS 2012	0.074	0.095	0.069	0.219
TOPSIS _R TOPSIS _F 2014	0.186	0.234	0.174	0.337
TOPSIS _R TOPSIS _F 2017	0.290	0.385	0.273	0.588
TOPSIS _F 2012-2014	0.641	0.719	0.605	0.765
TOPSIS _F 2014-2017	0.493	0.586	0.464	0.710

Correlation coefficients are significant with $p < 0.050$;

Source: author's calculations based on Local Data Bank of the Central Statistical Office



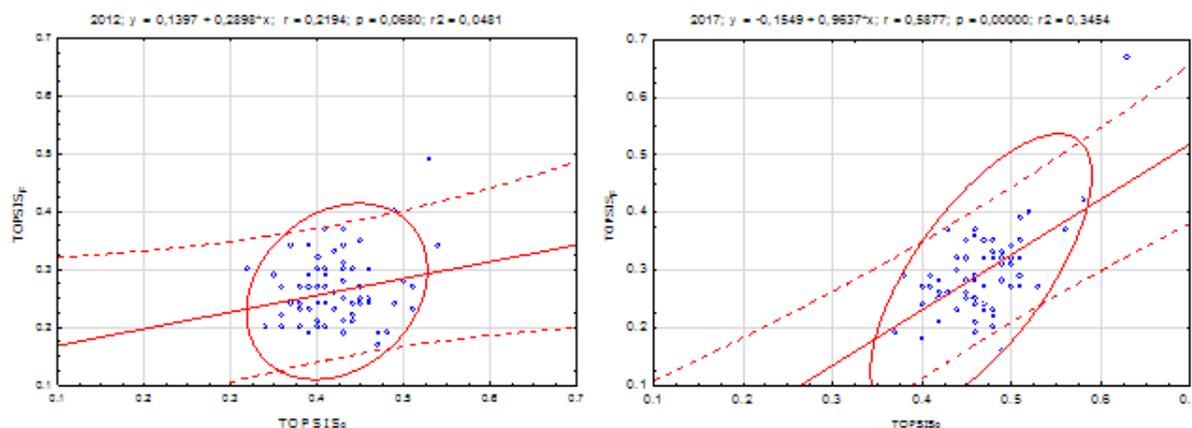
Source: author's calculations based on Local Data Bank of the Central Statistical Office

Fig. 1. The relation of synthetic measures year to year with adjustment of the regression line

Figure 1 presents correlograms describing the relationship between a synthetic measure of development and the financial situation. In the analyzed period, they were subject to convergence

(Pearson's correlation coefficients in the analysed time interval and the level increased). The location of individual municipalities on a graph in one large group may also indicate that they are statistically similar to each other. The outliers are Morawica, Sitkowka-Nowiny, which have a developed industrial function and are located in the orbit of the region's capital (Kielce).

The analysis of the scatterplot indicates that the increasing value of the measure of development or the financial situation is accompanied by a change in the position of the points that are getting closer and closer to the straight line. The analysed synthetic measures were subject to convergence (Pearson's correlation coefficients in the analysed time interval increased from 0.219 in 2012 to 0.588 in 2017, Figure 2). Measures indicate a similar level of equipment of units in the aspect of development and financial situation as well as stability of their level over time.



Source: author's calculations based on Local Data Bank of the Central Statistical Office

Fig. 2. Relation of synthetic measures with the adjustment of the regression lines of rural communes in the Swietokrzyskie Voivodeship (in 2012, 2014, 2017)

Conclusions, proposals, recommendations

- 1) The activity of local units requires making available to local self-government bodies public resources enabling organizing, supplying and financing public tasks for which local government authorities are responsible. The process of an individual's activity or its development takes place in a multidimensional space, creating a network of mutual connections and acting for the benefit of a given community. They shape measures of a financial, economic, technical infrastructure, social infrastructure, public order and safety, spatial order and ecology.
- 2) There is a correlation between the level of development and the financial situation of rural communes. From the financial perspective, you can make a comprehensive assessment of the functioning of the rural commune and its development opportunities. The financial situation is a derivative of the public tasks carried out by the local government. Socio-economic development is the process of transforming the economic and social environment into a place friendly to residents, allowing them to obtain decent income, ensuring access to public services, enabling participation in culture and giving a sense of agency especially in social matters and satisfying aspirations.
- 3) Conditions of financial standing of individuals may be shaped by the area in which they occur (e.g. location and size of territorial self-government units, available resources and natural assets, investment attractiveness) and may also be independent of it (e.g. economic fluctuations in the country and on world, state of public finances, scope of income and expenditure authority of territorial self-government units).
- 4) The value of the development measure fluctuated in 2012 from 0.38 (Blizyn, the weakest unit, financial group A) to 0.54 (Morawica, the best unit, financial group A). In 2017, the municipality

of Naglowice turned out to be the weakest (0.37, financial group D), while the best was Sitkowka-Nowiny (0.63, financial group A). The best units in the studied area are characterized by good industrial function, which is supported by well-developed technical and social infrastructure.

- 5) The value of a synthetic measure depends on the number and type of adopted variables to be tested. It can help local authorities to assess the effectiveness of past development instruments. It allows to assess disproportions between individual units. It allows to indicate weaker and better areas of the unit's operation. In the case of low spatial aggregations, we encounter data deficits most often caused by the lack of data representativeness.

Bibliography

1. Adamowicz, M. (2003). *Kształtowanie rozwoju lokalnego (Development of local development)*. In: *Strategie rozwoju lokalnego. Aspekty instytucjonalne (Local development strategies. Institutional aspects)*, M.Adamowicz (ed.). SGGW, Warszawa, p. 11.
2. Bieniasz, A., Golas, Z., Luczak, A. (2013). Zastosowanie metody TOPSIS do oceny kondycji finansowej gmin w Polsce w 2010 roku (Application of the TOPSIS method to assess the financial condition of communes in Poland in 2010), *Zeszyty Teoretyczne Rachunkowosci*, t. 70 (126), SKWp, Warszawa, p. 25-42.
3. Glowicka-Woloszyn, R., Wysocki, F. (2016). Kondycja finansowa gmin wiejskich a zrodla ich dochodow w wojewodztwie wielkopolskim (Financial condition of rural communes and sources of their income in the Wielkopolskie voivodship), *Stowarzyszenie Ekonomistow Rolnictwa i Agrobiznesu Roczniki Naukowe*, tom XVIII, zeszyt 1.
4. Churski, P., Borowcza, A., Dolata, M., Dominik, J., Hauke, J., Perdal, R., Konecka-Szydłowska, B. (2013). *Czynniki rozwoju obszarow wzrostu i obszarow stagnacji gospodarczej w Polsce (Growth factors for growth areas and areas of economic stagnation in Poland)*, Uniwersytet im. Adama Mickiewicza, Poznan.
5. Douglas, J.W., Gaddie, R.K. (2002). State rainy day funds and fiscal crises: Rainy day funds and the 1990-1991 recession revisited, *Public Budgeting & Finance*, t. 22.
6. Dziekanski, p. (2016). *Spatial Changes and Assessment of the Financial Condition of Local Government Units in the Context of the Income Structure*. In: Formankova S., International Conference on Management (ICoM), Trends of Management in the Contemporary Society (Peer-Reviewed Conference Proceedings), Brno, Publisher: Mendelova univerzita v Brně.
7. Dziekanski, p. (2016). Spatial Differentiation of the Financial Condition of the Swietokrzyskie Voivodship Counties. *Barometr Regionalny*, Tom 14 nr 3/2016, p. 79-91.
8. Dziekanski, p. (2018). *Territorialisation of Spatial Disproportions of Infrastructure and Development of Rural Areas of the swietokrzyskie voivodship*. In: Proceedings of the 2018 International Conference "Economic Science for Rural Development" No 47 Jelgava, LLU ESAF, 9 11 May 2018, p. 73-80.
9. Dziekanski, P., Wyszowski, A. (2018). Ocena przestrzennego zroznicowania sytuacji finansowej gmin wojewodztwa swietokrzyskiego z wykorzystaniem miary syntetycznej (Evaluation of the spatial diversity of the financial situation of the communes of the Swietokrzyskie province with the use of a synthetic measure), *Optimum. Economic Studies*, nr 1 (91), p. 219-238.
10. Korenik, S. (1999). *Rozwoj regionu ekonomicznego na przykladzie Dolnego Slaska (The development of the economic region on the example of Lower Silesia)*. Wyd. Akademii Ekonomicznej im. Oskara Langego we Wroclawiu. Wroclaw
11. Malina, A. (2004). *Wielowymiarowa analiza przestrzennego zroznicowania struktury gospodarki Polski wedlug wojewodztw (Multidimensional analysis of the spatial diversity of the structure of the Polish economy by voivodships)*, Wyd. Akademii Ekonomicznej w Krakowie, Krakow, p. 96-97.
12. Markowski, T. (2008). *Teoretyczne podstawy rozwoju lokalnego i regionalnego (Theoretical foundations of local and regional development)*. In: *Gospodarka regionalna i lokalna (Regional and local economy)*. ed. Z. Strzelecki, Warszawa, p. 9.
13. Mioduchowska-Jaroszewicz, E. (2013). Metody i kierunki oceny kondycji finansowej jednostek samorzadow terytorialnych (Methods and directions of assessing the financial condition of local government units), *ZN US*, nr 786, Finansowe, Ubezpieczenia, nr 64/2, p. 127-140.
14. Mlodak, A. (2006). *Analiza taksonomiczna w statystyce regionalnej (Taxonomic analysis in regional statistics)*, Difin, Warszawa.
15. Oplotnik, Z., Brezovnik, B. (2004). Financing local government in Slovenia. *Post-Communist Economies*, Volume 16, Issue 4.
16. Prus, P., Drzadzinska, K. (2017). *Farmers' Assessment of Training Services and the Impact of Agricultural Advisory on Selected Developmental Factors Affecting Farming*. In: Proceedings of the International Scientific Conference „Economic Science for Rural Development”, Latvia University of Agriculture, Jelgava, No. 44, pp. 338-344.
17. Satola, L. (2015). Kondycja finansowa gmin w warunkach zmiennej koniunktury gospodarczej (Financial condition of communes in the conditions of a changing economic situation). *Journal of Agribusiness and Rural Development*, 1 (35), p. 115-123.
18. Stanny, M. (2013). *Przestrzenne zroznicowanie rozwoju obszarow wiejskich w Polsce (Spatial diversification of rural development in Poland)*, IRWiR PAN, Warszawa.
19. Wysocki, F. (2010). *Metody taksonomiczne w rozpoznawaniu typow ekonomicznych rolnictwa i obszarow wiejskich (Taxonomic methods in recognizing economic types of agriculture and rural areas)*, Wyd. Uniwersytetu Przyrodniczego w Poznaniu. Poznan.

20. Wysocki, F., Lira, J. (2005). *Statystyka opisowa (Descriptive statistics)*. Wyd. UP w Poznaniu, Poznan.
21. Zakrzewska-Poltorak, A. (2011). Zasoby endogeniczne jako czynnik rozwoju lokalnego i regionalnego. Studium przypadków wybranych gmin województwa dolnośląskiego (*Endogenous resources as a factor of local and regional development. Case study of selected communes of the Lower Silesian Voivodship*), *PN UE we Wrocławiu*, nr 152, p. 579-588.

ADVANTAGES AND DISADVANTAGES OF OUTSOURCING ACCOUNTING WORLDWIDE AND IN LATVIA

Ivita Faitusa¹, Dr.oec./ lecturer
¹University of Latvia

Abstract. The accounting outsourcing services have not rich experience in Latvia. It started developing in the 1990s, but accounting outsourcing services have different expertise and history in Europe and around the world. An accountant is not a regulated profession in Latvia; an accountant is able to practice without a mandatory accountancy qualification, and it is enough for him/her to have only an economic-related academic or professional certificate, diploma or degree or experience or an accountant leading to a certificate of competency. This research aims to identify main future challenges for outsourcing accounting companies and accountants. The article looks at both theory and practice and attempts to determine and understand problematic issues about the advantages and disadvantages of outsourcing accounting leading to recommendations for improvement. The rapid development of cloud accounting has played an essential role in the development of outsourcing accounting these days. The author found that only in Norway there are specific rules for outsourcing accountants or external accountants. Main advantages of cloud accounting are possibilities of remote work and a universal system for accountants and managers. The author defined three significant questions for the Accounting Outsourcing Survey in Latvia, Lithuania, and Estonia.

Keywords: accounting, accounting outsourcing.

JEL code: M41.

Introduction

Outsourcing services have helped thousands of countries to be profitable and increase efficiency in Europe. In the paper, the author intends to discuss the historical development of outsourcing accounting companies, cloud accounting as a part of the outsourcing service and as a new paradigm of accounting policies. The development of an accountant's profession is a popular subject in researches in many countries. The author made theoretical research on literature review and developed survey questions for the next research, evaluating outsourcing accountants in the three Baltic States. The main problem is that there are no mandatory requirements regarding education for a practising accountant in Latvia. This research aims to identify main future challenges for outsourcing accounting companies. The scientific literature review and monographic method, economic analysis and synthesis methods, data comparative analysis method, and data analysis of the European Commission regulated professions database are used in this article.

Outsourcing accounting services worldwide and in Latvia

Any company and even any individual, who carries out an economic activity, must keep an accounting. „Accounting is a system of measurement ('to count') and reporting ('to account for') of economic events for the purpose of decision making.” (Stolowy H. &, Ding Y., 2017).

In general, the main reasons why companies outsource their services are to ensure a high level of productivity and to offer maximum quality to their own customers. The area of outsourced service is vast, including but not limited to business process outsourcing (BPO), human resources services, and information technology (IT) outsourcing. Some of the most outsourced global services are financial accounting services, generating much of Business Process Outsourcing revenue. The largest global payers in this area are Deloitte, PricewaterhouseCoopers, Ernst&Young, and KPMG constituting the so-called „The Big4” offering services such as accounting, auditing, corporate finance or insurance services (Popovici, Moraru, 2018).

¹ E-mail: ivita.faitusa@lu.lv, phone No +371 26141974

The origins of accounting services in Latvia should be related to Swiss Professor E. Lauris who established the first accounting office in 1901, whereas the offices had already spread all over Europe by the end of the 1930s. Accounting offices carried out accounting for the agricultural and craft companies. In Latvia, the first office of this kind started its activities in 1923, and it provided services to 71 agricultural companies during its first year of operations (Millere, 2011).

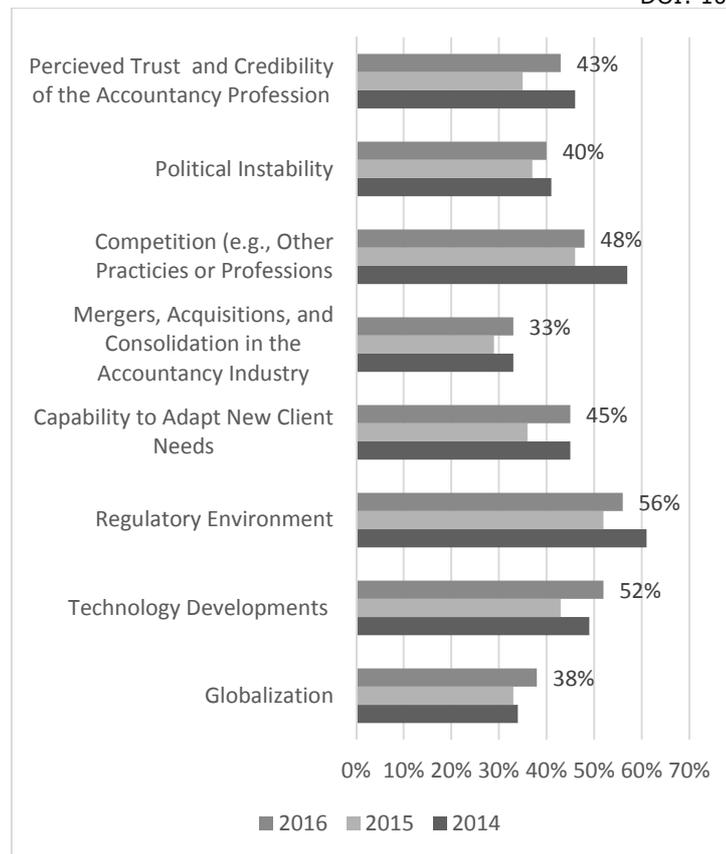
Since the Industrial Revolution, companies have grappled with how they can exploit their competitive advantage to increase their markets and their profits. Almost throughout the 20th century, a model was a large integrated company that can „own, manage, and directly control“ its assets. In the 1950s and 1960s, the rallying cry was diversification to broaden corporate bases and take advantage of economies of scale. By diversifying, companies expected to protect their profits, even though expansion required multiple layers of management. Subsequently, in the 1970s and 1980s, organisations attempting to compete globally were handicapped by a lack of agility that resulted from bloated management structures. To increase their flexibility and creativity, many large companies developed a new strategy of focusing on their core business, which required identifying critical processes and deciding which of those could be outsourced (SCRC, 2006).

Only in the 1990s, after the restoration of Latvia's independence, the accounting services again could develop as an independent type of business (Sneidere, Bumane, and Laschenko, 2013).

At present, outsourcing has become a global phenomenon that has revolutionised the business environment. Outsourcing is more present than ever, and the type of impact that this field can have on the economy lies with each state. Investing in infrastructure, education, openness to innovation, and innovation itself can make a difference in the long run (Popovici, Moraru, 2018).

The 2016 International Federation of Accountants Global SMP Survey asked practitioners from small and medium-sized practices across the globe about their challenges, how various environmental factors may affect them over the next five years, their 2016 revenues and projected 2017 revenues and the consulting services they provided. It additionally reports on practitioners' views on the impact of challenges that their small and medium-sized corporate customers faced. Besides, it introduced questions on personnel and staffing issues, technology challenges, collection ratios, and employee utilisation ratios (IFAC, 2017).

Data (Fig. 1) enables us to see that respondents rated eight factors to indicate the degree to which they believe each element can impact their practice over the next five years. Consistent with 2014 and 2015, the Regulatory Environment continued to be viewed as the most impactful with 56 % of respondents anticipating that it will have a high or very high impact. Technology developments at 52 % up from 43 % in 2015 were viewed as having the next highest potential impact on SMEs. The percentage of respondents that rated the anticipated implications of Capability to Adapt to New Client Needs as high or very high (45 % up from 36 % in 2015), and Perceived Trust and Credibility of the Profession (43 %, up from 35 % in 2015) increased substantially in comparison to 2015. For all four of the environmental factors noted, sensitivity to the factors increased in 2016, falling more in line with 2014 survey results. (IFAC, 2017).



Source: author's construction based on IFAC, 2017

Fig. 1. Factors impacting SMPS over next five years- comparison of 2016, 2015, 2014 (sum of high & very high impact)

The Framework for International Education Standards for Professional Accountants and Aspiring Professional Accountants (2015) defines such requirements for the accountancy profession: preparing, analysing, and reporting relevant and faithfully represented financial and nonfinancial information; partnering in decision-making and in formulating and implementing organisational strategies; developing and examining relevant tax information (Bruna I. et al, 2017). According to those theoretical statements, the author will analyse the regulation of the accountant's profession as an essential quality provider to ensure accountancy service.

Analysis of accountants' profession in European Countries

After data analysis of the European Commission regulated professions database (European Commission, 2019), the author found that three different generic names of accountants' professions exist in 18 European Union Member States: 1) Accountant/ Tax Advisor includes 38 regulated professions, 2) Auditor/ Accountant includes 40 regulated professions, and 3) public finance accountants include three regulated professions, which are incorporated in the European database as Auditors and Accountants together. Names of professions differ, and we can find more than 10 types of professions for an accountant (Table 1).

From data (Table 1), we can see that professions are very different, and there are No common names in, for example, the generic name of the profession (*auditor/accountant*). There are Chartered Accountants and Auditors in Austria, but in the Netherlands, there is auditor/accountant. Moreover, many other differences are observed in European countries.

There are three main types of regulation in European countries: reserves of activities, reserves of activities and protected title, and protected title (without reserves of activities).

There are three qualification level types: SEC - diploma post-secondary education; PS3 - diploma of the post-secondary level (3-4 years), and attestation of competence just in the Czech Republic.

The author found that there are specific rules for outsourcing accountants just in Norway: external accountants must be authorised by the Financial Supervisory Authority of Norway (Finanstilsynet) and shall conduct their client's duties according to the accounting and bookkeeping legislation. External accountants shall do its business by sound accounting practice. External accountants shall prepare reports and information to their clients that they must provide by law or regulation. These include annual accounts, value-added tax reports, reports for tax and national insurance, etc. (European Commission, 2019).

The author did not find information about the regulation of outsourcing business in Europe and made conclusions that in the countries where regulated accountants' professions were regulated, one for outsourcing companies should be as well.

In Latvia, the Law on Accounting stipulates that „an accountant is an individual, whose qualification corresponds to the fourth or the third level qualification of an accountant determined by the Cabinet of Ministers and whose expertise is attested by a relevant educational document (diploma or certificate) as well as such an individual, whose expertise in relevant accounting issues is certified by experience or an appropriate certificate, and which carries out the duties of an accountant. In his turn, „an outsourced accountant is an individual, who undertakes to provide or provides a customer with an accounting service which meets the requirements of an accountant based on a written agreement with a company (other than an employment contract)” (Saeima, 1992).

In Latvia, there are no mandatory requirements regarding education for a practising accountant. Public authorities of the Republic of Latvia should genuinely look at the accountancy profession to determine the level of qualification and experience required to establish and ensure that skilled accountants manage a company's financial statements (Millere, Faitusa, Grima, Baldacchino, 2018).

Amendments to the Law on Accounting are planned with a licencing program for outsourcing accountants this year.

Like other forms of outsourcing, finance and accounting outsourcing (FAO) has evolved significantly in recent years. These changes centre on three areas. First, the types of finance and administration processes that companies are outsourcing have expanded beyond payables and payroll processing to include processes such as data analyses. Secondly, the management of the relationship between the FAO buyer and the FAO provider has become more efficient. Thirdly, the rise of cloud computing has added new wrinkles not only to FAO relationships but also to the decision of whether to outsource or not (Krell, 2011).

In the next part of the research, the author will find the advantages and disadvantages of cloud accounting or cloud computing as a modern challenge for each accountant.

Regulated accountants' profession in European Countries in 2019

State	Profession	Generic name of profession	Type of regulation	Qualification level
Austria	Certified Accountant (Buchhalter)	Public Finance Accountant	Reserves of activities	DSE - Diploma (post-secondary education)
	Chartered Accountants and Auditors	Auditor/Accountant	Reserves of activities	PS3 - Diploma of the post-secondary level (3-4 years)
	Senior Accountants Payroll Accountant	Accountant/Tax advisor	Reserves of activities	DSE - Diploma (post-secondary education)
Bulgaria	Certified Public Accountant (auditor)	Auditor/Accountant	Reserves of activities	PS3 - Diploma of the post-secondary level (3-4 years)
Cyprus	Certified Public Accountant		Reserves of activities	PS3 - Diploma of the post-secondary level (3-4 years)
Germany	Accountant		Undefined	PS3 - Diploma of the post-secondary level (3-4 years)
Malta	Accountant		Reserves of activities and protected title	Not applicable
Netherlands	Auditor/Accountant		Reserves of activities and protected title	PS3 - Diploma of the post-secondary level (3-4 years)
	Auditor/Accountant	Reserves of activities and protected title	PS3 - Diploma of the post-secondary level (3-4 years)	
Belgium	Accounting Professional Accounting Professionals/Tax-experts Accountant	Accountant/Tax advisor	Reserves of activities and protected title	PS3 - Diploma of the post-secondary level (3-4 years)
Czech Republic	Accounting consulting, bookkeeping, tax accounting		Reserves of activities	Attestation of competence
France	Account / chartered account / bookkeeper / certified public account		Reserves of activities and protected title	PSM - Diploma from post-secondary level (more than 4 years)
Hungary	Chartered Accountant		Reserves of activities	DSE - Diploma (post-secondary education)
Iceland	Chartered Accountant		Reserves of activities	PS3 - Diploma of the post-secondary level (3-4 years)
Ireland	Certified Public Accountant Chartered Accountant/Auditor Incorporated Public Accountant Chartered Certified Accountant		Accountants designation is regulated by a professional body which is recognised in a unique form by the State	PS3 - Diploma of the post-secondary level (3-4 years)
Italy	Dottore commercialista-Accountant		Reserves of activities	PSM - Diploma from post-secondary level (more than 4 years)
	Esperto contabile-Accountancy Expert			PS3 - Diploma of the post-secondary level (3-4 years)

State	Profession	Generic name of profession	Type of regulation	Qualification level
Luxemburg	Accountant		Reserves of activities and protected title	SEC - Certificate attesting the completion of a secondary course
Norway	External Accountant		Reserves of activities	PS3 - Diploma of the post-secondary level (3-4 years)
Portugal	Certified Accountant		Reserves of activities and protected title	PS3 - Diploma of the post-secondary level (3-4 years)
Romania	Licensed Accountant		Reserves of activities and protected title	SEC - Certificate attesting the completion of a secondary course
	Chartered Accountant			PS3 - Diploma of the post-secondary level (3-4 years)
United Kingdom	Chartered Management Accountant		Protected title (without reserves of activities)	PS3 - Diploma of the post-secondary level (3-4 years)
	Chartered Public Finance Accountant	Protected title (without reserves of activities)	PS3 - Diploma of the post-secondary level (3-4 years)	
	Chartered Certified Accountant	Auditor/Accountant	Protected title (without reserves of activities)	PS3 - Diploma of the post-secondary level (3-4 years)

Source: Developed by the author based on the European Commission regulated professions database, 2019

Cloud accounting advantages

The study by PricewaterhouseCoopers (2014) shows that although the evaluation trend of cloud technology is significant in the last decade, the accounting standards have evolved too, but without a practical guide for users of cloud applications (Prichici and Ionescu, 2015). In the rapidly changing global economy, robotics process automation has become one of the most critical fastest growing concepts. Digital value co-creation within service businesses and networks sets the value for end customer experience within more efficient operations by focusing on core business development with the use of modern technology (Kedziora and Kiviranta, 2018). Automation has been an essential component of business process management (Laycock and Hartmann, 2005).

With cloud computing, a business can have financial information as of up to the hour, even a minute that can be fully accessible and managed by their accountant. One of the most significant technological trends now is the emergence of cloud technology (Khanom, 2017). Cloud computing is the new paradigm that has changed traditional computer business schemes: static, close, centralised, and proprietary methods cannot cope with the new requirements that have emerged. Still, this new scenario poses some opportunities to use and new problems to be faced (Ruiz-Agundez et al., 2011).

There are three most common myths about cloud accounting. The first myth: storing data on a PC is safer than in the cloud. The third myth: cloud accounting services are too expensive. For cloud accounting service providers, security is among the critical factors for successful service offering. Huge funds are being invested in setting up data centres and training staff to meet all the security standards set by the European Union and worldwide. The second myth: the data in the cloud are freely accessible to the controlling authorities. In reality, it is impossible both in a legal, practical and moral aesthetic point of view. All legal details are included in an agreement signed between the cloud accounting service provider and a customer. One of the rare occasions, when the controlling authorities have access to the data of a company, is when the employees of the company authorise

that access during an inspection. The third myth: cloud accounting services are too expensive. The cost of cloud services or the IT structure of an enterprise depends on the corporate data security strategy, business model, and organisational needs. Any enterprise should evaluate whether the enterprise needs to buy its own servers because perhaps other systems will be operated on those servers apart from accounting system or the enterprise can entrust IT server infrastructure to cloud service providers (Slaidins, 2017).

The author agreed with researchers (Slaidins V, 2017.; Prichici and Ionescu, 2015) and concluded the following advantages of cloud accounting as cloud computing allows companies to efficiently and economically:

- 1) use IT through the model „use as you need and pay as you go“;
- 2) work remotely, because accounting outsourcing provider can connect to a database, view, and enter accounting data of a company;
- 3) advantages for managers and accountants – an accountant can create a report on different expenses, and a manager will see it in the cloud without additional files and E-mails.

The main disadvantage for cloud accounting will be faced at the places without high-quality Internet or with unstable Internet and quality of cloud service which depends on experience and technologies.

The accounting profession will face significant changes in the next three decades, and professional organisations, their members, and educational institutions should respond. The three changes, namely, evolving smart and digital technology, continued globalisation of reporting/disclosure standards, and new forms of regulation, are also significant challenges for the profession (Islam, 2017).

Creating questions for survey of outsourcing accountants in the three Baltic States

After theoretical research, the author continued with one practical issue. The survey is aimed at understanding the specific challenges and opportunities faced by accounting outsourcing companies in Latvia, Lithuania, and Estonia. The author decided to include questions from the 2016 International Federation of Accountants (IFAC) Global SMP Survey (IFAC, 2017); some changes are made to make it more accessible type of survey for small countries.

Question 1. Respondents should report the size of a company: self-employed – one accountant; 2-5 partners and staff; 6-10 partners and staff; 11-20 partners and staff; 21 or more partners and staff.

Question 2. Respondents should report the extent to which their SMEs were presently facing 11 challenges. Challenges include attracting new customers; rising costs; keeping up with new regulations and standards; differentiating from competition; experiencing pressure to lower fees; managing cash flow and late payments, retaining existing customers, serving customers operating internationally; succession planning; personnel and staffing issues; technology developments can be evaluated in scale from low to very high challenge.

Question 3. Respondents should report on technology issues of an accounting company: investing in and staying current with software; achieving a digital, paperless environment; determining what technology is best for the practice; managing privacy and security risks; investing in and staying current with hardware; advances in data analytics, including availability and use of big data; moving to the cloud.

Conclusions, proposals, recommendations

- 1) In Latvia, there are No mandatory requirements regarding education for a practising accountant and outsourcing accountants, accountant's profession is not a regulated profession like in other 18 countries in Europe. The author found that only in Norway there are specific rules for outsourcing accountants or external accountants.
- 2) Main advantages of cloud accounting are possibilities of remote work and a universal system for accountants and managers. Investments in infrastructure and investments in the education of staff are the most critical factors for improving outsourcing services and be able to implement the latest IT.
- 3) The author decided to include part of questions from the *2016 International Federation of Accountants Global SMP Survey*. The author defined three significant questions for the Accounting Outsourcing Survey in Latvia, Lithuania, and Estonia.

Bibliography

1. Bruna, I., Senkus, K., Subaciene, R., Sneidere, R. (2017.) *Evaluation of Perception of the Accountant's Role at the Enterprise in Latvia and Lithuania*. European Research Studies Journal, Volume XX, Issue 3A, pp. 143-163.
2. European Commission (2019). *European Commission Regulated Professions. Accountant profession*. Retrieved: <http://ec.europa.eu/growth/tools-databases/regprof/index.cfm> Access:10.02.2019.
3. The 2016 IFAC Global SMP Survey (2017). Retrieved: <http://www.ifac.org/system/files/publications/files/2016-IFAC-Global-SMP-Survey.pdf> Access: 11.02.2019.
4. International Federation of Accountants (2017). *Handbook of International Education Pronouncements*. Retrieved: <http://www.ifac.org/publications-resources/2017-handbook-international-education-pronouncements>. Access 06.02.2019.
5. Islam, M.A. (2017). *Future of Accounting Profession: Three Major Changes and Implications for Teaching and Research*. Retrieved: <https://www.ifac.org/global-knowledge-gateway/business-reporting/discussion/future-accounting-profession-three-major> Access: 06.02.2019.
6. Kedziora D., Kiviranta H.M. (2018). *Digital Business Value Creation with Robotic Process Automation in Northern and Central Europe*. Management Volume 13(2) Summer 2018. pp.161.-174
7. Khanom T. (2017) *Cloud Accounting: A Theoretical Overview*. IOSR Journal of Business and Management. Volume 19, Issue 6. Ver.V.(June 2017)., pp.31-38.
8. Krell E. (2018) *Finance and Accounting Outsourcing Assessing and Planning for Success*. Chartered Professional Accountants of Canada. p.19.
9. Millere I., Faitusa I., Grima S., BaldacchiNo P.J. A (2018). *Comparative Analysis of the Latvian and Maltese Regulatory and Professional Requirements for Accountants*. New Challenges of Economic and Business Development - 2018: Productivity and Economic Growth: International Scientific Conference, May 10-12, 2018, Riga, Latvia: Proceedings Riga: University of Latvia, 2018. pp.463-473
10. Millere I. (2011). *Gramatvedibas attistiba Latvija*. LU Akademiskais apgads, pp.181.-182.
11. Popovici N., Moraru C. (2018). *Outsourcing Management: Outsourcing Services Worldwide and in Romania*. „Ovidius” University Annals, Economic Sciences Series. Volume XVIII, Issue 1/2018.
12. Prichici C., Ionescu B.S. (2015) *Cloud Accounting-a New paradigm of Accounting Policies*. SEA- Practical Application of Science. Volume III, Issue I (7)/2015. pp.489-496.
13. Ruiz-Agundez I., Penya Y.K., Bringas P.G. (2011). *A Flexible Accounting Model for Cloud Computing*. Conference paper. May 2011. Retrieved: <http://www.researchgate.net/publication/224248659>. Access: 12.02.2019.
14. Saeima (1992). *LR Law „On Accounting”* (with amendments to 01.01.2018). Retrieved: <https://likumi.lv/doc.php?id=66460>. Access: 06.02.2018.
15. Slaidins V. (2017). *Makonpakalpojumi gramatvediba – miti un realitate*. Bilance Nr.20 (416) Oktobris 16, 2017., pp.24.-27.
16. Sneidere R., Bumane I., Lascenko J. (2013). *Accounting Outsourcing Services in Latvia: Problems and Possible Solutions*. Economics and Management:2013 18(1), p.26.-38.
17. SCRC (Supply Chain Resource Cooperative) SME (2006). *A Brief History of Outsourcing*. June 1, 2006. Retrieved: <https://scm.ncsu.edu/scm-articles/article/a-brief-history-of-outsourcing>. Access:10.02.2019.
18. Stolowy, H. &, Ding, Y. (2017). *Financial Accounting and Reporting: a Global Perspective*. 5th Edition. Hampshire, United Kingdom, Cengage Learning EMEA, p. 660.

ASSESSMENT OF ECONOMIC ACTIVITY IN POLAND IN THE LIGHT OF SELECTED TAX REVENUES

Lukasz Furman¹, PhD

¹State Higher Vocational School Stanislawia Pignonia in Krosno

Abstract: Economic activity is very important today, because it allows to increase economic development and economic growth. The literature presents different approaches to the assessment of economic activity. In this article the analysis of economic activity in various regions of Poland has been undertaken. In order to assess this activity, income taxes were selected, and were considered to be the right economic barometer to identify which of the regions best develop and produce in economic activity. The presentation of this subject matter will allow for proper shaping of economic policy in Poland in future. At the beginning, the hypothesis was put forward that the economic activity in the Member of Parliament is strongly diversified. In order to verify the hypothesis, the shares in tax revenues that are transferred from the state budget to the administrative unit, i.e. the voivodeship, were selected. In particular, the analysis covered shares in income in personal income tax and corporate income tax.

The main part analyses statistical data on the development of shares in income taxes per capita in each voivodeship. The analysis covered a five-year period from 2013 to 2017. Finally, conclusions were drawn from the analysis carried out

Key words: income tax, voivodeship, economic activity.

JEL code: H24, H25.

Introduction

Economic activity is often the subject of scientific research, which is carried out on the basis of various data. Usually, to determine the degree of economic development of a given area, data on turnover or wages are obtained. Often other data are also used, which, after proper analysis, allow to illustrate which areas have a greater economic potential. The discussed topics can be observed and analysed in different dimensions, i.e. local, regional, national or international.

In this article the topic of economic activity was presented in the regional dimension and concerned all voivodships of Poland. In order to precisely diagnose this problem, a hypothesis was put forward that there is a diversified economic activity in Poland. In order to verify the hypothesis, the method of statistical analysis of the data was used. The shares in income from income taxes for each of the voivodships were taken into account. The summary of the article contains the relevant conclusions from the analysis.

1. Tax as a barometer of economic activity

Economic activity is undoubtedly a factor shaping the economic development of a given region. The concept of economic activity is inextricably linked with economic development, which according to Czaplicka is considered not only a quantitative change (economic growth), but also qualitative transformation of the economy. Economic development means comprehensive changes taking place in the economy in the long term (Bakiewicz, Czaplicka 2011, p. 77, Lipton 1990, p. 77).

There are many approaches to explaining the problems of economic development, which is a complex process. Most often it is defined as the improvement of quantitative and qualitative measures, which characterize the cross-sectional socio-economic development in a given area. According to Potoczek, regional development is a permanent increase in the standard of living of the inhabitants and the economic potential of a large territorial unit (Potoczek, 2001).

¹ Rynek 1, 38-400 Krosno, Poland, e-mail: lukasz.furman@pwsz.krosno.pl

Kudlacz, on the other hand, about regional development says that in order to get to know it, one has to trace a multidimensional process related to: economic potential, economic structure, natural environment, spatial and infrastructural development, spatial order, the standard of living of the inhabitants (Kudlacz 1999). Observing the economic potential and its structure can be done through the analysis of tax revenues from a given area. In the economic literature Joseph E. Stiglitz points out that taxes, for the most part, affect the way the economy functions, among others, the allocation of resources and the willingness to bear the risk (Stiglitz 2013, p. 50).

Existing taxes in the economy are to perform certain functions in a given economic system. Through the prism of its construction, the state may achieve various economic objectives, e. g. through the structure of this tax and the level of taxation. Many authors believe that they are a factor in the economic development of each country (Grycuk 2010, p. 1-4).

Through the prism of tax revenues generated in a given area, we can also assess economic development, which is most often understood as quantitative and structural changes in the national economy, which are the consequence of economic growth (Encyklopedia PWN).

In order to diagnose economic activity in voivodships, in this article statistical indicators were used, taking into account income from income taxes due to the budgets of voivodships.

Individuals income is subject to different tax rates. In the case of natural persons, the following tax acts shall apply:

- Personal Income Tax Act of 26 July 1991,
 - Act of 20 November 1998 on flat-rate income tax on certain income earned by natural persons.
- Payments of income tax on the:
- natural persons are carried out by natural persons conducting business activity which is taxed according to a progressive scale or linear scale or as a lump sum on recorded income,
 - payers who, while paying any kind of remuneration to natural persons, are obliged under tax laws to calculate, withhold and collect personal income tax, and then pay it to the appropriate bank account of the tax authority.

As indicated at the beginning of this section, we apply several tax rates to the taxation of income. Persons employed on a contract of employment pay tax on their income according to a progressive scale, i. e. 18 % and 32 %. Individuals who are self-employed may choose to tax their income according to this progressive scale or to benefit from 19 % flat-rate taxation. For a selected group of individual entrepreneurs, the Polish tax system offers lump-sum taxation, which consists in taxing income according to different rates, i.e. 20 %, 17 %, 8.5 %, 5.5 %, 3 %, Taxation of income at such low rates is, however, subject to a revenue limit of up to EUR 250,000 per PLN.

The income tax advances established by taxpayers are paid to the tax office, which, after appropriate conversion and determination of the amount of the share in the income, transfers the calculated amount to the voivodship self-government. Advances paid by taxpayers are paid monthly according to the calculated tax advance or a predetermined advance payment, which is paid in the same amount every month. It is also possible to pay advance income tax in a quarterly period. After the end of the month, the tax office determines the amount of the share in receipts and then transfers it to the bank account of the relevant voivodeship.

On the other hand, the income of legal persons is taxed according to the Act of 15 February 1992 on corporate income tax. The basic rate in this tax is 19 %, but there are some exceptions to this rule. For the group of small taxpayers (income from business activity up to EUR 1,200,000) and taxpayers starting their business activity - in the year in which they started it, the rate is 15 %.

2. Rules for determining shares in income from income taxes

The value of shares in income from income taxes transferred to the budgets of voivodships shall be determined in accordance with strictly defined rules laid down in the Act of 13 November 2003 on Income of Local Government Units.

In particular, Article 9 of the aforementioned Act specifies the methods of determining the amount of shares in personal income tax. According to it, the amount of the share: a/ the municipality's revenue from the personal income tax, which constitutes State budget revenue, is determined by multiplying the total amount of the revenue from this tax by 0,3934 and a ratio equal to the share due in the year preceding the base year of the personal income tax on natural persons residing in the municipality, in the total amount of the tax due in the same year, the amount of the contribution of the county to the income tax revenue of the State budget shall be determined by multiplying the total amount of income from this tax by 0,1025 and an index equal to the share due in the year preceding the base year of income tax on natural persons residing in the county in the total amount of tax due in the same year, c/ the amount of the voivodship's share in the revenue from personal income tax, which constitutes State budget revenue, is determined by multiplying the total amount of revenue from this tax by 0. 0160 and an indicator equal to the share due in the year preceding the base year of income tax on natural persons residing in the area of the voivodship in the total amount of tax due in the same year.

The indicators listed in points a - c are determined on the basis of the data contained in the tax returns submitted, the amount of income earned and the annual tax calculation made by the taxpayers, as at 15 September of the base year.

In the next article 10 of the Act on income of local government units, the rules of determining income tax receipts from corporate income tax were specified. According to the envisaged rules, if a corporate income tax payer has a permanent establishment (branch) located within the territory of a local government unit other than the one competent for its registered office, the part of the income from the participation in the income tax is transferred to the budget of the local government unit in whose territory the permanent establishment (branch) is located, proportionally to the number of persons employed there on the basis of an employment contract. The legislator has also provided that shares in corporate income tax will also cover taxpayers who operate through a foreign company located on the territory of the Republic of Poland. Part of the income from the participation in the income from this tax is transferred to the budget of the local government unit in the territory of which the work is performed, on the basis of an employment contract, by persons employed by the taxpayer or by its foreign company, in proportion to the number of persons employed by the taxpayer or the foreign company on the territory of the Republic of Poland. Entrepreneurs, however, are forced to prepare and submit information to tax offices, including a list of companies (branches) and the number of persons employed under an employment contract, performing work in individual companies with the indication of local government units, in which they are located.

The presented rules of calculation of due shares in taxes constituting state budget revenue are complicated to apply and labour-intensive. In particular, it is necessary to determine the number of persons who inhabited the territory of a given territorial self-government unit. Additionally, taxpayers paying corporate income tax are obliged to submit tax information on the number of persons employed in organizational units (branches) of entrepreneurs, however, located within the territorial jurisdiction of a given self-government. Although it is an administrative activity, it takes a lot of time on the part of tax entities. Taxpayers must compile the information necessary to compile the

information and then forward it to the competent tax authority. Failure to comply with this obligation may result in the taxpayer being punished with a penalty in the form of a penal mandate.

Therefore, the transfer of appropriate shares to local government units depends on the timely, reliable and reliable presentation of tax information by the entrepreneur to the tax office. Here, there may arise problems related to untimely submission of the tax form by the entrepreneur to the tax authority, which may significantly disturb the process of transferring by the tax accounting department the relevant shares in income taxes for a specific local government budget. The case seems to be of particular concern when the Authority does not receive the relevant documentation on the basis of which it can transfer the relevant amounts of the shares. Sometimes there are situations where tax offices transferring part of their income taxes to communes, districts or provinces have to pay interest on late transfer of shares, which is often not their fault. Such a situation worsens the state of settlements. The revenues of local government budgets in question constitute a valuable inflow of funds. From the point of view of the financial management of each local government, they are an important point in the overall budget revenue. Some municipalities or towns outdo each other in ideas on how to narrow down the value of shares in income tax receipts. They usually focus on the promotional campaign „;I live here, I pay taxes here“;. The activities are a lottery with prizes, aimed at natural persons who will register in Rzeszów. The registration will be followed by an increased share in the personal income tax to the city budget.

The Act of 13 November 2003 on the income of local government units as the source of own income of municipalities defines, among other things, shares in income from corporate income tax (CIT). At the same time, it indicates that the amount of this share amounts to 6.71 % of income from CIT taxpayers with their registered office in the area of a given commune. If a CIT payer has a company (branch) located in a commune other than the commune in which it has its registered office, then a part of the income from the participation in CIT receipts is transferred to the budget of the commune in which the company (branch) is located, proportionally to the number of persons employed in it under an employment contract.

3. Shares in income taxes transferred to the budgets of voivodships

As part of the following chapter, statistical data from the Local Data Bank, the Central Statistical Office (GUS) on the value of shares acquired in corporate income tax by individual voivodships were analysed. The presented data are closed in the period from 2013 to 2017. Below each Table there are short conclusions concerning the analysed subject matter. Moreover, for the aforementioned period the ratios of shares in income in the income tax on natural persons per capita of the voivodship and the income tax on legal persons per capita of the voivodship were calculated. In the first of the tables, on the basis of statistical data, the amount of shares in income tax to natural persons per 1 inhabitant of a given voivodship was calculated.

**Shares of voivodships in state budget revenues –
 personal income tax per capita**

WOJEWODZTWO	2013	2014	2015	2016	2017
	PLN	PLN	PLN	PLN	PLN
POLSKA	27.38	29.56	32.00	34.47	37.56
DOLNOSLASKIE	28.74	31.11	34.01	36.63	40.09
KUJAWSKO-POMORSKIE	22.95	24.56	26.57	28.72	31.39
LUBELSKIE	18.79	20.39	22.23	23.83	25.57
LUBUSKIE	22.68	24.25	26.50	28.78	31.59
LODZKIE	25.76	27.93	30.30	32.65	35.62
MALOPOLSKIE	25.56	27.39	29.73	32.36	35.89
MAZOWIECKIE	42.93	46.21	49.53	53.32	57.76
OPOLSKIE	22.30	24.26	25.95	27.95	30.58
PODKARPACKIE	17.95	19.58	21.28	23.04	25.21
PODLASKIE	20.26	21.85	23.73	25.65	28.06
POMORSKIE	27.46	29.58	32.18	34.80	38.25
SLASKIE	31.06	33.86	36.44	38.35	40.91
SWIETOKRZYSKIE	19.80	21.34	22.67	24.34	26.74
WARMINSKO-MAZURSKIE	20.43	22.09	23.83	25.85	27.86
WIELKOPOLSKIE	27.02	28.95	31.53	34.51	38.07
ZACHODNIOPOMORSKIE	23.77	25.51	28.11	30.05	33.04

Source: author's calculations based on Polish Statistical Office

On the basis of the analysis of the data contained in the Table above, we can state that the largest share in the tax revenues obtained from personal income tax is held by the Mazowieckie, Śląskie, Dolnoslaskie, Wielkopolskie and Mazowieckie Voivodships, respectively. The calculated indices for these voivodships allow us to state that there is a very high economic activity in these voivodships related to the employment of employees and running an individual business activity. Obtaining the highest level of the indicator in the voivodships in question is primarily related to the location of these voivodships by the main communication routes and very good development of infrastructure enabling the development of economic activity. Mazowieckie voivodship, as it reached the highest level of the indicator, shows that there is the best economic activity in its area. Achieving such a high level of the meter (above 40 PLN and 50 PLN in the last two years of the survey for the Mazowieckie Voivodship) is an undoubted success for the Mazowieckie Voivodship and the other mentioned. Despite such good results recorded in five voivodships in economic policy should also pay attention to the voivodships where the level of the calculated share of personal income tax is the lowest. The calculations show that the worst economic activity is in Lubelskie, Podkarpackie, Podlaskie and Swietokrzyskie voivodships. The recorded level of the indicator significantly below PLN 30 per capita, often not exceeding the average result obtained for the whole area of Poland.

Shares in taxes constituting state budget revenues corporate income tax in 2013 - 2017

WOJEWODZTWO	2013	2014	2015	2016	2017
	PLN	PLN	PLN	PLN	PLN
POLSKA	105.50	108.20	118.68	124.97	140.81
DOLNOSLASKIE	173.48	139.24	169.51	149.39	180.27
KUJAWSKO-POMORSKIE	79.12	82.39	86.04	95.81	93.87
LUBELSKIE	58.76	59.96	56.74	54.85	61.89
LUBUSKIE	69.02	75.53	79.45	85.68	98.06
LODZKIE	96.50	94.90	105.56	106.24	106.56
MALOPOLSKIE	79.35	85.21	90.97	106.89	110.54
MAZOWIECKIE	215.83	233.36	259.03	272.13	333.91
OPOLSKIE	79.23	65.51	79.71	86.66	86.82
PODKARPACKIE	57.16	62.64	65.34	68.00	73.26
PODLASKIE	54.97	49.76	54.28	55.20	62.60
POMORSKIE	113.82	117.08	115.06	119.48	134.99
SLASKIE	85.38	91.07	94.12	108.34	119.84
SWIETOKRZYSKIE	48.78	51.77	57.44	51.02	50.01
WARMINSKO-MAZURSKIE	50.67	52.33	55.70	55.43	52.75
WIELKOPOLSKIE	105.80	117.46	137.34	154.26	163.80
ZACHODNIOPOMORSKIE	67.34	69.26	73.62	78.43	84.11

Source: author's calculations based on Polish Statistical Office

From the calculation of the ratio of income share in the corporate income tax per capita we can state that legal persons are much more active in the economy than natural persons. The level of indices in Table 2 is in some cases several times higher than the value of indices located in Table 1. Among the most economically active voivodships (the level of the index above PLN 100) are: Mazowieckie in the years 2013-2017 the level of the index in the range of PLN 200 to PLN 300. In 2017, the indicator exceeded PLN 300, which indicates a very high economic activity. For the Mazowieckie Voivodeship, the height of the achieved indicator can be explained by the fact that the capital city of Warsaw is the place where many large enterprises, including large companies with international capital, have their registered office. A large concentration of economic units influences the largest economic activity of the Mazowieckie Voivodeship.

The lowest economic activity was in the following voivodships: Swietokrzyskie and Lubelskie (the index obtained in the years under review was below PLN 60). It is worth stressing that in the years 2013-2017 the average index for the whole Poland ranged from PLN 105. 50 to PLN 140. 80 per 15 voivodships. Such a level of the indicator was achieved only in four voivodships, i. e. Mazowieckie, Wielkopolskie, Pomorskie and Dolnoslaskie. As a result, the most active economic entities are legal entities from the above mentioned voivodships.

Summary

The analysis carried out in the scope of economic activity in individual voivodships of Poland allows to draw a few conclusions, i.e. :

- 1) the most important from the point of view of transfers received from the state budget are the shares in corporate income tax, as in the analysed period of 2013-2017 the voivodeships recorded the highest income per capita on this account;

- 2) In the area of income from shares in personal income tax, it can be stated that they provided much less income for the budgets of voivodships than shares in corporate income tax;
- 3) changes in the economic policy shaping economic activity of entrepreneurs need first of all the voivodships reaching the lowest indices, i. e. Lubelskie, Podkarpackie, Podlaskie and Swietokrzyskie; this concerns both the reference to natural persons and legal persons conducting business activity;
- 4) the analysis indicates where entrepreneurship should be developed in order to achieve sustainable economic development in Poland and economic activity is so highly diversified.

Bibliography

1. Local Data Bank, Available www.stat.gov.pl,
2. Bakiewicz, A., Czaplicka, K. (2011), *Wzrost i rozwój gospodarczy w krajach rozwijających się* [w:] R. Piasecki (red.), *Ekonomia rozwoju*, PWE, Warszawa, p. 70-93.
3. Grycuk, A., *Podatek, CIT jako narzędzie polityki gospodarczej*, Biuro Analiz Sejmowych, Infors Zagadnienia społeczno – gospodarcze nr 4 (74), 18.02.2010 r., p. 2.
4. Lipton D., Sachs J., Fischer S., Janos K., (1990), *Creating a Market Economy in Eastern Europe: The case of Poland*, *Bookings Papers on Economic Activity*, Volume 1990, Issue , p. 77.
5. Kudlacz, T., (1999), *Programowanie rozwoju regionalnego*, Wydawnictwo Naukowe PWN, Warszawa, p. 150.
6. Marczak, L., (2007), *W sprawie klasyfikacji dochodów jednostek samorządu terytorialnego* [w:] Patrzalek L., *Stan i kierunki rozwoju finansów samorządu terytorialnego*, Wydawnictwo WSB Poznań – Wrocław, p. 45.
7. Nojszewska, E., (2002) *Podatek dochodowy jako narzędzie polityki gospodarczej*, Szkoła Główna Handlowa w Warszawie, p. 87.
8. Potoczek, A., (2001) *Programowanie rozwoju lokalnego i regionalnego jako zadanie samorządu terytorialnego*, [w:] Potoczek A., *Stymulowanie rozwoju lokalnego – perspektywa społeczna i organizacyjna*, Regionalny Ośrodek Studiów i Ochrony Środowiska Kulturowego w Toruniu, Torun p. 15.
9. Stiglitz, J.E. (2013), *Ekonomia sektora publicznego*, PWN, Warszawa.
10. Wyrzykowski, W., *Podatkowe uwarunkowania rozwoju przedsiębiorczości w Polsce*, Wydawnictwo Politechniki Gdańskiej, 2013.

TAX CHALLENGES IN THE COLLABORATIVE ECONOMY

Maris Juruss¹, Dr.oec., asoc. professor; **Justina Hudenko**¹ Dr.oec., asis. professor and **Ilze Varlamova**¹, Mg.oec.

¹Riga Technical University, Latvia

Abstract. A variety of collaborative economy business models are rapidly emerging and growing across the world, calling for changes in traditional tax policies. Although the collaborative economy shows a rapid growth, the review of the existing taxation practices within the collaborative economy reveals inefficiency, associated mainly with the blurred boundaries among professional and non-professional service providers, with the avoidance to cooperate from collaborative platforms and with the fragmentation in taxation regimes among EU member states and worldwide. The aim of this paper is to investigate tax challenges arising from the collaborative economy and to offer a comprehensive model of the tax system development in the collaborative economy. Accordingly, this paper demonstrates the results of systematization of the collected task-oriented data and the description of the proposed model developed by the generalisation approach. Data collection and systematization methods have been used. The authors conclude that the taxation of the collaborative economy must be investigated on the global level by using collaborative economy instruments (platforms and scoring). The role of awareness of both service providers and tax administrations is stressed in the discussion part.

Key words: collaborative economy, taxation, information exchange, peer-to-peer services, collaborative platforms.

Jel codes: H21, H24, H25, K34, H71

Introduction

In a view of a technological progress, a new concept of cost sharing has become the central issue in many fields of the economy. This economic behaviour has become so popular that it has created a new concept - collaborative economy. In light of common digital cognition, it is becoming extremely difficult to ignore the shift from traditional business-to-peer (B2P) economy to peer-to-peer (P2P) and peer-to-business (P2B) forms (Butenko & Larouche, 2015), as this new business model has high potential for the development. There is a growing body of literature that recognises the importance of taxation issues in this field and shows the increasing concern that tax administration is being disadvantaged for the time being.

This paper is aimed to investigate factors that determine an effective taxation in the collaborative economy and proposes a new model of the tax system development. The key issues addressed to tax policy makers in this paper are: a) prior notification about classification of service providers, distinguishing professionals from non-professionals; b) development of cooperation between collaborative platforms and tax administrations; and c) development of the common integrated tax system on EU or worldwide level. For these analysis, task-oriented data collection and systematization methods were used. A generalisation approach was utilised, integrating the addressed issues to establish a common model of the tax system development in the collaborative economy. Data collection, systematization methods and other scientific methods have been used for the specified tasks. The following tasks were completed: a) analysed the practices taken by EU countries to tackle the collaborative economy tax issues; b) measured the impact of new approach to deal with tax issues of collaborative economy.

This study was exploratory and interpretative in nature as there were relatively few historical studies and lack of statistics in this area. However, the study offers some important insights into the relations among actors and into aspects of the taxation system in the collaborative economy. Understanding these links will help to completely change the perception of taxation policy and encourage tax administrations to become the equal partners of the collaborative society. A full discussion of the specific taxation tool kit lies beyond the scope of this study.

The paper has been divided into four parts. The first part provides quick insight into concepts and trends of collaborative economy, the second part investigates existing knowledge and practices in the taxation of collaborative economy, the third part describes the proposed model of tax system development in the collaborative economy and, finally, the last part discusses limitations of the research and provides recommendations for future studies and practical implementations. At the end of the paper the conclusions and recommendations are summarised in brief.

1. The concept and trends of collaborative economy

This part of the paper determines the concept of the collaborative economy, highlights its main actors and their economic relations in a view of the taxation needs as well as assesses the significance of this activity in present and future.

To be going on, here it is necessary to clarify exactly what is meant by collaborative economy. In the field of economy, various terms of the same concept are found. Bretta (2018) Stanoevska-Slabeva et al. (2017) and many others used the term „sharing economy“ to refer to the emerging taxation framework. Maselli et al. (2016) argued that „the definition of the sharing economy is precise, but somewhat restrictive“ and used in their essay the term „on-demand economy“. Other mutually substitutable terms used in this content are „peer-to-peer economy“, „gig economy“, „platform economy“. Although Selloni (2017) made a synthetic overview of the mentioned terms highlighting their distinctions, throughout this paper, the term „collaborative economy“ will be used to refer to all the „distributed networks of connected individuals and communities versus centralised institutions“ (Botsman and Roger, 2010) as this particular term is used by the European Commission (2017).

The key actors of the collaborative economy can be listed as follows:

- persons, that share assets, resources, time and/or skills - service providers;
- users of the shared objects- users;
- intermediaries that connect them via an online platform - collaborative platforms.

The main discrepancy of the collaborative economy is that transactions generally do not involve a change of ownership, and can be executed P2P and P2B both for profit and not-for-profit (based on European Commission, 2018). To continue comparison of the odds between the collaborative and traditional economy for taxation needs we viewed it from several aspects of taxation system: a) the payer, b) the base, c) the rate, d) the application, e) the administration.

Practically any person who has an unused asset or unemployed time can engage in collaborative economy and earn income. This blurs the boundaries between professional provision of service and occasional (non-professional) „gig“. Therefore, it is a challenge to identify a tax payer, as it does not have a continuous status (Petropoulos, 2017). In some countries, professional and non-professional activities are differentiated stating that professional activity is profit-oriented, whereas non-professional activity involves cost reduction (European Commission, 2016). In other countries, thresholds of income or activity's frequency are introduced to classify tax payers (Bozdoganoglu, 2017), therefore, narrowing a taxbase. This requires a continuous analysis of each actor's activity and a huge administrative resource. Moreover, if there is not a clear boundary between the employment status of a service provider, i.e. whether a person is an independent economic operator or an employee of the collaborative platform, it is resulting in tax rate determination problem (Petropoulos, 2017; Leighton, 2016). The technological progress has made it possible to connect demand and supply in a digital environment (collaborative platforms) quickly and efficiently. These platforms can be physically located in the distinct country from where they generate income from

users' commissions for P2P transactions. According to the existing tax regulation, digital presence does not create the legal basis for the tax application, as a result, the collaborative platforms usually shift their residences to countries with lower tax rates, but act worldwide. Last, but not least, the massive number of small-scale activities are facilitated by the collaborative platforms resulting in negative cumulative impacts. Zale (2016) reported that scale is a defining feature and a fundamental challenge of the collaborative economy. Small-scale activities that once fit the criteria for light or No regulation are occurring at scales at which regulation makes sense.

The European Commission (2018) reveals that the collaborative economy has expanded in many fields of economy where the most popular sector is the finances. Most of the collaborative platforms are originated in the EU, but there are also 42 internationally operating platforms originated outside the EU (mainly in the United States) and operating in international markets (European Commission, 2018). The turnover of the collaborative economy in the EU was estimated EUR 26.5 billion (0.17 % of EU-28 GDP in 2016) and is expected to reach an average of EUR 160-572 billion in the future (Council of the European Union, 2017), where Estonia, Poland, Latvia, Luxembourg, the Czech Republic and Sweden perform above the EU-28 average, but in absolute numbers, France enjoys the largest collaborative economy market share in the EU (EUR 8.6 billion), followed by the UK (EUR 4.6 billion), Spain (EUR 2.7 billion) and Poland (EUR 2.7 billion) (European Commission, 2018). The European Commission (2018) has also reported that about 394,000 persons are employed within the collaborative economy in the EU-28 (0.15 % of EU-28 employment).

The results in this part indicate that the number of collaborative platforms, service providers and users is likely to continue to rapidly increase in the next decade. This enables certain policymakers simply to forbid some services provided by the collaborative platforms, as it is done temporarily in Hamburg and Brussels for Uber or in Berlin for Airbnb, or contrary, to allow work at their will. Trends in the collaborative economy call for changes in tax system, considering significant differences stated between the taxation conditions in the traditional and the collaborative economies: uncertainty in a tax regime of tax payers, a huge scale of minor transactions, unpredictability of residency of collaborative platforms etc. The next part, therefore, moves on to discuss the necessary changes.

2. Taxation practices in the collaborative economy

This part of paper is aimed to review recent research and practices in the field of the taxation in the collaborative economy to pick up the best practices and to dismiss ineffective solutions.

Remeur (2018) based on the review provided by Codagnone et.al (2016) concluded that the literature on the collaborative economy does not address tax aspects in detail. She suggested that „dealing with taxation in the collaborative economy requires a case-by-base and tax-by-tax approach that prevents a straightforward 'one-size-fits-all' approach” and linked the collaborative economy and the digital business, as they share common features. This reflects the existing attitude to the fragmentation in the taxation of the collaborative economy. Several member states that have adopted measures to foster a tax compliance in this sector do this in distinct ways: Belgium, Denmark, Finland and France specify diverse thresholds, beyond which the profit is to be considered professional income and subject to tax; the tax authorities were granted the powers to obtain data from digital platforms in the United Kingdom; Slovakia and Hungary apply general taxation rules (European Parliament, 2018).

As it was mentioned, since the collaborative platforms provide intermediary services in a digital environment, it makes tax administration in their domestic market difficult, since collaborative platforms do not have a physical presence in the country where their users are. Therefore, as

presented by Erwin & Karaman (2017) the income generated in country's territory cannot be subject to income tax. Pantazatou (2018) considered that challenges of the collaborative economy are in the identifying of the taxpayers and the taxable income, as well as the lack of compliance and enforcements. She associated these challenges with the incoherent taxation of the collaborative economy at the Member State level and suggested the EU to take comprehensive action by adopting legislation that would establish general principles or guidelines for all Member States. Goudin (2016) also came to the similar conclusion.

Apart from the legislation tools, Rigaux (2016) confirmed the effectiveness of rising the awareness of users and service providers as well as of the development of the cooperation among tax administrations and collaboration platforms. For instance, the „Sharing Economy Tax Centre“ has been set up to provide information on the application of taxes to the collaborative economy in Ireland. This approach can make sense, since Rahim et al. (2017) also has shown that service providers involved in the peer-to-peer model are not well informed of their tax risks.

In the places where tax administrations achieve cooperation with the collaborative platforms (Airbnb tourism tax - Paris, Amsterdam, Lisbon; Uber VAT- Spain, Sweden, Netherlands) they even undertake withholding and collecting taxes to the respective budget. Another cooperation practise emerged from collaborative platforms operating in the transport sector in Estonia. They transmit information about drivers' income to tax administrations which is automatically added to their tax declaration (Bozdoganoglu, 2017). However, the largest collaborative platforms (as Airbnb and Uber) operate in a collaborative economy by organization of the international holding company network which have subsidiaries in countries with the most favourable tax regimes (Petropoulos, 2017; O'Keefe & Jones, 2015). In this way, international companies carry out the aggressive tax planning, which makes it possible to avoid taxes, reduce income tax base and shift profits to countries with lower tax rates (Karaman & Erwin, 2017; McClure et al., 2016). On the other hand, only those collaborative platforms that have reached global scale are known to national tax administrations as they have reached wide resonance. Smaller platforms are used to be engaged in non-registered economic activity (Pantazatou, 2018).

Considering all of this evidence, it seems that the existing state of play outlines a critical role of users and service providers' awareness as well as the necessity to combat the territorial fragmentation of the taxation. It has emerged that tax administrations must study the effectiveness lessons from the collaborative society. The third part of the paper, therefore, moves on to discuss the model of the tax system development in the collaborative economy.

3. The model of the tax system development in the collaborative economy

The following part of this paper moves on to describe in greater detail the tax system development action model. The review of research and practices provided the set of three related significant clusters of emerging taxation system:

- service providers, that generate (or not) value added or personal (corporative) income, imply a corresponding tax liability and are the key element in the collaborative economy chain in terms of tax classification;
- collaborative platforms, that ensure that users and service providers make their activities, are the key element in terms of tax avoiding;
- tax administrations, considering absence of any physical boundaries in digital economy, are a key issue to the international collaboration in order to combat tax evasions in national economies.

Taken together, these results suggest that the only effective solution of the tax system development towards the collaboration economy is integrating it in the collaborative society on these three levels. Figure 1 presents the model of tax system development in the collaborative economy: there are three levels of inclusions that require different actions of the actors. A brief description of each level is provided below the Figure developed by the authors.

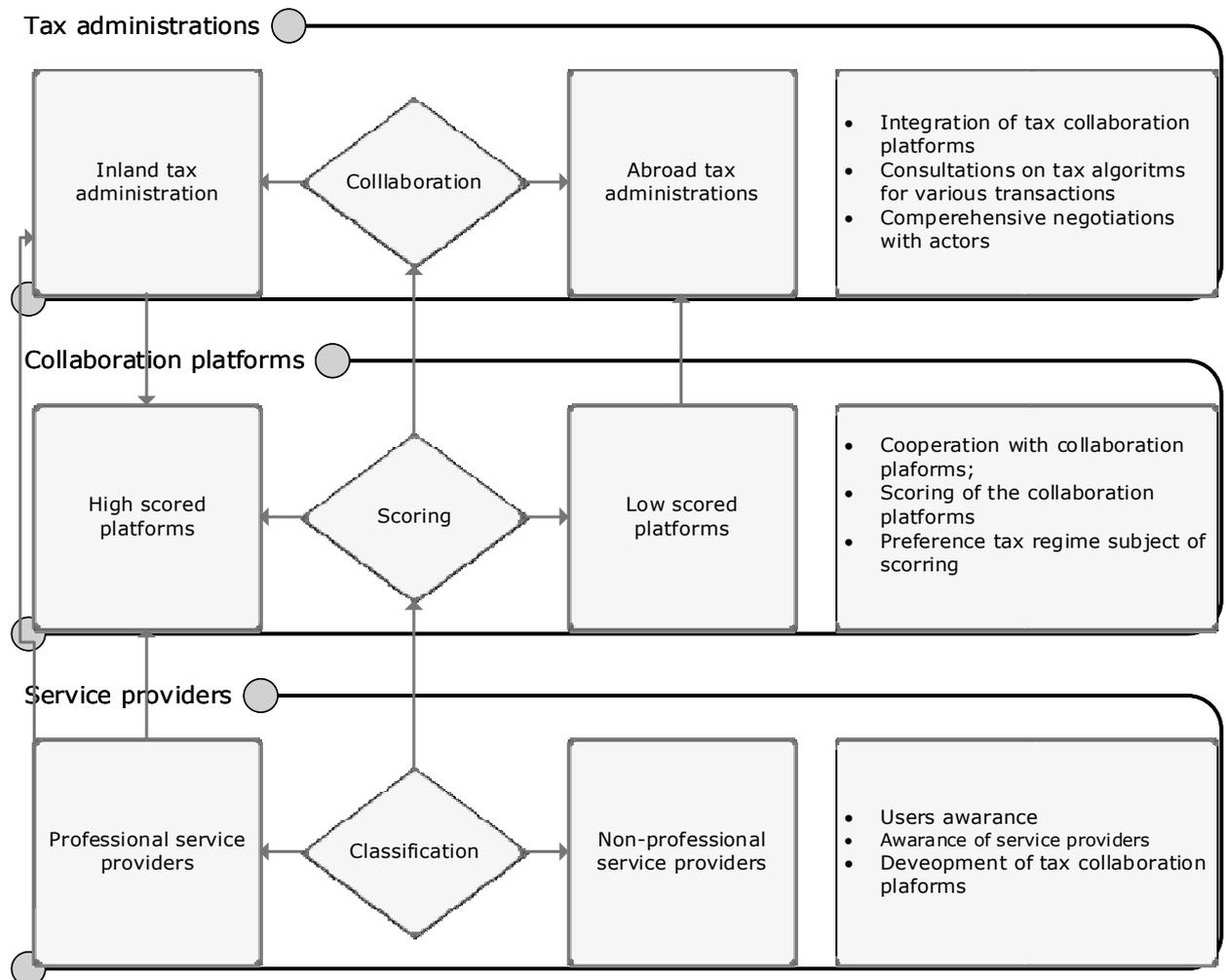


Fig. 4. **The model of the tax system development in the collaborative economy**

The first level –classification of service providers

The service providers must be classified as professional (tax payers) and non-professional (non-tax payers) service providers. Tax administration must provide clear labelling criteria: number of transactions, annual turnover, business profile and other classification factors that allow to determine the tax regime. These criteria must be traceable allowing the service provider to foresee and predict its „score“ in the initial collaborative platform. The tax administrations must care to develop „the tax collaboration platform“ that can collect „scores“ of the service provider from different collaboration platforms to combine them in the tax declaration.

The second level - scoring of collaboration platforms

There is an urgent need to set clear guidelines for cooperation between tax administrations and collaborative platforms. The scoring of collaborative platforms may raise a competitive advantage of the tax system of the initial country. The tax administration can provide a preference tax regime for collaboration platforms or/and service providers of high scored collaborated platform to achieve

service providers favour to the high-scored collaborative platforms, thus initiate an interest of the collaboration platform to cooperate with the tax administrations.

The conditions of collaboration platform scoring may be licensing of „professional“ service providers, exchange of information with „the tax collaboration platform“, extending of user profile with taxation details in deals where it used to be in, providing of taxation information for different deals and asking for digital confirmation, providing of tax collection and tax returns.

The third level – collaboration of tax administrations

The tax administration collaborates with service providers and collaboration platforms, tracing the above-mentioned information and maintaining its own collaboration platform to provide actual taxation details to any „on demand transaction“. Adapted tax regulation applies to non-professional service providers who are granted tax allowances up to a certain threshold from the collaborative economy. The tax administration collaborates with other tax administrations in order to exchange „scores“ of registered service providers and collaboration platforms as well as to provide taxation algorithm to any „on-demand transaction.“

The investigation of the collaborative economy has shown that effective taxation in this field may be achieved by using collaborative society tools on all levels of the taxation systems. We propose to develop the taxation system in the collaborative economy by some sort of the „gamification“: rising awareness of the service providers and the cooperation interest of collaborative platform by using scoring. we also stress the necessity of collaboration among tax administrations.

4. Research results and discussion

The proposed integration of the tax administrations into the collaborative economy is a step forward to efficient asset and working time distribution enjoyed in the collaborative economy. An inclusion of service providers in the scoring for tax payer classification is a general action plan for introducing clear boundaries between professional and non-professional service providers in the up-to-date manner.

However, similar scoring criteria cannot be extrapolated to all service providers. For instance, hotels are subject to requirements such as licensing, periodic health and safety inspections (Murphy, 2016), these requirements are not identical to the dwellings rented on a collaborative platform. Regarding the transport sector, the variations may cover having of the license, technical inspection of the car etc. The developed „collaborative model“ among tax administrations, service providers and collaborative platforms calls for the extensive awareness of the tax administration and policy makers in new development of economy.

With the rapid change and development of technology, the adaptation of the relevant regulation is lagging as never, namely the social drive that allows people to learn new technologies in their daily lives. It is, therefore, up to the responsible national authorities to put in place a regulatory framework that is appropriate to economic reality and not vice versa, subjecting it to the outdated (Rigaux, 2016).

Conclusions, proposals, recommendations

The aim of the present research was to examine factors that determine an effective taxation in the collaborative economy and to propose a new model of the tax system development. This study has identified, that:

- 1) the number of collaborative platforms, service providers and users is likely to continue rapidly increase in the next decade;

- 2) the significant differences stated between the taxation conditions in traditional un collaborative economies (uncertainty in tax regime of tax payers, huge scale of miserable transactions, unpredictability of residency of collaborative platforms) call for changes in the taxation systems;
- 3) the existing state of play outlines a critical role of users and service providers' awareness;
- 4) there is a strong need to combat the territorial fragmentation of the taxation;
- 5) there is No common approach to deal with tax issues at EU level, were some practices are progressive compared to other member states with No specific measures dedicated at all;
- 6) the development of common integrated tax system at EU level would have positive impact on member state's tax budget.

Therefore, continued efforts are needed to make tax systems in the collaborative economy more effective. The results of the study suggest that the effective solution of the tax system development is to bring it towards the collaboration economy by the integration of tax administration in collaborative society on three levels: service providers, collaborative platforms and tax administrations and using of the tools that are accepted in this field. The findings of this study have several important implications for future practice:

- experimental investigations are needed to estimate efficient scoring criteria;
- a cross-national cooperation of the tax administrations is required to ensure effectiveness of taxation process without physical boundaries;
- A greater focus on academic programmes for tax administrators could raise awareness of the tax administrators and service providers allowing advanced view dealing with the collaborative platforms.

Bibliography

1. Bozdoganoglu, B. (2017). Tax issues arise from a new economic model: sharing economy. *International journal of business and social science*. Volume 8. Number 8. Pp 119-135. Retrieved: https://ijbssnet.com/journals/Vol_8_No_8_August_2017/13.pdf. Access: 15.11.2018.
2. Botsman, R., Rogers, R. (2010). *What's mine is yours: the rise of collaborative consumption*. Harper Business, New York. P.304.
3. Bretta, G. (2018). VAT and the Sharing Economy. *World Tax Journal*, Volume 10, No.3. pp.1-26.
4. Butenko, A., Larouche, p. (2015). *Regulation for innovativeness or regulation of innovation*. Tilburg Law and Economics Center (TILEC) Law and Economics Research Paper Series. TILEC Discussion Paper No. 2015-007. p.31.
5. Codagnone, C., Biagi F., Abadie F. (2016). *The passions and the interests: unpacking the sharing Economy*. JRC Science for Policy Report. Retrieved: <http://publications.jrc.ec.europa.eu/repository/bitstream/JRC101279/jrc101279.pdf>. Access 15.11.2018.
6. Council of the European Union. (2017). Opinion of European Economic and Social Committee. *Taxation of the collaborative economy- analysis of possible tax policies faced with the growth of the collaborative economy*. Retrieved: <http://data.consilium.europa.eu/doc/document/ST-13925-2017-INIT/en/pdf>. Access: 15.11.2018.
7. Karaman, F., Erwin B. (2017). The sharing economy part 2: governments strike back. *Insights*. Volume 4, No.11. p.11.
8. European Commission. (2016). *A European Agenda for the collaborative economy*. Retrieved: <https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=COM%3A2016%3A356%3AFIN>. Access: 15.11.2018.
9. European Commission. (2018). *Study to Monitor the Economic Development of the Collaborative Economy at sector level in the 28 EU Member States*. Retrieved: http://www.technopolis-group.com/wp-content/uploads/2018/08/CE_Final-report_PartA_Final_230218.pdf. Access: 15.11.2018.
10. European Parliament. (2018). The collaborative economy and taxation. Taxing the value created in the collaborative economy. Retrieved: [http://www.europarl.europa.eu/RegData/etudes/IDAN/2018/614718/EPRS_IDA\(2018\)614718_EN.pdf](http://www.europarl.europa.eu/RegData/etudes/IDAN/2018/614718/EPRS_IDA(2018)614718_EN.pdf). Access: 15.11.2018.
11. Goudin, p. (2016). *The Cost of Non-Europe in the Sharing Economy. Economic, Social and Legal Challenges and Opportunities*. European Parliament Research Service, PE 558.777, January 2016, p.28.
12. Leighton, p. (2016). Professional self-employment, new power and the sharing economy: some cautionary tales from Uber. *Journal of Management & Organization*. Volume 22(6). pp.859-874.
13. Maselli, I., Lenaerts, K., Belavy, M. (2016). *Five things we need to know about on-demand economy*. Centre for European Policy Studies. No 21. Retrieved:

- [https://www.ceps.eu/system/files/CEPS %20Essay %20No %2021 %20On %20Demand %20Economy.pdf](https://www.ceps.eu/system/files/CEPS%20Essay%20No%2021%20On%20Demand%20Economy.pdf).
Access: 15.11.2018.
14. McClure, R., Lanis, R., Govendir, B. (2016). *Analysis of Tax Avoidance Strategies of Top Foreign Multinationals Operation in Australia: An Expose*. Retrieved: <http://cdn.getup.org.au/1507-Aggressive-Tax-Avoidance-By-Top-Foreign-Multinationals.pdf>. Access 15.11.2018.
 15. Murphy, M. (2016). Cities as the Original Sharing Platform: Regulation of the New Sharing Economy. *Journal of Business & Technology Law*. Volume 12, Issue 1. p127-149.
 16. O'Keefe, B., Jones M. (2015). How Uber plays the tax shell game. *Fortune.com*, p. N.PAG. Retrieved: <http://auth.rtu.lv/php/redirect.php?goto=http://search.ebscohost.com.resursi.rtu.lv/login.aspx?direct=true&db=bth&AN=110478097&site=ehost-live>. Access: 28.11.2018.
 17. OECD (2017). Shining light on the Shadow economy: Opportunities and Threats. Retrieved: <https://www.oecd.org/tax/crime/shining-light-on-the-shadow-economy-opportunities-and-threats.pdf>
 18. Pantazatou, K. (2018) *Taxation of the Sharing Economy in the European Union*. Forthcoming, Cambridge Handbook of Law and Regulation of the Sharing Economy, Davidson, Infranca and Finck (eds.), CUP 2018. Retrieved: <https://ssrn.com/abstract=3091281>. Access 15.11.2018.
 19. Petropoulos, G. (2017). An economic review of the collaborative economy. *Policy Contribution*, issue No 5. Retrieved: <http://bruegel.org/wp-content/uploads/2017/02/PC-05-2017.pdf>. Access: 15.11.2018.
 20. Rahim, N., Lapanjuuri, K., Day, F., Piggott, H., Hudson R., Lubian, K. (2017). *Research on the sharing economy*. HMRC report 453. Retrieved: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/658728/HMRC_Report_453_Sharing_Economy.pdf. Access: 15.11.2018
 21. Remeur, C. (2018). *The collaborative economy and taxation: Taxing the value created in the collaborative economy*. EPRS | European Parliamentary Research Service. Retrieved: [http://www.europarl.europa.eu/RegData/etudes/IDAN/2018/614718/EPRS_IDA\(2018\)614718_EN.pdf](http://www.europarl.europa.eu/RegData/etudes/IDAN/2018/614718/EPRS_IDA(2018)614718_EN.pdf). Access: 15.11.2018.
 22. Rigaux, L. (2016). *Sharing Economy: A New Challenge for the Tax Systems in the European States?* EMLE Master Thesis, Universitat Hamburg. Retrieved: https://www.academia.edu/29766860/Sharing_Economy_A_New_Challenge_for_the_Tax_Systems_in_the_European_States?auto=download. Access: 15.11.2018
 23. Selloni, D. (2017) New Forms of Economies: Sharing Economy, Collaborative Consumption, Peer-to-Peer Economy. In: *CoDesign for Public-Interest Services*. Research for Development. Springer, Cham.
 24. Stanoevska-Slabeva, K., Lenz-Kesekamp, V., Suter, V. (2017). Platforms and the Sharing Economy: An analysis. *Report from the EU H2020 Research Project Ps2Share: Participation, Privacy, and Power in the Sharing Economy*. p.92.
 25. Zale, K. (2016). *When Everything is Small: The Regulatory Challenge of Scale in the Sharing Economy* (San Diego L. Rev. 949. U of Houston Law Center. No. 2016-A-23. Retrieved: <https://ssrn.com/abstract=2866044>. Access 15.11.2018

SELECTED INSTRUMENTS OF ENVIRONMENTAL PROTECTION IN THE CONTEXT OF CONTEMPORARY PARADIGMS OF EU AGRICULTURE

Grzegorz Konat¹, MA; Joanna Pawlowska-Tyszko², PhD and Michal Soliwoda³, PhD
^{1,2,3}Institute of Agricultural and Food Economics – National Research Institute, Warsaw, Poland

Abstract. The existence of many possible ecological policy instruments and numerous paradigms in the approach to agriculture in Europe prompts us to analyse the intersection of these two. The purpose of this study is, therefore, to present the selected instruments for environmental protection and to assess their impact on the economic condition of farms in the context of the European Union's agriculture paradigms. It has been achieved using the method of analysis of the source texts (desk research). The paper finds necessary to harmoniously expand fiscal/financial instruments of environmental protection, as well as to establish administrative regulations, taking into account the assessment criteria from the perspective of the state, the sector, as well as social environment. We also underline that decision-makers shaping the instruments of agricultural policy as well as climate and environmental policies for rural areas, should precisely identify groups of related instruments of a typically tax, subsidy or financial nature, taking into account the economic size or production type of farms. This objective may be served by more precisely determined eligibility criteria as well as by the promotion of certain types of instruments (e.g. preferential loans and subsidies, or subsidies under Rural Development Programmes, RDPs), which have not been widely disseminated to entities that could potentially benefit from them so far.

Key words: instruments of environmental protection, paradigms of agriculture, ecological fiscal reform, European Union, desk research

JEL code: H23, O13, Q15, Q50, Q58

Introduction

The active protection of the planet's natural resources is becoming an increasingly pressing problem. Environmental pollution, however, is not only a matter of ecology or public health, but also – from an economic point of view – the one of an inefficient use of resources. What is more, it seems that environmental external costs will increasingly affect the society, leading – considering also the ineffectiveness of hitherto policies that do not encourage economical use of natural resources – to the search for effective solutions in the field of economics. In this context it should also be remembered that an especially sensitive area with a significant impact on the environment is agriculture.

Resulting from the aforementioned developments, the evolution of ecological policies across the world leads to the search for solutions that at the earliest possible stage would lead to reduction in the use of natural resources as well as to reduction of the amount of pollutants discharged or that would prevent disturbances in the natural environment in general. Therefore, it seems necessary, in the current environmental and technological conditions, to use, inter alia, also financial instruments in environmental protection. European Union has recommended their implementation since 1992, but to this day No homogeneous policy has been created at the EU level. However, some actions took place in individual member states, which taxed selected activities and products with negative impact on the environment.

Of course, one cannot forget that the implementation of pro-ecological solutions involves not only hopes, but also fears. In the case of agriculture, the latter mainly concern the increase of operating costs, and thus the decline of competitiveness on both domestic and international markets. The existence of many possible ecological policy instruments and numerous paradigms in the approach to agriculture in Europe prompts us to analyse the intersection of these two categories. This is also

¹ Grzegorz.Konat@ierigz.waw.pl

² Joanna.Pawlowska-Tyszko@ierigz.waw.pl

³ Michal.Soliwoda@ierigz.waw.pl

the purpose of this study: presentation of selected instruments for environmental protection and assessment of their impact on the economic condition of farms in the context of the European Union's agriculture paradigms. It will be achieved using the method of analysis of the source texts (desk research).

The remainder of this article is organised as follows: in the next section we present our findings, beginning with the discussion of selected environmental protection instruments and their application in EU countries, followed by the sub-section on modern paradigms/concepts of agriculture in the context of environmental protection, presenting also our analysis of the interdependence of the previously discussed instruments and paradigms. The paper is concluded with some policy proposals and recommendations.

Research results and discussion

1. Selected environmental protection instruments and their application in the EU countries

Instruments for environmental protection can be broadly divided into two categories: direct and indirect regulations. The aforementioned includes legal and administrative instruments (including regulations on greening, cross-compliance, eligibility criteria for subsidies under the Common Agricultural Policy, CAP), while in the group of indirect regulations we can distinguish economic instruments (including subsidies) and financial instruments. Economic instruments include: eco-taxes and fees, financial incentives supporting law enforcement (financial penalties due to improper use of the environment), deposit systems and deposits, creation of a market for emission allowances (permits negotiable, interventions in market mechanisms), environmental insurance or subsidies (including loans, exemptions, tax breaks and preferential loan rules). On the other hand, financial instruments include: loans (including loans for pro-ecological investments), guarantees and sureties for loans as well as venture capital funds.

As we can see, the range of instruments for environmental protection therefore extends from a wide catalogue of administrative interpretations, through a catalogue of fees and impulse stimuli (penalties), deposit systems and market creation mechanisms, to subsidies, concessions and loans.

However, in the set of instruments discussed above, particular attention should be paid to fiscal instruments that could play a special role in relation to other instruments—above all, an autonomous role in shaping the financial base of the state's environmental policy. Here, the tax system is one of the crucial tools for determining the behaviour of entrepreneurs applied by the state administration. Through this system, governments have the option of awarding certain solutions and limiting others, stimulating specific behaviours or deciding on the direction of economic development. On a practical level, the main difference between these economic instruments and direct regulations is that the former do not indicate the desired polluters' behaviour who retain a certain freedom of decision to modify their behaviour according to their preferences. Economic instruments occupy a special place among all environmental protection measures – they are an indirect tool of influence on economic entities, affecting their financial results. They cover all polluters, in accordance with the principle that every user of the environment (business entity) should pay full, and thus also external, costs of their activities.

Examples of fiscal solutions applied in environmental protection

Country	Poland	Belgium	Finland	France	Greece	Spain	Norway	Romania	Ukraine	United Kingdom
Solution applied										
investments in the area of environmental protection		X		X	X	X				
investments in new technological lines	X				X					X
investments in new products					X					
recycling or recovery of packaging		X			X					
investments in ecological car fleet		X								X
increasing eco-efficiency of buildings	X	X			X					
for companies using renewable energy sources	X	X	X			X				X
other incentives							X		X	

Source: authors' elaboration based on Przegląd... (2011)

Table 1 presents examples of fiscal instruments that have been implemented in environmental protection in selected European countries. Previous experience of EU countries in using fiscal/tax instruments as an ecological policy tool is difficult to assess and compare due to different interpretations of the reform process by different countries. Moreover, most economic instruments operate outside the mechanism of the so-called ecological fiscal reform. Examples of specific solutions used in several European Union member states are presented in Table 2.

**Tax instruments in the area of environmental protection
 in selected EU countries**

Country	Solution applied
Tax incentives for innovations and investments in the area of environmental protection	
Spain	tax relief amounting to 8 % of the value of investments in fixed assets for environmental protection (e.g. devices reducing noise, air pollution, pollution of surface water, groundwater and marine waters, as well as devices for reducing, recovering or neutralizing industrial residues)
France	tax relief for research and development related to investments or implementation of environmental innovations, amounting to 30 % of expenses incurred by existing enterprises and 35 %-40 % for new companies; this relief consists in deducting the amounts deducted from the income tax of the taxpayer investing in research and development in the course of 3 consecutive tax years
Belgium	tax relief amounting to 80 % of the expenditure invested in the acquisition of a patent; this relief can be granted to companies regardless of the type of legal form as well as sector in which they operate
Greece	reduction of the tax base by 50 % of the value of expenses incurred by enterprises to reduce the environmental impact of their operations
Tax incentives for innovations and investments in new technological lines in the field of environmental protection	
Poland	<ul style="list-style-type: none"> deduction from the tax base up to 50 % of the amount spent on the acquisition of new technology write-offs for the innovation fund created by R&D centre (write-off not greater than 20 % of R&D centre revenues) and exemption from property tax, agricultural and forest tax
United Kingdom	increased rates of tax amortization for investments in selected "green" technologies - energy-saving devices and installations (including water purifiers or air conditioners)
Greece	subsidies for new technologies with innovative applications that aim to protect the environment and increase energy efficiency in an amount not exceeding 50 % of eligible investment expenditure; the subsidy can be combined with tax breaks, which vary depending on the size of the investment and the region in which these technologies are to be used

Source: authors' elaboration based on Przegląd... (2011) and Reforming... (2007)

As compared to the other countries presented, Poland is quite an interesting case. Electricity produced from renewable energy sources is exempt from excise duty in this country. There is also a possibility to deduct from the tax base of corporate and personal income taxpayers up to 50 % for new technologies. You can also get a tax exemption from personal income tax based on a thermal modernization bonus. This bonus is due to the investor to repay part of the loans taken for thermal modernisation, if there is a reduction in energy consumption.

Finally, as regards agriculture, there is an investment exemption in agricultural tax in Poland for expenditures on the purchase and installation of equipment for the production of energy from renewable sources (in the amount of 25 % of investment outlays from due agricultural tax, from the land on which the investment was founded). It can be used for No more than 15 years. However, tax incentives for investments in this area in Poland end with this. There are also No regulations aimed at encouraging entrepreneurs to use products from domestic farmers. Poland is not an exception in this area, as other countries also do not support their agriculture in this way.

2. Modern paradigms/concepts of agriculture in the context of environmental protection

Paradigms in agriculture as „sets of concepts, practices or thought patterns that create a framework to define our way of looking at something” (Steele, 2016) have strongly evaluated under the influence of changes in the environment of business organizations. The paradigms related to sustainability have played an important role from the 1980s (e.g. the Brundlandt Report in 1987). Byerlee, de Janvry and Sadoulet (2015) argued convincingly that „globalization, integrated value chains, rapid technological and institutional innovations, and environmental constraints have deeply changed the context for agriculture's role”. They proposed a New Paradigm that may be useful for

„triggering economic growth, reducing poverty, narrowing income disparities, providing food security, and delivering environmental services“. The concept of Byerlee et al. (2015) was mainly addressed to governments in developed countries. However, this approach to roles of agriculture is based on a radical reorientation in a general philosophy of agricultural finance. There is a plethora of determinants (including mega-, macroeconomic and social) that may affect development of the agricultural sector in a near future. The concept of the so-called Model of European Agriculture significantly underlines its need to „provide a competitive and diverse agricultural sector that is environmentally responsible and addresses issues of food quality and animal welfare“ (Cardwell, 2014). This is consistent with pressures from supra-national organisation (including WTO, OECD etc.) that recommend and supervise the set of economic tools within the legislative framework in order to maintain the sustainable development.

The main objectives of the new Common Agricultural Policy (CAP) will include (Communication... 2017, p.11):

„(1) to foster a smart and resilient agricultural sector;

(2) to bolster environmental care and climate action and to contribute to the environmental and climate objectives of the EU;

(3) to strengthening the socio-economic fabric of rural areas“.

The aforementioned EU Document (i.e. Communication..., 2017) strongly emphasizes the need to rebuild the model of European agriculture that is, however, based on a very traditional and narrow concept of sustainability. In order to broaden the picture of modern approaches to agriculture in the context of environmental protection, we should also mention two developed concepts: smart agriculture (smart and sustainable development of its sector) and agriculture resilient to shocks.

The first of these two involves both smart farming technologies (SFT) that are important for „delivering a more productive and sustainable agricultural production, based on a more precise and resource-efficient approach“ (Smart..., 2017). Smart agriculture instruments should therefore support farmers in delivering public goods and maintaining biodiversity of rural ecosystems. They should be oriented to fostering both technological development with digitisation (related to precise agriculture) and better access to training, advice and innovation. This should result in „resource efficiency enhancing an environment and climate smart agriculture“ (Communication..., 2017, p. 12). The instruments to secure that goal should include smart investment subsidies (e.g. under the second pillar of the CAP) with a good project controlling system (including their environmental effects) and financial tools (for example preferential credits for financing „cleaner“ technologies).

The agriculture resilient to shocks, on the other hand, that is agriculture less sensitive to exogenous shocks, should be equipped with a set of risk management tools that—in the European context—should be partially supported by EU bodies (within CAP). The modern approach that is presented in the aforesaid document (Communication... 2017) may be based on traditional instruments (for example, direct payments with more precise eligibility criteria) and institutional actions (related to price risk management, e.g. derivatives for agricultural commodities). Catastrophic events related to climate change may be mitigated by public interventions, but investment activities in rural areas are not without significance.

The operationalised concepts of modern agriculture that is smart and resilient include various political and economic instruments that may affect the impact of farms on their environment. However, they stimulate farmers to change on-farm strategies that is crucial from the perspective of environmental protection. The concepts (in general) and paradigms (*sensu stricto*) should be

operationalised with the use of political, legal and economic tools. For example, FAO underlines the role of sustainable intensification (sustainable crop production intensification, SCPI) that may be a useful as path to more efficient agricultural systems in both developed and in-transition countries. Some political recommendations for fostering SCPI include, inter alia (Save and Grow, 2011):

- „Linking public and private sector support“;
- „Incorporating the value of natural resources and ecosystem services into agricultural input and output price policies“;
- „Increasing coordination and reducing transaction costs“;
- „Building regulatory, research and advisory systems for a very wide range of production and marketing conditions“.

The second bullet refers to eliminating subsidies on fertilizers/pesticides and designing positive incentives, such as payments for environmental services, or environmental labelling in value chains. The third one involves „coordinated action to reduce the transaction costs of access to input and output markets, extension and payments for environmental services“ (Save and Grow, 2011).

Table 3

Evaluation of environmental protection instruments in the context of new agricultural development paradigms

Instrument	Impact on sustainability in agriculture			Impact on smart development	Impact on shock resilience
	societal	environmental	economic		
Eco-taxes / charges	-	+	-	+	-
Separate area payment	+	+/-	+	-/+	+
Subsidies for crop insurance	+	+	+	+	+
Tax on nitrogen fertilizers	+	+	-/+	+	-
Subsidies for investment in adaptive capital	+	+	+	+	+
Greening payments	-/+	+	-/+	+	-/+
Carbon tax for emissions to soil	+	+	-	+	-
RDP subsidies (agri-environmental and LFA)	+	+	+/-	+	+
Preferential loans for financing pro-ecological investments	-/+	-/+	+	-/+	-

Source: authors' elaboration based on Bragadottir et al. (2014), Przegląd... (2011) and Reforming... (2007)

The above presentation of environmental protection instruments as well as agricultural paradigms in the EU allows us to move on to the analysis of their interdependencies (Table 3). The analysis of the information summarised shows that tribute instruments (e.g. eco-taxes) may have a negative impact on the social sustainability of agriculture. On the other hand, in the case of area payments (e.g. in the form used in the CAP so far), as well as preferential loans and credits (for financing pro-ecological investments), the impact on environmental sustainability is ambiguous (unless they stimulate sustainable intensification of cultivation or animal breeding). It is, however, difficult to

show the positive impact of a separate area payment, or credits and loans, in the current formula. Nonetheless, it is worth noting that CAP subsidy instruments, by their very nature, support farms' resilience to shocks (area payments in particular are a tool for stabilizing agricultural incomes in EU countries).

Conclusions, proposals, recommendations

- 1) The range of instruments for environmental protection extends from a wide catalogue of administrative interpretations, through a catalogue of fees and impulse stimuli (penalties), deposit systems and market creation mechanisms, to subsidies, concessions and loans.
- 2) However, in the set of instruments, particular attention should be paid to fiscal instruments that could play a special role in relation to other instruments—above all, an autonomous role in shaping the financial base of the state's environmental policy.
- 3) In selected European countries discussed here there is a number of initiatives in the form of tax incentives supporting environmental protection.
- 4) The arguments for their application are, inter alia, perception of environmental taxes as effective tools for solving environmental problems and potentially higher economic growth.
- 5) Research indicates, however, that the implementation of fiscal instruments for environmental protection is rarely accompanied by real GDP growth, which is related to limited investment and a decrease in the competitiveness of countries that have introduced taxes to systems comparing to countries not using these mechanisms. These arguments may discourage the introduction of fiscal solutions to agriculture.
- 6) The necessary assessment of the impact of environmental protection instruments on sustainable-development, smart and resilient to shocks agriculture (being the three main contemporary agricultural paradigms identified here), should take into account their mutual interactions (substitution/complementarity).
- 7) It seems necessary to harmoniously expand fiscal/financial instruments of environmental protection, as well as to establish administrative regulations, taking into account the assessment criteria from the perspective of the state, the sector, as well as social environment.
- 8) Decision-makers shaping the instruments of agricultural policy (at the EU and national level), as well as climate and environmental policies for rural areas, should precisely identify groups of related instruments—typically of a tax, subsidy or financial nature—taking into account the economic size or production type of farms. This objective may be served by more precisely determined eligibility criteria as well as by the promotion of certain types of instruments (e.g. preferential loans and subsidies, or RDP subsidies), which have not been widely disseminated to entities that could potentially benefit from them so far.

Bibliography

1. *Agriculture and the Environment: Lessons Learned from a Decade of OECD Work* (2004). OECD. Retrieved: <http://www.oecd.org/tad/sustainable-agriculture/agri-environmentalindicatorsandpolicies/33913449.pdf> Access: 5.02.2019.
2. Bragadottir, H., von Utfall Danielsson, C., Magnusson, R., Seppanen, S., Stefansdotter, A. and Sunden, D. (2014). The Use of Economic Instruments In Nordic Environmental Policy 2010–2013. *TemaNord* 549, Nordic Council of Ministers, Denmark.
3. Byerlee, D., de Janvry, A., Sadoulet, E. (2009). Agriculture for Development: Toward a New Paradigm. *Annual Review of Resource Economics* 1:1, 15-31.
4. Cardwell, M. (2004). *The European Model of Agriculture*. Oxford: Oxford University Press.
5. *Communication from The Commission To The European Parliament, The Council, The European Economic And Social Committee And The Committee Of The Regions, The Future of Food and Farming* (2017). COM(2017) 713 final, Brussels, 29.11.2017.

6. *Przegląd zachet podatkowych w kontekście CSR w wybranych krajach europejskich* (2011). Acreo Taxand. Warszawa.
7. *Reforming environmentally harmful subsidies. Final report to the European Commission DG Environment* (2007). IEEP et al. March.
8. *Save and Grow* (2011). FAO. Retrieved: <http://www.fao.org/ag/agp/save-and-grow/> Access: 1.02.2019.
9. *Smart Farming Thematic Network* (2017). EIP-Agri. Retrieved: <https://ec.europa.eu/eip/agriculture/en/news/smart-farming-thematic-network> Access: 5.02.2019.

TAX INCENTIVES FOR MICRO ENTERPRISES – LATVIA'S EXPERIENCE

Inguna Leibus¹, Dr.oec., professor
Latvia University of Life Sciences and Technologies

Abstract. The author continues studies on tax incentives for micro enterprises. Latvia has introduced a special tax regime – a micro-enterprise tax (MET), the improvement of which still continues to reduce its application for unfair tax competition. Following significant changes in the tax regulation, the popularity of MET in Latvia has decreased; though, it is still high, especially in the service sector. The micro-enterprise tax shall be retained considering the reduction of administrative and tax burdens; however, it is recommended to introduce a payment for every employee from his/her actual salary in addition to the payment from the enterprise turnover to ensure the tax sustainability and to improve the social security of micro-enterprise (ME) employees. Latvia's experience may be useful also for other countries, especially those with high unemployment and illegal employment rates, to stipulate involvement of the population in legal employment.

Key words: tax incentives, micro-enterprise, small business, social insurance, tax policy.

JEL code: H21, H25, J30.

Introduction

A special tax on micro-enterprises has been created as fiscal instrument to support small business in Latvia. The MET was introduced on 1 September 2010 with the aim to create the necessary preconditions for the population having lost employment due to the economic crisis to start business, to reduce administrative requirements and to simplify the tax calculation. The initial aim had to be changed after the crisis with the economic recovery and decline of unemployment. The reduction of administrative and tax burden on ME was still topical; though, simultaneously there was a requirement to observe the common public interests in the sphere of fair competition and social security. The very rapid increase in the application of the MET regime was the reason for such a requirement. The increase was promoted not only by the reduced administrative burden on ME but mainly by lower tax burden and lower labour costs compared with the general tax regime. The MET created two basic problems: distortion of competition in business and insufficient social security of employees working in ME. The advanced hypothesis: the MET regime is widely applied as tax incentive for micro-enterprises in Latvia; though an improvement of the provisions is required to ensure its sustainability. Therefore, the research aim is to provide solutions for the improvement of micro-enterprise tax to ensure the sustainability of MET regime. The following tasks are derived from the research aim: 1) to study the recent scientific publications on tax incentives for micro-enterprises in the EU Member States; 2) to analyse the latest statistical data on the application of the MET regime in Latvia; 3) to develop recommendations for the improvement of the MET regime. The research employs monographic and descriptive statistical methods and covers the period from the introduction of MET in 2010 to 2018; however, a profound analysis was dedicated to the tendencies after 2016 when additional measures were introduced to restrict the application of the MET regime in Latvia.

Research results and discussion

In Latvia, the introduction of MET has led to several positive features in the economy, for example, decrease of illegal employment and increase in the number of newly established enterprises. However, this undoubtedly had also negative consequences, of which two the most essential are: 1) unequal tax competition leading to particularly favourable tax reduction for the MET payers; 2) social

¹ Corresponding author. Tel.: + 37129458010
E-mail address: inguna.leibus@llu.lv.

security of employees of the MET payers is exposed to risk, especially if the MET regime has been chosen purposefully to reduce labour costs (Leibus, 2014).

Several researchers in Latvia have pointed on the negative consequences of the MET regime. The author partly agrees with the statement of Juruss, Kuma and Neimane that the present MET regime negatively affects the development of business environment in Latvia, since 1) it has not sufficiently facilitated employment; 2) it creates social security problems for people working under the MET regime and 3) the MET regime is used for tax optimisation (Juruss, Kuma, Neimane, 2017). Nevertheless, the author would like to emphasise that the negative consequences of the MET regime may not reject its positive impact; thus, the application of MET as fiscal instrument for the support of micro-enterprises may be continued; yet, it requires improvement. However, the author cannot agree with Prohorovs and Bistrova that MET is not applicable to self-employed (Prohorovs, Bistrova, 2017). The simplicity of tax calculations provided by the MET regime can contribute most to the activity of these taxpayers.

It is very positive that the MET significantly reduces the administrative burden on micro-enterprises and simplifies the tax calculation (Leibus, 2012). The authors Bergner and Heckemeyer in their research have analysed small and medium-sized enterprises (SME) in 27 European countries between 2004 and 2010, and they have concluded that small-sized enterprises really consider possibility to choose a simplified tax accounting; hence, choosing an appropriate type of business activity (Bergner, Heckemeyer, 2017). Consequently, the mentioned authors confirm the idea on the necessity of a special tax regime for small enterprises to reduce administrative requirements. There are relatively few EU Member States with a special tax regime for micro-enterprises; basically, the corporate income tax reliefs are set for companies during their first years of operation or investment support.

Bergner with the co-authors Bräutigam, Evers & Spengel indicate that disproportionate tax compliance costs for small-sized enterprises are the most significant argument for the application of a special tax regime. In general, the policy makers shall shift their attention from providing discriminatory incentives to developing a generally neutral and simple tax system that would be beneficial to both small and large enterprises (Bergner, Bräutigam, Evers, & Spengel, 2017).

It should be considered that Latvia has a unique experience in creating a MET and there had been No possibility to learn from other countries. Only the implementation of this intention into the practice has identified the weaknesses or „tax holes”, which some entrepreneurs urgently used to reduce the tax burden. The law regulating the application of a MET has been amended several times since the tax introduction. The amendments included ever-new provisions of the law to „stifle holes” in the legal enactments that allowed undesirable and inappropriate tax planning not complying with the MET aim and unequal competition among companies paying taxes consistent with the general tax regime and the ones working under the MET regime. Also, the initially set MET in the amount of 9 % of turnover was too desirable for the small business; thus, it was gradually increased from 9 % to 15 % in 2018 (Table 1). The redistribution of collected MET was gradually changed with the increase of the MET rate; hence, increasing the amount of redistributed mandatory state social insurance contributions (MSSIC) from 65 % to 80 % in 2018.

The most significant criteria and indicators of the MET in Latvia between 2010 and 2018

Indicator	2010	2018
Turnover, EUR	100 000	40 000
Number of employees	5	5
Monthly salary (income), EUR	711	720
One person may be the owner of only one enterprise being the MET payer	yes	yes
One person may be employed only by one MET payer at the time	no	yes
MET rate, % of turnover	9	15
Taxes included into the MET	MSSIC, PIT, CIT	
Redistribution of the MET for the social insurance of employees, %	65	80

PIT – personal income tax, CIT – corporate income tax

Source: Micro-enterprise Tax Law, 2010, latest amendments

Bergner S.M. (2017), a German researcher, in his PhD thesis has also analysed the experience of Latvia in the introduction of the MET regime by indicating on two basic policy consequences. First, policy makers, when designing tax incentives for SME, shall avoid explicit size thresholds, especially those related with the employment thresholds, since this is likely to trigger a response reaction by reducing the growth of paid employment and companies. Second, legislators shall be aware not to offer too favourable regimes resulting in strong distortion of competition among companies (Bergner, 2017). It must be agreed that S.M. Bergner has precisely identified risks faced by the legislators in Latvia.

In the case of Latvia, the problem with very strictly set thresholds for the company size was solved by allowing not to calculate additional taxes within the year in which the criteria set for the MET payer are exceeded, i.e. the turnover has grown but the growth does not exceed 30 % and/or the number of employees has increased by 1-2 employees compared with the previous year. ME could use such an opportunity from 2014 onwards. As a result of the changes, the enterprise growth in one taxation year does not increase the tax burden on a ME. However, the enterprise may not apply a preferential tax regime in the following year after exceeding the criteria. Therefore, after the change of a tax regime the amount of taxes to be paid significantly increased for the enterprise, especially those operating in labour-intense sectors. This condition has promoted an artificial fragmentation of enterprises in Latvia, i.e. one and the same business is performed through two or even more enterprises by registering the subsequent enterprise on the name of a trustworthy person. In addition, these enterprises were not prohibited of employing the same employees. Therefore, the same employee could have been employed by several enterprises paying the MET, and hence s/he did not financially suffer from the restriction that the maximum salary in MET paying company may not exceed EUR 720 per month. In practice, the possibility for one owner to establish several enterprises operating in the MET regime was restricted already from the very beginning of the MET introduction; though, the possibility of being employed by more than one micro-enterprise is gradually eliminated only from 2018 (Table 1).

The preferential tax regime for ME in Latvia was so desirable that the number of MET payers increased rapidly with every year, and already 14.05 % of all taxpayers had chosen the MET regime in 2016. The negative effects of the MET such as distortions of tax competition and decrease of social security for employees became increasingly evident; thus, it was necessary to reduce the appealingness of the MET regime. Basically, this appealingness was expressed as a lower tax burden

compared with the general tax regime. Therefore, the MET rate was gradually increased from 2017. Meanwhile, in 2018, the criterion on annual turnover was reduced from EUR 100 000 to EUR 40 000 to ensure that the MET regime is used only by micro-enterprises. As a result, the number and proportion of the MET payers started to decline; in 2018, the respective decline was 9.98 % and 1.44 percentage points (pp) compared with 2016 (Table 2), while the amount of paid tax continued to increase (+41.73 %).

Table 2

Changes in the number of MET payers and MET revenues and their share in Latvia

Indicator	2016	2017	2018	2018/2016
Number of MET payers on 1 January	49293	45411	44373	-9.98 %
Total taxpayers on 1 January	350924	352390	352006	+0.31 %
Share of the MET payers	14.05	12.89	12.61	-1.44 pp
MET (mln, EUR)	63.5	82.1	90.0	+41.73 %
Labour taxes (PIT + MSSIC) (mln, EUR)	4483.9	4922.7	5232.1	+16.69 %
MET/ labour taxes, %	1.42	1.67	1.72	+0.30 pp

Source: author's calculations based on the statistical data of the SRS of the Republic of Latvia

The MET regime is very desirable by small entrepreneurs not only because of the reduced tax burden. The administrative burden is also considerably diminished, since paying the MET of 15 % (initially 9 %) of all enterprise income or turnover, the MET replaces several other taxes that the enterprise would have to pay under the general tax regime. No labour taxes are to be paid separately, which means that net salary equals the gross salary for the employees operating under the MET regime. Though, to ensure the tax revenue distribution consistent with their aim, the State Treasury redistributes the collected MET by redirecting 80 % (initially 65 %) of the collected MET to the social insurance contributions of employees, while the rest of the tax is redistributed between PIT and CIT. This ensures a simple tax calculation and administration as well as retains a personalised social insurance of every employee, as the amount of insurance depends on the tax contributions made.

Comparing the amount of MET totally collected in Latvia with the amount of PIT and MSSIC, there is a positive trend (Table 2). Despite the decrease in the number of MET payers, the ration of collected MET to labour taxes grows, mainly due to the increase in the MET rate. However, a topical problem is still the social security of employees operating under the MET regime, which is not only less security for the employee itself but it may be a burden for the rest of the society, providing the minimum social guarantees for an employee of the MET regime in case social contributions made for him/her are not sufficient for the national minimum security.

Moreover, unlike the general tax regime, where the social insurance of employees is proportional to their salary, in case of the MET regime, it is more dependent on the size of the enterprise's turnover, while the amount of salary has a slight impact on social security, since 80 % of the MET which is redistributed as the MSSIC is distributed among employees proportionally to the amount of salary of each employee. For example, if a ME has a turnover of EUR 2000 per month, then 15 % of the MET equals EUR 300 and EUR 240 are redistributed as the MSSIC. If it is assumed that there are two employees in the enterprise, one of which receives EUR 700 and the other receives EUR 500 per month, then the share of the first employee's salary is 58.3(3) % of the salary fond ($700/(700+500)$) and EUR 140 are redirected for his/her social insurance, while the remaining EUR 100 are redirected for the social insurance of the second employee. When recalculating according to the MSSIC rate of 35.09 %, it may be concluded that the social insurance object, from which the social security of these

employees depends, is almost EUR 400 for the first employee and almost EUR 285 for the second employee. In addition, nevertheless the salary of both employees exceeds the minimum salary in the country (EUR 430 in 2019), the social insurance object is less than the minimum salary. Therefore, it may be concluded that the social security for the majority of employees working in enterprises paying the MET will be lower in the future than those working under the general tax regime. In addition, health insurance in Latvia from 2019 is linked to the tax payments, and despite the fact that this is a legal tax payment regime, the employees working in enterprises paying the MET are left outside this system.

Hence, considering the above-mentioned, the number of employers and employees in the MET regime has also started to decrease from 2017, by 12.36 % and 9.92 %, respectively, compared with the previous year (Table 3). The author has No data available for 2018 but it can be asserted that the decline still continues. A positive trend is the increase in the average number of employees in both the companies paying tax in the general tax regime (by 1.60 %) and those paying the MET (3.03 %), which shows the stability of companies and a relatively slow growth.

Table 3

Changes in the number of employers and employees, and salary in the general tax and the MET regimes in Latvia between 2016 and 2017

Indicator	General tax regime			MET regime		
	2016	2017	2017/ 2016, %	2016	2017	2017/ 2016, %
Number of employers	79369	78807	-0.71	45113	39535	-12.36
Number of employees, on average per year	742120	748791	0.90	74473	67084	-9.92
Number of employees, on average employed by one employer	9.35	9.50	1.60	1.65	1.70	3.03
Average salary, EUR	785	903	15.03	551	566	2.72

Source: author's calculations based on the statistical data of the SRS of the Republic of Latvia

The average salary in the companies paying taxes under the general tax regime grows faster than those paying taxes under the MET regime, by 15.03 % and 2.72 %, respectively, compared with the previous year (Table 3). This may be explained by the restriction regarding the income of a ME, which may not exceed EUR 720 per month. This is another reason why the MET regime is not so desirable any more, especially in the sectors with higher average salary (Table 4).

TOP-10 sectors in Latvia with the largest proportion of MET payers and the average salary in these sectors

NACE 2 code	Sector	MET, % of the number of taxpayers in the sector		2018/2016, pp	Average salary in Q1-Q3 of 2018, EUR per month
		01.01. 2016	01.01. 2018		
81	Services to buildings and landscape activities	36.0	39.0	3.0	477
74	Other professional, scientific and technical activities	8.3	32.7	24.4	768
62	Computer programming, consultancy and related activities	35.5	32.3	-3.2	1965
97	Activities of households as employers of domestic personnel	6.7	32.3	25.6	263
59	Motion picture, video and television programme production, sound recording and music publishing activities	26.3	31.1	4.7	702
71	Architectural and engineering activities; technical testing and analysis	32.0	30.7	-1.3	961
82	Office administrative, office support and other business support activities	35.4	30.0	-5.4	1069
69	Legal and accounting services	32.9	29.0	-3.8	1290
53	Postal and courier activities	20.0	28.4	8.3	693
43	Specialised construction activities	25.6	27.5	1.9	656

Source: author's calculations based on the statistical data of the SRS of the Republic of Latvia

As noted before, the largest number and proportion of the MET payers was in 2016 when they accounted for more than 14 % of all registered taxpayers. In the coming years, the number of MET payers as well as their proportion was gradually decreasing. Nevertheless, the proportion of MET payers is still very high in some sectors (Table 4). In addition, there is still an increase in the proportion of MET payers in several sectors, for example, almost one third of all taxpayers in the sector „Activities of households as employers of domestic personnel“ are enterprises operating under the MET regime (32.3 % in 2018), the increase is 25.6 pp within two years, while the increase of the proportion of MET payers is 24.4 pp in the sector „Other professional, scientific and technical activities“ and 8.3 pp in the sector „Postal and courier activities“. The sector „Services to buildings and landscape activities“ has invariably the largest proportion of the MET payers (36 %-39 %). Since the introduction of the MET regime, there has been a clear trend that this regime is mainly chosen by service sectors as it is significantly more advantageous in labour-intense rather than material-intense sectors. However, according to the statistics of recent years, the number of MET payers is declining more rapidly in the sectors with higher average salary, e.g. „Office administrative, office support and other business support activities“ by 5.4 pp, „Legal and accounting services“ by 3.8 pp and „Computer programming, consultancy and related activities“ by 3.2 pp. In most of the sectors listed in Table 4, the average salary is lower than the average salary in Latvia (according to the Central Statistical Bureau (CSB), the average salary in the private sector was EUR 957 in Q1 of 2018), except for four sectors where the salaries exceed the average salary and where the proportion of MET payers gradually decreases.

Analysing by sub-sectors, it is even more apparent that the MET regime is chosen in the service sector. One third of the MET payers registered in Latvia are employed in the 10 sub-sectors (Table 5). The sub-sector „Other personal service activities not classified elsewhere“ represents the largest

number of the MET payers. In 2018, they account for 8.6 % of the total MET payers registered in Latvia.

Table 5

TOP-10 sub-sectors in Latvia with the largest number of MET payers and their changes

NACE 2 code	Sub-sector	01.01. 2017	01.01.2018		2018/ 2017
		number	number	% of the number of MET payers in Latvia	
9609	Other personal service activities n.e.c.	4276	3824	8.6	-10.6
6920	Accounting, bookkeeping and auditing activities; tax consultancy	2203	2151	4.8	-2.4
0220	Forestry and logging	1513	1418	3.2	-6.3
4120	Construction of residential and non-residential buildings	1309	1224	2.8	-6.5
9602	Hairdressing and other beauty treatment	1202	1223	2.8	1.7
4520	Maintenance and repair of motor vehicles	1065	1049	2.4	-1.5
6201	Computer programming activities	996	1009	2.3	1.3
7022	Business and other management consultancy activities	1001	945	2.1	-5.6
4399	Other specialised construction activities n.e.c.	900	918	2.1	2.0
6910	Legal activities	858	812	1.8	-5.4

Source: author's calculations based on the statistical data of the SRS of the Republic of Latvia

A large number of the MET payers is also registered in the sub-sector „Accounting, bookkeeping and auditing activities; tax consultancy” (4.8 % of the total MET payers in Latvia). Mostly they are outsourced accountants who would have No difficulties to calculate taxes also in the general tax regime; though, they choose to pay the MET. Therefore, it provides not only the possibility to reduce the tax burden, which allows reducing the costs for accounting services, but also to reduce the administrative burden by a significant simplifying of the tax calculation and the declaration procedure. In addition, it has to be taken into account that a large part of population in Latvia chooses to earn additional income in other jobs apart from the basic employment incl. self-employment by providing different types of services. According to the data of the CSB of the Republic of Latvia, for example, in 2017, only 29.6 % of employees in the sector „Legal and accounting services” (NACE code 69) and 37 % of the employed in the sector „Other personal service activities” (NACE code 96) worked in the private sector with the work time tracking. This, in turn, means that very often a ME is not the only source of income for the MET payers but it is an additional source of income, and it is important that it is easy to calculate and pay the tax on this additional income.

According to the statistics, the MET regime is still very popular in Latvia even after the introduction of less favourable legal provisions. Considering the fact that the MET regime has greatly reduced the administrative burden on ME, it has to be retained also in the future by improving the provisions related with the social insurance of employees. The problem could be solved by including two tax objects into the MET calculation base – turnover and income (salary). A fixed percentage of the actual salary shall be set as an additional payment to the employer for every employee for his/her social insurance. This means not a constant payment or a payment from a certain size, such as the minimum salary but from the actual activity Figures of an enterprise. In Latvia, an attempt to introduce additional MSSIC on micro-enterprises from the minimum salary set in the country has

already suffered a failure. This is very significant particularly for start-up companies that have difficulties to predict both the size of turnover and salaries as they often depend on the company's success to conquer the market and develop. Moreover, it is very important to calculate the correct tax proportion or rate for each tax object. It is recommended to keep the tax rate on turnover lower than the rate on income (salary), which would make the MET more desirable also in material-intensive sectors that would have to pay a higher tax share on turnover, while lower – on salaries paid.

In the case of Latvia, it is now advisable to introduce a payment for the pension insurance of a ME employees in the amount of 5 % and health insurance in the amount of 1 % from the salary in addition to the tax on the ME turnover. An employer would make the tax payment at its own expense. The introduction of an additional tax payment would retain the simplicity of the MET regime and the gross and net salaries would still remain the same. In such a case, the administrative burden would not increase. The tax burden for the MET payers would increase by about 2-5 %, calculating against the ME turnover. The increase in the tax burden of each enterprise would depend on the proportion of expenditure on salaries; if it is 80 % of turnover, the tax burden would increase by 4.8 % but if it is 40 %, then by 2.4 %. Nevertheless, tax payments for each ME would grow considerably by around 20-30 %, since the tax is relatively low at present. Probably the tax rate on turnover should be slightly reduced to minimise the negative effect; this could be done by finding the optimum balance between these two tax objects. As an additional measure to compensate for the tax increase, it is advisable to increase the criterion on income, which has not been changed since 2010, and thus, it lags behind the average net salary in the country that exceeds EUR 720 in 2019. Currently, this restriction hinders the growth of many ME.

To convince the MET payers of the necessity for an additional tax object, it is very essential for the society to explain the potential risks of making No changes and the benefits of changes. The payment for pension insurance of 5 % of the actual salary is recommended, since it is the same as the payment for self-employed introduced from 2018. The payment of 1 % for health insurance, in turn, has been introduced already from 2017 for all employees except for the employees of the MET payers. It is advisable to change the proportion of the MET object in the coming years by increasing the tax proportion on income (salaries) and decreasing the tax on turnover respectively.

The introduction of an additional tax payment would considerably increase the MET collected in the country. If it is calculated consistent with the statistical data of 2017 (Tables 2 and 3), the average salary for 67 000 people employed by the MET payers is EUR 566 per month or EUR 6792 per year, then the payment of 6 % of the salary would increase the MET payments by approximately EUR 27 million or 33 %. The reduction of a „tax shock“ for companies changing the tax regime from the MET regime to the general tax regime is a positive aspect of such a tax increase in Latvia, because currently the tax burden when changing the status of a taxpayer may grow even 2-3 times, directly at the expense of labour taxes. The proposed changes would reduce the tax burden difference between the two tax regimes, which would diminish the consequences of unequal tax competition.

Conclusions, proposals, recommendations

- 1) The present studies confirm that micro-enterprises need special tax support and incentives; though, they may not be too profitable that would distort the tax competition among companies operating under different tax regimes.
- 2) In Latvia, a number of significant changes has been introduced in recent years to amend the legal and regulatory enactments of the MET to improve this tax regime and reduce its application for unfair tax competition.

- 3) The popularity of the MET regime in Latvia that is just slightly declined after the introduction of less favourable amendments for entrepreneurs confirms that micro-enterprises have appraised the positive impact of the MET regime on the reduction of the administrative and tax burdens, especially in the service sector. This tax regime is not suitable for material-intensive sectors or a lower tax rate shall be applied to these sectors if the tax is calculated on the enterprise turnover.
- 4) It is recommended to introduce a payment for each employee at 5 % from the actual salary for an employee's pension insurance and 1 % - for the health insurance to improve the social security of the employees of the MET payers in Latvia. These payments would be easy to administer. It is recommended to increase the criterion on income (salary) or/and slightly decrease the MET rate on the company turnover to compensate for the increase in the tax burden on micro-enterprises.
- 5) Latvia's experience is particularly recommended for countries with high rates of unemployment and illegal employment to promote the involvement of population in legal employment. However, it is advisable to include also the actual salary of employees in the MET object in addition to the company turnover not to reduce the social security of micro-enterprise employees.

Bibliography

1. Bergner, S., Bräutigam, R., Evers, M., & Spengel, C. (2017). *The Use of SME Tax Incentives in the European Union*, p.125.
2. Bergner, S.M., & Heckemeyer, J.H. (2017). Simplified Tax Accounting and the Choice of Legal Form. *European Accounting Review*, 26(3), pp. 581-601.
3. Bergner, S.M. (2017). *Tax Incentives for Small and Medium-sized Enterprises - a Misguided Policy Approach?* Doctoral dissertation, p.350.
4. *CSB Statistics*. Retrieved: <https://www.csb.gov.lv/lv/statistika/statistikas-temas/socialie-procesi/darba-samaksa/meklet-tema/2385-darba-samaksas-parmainas-2018-gada-2>. Access: 7.01.2019.
5. Juruss, M., Kuma, E., & Neimane, L. (2017). Optimal Taxation of Small Businesses. In: *Economic Science for Rural Development Conference Proceedings* (No 46), pp.242-249.
6. Leibus I. (2014) Problematic Aspects of Micro-Enterprise Tax in Latvia. *Economics and Rural Development. Research papers*, Vol. 10, No 1, pp. 32-38.
7. Leibus, I. (2012). Micro-Enterprise Tax as Means of Promoting Entrepreneurship in Latvia. *Science and Studies of Accounting and Finance: Problems and Perspectives: Scientific Journal* No 1 (8). Aleksandras Stulginskis University, pp. 116-120.
8. *Mikrouzņēmumu nodokļa likums* (Micro-enterprise Tax Law): LR likums (2010)
Retrieved: <http://www.likumi.lv>. Access: 7.01.2019.
9. Prohorovs, A., Bistrova, J. (2017) The evaluation of microenterprise tax regime efficiency in Latvia. In: *Economic Science for Rural Development Conference Proceedings* (No 46), pp.317-328.
10. *VID statistika (SRS Statistics)*. Retrieved: <http://www.vid.gov.lv/default.aspx?tabid=11&id=5729&hl=1>. Access: 07.01.2019.

FINANCIAL EXCLUSION OF A TRANSACTIONAL CHARACTER: CASE STUDY OF THE UNEMPLOYED IN THE CITY OF PLOCK¹

Anna Nowacka, Ph. D.

²Faculty of Economic Sciences and Informatics The State University of Applied Sciences in Plock

Abstract: Financial exclusion still constitutes a serious problem of economic and social character in Poland. The unemployed are particularly vulnerable to financial and transactional exclusion. The lack of employment and permanent income makes it impossible for them to access a wide range of banking services. Empirical research confirms that social and demographic characteristics constitute a strong differentiating factor for the level of using banking services by the unemployed in Plock. Their education, age and time during which they remain without a job influence the level of transactional exclusion. The elderly, people with elementary education or basic vocational education having the status of unemployed for at least 3 months constituted the group of unemployed with the lowest access to banking services.

Key words: financial exclusion of a transactional character, the unemployed, banking services.

JEL code: D14

Introduction

The phenomenon of financial exclusion has multi-dimensional character connected with the consequences resulting from economic and social background. Several social and economic characteristics which determine financial exclusion to a large extent can be enumerated. They include: the level of education, professional status, income, age, place of residence. The unemployed are particularly vulnerable to financial exclusion.

People remaining without employment generally live on their savings, if they have any, state benefits, allowances, they are dependent on their families or illegal work is the source of their income. No income or the impossibility to document it constitute a serious obstacle in using financial services: bank credits and loans, having a bank account, performing financial operations. Low income makes it impossible for households to undertake activities aiming at improving their standard of living.

1. Transactional exclusion versus financial exclusion

European Commission defines financial exclusion as the situation in which a person faces difficulties in accessing and/or using financial services and products in the scope matching their needs and enabling them to live normal social life (Report of the European Commission, 2008, p. 9). This definition presents negative effects of financial exclusion, which often leads to social exclusion and makes it impossible for citizens to properly function in the society. This phenomenon may also result in lower income and lower standard of living.

When it comes to the segments of financial products, World Bank enumerates the following fields of financial exclusion: transactional banking, savings, credits, insurance (Report of the European Commission, 2008, p. 11). It is worth to emphasize that financial exclusion in the field of transactional banking may be graded basing on the scope and intensity of using different types of services by consumers. For this reason, the European Commission points out to several levels of financial exclusion (A. Kurczewska, 2011, p.55):

- the first refers to those who do not use any banking services at all;
- the second to those who own a bank account, but they do not use many of its options, such as for example online banking services and debit or credit cards;

¹ The article was financed from the funds of the city of Plock in connection with the competition of the Mayor of the city of Plock for financing research grants realized within the task "Cooperation with universities"

² Contact: email: prorektor@pwszplock.pl

- the third concerns to individuals who have the access to a wide range of banking services, but these services are not fully adapter to their needs or social and economic status.

Basing on the definitions presented above it can be assumed that financial exclusion of a transactional character refers to the condition in which individuals or social groups experience the lack of access or limited access to such banking services as a bank account and its functionalities, online banking services, debit cards.

2. Methodology and course of the research process

The aim of the paper consists in the attempt to determine the level and scale of financial exclusion of a transactional character in Poland at the example of the city of Plock. The suggested definition of financial exclusion of a transactional character served as a starting point for developing the concept for the measurement of this phenomenon. Basing on three types of including consumers in the field of transactional banking enumerated by M. Polasik and A. Piotrowska (2014, p.319), the following systematics of the levels of using banking services was adopted, demonstrating as well the level of exclusion of the unemployed:

- deprived of the access to banking services (suffering from exclusion) – these individuals do not own a bank account and they do not use other banking services;
- with too little access to banking services (suffering from partial exclusion) – they own a banking account, but do not use debit cards and online banking services or use them to a limited extent or individuals who do not own their banking account, but use the remaining services;
- having sufficient access to banking services (included) – they own a bank account, use debit cards and online banking services.

Empirical research was realized under the form of a questionnaire addressed to the unemployed registered in the Municipal Employment Office (MUP) in Plock. According to the state of affairs at the end of August 2018, 4319 persons were registered in the MUP in Plock (Report, 2018, p. 1). 350 unemployed persons were in total covered by the survey, which made it possible to obtain a representative sample allowing to make conclusions concerning the entire population of the unemployed in Plock with the accuracy of 5 %. Persons covered by the questionnaire were selected following the convenience sampling method (Hill and Aleksander, 2003, p. 126). The unemployed who expressed the will to answer the questions included in the questionnaire were asked to fill it in. The survey was conducted in the period between September and October 2018.

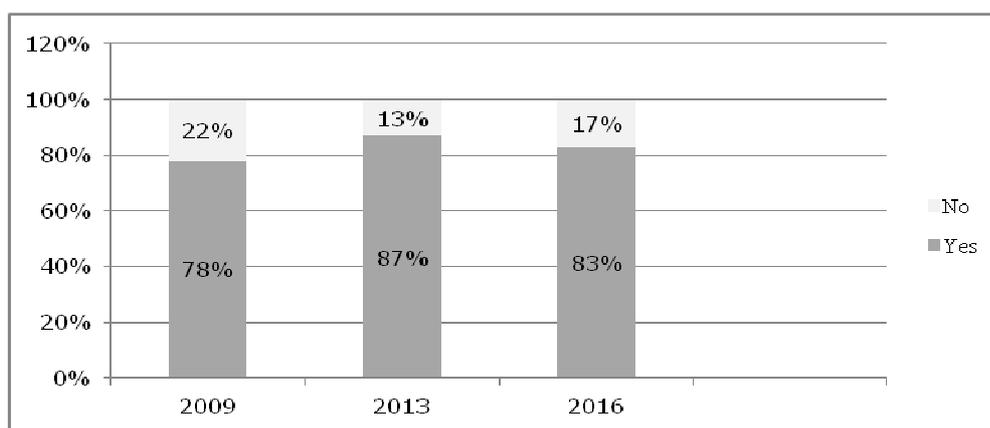
Statistical significance threshold was traditionally assumed at the value of 0.05. Statistical significance of the analysed relationships was calculated basing on the likelihood ratio used for analysing the relationships between categorical variables, i.e. those which divide those surveyed into groups when some of the specified categories include a limited number of representatives. Statistically significant relationships were complemented with the values of V . Cramer's effect size. The interpretation of the value of this gauge depends on the number of persons surveyed and the number of groups compared.

350 respondents took part in the survey, including 221 women (63.1 %) and 129 men (36.9 %). The biggest number of those surveyed had secondary school education – 46.3 %, while the smallest elementary education – 5.1 %. 21.4 % of respondents claimed to have obtained basic vocational education, while 25.7 % university education. The biggest number of those surveyed (30.5 %) were registered in MUP in Plock for several weeks. The group of those registered for up to 3 months was represented by 12.3 % of the unemployed, while the group of those registered for over 3 months – 18.6 %. Persons remaining without employment for a year or a few years represented respectively

the group of 14.3 % and 19.7 %. The most frequently mentioned reason for registering in MUP in Plock was giving up the job in order to search for a better paid one – 26.3 %, the least frequent of the reasons mentioned was the liquidation of their previous workplace – 10.6 %. Respondents receiving unemployment benefit registered at the Municipal Employment Office in Plock represented only 15.4 % of the total of respondents.

3. Presentation of research results

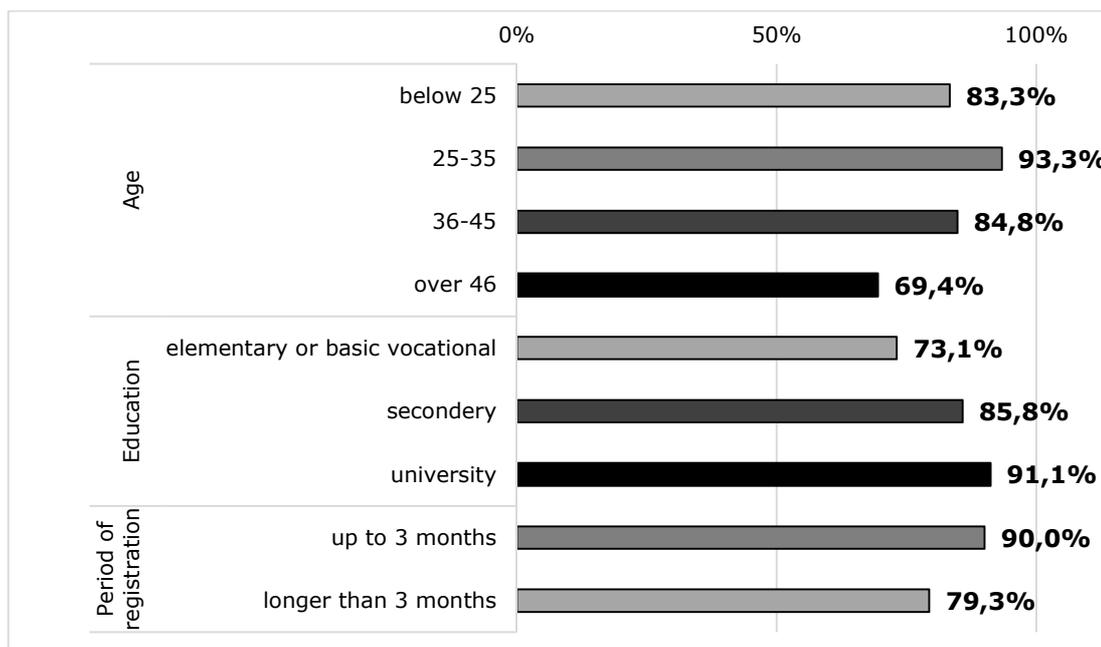
According to the report by Narodowy Bank Polski (Central Bank of the Republic of Poland), in 2016 83 % of the Poles surveyed declared to own a bank account (D. Maison, 2017, p.11).



Source: author's calculations based on: D. Maison, 2017, p. 11

Fig. 1. Population share owing a bank account in Poland in the years 2009-2016

Nearly 17 % of adult Poles did not own a bank account, even if this percentage decreased in comparison to 2009. The highest level of access to banking services was recorded among the respondents aged 25-54 and having university education. The highest level of financial exclusion is observed in this field among the eldest respondents, those with elementary education as well as the unemployed and the inhabitants of rural area. It is however necessary to notice that in the years 2009-2016, percentage of the owners of bank accounts increased to the greatest extent among the elderly (D. Maison, 2017, p.15).



Source: author's study

Fig. 2. Using bank services and the age, education and period of being registered in MUP in Plock

Basing on the result of the survey it can be concluded that 83,4 % of unemployed respondents in Plock were the clients of banks. These data are consistent with overall national results in Poland.

Respondents aged over 46, with elementary or basic vocational education, registered in the employment office longer than 3 months would use banking services the least frequently. Basing on the values of the likelihood ratio, statistically significant correlations between using banking services and the age of respondents were reported: $\chi(8) = 24.97, p < 0.01, V(8) = 0.19, p < 0.01$, in connection with the education: $\chi(6) = 14.84, p < 0.05, V(6) = 0.15, p < 0.05$ and the period of being registered in the employment office: $\chi(4) = 10.35, p < 0.05, V(4) = 0.12, p < 0.05$.

The next question made it possible to assess the level of access to banking services. Respondents would point to the scope of financial services used by them (Table 1).

Table 1

Scope of banking services used by the unemployed

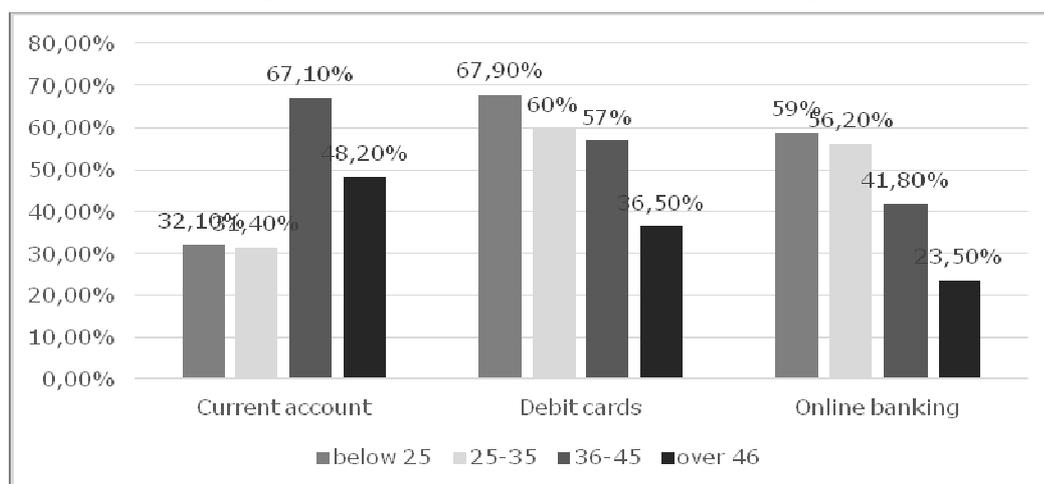
Banking products	Number of respondents	Percentage of respondents
Current account	175	50 %
Debit cards	194	55.4 %
Online banking	158	45.1 %

Source: author's study.

The survey made it possible to assess the number of unemployed in Plock who hold a current account (50 %). An interesting issue consists in bigger popularity of using debit cards than having a current account. It may result from the fact that a part of respondents use banking accounts together with other members of their families. This thesis may be confirmed by the results of overall study conducted in Poland in 2016 which demonstrates that 22 % of Poles refer to this reason of not having a bank account (D. Maison, 2017, p. 22). A positive aspect is a relatively high percentage of the unemployed using online banking services – 45.1 %.

Demographic as well as social and economic factors influence the level of access to banking services by the unemployed. The age, education as well as period of being registered in the Employment Office significantly differentiate the level of using banking services.

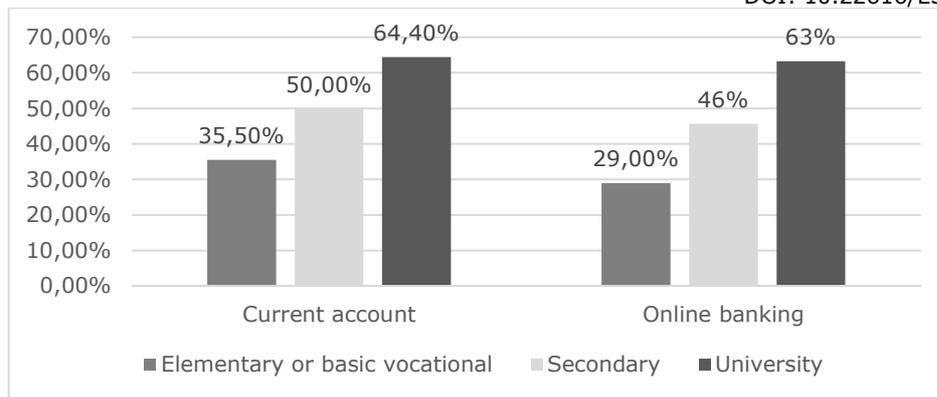
The youngest respondents (below 25 years of age) would own a bank account the least frequently, but they used online banking services and debit cards the most often (Figure 3).



Source: author's study

Fig. 3. Using banking products depending on the age of respondents

Statistically significant correlations were obtained between the age of those surveyed and using bank accounts: $V(8)=0.26, p < 0.001$, using debit cards: $V(8)=0.21, p < 0.001$ and using online banking services: $V(8)=0.25, p < 0.001$. It is worth noticing that the persons with university education represent the group with higher level of access to banking services (Figure 4).

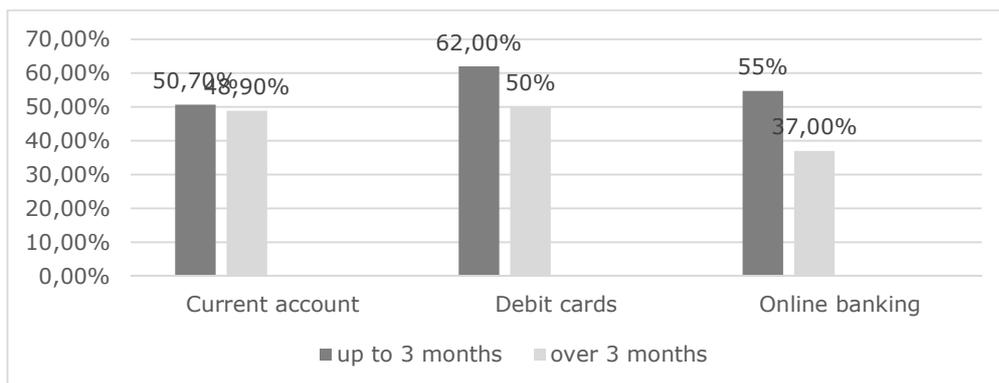


Source: author's study

Fig. 4. Using banking products and the education of respondents

Statistically significant correlations were obtained between the education of respondents and using bank accounts: $V(6)=0.17$, $p<0.01$, using online banking: $V(6)=0.21$, $p<0.001$. Data presented on Graph 4 demonstrate that the unemployed with elementary or basic vocational education constituted a group of clients who least frequently owned bank accounts and using online banking services.

It should be noticed that the period of remaining without employment had the influence on the clients' activity in the field of using banking services (Figure 5).



Source: author's study

Fig. 5. Using banking products and the period of being registered in MUP in Płock

Respondents being registered as unemployed for over than 3 months would significantly less frequently use subsequent banking services. Statistically relevant correlations were obtained between the period of being registered in Municipal Employment Office (MUP) in Płock and using bank accounts: $V(4)=0.13$, $p<0.05$, using debit cards: $V(4)=0.13$, $p<0.05$ and using online banking services: $V(4)=0.15$, $p<0.01$.

Conclusions, proposals, recommendations

In spite of a huge progress in the last years connected with using bank accounts, different forms of online banking and debit cards, there still exists a group of citizens deprived of the access to these services or voluntarily resigning from this opportunity. The reluctance towards having a bank account and big popularity of cash operation demonstrate that the level of financial exclusion of a transactional character still remains high, both with reference to the entire population of Poland (ca. 17 %) as well as to the unemployed in Płock (ca. 16.6 %).

Basing on research results, the level of access to banking services by the unemployed in Płock looks as follows:

- individuals not using banking services – 16.6 %;

- individuals using banking services in a limited scope – 33.3 %;
- individuals with full access to banking services – 50.1 %.

A positive signal consists in the fact that a half of respondents use different forms of banking services.

The analysis of empirical data obtained confirmed strong diversification of the level of financial exclusion of a transactional character in connection with: the age, education and the period of being registered as unemployed. Respondents with elementary or basic vocational education, aged over 46 and remaining without employment for longer than 3 months may be considered as having the lowest access to banking services, i.e. the most vulnerable to financial exclusion of a transactional character. Younger individuals (up to 35), with university education, having the status of an unemployed for a short period of time (up to 3 months) are much more willing to use online banking services and debit cards. This group may be considered as having the biggest access to banking services.

The results obtained in connection with the scale and level of financial exclusion of a transactional character among the unemployed encourage to suggest the activities which would aim at preventing this phenomenon. Important increase in the access to banking services could be achieved thanks to an educational campaign which would convince those reluctant to use banking services. What is more, banks should be more flexible in adapting their offer to clients' needs.

Literature

1. European Commission. (2008). *Financial Services Provision and Prevention of Financial Exclusion*, March. Retrieved: <https://ec.europa.eu/social/BlobServlet?docId=761&langId=en> . Access: 07.01.2019
2. Hill, N., Alexander, J. (2003). *Pomiar satysfakcji i lojalności klientów* (Measurement of clients' satisfaction and loyalty). Krakow: Oficyna Ekonomiczna
3. Kurczewska, A. (2011). *Społeczna odpowiedzialność instytucji mikrokredytowych w Europie* (w:) *Mikrokredyty w Europie sposobem na pobudzenie przedsiębiorczości i walkę z wykluczeniem społecznym* (Social responsibility of micro-credit institutions in Europe [in:] *Microcredits in Europe as the way to stimulate entrepreneurship and fight with social exclusion*), B. Mikołajczyk, A. Kurczewska (ed.), Warszawa: Difin.
4. Polasik, M. Piotrowska, A. (2014). *Transakcyjne wykluczenie finansowe w Polsce w świetle badań empirycznych* (Financial exclusion of a transactional character in view of empirical research), „Prace Naukowe Uniwersytetu Ekonomicznego we Wrocławiu „, No 330/2014, p. 316-325.
5. Maison, D. (2017), *Postawy Polaków wobec obrotu bezgotówkowego* (The attitudes of Poles towards non-cash turnover), Report of NBP, Warszawa.
6. *Report on the labor market 01.08-31.08.2018 Municipal Employment Office MUP in Płock*. Retrieved: http://mupplock.praca.gov.pl/documents/4063619/6455409/MRPiPS-01_%2008.2018.pdf/6698b386-c77a-487d-8b59-ca35a9ef60dc?t=1536920094755. Access: 29.01.2019

STOCK MARKET INSTITUTIONAL AND REGULATORY FRAMEWORK IN THE BALTIC STATES

Aija Pilvere-Javorska^{1*}, MBA, Irina Pilvere¹, Dr.oec. and Baiba Rivza¹, Dr.hab.oec.

¹Latvia University of Life Sciences and Technologies

Abstract. This paper focuses on the institutional and regulatory aspects of stock market in the Baltic States. Research aim is to assess stock market institutional and regulatory framework in the Baltic States. Analysis of the main European Union (EU) legislation acts, national laws, supervisory and market organizer rules and regulations were performed, as well as were examined European level and national level institutions, in terms of state authorities performing supervision and market organization. Authors investigated and created comprehensive structure of how stock market supervision and market organization is executed among three Baltic States, as well as constructed an extensive scheme of the main stock market impacting regulatory documents on both the (EU) and national level. Authors concluded that stock market has 2 level organization and supervision, and is most similar in Estonia and in Latvia, while in terms of national legislation stock market is more similar in Latvia and in Lithuania, with in Estonia differentiating and thus creating an advantage and being more attractive for the companies interested to be listed there.

Key words: Stock market, institutions, regulatory framework, Baltic States.

JEL code: G10, G18, G23.

Introduction

Stock market is an important place, where investors can invest their resources directly in chosen markets and companies. A. Boubakari and D. Jin (2010), states that „sometimes investors avoid investing directly to the companies because they cannot easily withdraw their money whenever they want. But through the financial stock market, they can buy and sell stocks quickly with more independence“. Stock market displays positive relation to economic growth by providing new financial resources to the companies as discovered by R. Levine (1991). Some markets are riskier than others, and authors emphasize that the institutional and regulatory system can mitigate in part that risk and make some markets attractive to the issuers – the companies willing to get listed and to the investors, who are looking to invest their money by legislation and strong and established institutional system and laws. According to E. Brousseau and A. Nicita (2010) „recent debates over global financial crises have further renewed the role of institutional setting and legal standards as „genetic“ features of well-performing markets“. The institutional and regulatory system needs to protect investors and companies from corruption, fraud and market abuse and to set equal operation field for involved stakeholders. Researcher K. Lannoo (2001) states that „securities market regulation is to ensure proper disclosure and enforcement via a complex set of intermediaries and institutions“. Accession to the EU in 2004 by Estonia, Latvia and Lithuania, changed stock market in the Baltic States, as well as its regulatory framework, where local laws are interdependent on the EU rules and regulations. A. Kein (1998) analyzed Estonian regulatory framework of securities market, and how it was formed since Estonia regained independence, and before accession to the EU, as well as analyzed institutional systems in Estonia. V. Deltuvaitė (2016), has reviewed stock market integration in the Baltic Countries and „found strong evidence that the stock markets are co-integrated“ and recognized that „some empirical aspects of the Baltic stock market integration have been analyzed in the scientific literature, however, a comprehensive analysis on the Baltic stock market integration level is still missing“. R. Rupeika-Apoga (2013) reviewed briefly „supervision and regulation of financial intermediaries and institutional and market infrastructure“, and „emphasizing the banking and insurance sector supervision and securities regulation“, focused on banking and insurance industries,

* Corresponding author ph.: +37129378107; e-mail address: apilvere@gmail.com

the need for its improvement in the Baltic States post crisis with drawing main attention on banking industry. Importance of the institutional system, especially new one is emphasized by M.G. Hogson (1998), who states that institutions are important piece of the system. Moreover, the importance of common capital market is stressed out in the 2017 meeting among all three Baltic States Finance Ministers and the European Bank for Reconstruction and Development (EBRD) urging the need to create pan-Baltic capital market, especially „including the establishment and improvement of the underlying legal framework“ (Baltic states to ..., 2017). Therefore, authors have set following **research aim**: to assess stock market institutional and regulatory framework in the Baltic States. In order to reach the aim, the main **tasks** are defined: 1) to evaluate existing stock market institutional and organizational structure in each of Baltic States; 2) to assess the main stock market impacting rules and regulations in the Baltic States from the EU and national perspective. **Research object** is the institutional and regulatory framework of stock market in the Baltic States. Authors believe *that novelty of the research paper* is that there are limited publications on stock market institutional and regulatory implications in the Baltic States, and after all three Baltic countries accessed to the euro, there is a strong need and possibility to have common capital market, but No thorough overall analysis of current legislative and institutional structure has been performed.

Methodology and data.

Authors analyzed stock market impacting legislation, market and supervisory composition in the Baltic States using following methods to fulfill research aim and tasks: analysis, synthesis, the logical construction methods, the induction and deduction methods of the EU and Baltic States stock market legislation and institutional system. Scientific literature review was performed to understand the importance and topicality of the issue. Analysis and results are based on the information as it was on January 01, 2019.

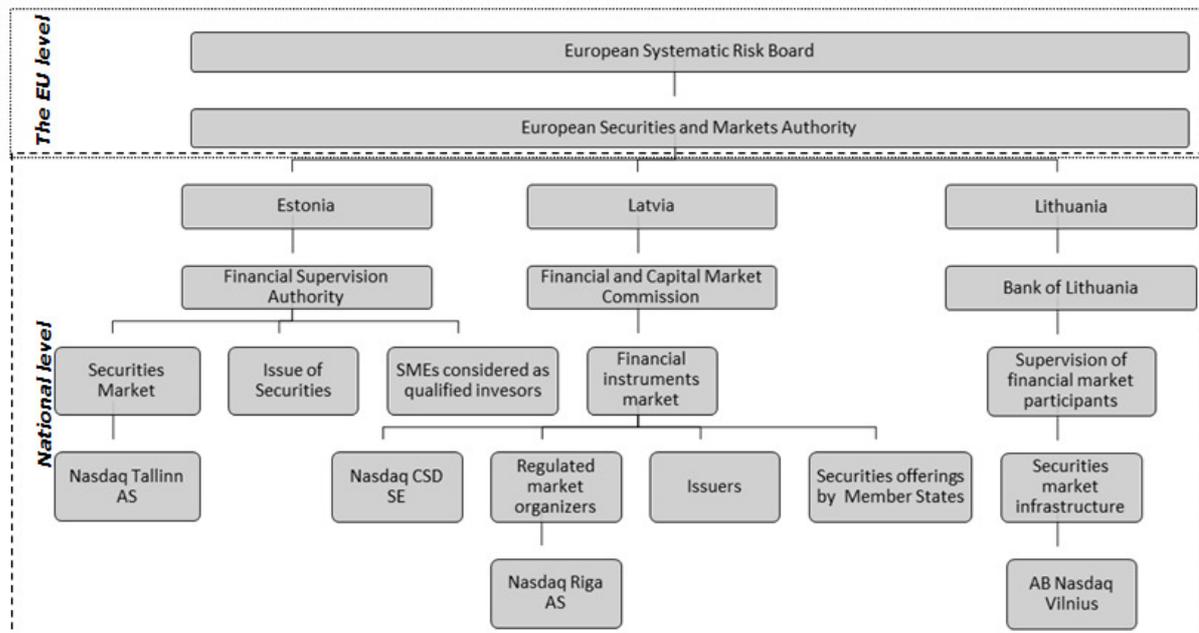
Research results and discussion.

1. The Institutional Framework of Stock Market in the Baltic States.

Accession to the EU in 2004 by Estonia, Latvia and Lithuania, changed the supervision format for stock market in the Baltic States. It is two level system: the EU supervisory framework, which is administered by the European Institutions such as the European Systemic Risk Board (ESRB), which is comprised of the European Commission, the European Central Bank, and the Chairs of European Securities and Markets Authority (ESMA), the European Insurance and Occupational Pensions Authority (EIOPA) and the European Banking Authority (EBA), the Joint Committee of the European Supervisory Authorities (ESAs), and the national competent or supervisory authorities of each Member State (Fig. 1). The ESRB with the ESMA carries out high-level supervision of the securities market in the EU. While 2nd level is national level supervision and market organization. Local supervision authorities oversee national securities markets. In Estonia and in Latvia, there is a separate Financial Authority formed, in Estonia, it is called the Financial Supervisory Authority (FSA), while in Latvia – the Financial and Capital Market Commission (FCMC). On contrary in Lithuania, this function is fulfilled by the Central bank – Bank of Lithuania (BoL).

Supervision framework addresses the issuers, who wants to get listed and who are already listed, and it regulates implementation and obeisance of rules and regulations, in the meantime, they do not organize the actual securities market. Stock market, is common in the Baltic States, which is true in terms of trading and settlement side of the stocks, in the meantime in each of the Baltic States, there is a separate market organizing legal entity belonging to the corporation NASDAQ (Nasdaq Tallinn AS, Nasdaq Riga, AS, AB Nasdaq Vilnius), commonly referred as to Nasdaq Baltic

(Fig. 1). Listed companies and new issuers, who intend to get listed, must apply to the local market organizer and follow their rules for each country and local legislation, and register their securities with local securities depository, which since 2017 has merged its business and is operating in the Baltic States as Nasdaq CSD SE supervised by the FCMC, providing its services in Estonia and in Lithuania as Nasdaq CSD SE branch in Estonia and Nasdaq CSD SE branch in Lithuania. Although settlement of stocks takes place under each country's legislation. Authors conclude that despite the unite currency euro, and a talk on common capital market, the organization and supervision of stock market in the Baltic States is regulated and organized by different entities in each country.



Source: Authors' constructed and derived based on ESMA, FSA, FCMC, BoL, Nasdaq Baltic, Nasdaq CSD data

Fig. 1. The Institutional System of Stock Market Supervision and Organization in the Baltic States as of 01.01.2019.

1. Stock Market Regulatory Framework in the Baltic States.

As stock market supervisory structure in the Baltic States is two level, that is also the case with stock market rules and regulations (Fig. 2). With the accession to the EU, there are two level rules and regulations: the EU and national level. On the EU level, authors have identified eight main impacting legislation acts, which consist of five regulations and three directives. As per the EU definition: „A "regulation" is a binding legislative act. It must be applied in its entirety across the EU”, while „A "directive" is a legislative act that sets out a goal that all EU countries must achieve. However, it is up to the individual countries to devise their own laws on how to reach these goals.” Directives are implemented in the local legislation as per each Member States, how it sees it fit. Thus, there might be a difference in the interpretation and application of the requirements set out in the directives. In the meantime – regulations must be taken and applied as is, without interpretation by each Member State.

The EU legislation. The main EU regulations, which are in force and are applied on national level are: 1) Prospectus regulation No. 2017/1129 with aim to harmonize and set uniform requirements across EU and attract more diverse source of capital to the issuers; 2) Benchmark regulation No. 2016/2011. It sets rules applicable to benchmark administrators and its target is to properly manage and calculate performance for index/funds; 3) Regulation No. 600/2014 or Markets in Financial Instruments Regulation (MiFIR), which targets to protect not only investors but also securities market in the EU and the investment providers et al. This regulation clarifies reporting procedures and sets

it to be more detailed and unified across EU Member States. It attempts to create more transparency in trading and for the investors, where in trading separating who has made the investment decision compared to who has made the execution decision; 4) Regulation No. 596/2014 also known as prevention of market abuse regulation. It targets to increase the investor protection against market manipulation and increase integrity of securities market, it is applicable to broader platform base compared to previous regulations and is updated to reflect recent changes in the investor and market related community behavior; 5) Finally, regulation No. 236/2012 or known as short selling regulation, because it is in general applicable to regulate dealings in short selling and credit default swaps. Intention is to provide more transparent pre-and post-trade data available to the public (investors) i.e., bid and offer prices and other information by the trading venues. Target is to reduce risk on uncovered short selling and settlement (Fig. 2).

The EU level	Regulations					Directives		
	Regulation 2017/1129 Prospectus	Regulation 2016/1011 Benchmark	Regulation 600/2014 MiFIR	Regulation 596/2014 Market abuse	Regulation 236/2012 Short selling	Directive 2014/65/EU MiFID 2	Directive 2003/71/EC Prospectus	Directive 2014/57/EU Market abuse
National level	Estonia		Latvia		Lithuania			
	Securities Market Act	Commercial Code	Law on the Financial Instruments Market	Commercial Law	Law on Securities	Law on Companies		
	FSA rules		FCMC rules		Law on Markets in Financial Instruments			
	Nasdaq Tallinn rules		Nasdaq Riga rules		BoL rules			
					Nasdaq Vilnius rules			

Source: Authors' constructed and derived based on ESMA, FSA, FCMC, Nasdaq Baltic, Regulation (EU) 2017/1129, Regulation (EU) 2016/1011, Regulation (EU) No 600/2014, Regulation (EU) No 596/2014, Regulation (EU) No 236/2012, Directive 2014/65/EU, Directive 2003/71/EC, Directive 2014/57/EU, Estonia: Securities Market Act, Estonia: Commercial Code, Latvia: Finanšu instrumentu tirgus likums, Latvia: Komerclikums, Lithuania: Law on Securities, Lithuania: Law on Companies, Lithuania: Law on Markets in Financial Instruments, Nasdaq Baltic rules and regulation for Tallinn, Nasdaq Baltic rules and regulation for Riga, Nasdaq Baltic rules and regulation for Vilnius.

Fig. 2. The Main EU and National Regulatory Framework of Stock Market in the Baltic States as of 01.01.2019.

Authors have identified three main existing directives (Fig. 2), which are in force as of 01.01.2019, with most important being No. 2014/65/EU or know as Markets in Financial Instruments Directive 2 in short MiFID 2 (replacing MiFID or previous directive No (2004/39/EC)). It sets definition of terms and increases regulation of financial markets and improves investors' protection via more transparent pricing, especially splitting of commissions charged for the analyst research and trading, increase standards for the investment related products. Long in force directive is also known as Prospectus directive No. 2003/71/EC. It is crucial for the companies planning to raise capital via public offering or to be admitted to trading, as well as to all involved parties, who help with prospectus and to local supervisory body, since this directive sets single and uniform general requirements for prospectus drafting, content etc. It also establishes publishing and validity of prospectus rules. Its main target is to have uniform standards, so the prospectus can be easily passported to other EU countries. Despite fact that regulation No 2017/1129 is repealing this directive, it is still in force. Third directive is No. 2014/57/EU to reduce market abuse. Both MiFID II/MiFIR are applicable only from 3 January 2018 according to ESMA.

Authors conclude that with changing investor and market behavior, the EU focus is now towards reducing market abuse (recent new regulation and directive) and setting uniform and more

transparent standards and requirements for the prospectuses and investment bank/brokerage pricing, deal execution and insider information handling.

National level legislation. A. Kein (1998) emphasized that „the capacity and incentive of institutional investors to exercise ownership rights and intervene in portfolio-companies' management, is largely determined by the existing legal framework“, and since the EU level legislation is unified across Member States, then role of national legislation is crucial and can make stock market attractive. There are two main impacting state laws in Estonia and in Latvia, while three in Lithuania. All companies must be first registered in commercial register as Joint Stock Companies (JSC) or in the process before listing converted to JSC. Only JSC shares can be listed, this is common rule among all three Baltic States. Commercial Code or Law on the Companies is the main company setting up and share issue regulating state level act in all three Baltic States (terms used slightly differs: Public Limited Company: AS in Estonia, Stock Company: AS in Latvia, Public Liability Company: AB in Lithuania). Authors are using term JSC as a form describing this type of companies, which is or can be listed.

Common company related rules among all three Baltic States are following:

- 1) Setting legal form of company as JSC, requirements of establishing, board, articles of association, setting rights for preferential shares, employee shares and running the company;
- 2) Setting number of management and supervisory board members;
- 3) Prohibition to acquire own shares, with few specific exceptions (Fig. 2).

Authors considers that there are two main most important differences for company formation and capital increase in the Baltic States law: 1) Different minimum amount of nominal share capital required for public JSC. The smallest is EUR 25000 in Estonia, EUR 35000 in Latvia, while the highest required is in Lithuania – EUR 40000; 2) Possibility of conditional share capital increase registration is only in Estonia, this usually speeds up process for investors after company has done the initial public offering (IPO) or secondary offering, to have new shares traded sooner.

Authors conclude that in Estonia the main law already sets it apart based on the least requirements for JSC, and in case of becoming solely listed or via the IPO route, it has the fastest bureaucratic route to start of trading due to possibility of the conditional share capital increase.

Second main state law is Securities Market Act (SMA) in Estonia, Law on the Financial Instruments Market (LFIM) in Latvia and Law on Securities (LoS) in Lithuania. These laws deal with setting rules and regulation in respect to dealing, issuing and trading of various securities, which the company can have.

Authors concluded that the most important features for stock issuers and investors are three clauses:

1. Setting in all countries when an offering is not qualified as public, main aspects are applicable if the offering is directed to solely qualified investors, or an offer addressed to fewer than 150 non-qualified investors per contracting country, or nominal value of one stock is equal or larger than 100 000 EUR. This is important, since then there is No need to make prospectus and offering public, thus significantly reducing the costs of the capital raising or listing process.

2. They set in all three countries rules, when listed companies' major shareholders are gaining controlling authority, and when they can express voluntary takeover bid, or when they are obliged to express mandatory takeover bid to the minority shareholders. This part also sets the price calculation mechanism for mandatory takeover bid price per offer share, thus serves as a protection of minority shareholders of the listed company.

3. And setting the criteria for qualifying as a small or medium company, it is also exactly stated in the prospectus regulation (must fulfill two out of three criteria, net turnover does not exceed EUR 50 million, average number of employees below 250, total assets below EUR 43 million). This is helpful when in the course of the offering if the company qualifies, they must fulfill minimum requirements set in the prospective directive and regulation, rather than the full set. Thus, it is less costly. According to the European Commission (2019): „small and medium-sized enterprises (SMEs) represent 99 % of all businesses in the EU.”

In Lithuania Law on Markets in Financial Instruments addresses mainly supervisory set up and financial brokerage firm organization and operation, thus has less impact on listed companies. From listed company perspective in Lithuania there are two main legal acts: Law on Companies and Law on Securities, as authors discussed above.

Lower significance though important are supervisory institution issued rules and regulations in each country. Market supervisory rules are the main rules of supervision, set mainly for banks and for fund managers, rather than specific rules for the issuers and investors. Specific rules for the issuers and investors are issued by market organizer Nasdaq, as is discussed below.

Market organizer rules and regulations. The EU and national legislation set high level requirements for the companies, while market organizer specifies in detail how and what a company must do to become listed and maintain the status of a listed company. In early 90-ties, while stock market in the Baltic States was only in the process of formation, it transitioned from unregulated and spontaneous stock market to regulated market with clearly set expectations and rules to follow by the market organizer. Market organizer Nasdaq Baltic has issued rules and regulations for each of three Baltic States. They set listing requirements and explain the process and requirements of listing as well as the organization of Nasdaq competent authorities, and process in case there is a breach of rules. Additionally, it sets out trading and settlement procedures and required disclosures by the issuers (Table 1). Authors discovered that Nasdaq Vilnius listing rules are available only in Lithuanian, thus stock market in Lithuania is at disadvantage compared to stock market in Latvia and in Estonia.

Table 1

Listing Requirements for the Issuers on the Baltic Stock Exchange Lists as of 01.01.2019.

Indicators	The EU Regulated Market		Alternative Market
	Baltic Main List	Baltic Secondary List	Baltic Alternative First North
Market capitalization/ equity value	Market value of shares should be equal or above EUR 4 million*.	At least EUR 1 million.	Not required.
Free-float	At least 25 % of shares belonging to public*.	Enough shares belonging to the public.	Not required.
History of performance	Last 3 years annual audited reports according to international financial reporting standards (IFRS).	Last 2 years annual audited reports prepared according to IFRS.	Last 2 years annual audited reports prepared according to local accounting principles or IFRS.
Prospectus	Prospectus.	Prospectus.	Prospectus or company description prepared with CA.
Certified Adviser (CA)	Not required.		An agreement with CA.
Ownership	Disclosure of shareholder ownership above 5 %.		

Source: Authors' constructed based on Nasdaq rules and regulations in the Baltic States.

In the Baltic States there are three lists where the companies can get listed (Table 1). Baltic Main List and Baltic Secondary List – both are the EU Regulated Market, while third list: Baltic Alternative

First North is an Alternative Market, it is not considered as regulated market per se, however, Nasdaq and supervisory institutions do regulate and supervise it, thus it has some attributes of the regulated market, though with less strict requirements. Smaller companies or companies, which do not meet or prefer not to follow the strict requirements of the regulated market, can get listed on the alternative market and get access to the investors. Long term institutional investors had preference for larger stocks, while recently it is changing, according to M.E. Blume and D.B. Keim (2012) state „that institutions have gradually increased their holdings of smaller stocks and decreased their holdings of larger stocks relative to market weights“. Baltic Main List has the strictest requirements for admission to listing and requires company to be larger in size, though companies in Baltic in general are SME, which is micro companies when compared to the ones listed on the stock markets in the Europe or USA. Requirements for being listed on the Baltic Secondary List is lower and thus these shares present higher degree of risk than shares listed on the Baltic Main List according to Nasdaq. Existence of three lists, allows the issuers and investors to choose the most appropriate one meeting their needs and requirements. For shares to be considered for listing, they need to be freely transferable and in addition to company being JSC, the shares must be registered with the depository. Once company becomes listed, each of the lists set reporting and disclosure requirements for the issuers (Table 2). The least requirements are for the companies listed on Baltic Alternative First North list.

Table 2

The Main Reporting and Disclosure Requirements for the Listed Companies on Stock Market in the Baltic States as of 01.01.2019.

Indicators	Regulated Market		Alternative Market
	Baltic Main List	Baltic Secondary List	Baltic Alternative First North
Financial reports	Audited annual report and interim reports of 3, 6, 9 and 12 months.		Audited annual report and 6 months interim report.
Disclosure requirement	Any economic or significant information of the issuer or its subsidiary if it is No less than 10 % of the issuer.		
Corporate governance code	The issuer must inform if it complies or not.		Not required.
Other	Number of shares owned by management and supervisory board and their connected persons.		Number of shares owned by management and supervisory board, CA and their connected persons.
	Information on share transaction performed by persons of or linked to the issuer.		Report significant transactions above 10 % of the issuer's share capital.
	Trade and price statistics for the reporting period.		
	Decision of share capital increase/decrease or dividend payment, any share related action.		

Source: Authors' constructed and derived based on Nasdaq rules and regulations in the Baltic States.

Conclusions, proposals, recommendations

- 1) The institutional organization for stock market in the Baltic States is rather similar, with exception that in Estonia and Latvia, there is a separate organization, which performs supervisory duties, while in Lithuania these functions are delegated to the Bank of Lithuania.
- 2) National laws have two main differences across the Baltic States, one is for setting the minimum nominal value required for setting up JSC, where in Estonia this requirement is the lowest, and in Lithuania it is the highest. Other difference is that in Estonia it is possible to have conditional capital increase, which speeds up the trading process of new shares, while in Latvia and in Lithuania, it is not possible.

- 3) Despite having a unified and known as the Baltic stock market, the issuers need to get registered and follow local stock market rules and regulations issued by three market organizers: Nasdaq Tallinn, Riga and Vilnius, where in last, listing rules for stock market is only in Lithuanian. Authors recommend to consider on the market organization level to have one common legal entity instead of three. It needs to be further investigated what are the obstacles to have that and whether benefits outweigh costs and risks.

Acknowledgment:

The research was supported by the National Research Programme „Latvian Heritage and Future Challenges for the Sustainability of the State” project „Challenges for the Latvian State and Society and the Solutions in International Context (INTERFRAME-LV)”

Bibliography

1. Baltic States to create a pan-Baltic capital market (2017). Retrieved: <https://www.ebrd.com/news/2017/baltic-states-to-create-a-panbaltic-capital-market.html>. Access: 31.01.2019.
2. Bank of Lithuania. Retrieved: <https://www.lb.lt/en/>. Access: 31.01.2019.
3. Blume, M.E., Keim, D.B. (2012). Institutional Investors and Stock Market Liquidity: Trends and Relationships, Retrieved: http://finance.wharton.upenn.edu/~keim/research/ChangingInstitutionPreferences_21Aug2012.pdf. Access: 01.02.2019.
4. Boubakari, A., Jin, D. (2010). The Role of Stock Market Development in Economic Growth: Evidence from Some Euronext Countries. *International Journal of Financial Research*, Vol. 1, No. 1, pp 14-20.
5. Brousseau, E., Nicita, A. (2010). How to design institutional frameworks for markets. *Revue d'économie industrielle*, Retrieved: <http://journals.openedition.org/rei/4144>; DOI: 10.4000/rei.4144 pp. 87-118. Access: 30.01.2019.
6. Deltuvaite, V. (2016). Investigation of Stock Market Integration in the Baltic Countries. *Economics and Business*, vol. 28, issue 1, pp. 38-44. Retrieved: <https://content.sciendo.com/view/journals/eb/28/1/article-p38.xml>. Access: 29.01.2019.
7. Directive 2003/71/EC of the European Parliament and of the Council of 4 November 2003 on the prospectus to be published when securities are offered to the public or admitted to trading and amending Directive 2001/34/EC. Retrieved: [https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX %3A32003L0071](https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A32003L0071). Access: 03.01.2019.
8. Directive 2014/57/EU of the European Parliament and of the Council of 16 April 2014 on criminal sanctions for market abuse. Retrieved: [https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX %3A32014L0057](https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A32014L0057). Access: 10.01.2019.
9. Directive 2014/65/EU of the European Parliament and of the Council of 15 May 2014 on markets in financial instruments and amending Directive 2002/92/EC and Directive 2011/61/EU. Retrieved: [https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=celex %3A32014L0065](https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=celex%3A32014L0065). Access: 19.01.2019.
10. Estonia: Commercial Code. Retrieved: <https://www.riigiteataja.ee/en/eli/504042014002/consolide>. Access: 19.01.2019.
11. Estonia: Securities Market Act. Retrieved: https://www.riigiteataja.ee/en/compare_original?id=517012019004. Access: 01.02.2019.
12. European Commission. Retrieved: http://ec.europa.eu/growth/smes/business-friendly-environment/sme-definition_en. Access: 30.01.2019.
13. *European Securities and Markets Authority, supervisory framework*. Retrieved: <https://www.esma.europa.eu/about-esma/governance/european-supervisory-framework>. Access: 17.01.2019.
14. Financial and Capital Market Commission. Retrieved: <http://www.fktk.lv/en/>. Access: 31.01.2019.
15. Financial Supervision Authority. Retrieved: <https://www.fi.ee/en>. Access: 31.01.2019.
16. Hogson, G.M. (1998). The Approach of Institutional Economics. *Journal of Economic Literature*, pp. 166-192.
17. Kein, A. (1998). Development of Capital Markets and its Institutions in Estonia. Retrieved: <https://www.nato.int/acad/fellow/96-98/kein.pdf>. Access: 28.01.2019.
18. Lannoo, K. (2001). EU Securities Market Regulation Adapting to the Needs of a Single Capital Market. *Report of a CEPS Task Force*, Centre for European Policy Studies, pp. 1-61.
19. Latvia: Finanšu instrumentu tirgus likums (Law on Financial Instruments Market). Retrieved: <https://likumi.lv/doc.php?id=81995>. Access: 07.09.2018.
20. Latvia: Komerclikums (Commercial Law). Retrieved: <https://likumi.lv/doc.php?id=5490>. Access: 07.09.2018.
21. Levine, R. (1991), Stock Markets, Growth, and Tax Policy. *The Journal of Finance*, Vol.46, issue 4.
22. Lithuania: Law on Companies. Retrieved: <https://www.lb.lt/en/legislation>. Access: 12.01.2019.

23. Lithuania: Law on Markets in Financial Instruments. Retrieved: <https://www.lb.lt/en/legislation>. Access: 12.01.2019.
24. Lithuania: Law on Securities. Retrieved: <https://www.lb.lt/en/legislation>. Access: 12.01.2019.
25. Nasdaq Baltic rules and regulation for Riga. Retrieved: <https://nasdaqbaltic.com/en/our-services/rules-and-regulations/nasdaq-riga/>. Access: 20.01.2019.
26. Nasdaq Baltic rules and regulation for Tallinn. Retrieved: <https://nasdaqbaltic.com/en/our-services/rules-and-regulations/nasdaq-tallinn/>. Accessed 19.01.2019.
27. Nasdaq Baltic rules and regulation for Vilnius. Retrieved: <https://nasdaqbaltic.com/en/our-services/rules-and-regulations/nasdaq-vilnius/>. Access: 21.01.2019.
28. Nasdaq Baltic. Retrieved: <https://nasdaqbaltic.com/en/about-us/nasdaq-baltic/>. Access: 18.01.2019.
29. Nasdaq CSD. Retrieved: <https://www.nasdaqcsd.com/>. Access: 03.02.2019.
30. Regulation (EU) 2016/1011 of the European Parliament and of the Council of 8 June 2016 on indices used as benchmarks in financial instruments and financial contracts or to measure the performance of investment funds and amending Directives 2008/48/EC and 2014/17/EU and Regulation (EU) No 596/2014. Retrieved: [https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX %3A32016R1011](https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A32016R1011). Access: 11.01.2019.
31. Regulation (EU) 2017/1129 of the European Parliament and of the Council of 14 June 2017 on the prospectus to be published when securities are offered to the public or admitted to trading on a regulated market, and repealing Directive 2003/71/EC. Retrieved: [https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX %3A32017R1129](https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A32017R1129). Access: 04.01.2019.
32. Regulation (EU) No 236/2012 of the European Parliament and of the Council of 14 March 2012 on short selling and certain aspects of credit default swaps. Retrieved: [https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=celex %3A32012R0236](https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=celex%3A32012R0236). Access: 03.01.2019.
33. Regulation (EU) No 596/2014 of the European Parliament and of the Council of 16 April 2014 on market abuse (market abuse regulation) and repealing Directive 2003/6/EC of the European Parliament and of the Council and Commission Directives 2003/124/EC, 2003/125/EC and 2004/72/EC. Retrieved: [https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX %3A32014R0596](https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A32014R0596). Access: 10.01.2019.
34. Regulation (EU) No 600/2014 of the European Parliament and of the Council of 15 May 2014 on markets in financial instruments and amending Regulation (EU) No 648/2012. Retrieved: [https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX %3A32014R0600](https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A32014R0600). Access: 04.10.2018.
35. Rupeika-Apoga, A. (2013). Financial Markets in the Baltic States in the Changing Environment. Conference proceedings *New Challenges of Economic and Business Development*.
36. The European Union legal acts. Retrieved: https://europa.eu/european-union/eu-law/legal-acts_en. Access: 17.01.2019.

ASSESSMENT OF BUSINESS ANGEL ACTIVITY IN NORTHERN EUROPEAN COUNTRIES

Anatolijs Prohorovs¹, Dr. sc. administr., associate professor; Levs Fainglozs¹, PhD student
¹RISEBA University of Business, Arts and Technology

Abstract. Business angels are one of the main sources of financing for innovative start-up companies. In this regard, it has been discussed in the existing literature that policy-makers and stakeholders are in great need for a tool to measure the level and scale of the development of the business angel market. It has been also mentioned that business angel activity in different countries is highly heterogeneous.

However, so far in the existing literature the comparison of the level of business angel activity in the countries of Northern Europe has not been made. Therefore, the aim of our research is to compare the level of the visible business angel market activity in Northern European countries. To conduct a comparative assessment of the business angels' activity, we used the Business Angel Activity Index calculation methodology developed by us. In this methodology, we justified the set of indicators and the weight of indicators for the calculation of the composite index. We have discovered that in 2016 – 2017 Estonia and Finland demonstrated the highest level of business angel activity among the countries of Northern Europe. We have also established that population size, the size of economy and GDP per capita rate in the Northern European countries are not the main factors that have a considerable impact on the level of business angel activity. Moreover, we confirm that business angel activity in the countries of Northern Europe is highly heterogeneous. We have also found that high scores of the ratio of the number of business angels to the working population in particular countries do not guarantee high level of business angel investment activity in these countries.

The paper also discusses the number of factors ensuring high business angel activity.

Keywords: business angels, business angel activity, business angel investment, Northern Europe.

JEL classification: G24, E22, C18.

Introduction

Business angel (BA) investment is the most significant source of risk capital for new and emerging entrepreneurial businesses (Mason, 2008; Harrison et al. 2010; The European Confederation of Angel Investing, 2015). The vast majority of early stage investments are made not by venture funds, but by business angels (Aridi, 2018). According to EBAN (2017), the amount of BA investment in Europe in 2017 constituted 55.3 % of the total amount of early stage investment.

Therefore, policy-makers and other stakeholders urgently need a tool to measure the level and scale of BA market development (Mason and Harrison, 2008). It is important to monitor not only the size of the market, but also other parameters and factors that characterize activity and efficiency of BAs, as well efficiency of the state policies aimed at promotion of BA activity (Wang et al., 2016).

Researchers note that there are several methods to obtain information on the invisible BA market activity, although each of them has certain limitations and some methods come at a considerable price (Mason, 2016). Although visible BAs constitute only the smallest fraction of all BAs, the data on the investment of BA networks and groups provide unique and valuable information on the BA investment trends (Mason, 2016). European Business Angel Network (EBAN) statistics on the visible BA market are based on the data of BA networks (EBAN, 2017). In addition, EBAN statistics on the visible BA market activity are in open access and in 2017 they provided the data on the number of BAs and the volume of their investment for 38 European countries. Despite certain limitations of the visible BA market statistics, they are used by the European Investment Fund (Kraemer-Eis et al., 2018).

Analysing of the existing literature it may be concluded that comparing the level of BA activity or measuring the BA market such indicators as the ratio of the number of BAs to the working or adult population, total investment amount, and the share of investment in a country's GDP are used most

frequently. There are only a few studies that specifically address the comparison of informal investor and/or BA activity in at least some countries of Northern Europe, for example, Bygrave (2009), Diaz-Moriana and O’Gorman (2013), Owen and Mason (2019).

However, the existing literature does not provide the answer to the question whether higher BA activity is characteristic of the countries with larger population, with higher GDP, or of the countries of „new Europe“ and „peripheral“ economies. In addition, researchers do not agree on whether certain differences in GDP per capita are the factor having an impact on the number of BAs. Such comparison has not been made, thus, respectively, so far it is difficult to say which countries of Northern Europe demonstrate higher BA activity.

Considering the above-said, the aim of our research is to compare the level of the visible BA market activity in Northern European countries considering several research questions. Firstly, the research aims to determine the degree of heterogeneity of the level of BA activity in the countries of Northern Europe; secondly, whether the level of BA activity is higher in the countries with higher GDP, GDP per capita and larger population aged 18 – 64 years; thirdly, whether the number of BAs is the factor having a significant impact on the volume of BA investment. And fourthly, what is the level of BA activity in the countries of „new Europe“ and countries with peripheral economies as compared to other Northern European countries.

Based on the methodology for comparative assessment of BA activity we have developed (Prohorovs et al., 2019), we have presented empirical evidence that GDP, GDP per capita, and population aged 18 – 64 years are not the main factors having an impact on the visible BA market activity. Moreover, we have found that categorization of a country into a group of countries of the so-called „new Europe“ (EU13), that is, the countries with post-communist economy or into a group of countries with peripheral economy, is not a factor limiting BA activity either.

In terms of structure, the paper consists of the following sections: In the first section, we reflect on the results of previous research, in the second section, we consider the research methodology. In the third sections, we compare BA activity indicators of the countries of Northern Europe for 2016 – 2017. In the fourth section, we present the results of index assessment and classification of BA activity of the countries of Northern Europe. In the last two sections, we discuss the obtained results, draw conclusions and make recommendations for further research.

1. Literature review

The BA market is changing under the impact of various factors. Thus, the interest of venture capital funds to seed financing has decreased (Kraemer-Eis et al., 2013), BAs started to unite into syndicates (Mason and Botelho, 2013; Carpentier and Suret, 2015; Mason et al., 2016; IFF Research, 2017). In some countries, BA activity has been to a certain extent influenced by the financial crisis (Mason and Harrison, 2015; The European Confederation for angel investing, 2015).

Researchers find that BA market activity is highly heterogeneous in different countries (Burke et al., 2008; Landstrom and Mason, 2016; Prohorovs et al., 2019). Researchers of BAND network (2015) observe that BA markets are diverse and are characterized by different degree of maturity. Thus, the UK, France and Germany are the most developed BA markets in Europe, whereas in Eastern Europe most countries are still at a very early stage of development. In a recent publication, Finland was included into the group of European countries with developed BA activity, together with France, Germany, the UK and Spain (Kraemer-Eis et al., 2018). The level of BA activity in different Central and Eastern European (CEE) countries also varies considerably, Estonia being the country with the highest BA activity among CEE countries (Prohorovs et al., 2019). When compared to GDP, total BA

investment amounts are relatively high in Estonia and Finland (Kraemer-Eis et al., 2018). Owen and Mason (2019) find that insufficient BA investment is an essential barrier to development of a wider equity finance market for small peripheral economies and that BA community in Estonia is possibly weaker than its counterpart in Finland.

Most frequently, researchers compare countries considering the number of BAs (Karaomerlioglu and Jacobsson, 2000; Mason, 2006; Centre for Strategy & Evaluation Services, 2012) and the amount of BA investment (Mason, 2006; Centre for Strategy & Evaluation Services, 2012; Avdeitchikova and Hans Landström, 2016). Some researchers use the number of BAs as percentage of adult or working population for measuring BA activity (Wong and Ho, 2007; Centre for Strategy & Evaluation Services, 2012; Diaz-Moriana and O'Gorman, 2013). At the same time, some researchers use such indicator as investment as percentage of GDP (Karaomerlioglu and Jacobsson, 2000; Wong and Ho, 2007). Mason and Harrison (2008) point out that measuring BA activity the main focus in data collection should be primarily made on the investment activity rather than on investors *per se*.

Burke et al. (2008) point out that higher GDP per capita rate in a country has a positive impact on the possibility of emergence of business angels. This statement might have appeared reasonable because one of the preconditions for becoming a business angel is that a person should be a high net worth individual (Mason, 2008). However, the existing literature does not answer the question whether certain differences in GDP per capita rates are the factor having an impact on the number of BAs (Mason, 2008).

Summarizing the literature review, we would like to point out that the existing literature does not provide any comparative analysis of the BA activity in the countries of Northern Europe.

The great majority of researchers use absolute or relative BA investment and BA number figures as the main indicators to measure the size of BA market.

The authors agree that the BA market is highly heterogeneous. Moreover, it is often mentioned in the literature that the highest level of BA market development is recorded in the UK, France and Germany, whereas in Eastern Europe most countries are still at a very early stage of development.

Although the question whether certain differences in GDP per capita rates are the factor influencing the number of BAs has been discussed in the existing literature, the researchers have not reached agreement on this issue yet.

In the literature we have reviewed, such issues as heterogeneity of the level of BA activity depending on the size of the economy (GDP) and population size, as well as depending on the fact whether a country is classified as a country with peripheral economy, have not been considered.

2. Methodology and data

To compare the level of BA activity in the countries of Northern Europe we have analysed which parameters researchers use to measure BA activity or BA market. For that purpose, we have selected twelve most frequently quoted papers on BA activity or BA market. The indicators that the researchers use for assessment of BA activity or BA market most frequently are the number of BAs and BA investment volume.

In order to compare BA activity indicators of different countries, we compare the relative rather than absolute indicator figures. Thus, in the present research, we will use the following indicators for assessment of BA activity: BA investment as percentage of GDP, investment rate as proportion of population aged 18 – 64, and the number of business angels as proportion of population aged 18 – 64. Inclusion of two BA investment indicators (both as a ratio to GDP and as a ratio to population)

into comparison of BA activity of different countries will adjust for possible disproportion in terms of GDP or population size.

Moreover, to make the assessment of BA activity of Northern European countries more accurate, we suggest introducing an additional, the fourth indicator – BA investment activity indicator. This indicator shows the amount invested by all visible BAs calculated per one BA.

To conduct comprehensive assessment of BA activity we have used the Business Angel Activity Index (BAAI) calculation methodology (Prohorovs et al., 2019), which substantiates the set of indicators and the weight ascribed to each indicator in the calculation of the composite index. Each of four indicators was given equal weight. This methodology implies using the data on the visible BA market for calculation of the indicators included in BAAI. To normalize all four indicators for calculating the composite BAAI index, we applied the Max normalization. BAAI was calculated as the average of normalized values of all four indicators.

As BA investment is characterized by certain cyclicity (Mason and Harrison, 2015), to increase validity of the obtained results all indicators used to compare the number of BAs and BA investment volume were calculated as mean for 2016 – 2017. In order to ensure symmetry of the calculations all indicators that were used in comparison of the number of BAs and BA investment volume were also calculated as mean for 2016 – 2017.

To obtain information on the number of BAs and BA investment volume the data of EBAN Statistics Compendium for 2016 and 2017 were used. To obtain information on GDP and population aged 18 – 64 years we used Eurostat data for 2016 and 2017.

Ten European countries are included in the group of Northern European countries, however, there is no valid source of information on the quantitative indicators of Iceland's BA market, for this reason, Iceland was not analyzed in this research.

3. Comparison of the business angel activity indicators of the countries of Northern Europe for 2016 – 2017

In order to analyse the data used for comparison of BA activity, in Table 1 we present relative values of the compared indicators and the ranking of Northern European countries based on the indicator scores.

The conducted analysis attests that the visible BA market of Northern European countries is highly heterogeneous. Depending on the type of indicator, indicator scores of the first and the ninth country (according to ranking) differ in the range from 4.2 to 31.7 times. With regard to the ratio of the number of BAs to adult or working population, the difference was 4.2 times, the ratio of BA investment to GDP – 31.7 times, the ratio of BA investment to adult or working population – 14.9 times, and the ratio of visible BA investment to the number of BAs – 8.5 times. Significant differences in the ranges among the scores of four indicators may confirm the view that application of only one or two indicators most frequently used by the researchers – the number of BAs and amount of investment to GDP – are not sufficient to make an accurate assessment of BA activity.

Considering the data presented in Table 1, it may be observed that the high relative indicator score of the number of BAs does not ensure high value of any other considered indicator: ratio of BA investment to GDP, ratio of BA investment to population (18-64) and the ratio of the visible BA investment to the number of BAs. This may signal that the number of BAs is not the main factor determining the volume of visible BA investment, which supports the opinion of Mason and Harrison (2008) that measuring BA activity the focus in data collection should be made on investment activity, but not on the investors themselves.

Data and ranking of the BA activity indicators of the countries of Northern Europe for 2016 – 2017

Country/ Indicator	Ratio of the number of BAs to population (18-64)		Ratio of BA investment to GDP		Ratio of BA investment to population (18-64)		Investment BA activity (ratio of visible BA investment to the number of BAs)	
	score, %	ranking	score, %	ranking	score, EUR	ranking	score, thous. EUR	ranking
Denmark	0.0065	8	0.0084	4	6.98	3	106.6	1
Estonia	0.0152	4	0.0444	1	12.34	1	81.5	2
Ireland	0.0263	1	0.0052	5	5.04	4	19.1	6
Latvia	0.0062	9	0.0102	3	2.18	7	35.1	4
Lithuania	0.0066	7	0.0037	8	0.83	9	12.5	9
Finland	0.0187	3	0.0182	2	12.17	2	65.1	3
Sweden	0.0137	5	0.0048	6	3.79	5	27.7	5
United Kingdom	0.0200	2	0.0043	7	2.58	6	12.9	8
Norway	0.0093	6	0.0014	9	1.45	8	15.7	7

Source: developed by the authors based on the data: EBAN Statistics Compendium, European Early Stage Market Statistics (2016 and 2017); Eurostat, Population on 1 January by age and sex (2018c); Eurostat, GDP and main components (2018a)

The analysis of each of the four BA activity indicators that we have conducted attests that the top four countries by the number of visible BAs to population aged 18 – 64 years includes Ireland, UK, Finland and Estonia. With regard to the ratio of the visible BA investment to GDP, the top four countries are Estonia, Finland, Latvia and Denmark. In terms of the ratio of visible BA investment to population aged 18 – 64 years, it is Estonia, Finland, Latvia and Denmark. Finally, in terms of the ratio of visible BA investment to the number of visible BAs, it is Denmark, Estonia, Finland and Latvia.

Having applied relative rather than absolute indicator scores in our analysis, we may observe that among the countries with the highest GDP and largest population, the UK was included in the top four by each indicator only once, whereas Sweden did not appear in the top four even once. If we had compared the absolute Figures of the number of visible BAs, the UK would have been ranked first and Sweden – second, whereas considering the amount of BA investment – first and fourth, respectively. At the same time, considering the absolute Figures of the number of visible BAs among the countries of Northern Europe, the UK 10.3 times surpasses Ireland, the country that was ranked first according to the relative value of this indicator, although judging by the relative score of the number of BAs, Ireland outperforms the UK by more than 31.5 %.

The case becomes even more evident if we compare the UK – an incontestable leader by absolute Figures of BA investment volume – with the ratio of BA investment to GDP of Estonia's BAs. The value of this relative indicator of Estonia's BAs is 10.3 times higher than that of the BAs from the UK.

The ratio of BA investment to population aged 18-64 years in Estonia is 4.8 times higher than in the UK.

The indicator of BA investment activity in Denmark (investment volume per one average BA) is 8.3 times higher than the corresponding indicator in the UK.

Out of nine analysed Northern European countries, the UK may be considered a large country both in terms of population and GDP. Sweden can be considered if not a large country but at least not a small one, as Sweden is ranked second after the UK among the countries of Northern Europe both in terms of population (about 10 million) and GDP, which significantly exceeds the corresponding indicators of other Northern Europe countries. However, neither the UK nor Sweden was ranked

higher than fifth according to any of the three indicators characterizing the level of investment BA activity.

Table 2 presents the values and the rankings according to GDP per capita and the ratio of the number of BAs to population in the countries of Northern Europe.

Table 2

Score and ranking by GDP per capita and by the ratio of the number of BAs to population

Country/ Indicator	GDP per capita 2017		Ratio of the number of BAs to population (18-64)
	score, EUR	ranking	ranking
Norway	67,100	1	6
Ireland	61,200	2	1
Denmark	50,800	3	8
Sweden	47,200	4	5
Finland	40,600	5	3
United Kingdom	35,300	6	2
Estonia	18,000	7	4
Lithuania	14,900	8	7
Latvia	13,900	9	9

Source: developed by the authors based on the data: EBAN Statistics Compendium, European Early Stage Market Statistics (2016 and 2017); Eurostat, Main GDP aggregates per capita (2018b)

GDP per capita in Norway is 1.65 times higher than in Finland, 1.9 times higher than in the UK and 3.7 times higher than in Estonia. At the same time, the ratio of BAs to population aged 18 – 64 years in Norway is 1.63 times lower than in Estonia, 2.01 times lower than in Finland and 2.15 times lower than in the UK. The comparison of the GDP per capita rates and the data on the number of BAs as percentage of population aged 18 – 64 years we have conducted demonstrates that in the countries with higher GDP per capita, higher GDP per capita rate does not have any positive impact on the number of BAs.

The differences in the ranking of the countries depending on the use of absolute or relative measurement units testifies that the researchers using absolute values in their measurements address the issue of the size of BA markets. The researchers using relative values measuring the BA market consider the level of BA (market) activity, which can also be considered as the level of efficiency of both BA community of a particular country and the entire ecosystem where this BA community operates.

Five main conclusions can be made considering the results of our analysis. Firstly, the visible BA market of the Northern European countries is highly heterogeneous. Secondly, in the countries of Northern Europe, the size of the economy, GDP per capita and population size are not the main factors determining the visible BA market activity. Thirdly, the number of BAs is not the factor that has a determining impact on the total investment amount of the entire visible BA community. Fourthly, to assess the level (and, to a certain extent, efficiency) of BA activity in definite countries the measurements should be made in relative values. And fifthly, the application of only one or two indicators most frequently used in research – absolute or relative indicator of the number of BAs and investment amount as percentage of GDP – is not sufficient to provide objective assessment of the level of BA activity.

4. Index assessment of business angel activity in the countries of Northern Europe

In the previous section, we have considered four indicators characterizing BA activity and the rankings of the countries of Northern Europe in accordance with the scores of each indicator in question. None of the countries demonstrated the same ranking by all four indicators. For two countries – Finland and Sweden – the difference in the ranking by different indicators constituted only one point, for other countries, the difference in the indicator rankings was two and more points, in case of the UK and Latvia this difference was six points. As the heterogeneity among the rankings by different indicators of BA activity of one and the same country was high, in order to make comparative assessment of BA activity of the countries of Northern Europe we used the methodology that we developed for comprehensive measurement of BA activity. This methodology is based on the calculation of the composite index – BAAI (Prohorovs et al., 2019). Normalized values of four indicators, the scores and ranking of the countries of Northern Europe according to the composite index of BA activity are presented in Table 3.

Table 3

Normalized values of the indicators, BAAI rates and the ranking of BA activity of the countries of Northern Europe for 2016 – 2017

Country/ Indicator	Ratio of the number of BAs to population (18-64)	Ratio of BA investment to GDP	Ratio of BA investment to population (18-64)	Investment BA activity (ratio of BA investment to the number of BAs)	BAAI value	BAAI ranking
Estonia	57.57	100.00	100.00	76.42	83.50	1
Finland	71.04	40.94	98.61	61.07	67.91	2
Denmark	24.87	18.99	56.53	100.00	50.10	3
Ireland	100.00	11.71	40.79	17.95	42.61	4
Sweden	52.07	10.75	30.70	25.94	29.87	5
United Kingdom	76.12	9.78	20.87	12.06	29.71	6
Latvia	23.55	22.92	17.63	32.93	24.26	7
Norway	35.17	3.07	11.75	14.70	16.17	8
Lithuania	25.26	8.33	6.73	11.73	13.01	9

Source: developed by the authors based on the data: EBAN Statistics Compendium, European Early Stage Market Statistics (2016 and 2017); Eurostat, Population on 1 January by age and sex (2016 and 2017); Eurostat, GDP and main components (2016 and 2017)

The obtained results of the complex assessment are to a great extent unexpected, since in the existing literature Estonia is not included in the list of countries with the developed BA market or high level of BA activity. Moreover, Estonia is a small country, both in terms of the size of economy and population, and as noted by Owen and Mason (2019), both Estonia and Finland are peripheral economies.

Based on the results of a rather detailed comparison of each of the four indicators included in the composite index we made in the previous section, we can make several conclusions concerning the final ranking of BA activity of the countries of Northern Europe for 2016 – 2017.

Among the countries of Northern Europe, Estonia is the smallest economy, whereas the UK, Sweden and Norway are the 1st, 2nd and 3rd largest economies, respectively, however, the UK was ranked sixth, Sweden – the fifth and Norway – the eighth in the BA activity ranking. This may indicate that the size of economy is not a significant factor determining the level of BA activity of a country.

Estonia takes the seventh place among the countries considered in the present research according to per capita income, and this indicator in Estonia is twice as low as the corresponding indicator of

the UK, which takes the sixth position by GDP per capita among the considered countries. Comparing Estonia with the countries where GDP per capita is higher than in the UK, the differences in the score of this indicator are even greater, for example, the difference with Norway is 3.7 times. This may indicate that GDP per capita is not a significant factor influencing the level of BA activity of a particular country.

In terms of population aged 18 – 64 years, Estonia is the smallest country in the selection. In turn, the UK and Sweden take the first and second position according to this indicator among Northern European countries; moreover, population figures aged 18 – 64 years in the UK and Sweden are several times higher than in any other country considered in this research. However, in the final ranking of BA activity of the countries of Northern Europe for 2016 – 2017, the UK takes the sixth position and Sweden takes the fifth. This suggests that population aged 18 – 64 years, that is, the working population, is not a factor having a considerable impact on the level of BA activity of a country.

According to the calculated composite indicator of BA activity of Northern European countries, the BA activity of the countries of Northern Europe in 2016 – 2017 may be classified as follows: Estonia and Finland – very high level of BA activity; Denmark and Ireland – high level of BA activity; Sweden and the UK – average level of BA activity; Latvia, Norway and Lithuania – BA activity below average level.

5. Discussion and conclusion

Until recently, the literature did not provide any evidence that BA activity figures in Estonia are higher than in the countries of „old“ Europe, which have higher level of economic development, as well as longer history of BA community development. On the contrary, it was noted that the UK, France and Germany have most developed BA markets in Europe, whereas in Eastern Europe most countries are still at a very early stage of development (BAND, 2015). It was mentioned that Finland and Estonia may be classified as small provincial economies and that BA community in Estonia is possibly weaker than that in Finland (Owen and Mason, 2019). Only in a recent study, Finland was added to the group of European countries with high BA activity, which includes also the UK, and it was mentioned for the first time that when compared to GDP, total BA investment amounts are relatively high in Estonia and Finland (Kraemer-Eis et al., 2018). Earlier it was mentioned in the literature that the level of BA activity in Estonia is higher than in Latvia (Prohorovs, 2014) and that it is the highest among CEE countries (Prohorovs et al., 2019). But BA activity rates in Estonia in 2012 were significantly lower than the corresponding indicators in Finland or Sweden in 2012 (Prohorovs, 2014). Considering the above-said, the obtained results of the comprehensive assessment of BA activity in Estonia may appear totally unexpected. However, indicator scores and the positions of Estonia in the ranking of BA activity by each of the four indicators – two first, one second and one fourth place – attest that the first place Estonia takes in the ranking of BA activity of the countries of Northern Europe is not caused by a possible mistake in the design of the composite BAAI. All the more so, two first and one second place Estonian BAs take in the ranking of the compared indicators characterize specifically investment BA activity in Estonia. This is in agreement with the opinion of Mason and Harrison (2008) that measuring BA activity the focus in data collection should be made on investment activity rather than on the investors themselves.

Let us consider the changes in the indicator scores from 2012 to 2017 resulting in a considerable increase of investment activity of the Estonian BA community in five years' time.

In 2012, the ratio of the number of BAs to population in Estonia was 2.6 times lower than in Finland and 2.8 times lower than in Sweden. In 2016 – 2017, the ratio of the number of BAs to population in Estonia was only 1.23 times lower than in Finland and 1.11 times higher than in Sweden. The changes in the scores of this indicator occurred due to a very rapid growth of the number of BAs in Estonia – in the period of five year, the number of BAs in Estonia grew 2.98 times, in Finland – 1.47 times, and in Sweden it decreased by 5 %.

From 2012 to 2016 – 2017, investment BA activity rate in Finland increased by 3 %, in case of Sweden's BAs it increased by 1 %, and investment activity of Estonia's BAs grew 3.5 times. Amount of investment per one average BA in Estonia in 2016 – 2017 was EUR 81.5 thousand per year, which is 1.25 times higher than the corresponding indicator of the BA community of Finland and 2.94 times higher than that of the BA community of Sweden.

If in 2012 the ratio of BA investment to GDP in Estonia was 2.5 times lower than the respective indicator of BAs in Finland, then in 2016 – 2017 this indicator in Estonia became 2.43 times higher than in Finland.

The results of our analysis demonstrate that the rapid increase of the investment BA activity in Estonia in the period from 2012 to 2017 occurred both due to increase in the number of BAs and due to increase of the investment volume per one average BA.

Let us consider possible reasons for such considerable growth of BA activity in Estonia. BA activity in the European countries is potentially connected with more successful exits observed in Europe (Kraemer-Eis et al., 2018). According to Kraemer-Eis et al., it can be expected that the key stakeholders of the companies that exited successfully will become business angels and will offer their knowledge and financing to start-up companies. We also find that successful exit opportunities business angels may use to exit from investment could have become one of the main factors promoting significant growth of BA activity in Estonia in recent years. We would like to substantiate this point of view with some evidence. Skype, acquired for \$2.6 billion (BBS News, 2005), is one of the most characteristic examples to the point. „Skype has put the Estonian startup ecosystem on the map. Its founders – dubbed the Skype Mafia – have become active angel investors in the community, created angel groups, and gone on to found other companies” (Startup Angels, 2019). For example, former employees of Skype established Transferwise, which attracted \$116 million in venture funding (Startup Angels, 2019). Moreover, all three founding partners who established Karma Ventures – an early-stage venture capital firm, specialized in late seed and A round investments in promising tech startups – are former Skype engineers (Startup Angels, 2019).

Nevertheless, we consider that there are other important factors apart from the factor mentioned by Kraemer-Eis et al. (2018) that may promote growth of BA activity of a particular country. In our view, high valuation of start-up companies in the last investment round when exit has not yet occurred, that is, business angels have not yet earned money for further investment, may be another important reason promoting growth of BA activity. Transferwise and Taxify may be mentioned as examples of such companies in Estonia. May 2018 funding round with a \$175 million investment from Daimler, Didi and others led to a 1-billion-dollar valuation for the company (Taxify), making it a unicorn (Nair, 2018). The fact of high valuation of such companies as Transferwise and Taxify by venture investors is a psychological factor for BAs and may be related to the realm of the behavioral finance (Barberis and Thaler, 2003). This factor has a positive impact not only on BAs, but also on the potential BAs, because it demonstrates that angel investment may bring return with high multiplier. Although some researchers point out that in crisis periods BAs implement a more active

investment policy than VC funds, with certain caution it may be assumed that the impact of this factor is more explicit in the positive phase of a business cycle. However, the period from 2012 to 2017 is not considered the crisis period either in the world, Europe, or Estonia. In addition, the EU monetary policy in the considered period was favourable to investment rather than savings. Thus, the presence of the companies with Estonian roots that received high valuation by international investors could have had a significant impact on the increase of both the number of BAs in Estonia and their investment volume.

There is another possible reason for such significant rise of BA activity in Estonia. It has been discussed in the literature that venture investors may not succeed unless they participate in the international cooperation (Lerner, 2009). Estonia has demonstrated that a rapidly institutionalized network of business angels may establish international contacts and ensure leverage in private investment (Owen and Mason, 2019). Owen and Mason report that 43 % of investments of Estonian BAs were made outside Estonia either in Estonian enterprises that relocated to other countries or through international investor links, largely enabled by close ties with angel networks in Finland (FiBAN), St. Petersburg (SoBA), and Latvia. EstBAN unites not only BAs from Estonia, but also international investors from other European countries and the United States (Owen and Mason, 2019). In Estonia, apart from EstBAN, there are also several other BA unions, including SuperAngel Fond (Estonian Startup Leaders Club, 2019), and Ivar Siimar has been included in Top 40 Business Angels that are rocking Europe and help startups grow (EU Startups, 2017). The story of Taxify is another interesting fact about international cooperation of Estonian BAs. Prior to announcing a strategic partnership with Didi Chuxing, Taxify had raised over EUR 2 million in investment capital from Estonian and Finnish angel investors (Estonian World, 2014). In our opinion, bearing in mind the territorial proximity of Estonia and Finland, certain trans-border „clustering” of BA communities of these two countries has occurred, which is to a certain extent attested by cross-contribution and close cooperation between EstBAN and FiBAN (EstBAN, 2019; FiBAN, 2019). Moreover, taking into consideration that Estonia and Finland take the leading positions in the field of BA activity among the countries of Northern Europe, it may be assumed that „clustering” of BA communities of these countries is another factor that promoted BA activity in these countries.

In the conducted research, we provided comprehensive assessment of the visible BA activity of the countries of Northern Europe, and based on the obtained data we may consider the results achieved and make the following conclusions: Firstly, we have found that the visible BA market of Northern European countries is highly heterogeneous. The data we have obtained confirm the opinion of numerous researchers, for example, Burke et al. (2008), BAND (2015), Landstrom and Mason (2016), about high heterogeneity of BA market activity of different countries. That is, high heterogeneity of the market activity in Northern European countries is consistent with the global trend.

Secondly, we have discovered that in the countries of Northern Europe, the size of economy, GDP per capita and population size are not the main factors determining visible BA market activity. With regard to our statement that GDP per capita rate is not the factor determining the level of visible BA market activity in the countries of Northern Europe, the empirical data we have obtained confirm the findings of Mason (2008), at the same time contradicting the opinion of Burke et al. (2008). As regards the impact of population size and GDP rate on the BA market activity, we have not found any previous research addressing this issue, and thus our data may become the starting point for further research.

Thirdly, the results of our research demonstrate that the countries of Northern Europe with the highest ratio of the number of visible BAs to working population (Ireland and the UK) demonstrated only the fourth and the sixth largest value of the „Ratio of BA investment to population aged 18 – 64 years“. Ireland and the UK took the fifth and the seventh position according to the „Ratio of BA investment to GDP“, and according to „Investment BA activity“ – the sixth and the eighth position. Considering the obtained results, it may be concluded that high scores demonstrated by a country with regard to the „Ratio of the number of BAs to the working population“ do not guarantee it will reach high scores of the visible BA market investment activity.

We would like to point out that since in this research we aimed at comparison of the level of visible BA market activity in the countries of Northern Europe, we considered only some factors having an impact on BA activity relevant for our research.

The results of our research also show that in order to assess the level and to a certain extent the efficiency of BAs of particular countries the measurements should be made in relative values. In addition, application of only one or two indicators most frequently used in analysis – absolute and relative values of the number of BAs and investment volume to GDP – is not sufficient to provide an objective assessment of the level of BA activity.

The data presented in our research may be not completely accurate due to the following reasons. First, EBAN statistics on the visible BA market are not sufficiently precise (Centre for Strategy & Evaluation Services, 2012), as EBAN statistics may leave out the data on investment by some BA clubs and groups that are not members of the national BA networks or EBAN. The conducted analysis proves that the level of deviation reported by Centre for Strategy & Evaluation Services (2012) is not that substantial. Moreover, in recent years, the quality of statistics on the visible BA market has considerably improved. Therefore, even if there are certain differences in statistics on the visible BA market, which were mentioned in the research by Centre for Strategy & Evaluation Services (2012), the overall picture of BA activity in the countries of Northern Europe we have presented would remain the same. Second, possible insignificant deviations could have been conditioned by the fact that we conducted analysis of the data for a two-year period, and that, taking into consideration certain cyclicity of BA investment, perhaps is not sufficiently long research period. Thus, considering the above-said, we believe that our findings on the results of BA activity in the countries of Northern Europe relatively objectively reflect the existing trends concerning the level of BA activity in the countries of Northern Europe.

Recommendation for future research

In view of considerable growth of BA activity in Estonia in the period from 2012 to 2017, it may be expedient to identify and study in detail the factors having an impact on the increase of BA activity in Estonia and the factors influencing BA activity in other countries.

Bearing in mind that the number of countries considered in our research was limited to the countries of Northern Europe, in further studies of BA activity it may be practical to increase the number of countries analysed. It is also recommended to analyse countries from different geographic regions and the countries with even greater differences in the level of their economic development, considering in the analysis the countries with larger economies and larger population.

Bibliography

1. Aridi, A. (2018). How can the Czech Republic Activate its Business Angels Market? The World Bank, SUBMITTED BY ANWAR ARIDI, 12/03/2018. Retrieved: <http://blogs.worldbank.org/psd/how-can-czech-republic-activate-its-business-angels-market> Access: 16.02.2019.
2. Avdeitchikova, S., and Landström, H. (2016). The Economic Significance of Business Angels: Toward Comparable Indicators, In: Landström, H. and Mason, C. (eds.) Handbook of Research on Business Angels. Series: Handbooks in venture capital, pp. 53-75
3. BAND (2015). The European Confederation for Angel Investing, The European Business Angels Market an Approximation. Retrieved: <http://www.business-angels.de/wp-content/uploads/2015/12/BAE-Book-final.pdf> Access: 16.02.2019.
4. Barberis, N., Thaler, R. (2003). A Survey of Behavioral Finance, NBER WORKING PAPER SERIES, Working Paper 9222. Retrieved: <http://www.nber.org/papers/w9222> Access: 16.02.2019.
5. BBS News (2005). EBay to Buy Skype in \$2.6bn Deal. Retrieved: <http://news.bbc.co.uk/2/hi/business/4237338.stm> Access: 16.02.2019.
6. Burke, A., Hartog, C., Stel, A. v., & Suddle, K. (2008). How does Entrepreneurial Activity Affect the Supply of Business Angels? *Scales research reports*. Retrieved: <http://citeseerx.ist.psu.edu/viewdoc/download?doi=10.1.1.621.1355&rep=rep1&type=pdf> Access: 16.02.2019.
7. Bygrave, W. (2009). Global Entrepreneurship Monitor: Financing Report 2009. Retrieved: <https://ssrn.com/abstract=2418273> Access: 16.02.2019.
8. Carpentier, C., & Suret, J.-M. (2015). Angel Group Members' Decision Process and Rejection Criteria: A Longitudinal Analysis. *Journal of Business Venturing*, 30(6), 808-821. Retrieved: <https://sciencedirect.com/science/article/pii/S0883902615000294> Access: 16.02.2019.
9. Centre for Strategy & Evaluation Services (2012). Evaluation of EU Member States' Business Angel Markets and Policies Final report. Retrieved: <https://ec.europa.eu/docsroom/documents/7862/attachments/1/translations/en/renditions/pdf> Access: 16.02.2019.
10. EBAN (2015). EBAN Statistics Compendium. Retrieved: <http://www.eban.org/wp-content/uploads/2016/06/Early-Stage-Market-Statistics-2015.pdf> Access: 16.02.2019.
11. EBAN (2016). EBAN Statistics Compendium. Retrieved: <http://www.eban.org/wp-content/uploads/2017/11/Statistics-Compendium-2016-Final-Version.pdf> Access: 16.02.2019.
12. EBAN (2017). EBAN Statistics Compendium. Retrieved: <http://www.eban.org/wp-content/uploads/2018/07/EBAN-Statistics-Compendium-2017.pdf> Access: 16.02.2019.
13. EstBAN (2019). Estonian Business Angels Network home page. Retrieved: <http://estban.ee/about> Access: 16.02.2019.
14. Estonian Startup Leaders Club (2019). Home page. Retrieved: <https://www.startupleadersclub.com/estonianmafia> Access: 16.02.2019.
15. Estonian World (2014). Retrieved: [http://estonianworld.com/technology/estonian-taxi %C2 %ADbooking-app-taxify-raises-100k/](http://estonianworld.com/technology/estonian-taxi-%C2%ADbooking-app-taxify-raises-100k/) Access: 03.02.2019.
16. EU Startups (2017). Top 40: Business Angels that are Rocking Europe and Help Startups Grow. Retrieved: <https://www.eu-startups.com/2017/12/top-40-business-angels-that-are-rocking-europe-and-help-startups-grow/> Access: 16.02.2019.
17. Eurostat (2018a). *GDP and Main Components (output, expenditure and income)*. Retrieved: http://appsso.eurostat.ec.europa.eu/nui/show.do?dataset=nama_10_gdp&lang=en Access: 16.02.2019.
18. Eurostat (2018b). *Main GDP Aggregates per Capita*. Retrieved: http://appsso.eurostat.ec.europa.eu/nui/show.do?dataset=nama_10_pc&lang=en Access: 16.02.2019.
19. Eurostat (2018c). *Population on 1 January by Age and Sex*. Retrieved: http://appsso.eurostat.ec.europa.eu/nui/show.do?dataset=demo_pjan&lang=en Access: 16.02.2019.
20. FiBAN (2019). Finnish Business Angels Network Home Page. Retrieved: <https://www.fiban.org/deal-flow--co-investing.html> Access: 16.02.2019.
21. Harrison, R., Don, G., Johnston, K., and Greig, M. (2010). The Early-Stage Risk Capital Market in Scotland Since 2000: Issues of Scale, Characteristics and Market Efficiency. *Venture Capital* 12 (3): 211-239.
22. IFF Research (2017). Business Angel Spotlight, Research by IFF Research and RAND for British Business Bank together with UK Business Angels Association. Retrieved: <https://www.british-business-bank.co.uk/wp-content/uploads/2017/12/Business-Angels-2017-Research-Findings-compressed-FINAL.pdf> Access: 16.02.2019.
23. Kraemer-Eis, H., Lang, F., and Gvetadze, S. (2013). Bottlenecks in SME Financing. In: Kolev, A., Tanayama, T., and Wagenvoort, R. (ec. eds.) (2013). Investment and Investment Finance in Europe. EIB Economics Department. pp. 277ff. Retrieved: http://www.eif.org/news_centre/research/index.htm Access: 16.02.2019.
24. Kraemer-Eis, Helmut; Botsari, Antonia; Gvetadze, Salome; Lang, Frank; Torfs, Wouter (2018): European Small Business Finance Outlook: June 2018, EIF Working Paper, No. 2018/50, European Investment Fund (EIF), Luxembourg. Retrieved: http://www.eif.org/news_centre/publications/EIF_Working_Paper_2018_50.htm Access: 16.02.2019.
25. Landstrom, H., Mason, C. (2016). Business Angels as a Research Field, In: Landstrom, H. and Mason, C. (eds.) Handbook of Research on Business Angels. Series: Handbooks in venture capital. Edward Elgar: Cheltenham, pp. 1-22. ISBN 9781783471713

26. Lerner, J. (2009). *Boulevard of Broken Dreams: Why Public Efforts to Boost Entrepreneurship and Venture Capital Have Failed--and What to Do about It*, Princeton University Press
27. Mason, C. (2008). *The Real Venture Capitalists: A Review of Research on Business Angels*. Retrieved: https://www.researchgate.net/publication/254813631_THE_REAL_VENTURE_CAPITALISTS_A_REVIEW_OF_RESEARCH_ON_BUSINESS_ANGELS Access: 16.02.2019.
28. Mason, C. (2016). Researching Business Angels: Definitional and Data Challenges, in H. Landström and C. Mason (eds), *Handbook of Research on Business Angels*, Edward Elgar Publishing
29. Mason, C., Botelho, T., & Harrison, R. (2013). *The Transformation of the Business Angel Market: Evidence from Scotland*. Retrieved 14/02/2019, from University of Glasgow Web site: https://www.gla.ac.uk/media/media_302219_en.pdf Access: 16.02.2019.
30. Mason, C., Botelho, T., & Harrison, R. (2016). The Transformation of the Business Angel Market: Empirical Evidence and Research Implications. *Venture Capital*, vol. 18, no. 4, pp. 321-344. DOI: 10.1080/13691066.2016.1229470
31. Mason, C., Harrison, R. (2015). Business Angel Investment Activity in the Financial Crisis: UK Evidence and Policy Implications. *Environment and Planning C: Politics and Space*, Volume: 33 issue: 1, page(s): 43-60
32. Nair, D. (2018). Uber's European Rival Taxify Wins Unicorn Status Raising Funds, Bloomberg. Retrieved: <https://www.bloomberg.com/news/articles/2018-05-30/uber-s-european-rival-taxify-wins-unicorn-status-raising-funds> Access: 03.02.2019.
33. Owen, R., Mason, C. (2019). Emerging Trends in Government Venture Capital Policies in Smaller Peripheral Economies: Lessons from Finland, New Zealand, and Estonia, John Wiley & Sons, *Strategic Change*, 28:83-93.
34. Prohorovs, A. (2014). Quantitative and Qualitative Analysis of the Informal Venture Capital in Latvia. *Journal Economics and Rural Development*, Volume 10, No 1, pp. 47- 68
35. Prohorovs, A., Faingloz, L., Solesvik, M. (2019). Measuring the Activity of Business Angels and the Results of Evaluating the Activity of Business Angels in Central and Eastern Europe Countries. Proceeding of the 33rd IBIMA Conference: 10-11 April 2019, Granada, Spain, coming soon
36. Startup Angels (2019). Tallinn. From Startup Angels Web site: <https://startupangels.com/market/tallinn/> Access: 03.02.2019.
37. Wong, P., Ho, Y. (2007). Characteristics and Determinants of Informal Investment in Singapore. *Venture Capital: An International Journal of Entrepreneurial Finance*, Volume 9, Issue 1, pp. 43-70. Retrieved: <http://dx.doi.org/10.1080/13691060600996772> Access: 03.02.2019.

INFLUENCE OF INFLATIONARY TAX ON THE REGIONAL ECONOMY OF GEORGIA AND THE NATIONAL BANK'S MONETARY POLICY

Vazha Verulidze, PhD in Economics, Professor
Faculty of Economics and Business, Batumi Shota Rustaveli State University

Abstract. Georgian economy is facing many challenges, including the high degree dependency of the consumer market on the import and inflation caused by the depreciation of the national currency.

Such situation has become permanent and has acquired the function of hidden tax burden, which significantly delays the development of the real economic sector of the region.

The aim of the research is to identify the influence of inflationary tax on the regional economy and their connection with monetary policy, to analyse the inflationary targeting mechanism, to identify the specifics of anti-inflation regulation and the role of the National Bank in the process of price stabilization.

Theoretical and empirical methods used in the article reveal that correlation between national currency depreciation against USD and inflation has established. The article highlighted that despite the monetary policy of the National Bank being implemented in the mode of inflation targeting and undergoing in the terms of a floating exchange rate, the inflationary pressures caused by the depreciation of the national currency continues to be, particularly, on the goods of the primary consumption. Bloomberg Electronic Trading System in order to determine the exchange rate doesn't not function properly in the country.

To ensure sustainable development of the economy, the National Bank should considerably improve the mechanism of exchange rate determination through the Bloomberg Electronic Trading System, and in order to reduce dependency on imports, it is crucial to elaborate mechanisms to develop and stimulate the production process based on the local resources.

Key words: regional economy, Exchange rate, inflation, Bloomberg Trading System.

JEL code: E31, E58.

Introduction

This paper discusses inflation caused by default of the national currency exchange rate on condition of the open economy. This process itself is stipulated by the dependence of the inner market on the import. Research of this phenomenon has been significant for Georgia due to the current processes in regional economy that have been observed during the last 10 years and their results. Merely, it confirms that macroeconomic stability has not been maintained with the help of the economical mechanisms been applied so far. Slowed down economic development is obvious and reformation of the regions is not performed. An increase in the primary costs of local production and realization expenses has become of irrevocable nature. For instance, in 2017, compared to 2013, the national currency was devalued 1.55 times while the Consumer Price Index increased by 1.2 times and the total cost of production and realization of products increased by 1.63 times.

The aim of the research is to determine the main causes of the unstable macroeconomic environment that delays the development of the country's regional economy.

In the terms of inflation, the NBG is limited to a change of the refinancing rate and to the interventions carried out in the case of imbalance between the demand and supply of the currency market as well as to direct participation in the process of trading.

With the increase of the refinancing rate, NBG withdraws the surplus money from the economy, however, it doesn't achieve the price stability as inflation is stipulated not by the excess of money, but a fall in the exchange rate of the national currency in relation to foreign currency. For a fragile economy like Georgia's, leaving of a separate segment of the market including the currency market in the self-regulation mode seriously damages macroeconomic stability of the country. The 2008 global economic crisis has actually confirmed the necessity of regulating the economy in order to prevent the crises.

Inflation caused by the changes in the current exchange rate has become significant since the example of Georgia over the years proved that the approach of targeting inflation in the regime of monetary policy applied worldwide didn't ensure price stabilization. It has also been confirmed that the Bloomberg Electronic Trading System introduced in many developed or developing countries has not been successful in all economic conjunctures.

The main challenge of the NBG is the essential revision of the monetary policy and development of the effective anti-inflation policy.

To minimize the negative external trade balance and inflationary pressure, it is necessary to ensure the legislative regulation to stimulate local production.

In these conditions, it is especially important to ensure effective use of the resource potential of the regional economy in order to improve export-import imbalance.

Results

For regional economics of Georgia, price increases on the product and service, caused by inflation, which occurs in the form of hidden inflationary tax, is the same burden for economic agents budgets as tax burden, it is unpredictable in most cases and hinders taking preliminary preventive measures. Inflationary tax is additional expense, which should be paid by the economic agents under the conditions of inflation that weakens the regional economics of the country even more. Therefore, the subject of current analysis is such widespread economic phenomenon in Georgia as the burden of inflation, caused by the change of exchange rate.

Regional economy, for its part, is the weakest link of the national economy; as „72 % of the total business sector turnover comes from Tbilisi-based companies, being 2.5 times larger than the turnover of the companies operating in all other regions of Georgia. Tbilisi companies have created 63 % of all jobs in Georgia.“ (Decree of the Government of Georgia, 2018).

The increase of the raw material prices due to inflation and the increase in the excise rate in 2017 have resulted in rise of total expenses for production and sales (Table 1) that is observed annually in all regions (Entrepreneurship in Georgia, 2018). For example, in the autonomous republic of Adjara, this indicator increased by 1.94 times in 2017 compared with 2013.

The price rise, caused by the increase of tax rate, especially on the consumer goods, took place in 2017 in Georgia, because since the 1st of January 2017 the excise duty has significantly increased on the gas of oil products and on natural gas as well as on oil products and oil distillates (Tax Code of Georgia, 2017). This was carried out in parallel to profit tax reform, which meant to exempt from the profit tax in case of profit reinvestment by the economic agents and the possibility to leave the above-mentioned amount with them or in the economics. However, finally it led to the situation that more money came out from the economics by increasing the excise duty, than it was left from the exemption of profit tax in the economics.

Total expenses for production and sales By region, mln GEL

Region	2013	2014	2015	2016	2017
The city of Tbilisi	29185.7	33407.6	38270.5	42710.9	47700.0
Abkhazeti AR	-	-	-	-	-
Adjara AR	2487.8	3209.6	3818.7	4499.7	4849.8
Guria	182.1	220.1	292.5	387.1	399.7
Imereti	1920.6	2252.4	2173.7	2634.1	3049.8
Kakheti	824.6	978.3	992.7	985.6	1161.5
Mtskheta-Mtianeti	539.2	615.3	638.2	636.2	808.1
Racha-Lechkhumi and Kvemo Svaneti	35.4	30.2	42.3	55.4	61.8
Samegrelo-Zemo Svaneti	1480.7	1575.6	1768.0	1965.9	2285.6
Samtskhe-Javakheti	483.2	521.8	593.4	674.5	821.2
Kvemo Kartli	2518.1	2570.0	3141.2	3315.7	3783.4
Shida Kartli	840.0	940.7	1094.4	1215.7	1296.6

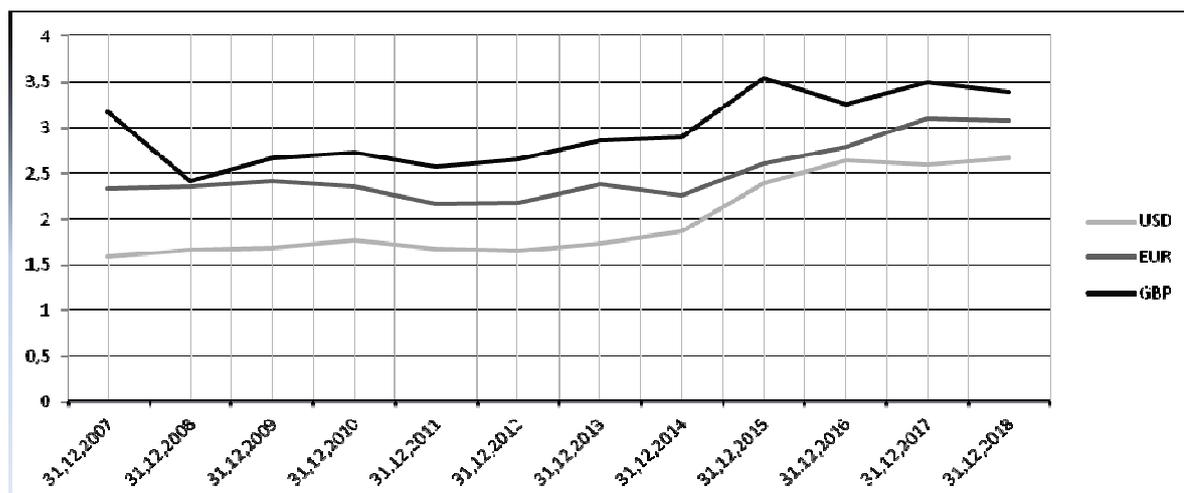
Source: National Statistics Office of Georgia

In accordance with the analysis of statistical data of the National Bank of Georgia, it has been determined that in most cases, the changeability of the national currency did not have prerequisite and basis. For example, from the 25th of August, 2017 till the 29th of September 2017, the rate of national currency suddenly fell down with 7 points against the US Dollars and with 20 points - from 24th of October till the 30th of November, 2017 (National Bank of Georgia, 2018). While there was No negative influence of seasonal factor on the national currency and the oil price had increased on the world market, that in fact should be the provocative factor of increasing the rate of national currency. The situation in the foreign exchange market had a negative impact on the consumer market in the conditions of the information vacuum. Therefore, on the 2nd of November 2017, National Bank of Georgia released an explanation about the situation existing on the currency market that: „average and long-term factors, acting on the rate, are positive. Recently, especially in autumn, the change of GEL rate has caused the high expectation of depreciation. Despite the fact that this expectation does not have the real fundamental basis, it has still made an influence on the short-term dynamics of GEL rate under the conditions of floating rate, increased the demand of foreign currency“(National Bank of Georgia, 2017).

We see that in dynamics the rate of the national currency in relation to the foreign currency is more and more falling down (Figure 1). The current situation in the Georgian foreign exchange market has proved that a large amplitude of fluctuations in the national currency is not connected by seasonal factors, nor by the expectation of society or nor external factors (for example, oil prices on the world market).

In such situation, there is a background to assume that in a developing country with a small economics like Georgia, problem can be to use the Bloomberg trading system in order to determine the exchange rate of the national currency. This assumption is also justified by the fact that the National Bank of Georgia, since the 5th of January 2018, was forced to make changes in the rule of determining the rate, where it has been marked out that: in the manner existing till now, if in

Bloomberg trading system on the interbank market the volume of the trade had not exceeded 3 million US Dollars, in calculation of the official rate of GEL the previous day deals also participated.



Source: National Bank of Georgia

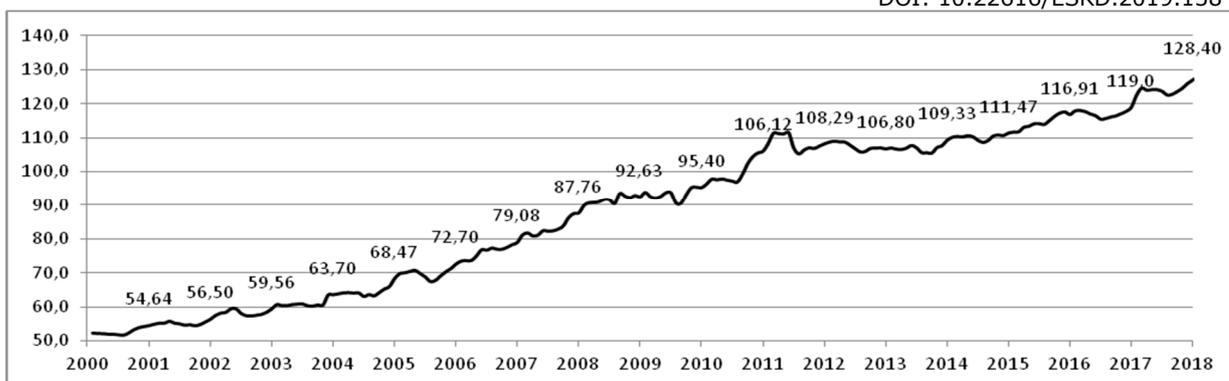
Fig. 1. Dynamics of the exchange rate of the national currency

That is why, there were rare cases when official and market rates were significantly different from each other, the reason of which was the low activity on the market on a concrete trading day. With the mentioned amendment, the above mentioned limit will be halved (till 1.5 million US dollars), as a result of it, official rate will be much closer to the market rate (National Bank of Georgia, 2018). This explanation of the national bank actually means that on interbank market, in case of small volume of trade, it may form such rate of GEL, which will be in conflict with the current processes in economics and it will provoke inflation. Importers react quickly on depreciation of GEL and increase the prices and this is reflected negatively on the activity of economic agents. In this case, the Bloomberg trading system needs to be improved because, this system only works correctly for large volumes of trading in the interbank market.

The National Bank of Georgia cannot manage to stop the inflationary pressure with monetary policy in short-term period, caused by depreciation of the national currency. Accordingly, to increase financial stability in long-term period, it uses the rate of monetary policy for the purpose of prevention of the expected inflation, which is now equal to 6.75 % (National Bank of Georgia, 2008-2018). The tight money policy prevents providing the economics with the required money. Therefore, society tries to adapt under the conditions of inflation, when the consumer price index is increasing annually (National Statistics Office of Georgia, 2010-2018), (Figure 2).

The main challenge of the economy of Georgia is a high degree of dependence on the import, which increases sensitivity towards the changes of the exchange rate. According to the data of 2016 of the payment balance of Georgia, 15.1 % of the import is hold by the investment product, 41.6 % – the product of the intermediate consumption and 43.3 % the product of consumer product (Balance of Payments of Georgia, 2016).

The negative consequences caused by inflation affect the regional economic agents, insofar as „Trade, repairs of motor vehicles and personal and household goods, transport and communication alongside construction sectors are the key drivers of growth in Tbilisi and AR Adjara“ (Decree of the Government of Georgia, 2018).



Source: National Statistics Office of Georgia

Fig. 2. Consumer Price Index (2010 average=100)

The problem is complicated by the fact that the choice of access on money resources for economic agents reduced by the undeveloped securities market, that creates the fertile soil to establish unfair rules of game by the bank sector, and due to inflation, they rose interest rates on loans. The author shares the opinion about the connection between the development of financial markets and economic growth, which was concluded by R. King and R. Levine. In particular, they noted that „there is strict and sustainable relationship between the level of the development of financial markets and long-run rate of the economic growth” (Danilov, Pivovarov, 2018).

For the sustainable development of regional economics of Georgia, financial stability of the trading partner countries has also great importance, because border regions mainly depend on the import. „Adjara AR, Guria and Samtskhe-Javakheti are the least industrialized Georgian territories. Share of industrial GVA in total GVA in those regions is meagre 8 %, 6 % and 5 % respectively” (Decree of the Government of Georgia, 2018). Financial stability in these regions also associate with events in Turkey, where inflation has recently exceeded 15 % (DAILY SABAH, 2018). In such situation, the depreciation of the national currency in Georgia will stimulate the import, and hinder weak local production.

In Georgia, it is empirically proven that, there is a similar correlation between the inflation and price rise as between the introduction of new taxes and price rise. Therefore, whether the price rise is stipulated by inflation or increase of tax burden, it has one and the same negative influence on the real economics of the country.

„As analysis shows, Georgia has two sectors in which brand products are already developed: tourism and agriculture” (Decree of the Government of Georgia, 2018). Agriculture is the field, the share of which in GDP has not increased for the last 10 years. The country is not able to provide its own population with agricultural products, but the government of Georgia has a vision in terms of regional development and thinks that „national, sectoral and regional development policies and strategies must be formulated with reference to the needs and development potentials of regions and territories, encompassing comprehensive territorial analyses and the differentiation of policy interventions and public investments in territorial terms” (Decree of the Government of Georgia, 2018).

Because of the dependence of the high degree on the import of the consumer market, the price rise in Georgia is mostly stipulated not by the existence of excess funds in the economy (the average rate of the monetization coefficient (M_2) does not exceed 17.71), but by depreciation of national currency towards the foreign currency, in particular towards the US dollars. Economics of Georgia turned out to be flaccid and very fragile during the impact of such factor as the change of currency rate is.

Discussion

The National Bank of Georgia implements the monetary policy in the targeting regime of inflation. This means that price stability is considered as the main goal of monetary policy, however results are not achieved yet „Despite the widely used targeting regime of inflation in modern conditions, the discussions about the adequacy of inflation targeting under the conditions of financial crisis as well as about its use in various countries are still going on” (Pestova, 2018).

According to the explanation of the National Bank of Georgia, the reason of such massive depreciation in the analysed period became the high expectation of depreciation in autumn and the influence of all other factors was evaluated only positively from its side. The explanation of such content of the national bank does not have the fundamental background because the past experience and analysis of statistical information makes clear that the expectation of depreciation in society did not begin in August-September but in December, because the increase of demand on the foreign currency was mainly caused in this period by the importers.

„In the case of emerging and transition economies, as the exchange rate exerts an influence on external and internal macro stability, clean floating is not a desirable option. Exchange rate depreciation may lead to inflation or negative balance sheet effects in financially dollarized/euroized economies. As a result, countries tend to adopt dirty floating, which assumes (in)direct manipulating fluctuations, although the exchange rate is not targeted per se” (Josifidis, Allegret, & Pucar, 2011).

The current situation on the currency market of Georgia confirmed that the fluctuations with a large amplitude of the national currency, in most cases, are related neither to seasonal factor nor the expectation of society and the external factor (for example, oil price on the world market). That's why it is difficult and almost impossible to predict the burden inflationary tax in advance for the economic agents, which creates unbalanced economic environment in the country.

One difficulty involved in switching to inflation targeting is the introduction of a floating exchange rate regime, in which significant fluctuations in the national currency's exchange rate may have a negative effect on inflation dynamics. However, these fears are not always justified. Inflation targeting noticeably reduces exchange rate pass-through to inflation, thus causing fluctuations of the national currency's exchange rate to have only a slight effect on consumer prices. Moreover, international experience shows that an inflation targeting regime is compatible with a managed floating exchange rate regime (Kataranova, 2010). But, it should be noted that, the international experience, which permits, the compatibility of the targeting regime of inflation with floating exchange rate, failed in Georgia and the mentioned regime cannot slow down to increase the consumer prices.

Food inflation has a direct contemporaneous effect on total inflation because food comprises approximately 30 % of the consumption basket. Higher food inflation implies higher relative prices of food items, and thereby higher total inflation. Indirectly, food inflation may affect inflation expectations (Gomez, Gonzalez, Melo, 2012). In Georgia, the increased price of the food products, is perceived with an extreme acuity, and it should unambiguously be said that it causes the inflationary expectations.

As the winner of Nobel memorial prize Joseph E. Stiglitz points out „it is awfully important planning the reforms and consequentiality of the rhythm for the development of economics. For example: if the market is opened very quickly for the competition (while strong financial institutions are formed), work places will be cancelled faster than new ones are created” (Stiglitz, 2012). As for reform planning and rhythm in Georgia, process started in the 90-ies of the last century and the result is

that the market of the country is actually opened, but still local production is not ready to compete the import product. „Agriculture delivering 9 % of GDP, but at the same time being the main occupation for more than a half of the country's population" (Decree of the Government of Georgia, 2018).

Chronic inflation ended in Brazil and Argentina after battling with it for long years. Assuming that the economic strategies to deal with inflation have been standardized and widely known, this paper focused on the political conditions that facilitate successful stabilization. It is argued that, if there is already an adequately designed disinflationary program at hand, political support from broad sections of the society is the most important factor for successful stabilization (Ozdemir, 2015). It should be noted that, in Georgia, proper use of public support and the resource of positive mood has not been made since the date of its moving to the market economy and the first reason of it is that, under the conditions of high confidence from the public, state had not fully had realized the scale of the reforms, to be implemented and the second reason is that when government formed its decision, public support had already become very weak. Accordingly, the reforms, started in the economics, are incomplete or the most important economic reforms have not begun yet.

The country needs systemic economic reforms, which at first will make the real sector of economics stronger, and then the market will be open for foreign companies and not on the contrary, which is taking place now.

Despite the current situation in the Georgian economy, there is still a possibility of its development. „There are segments of potential growth, of the goods and service in low-rate developing countries" (Kondrat'ev, 2018). In Georgia, processing sector of agricultural production can be considered as such segment, on which it is possible to increase the demand, because its primary raw materials will be ecologically clean agricultural products.

Conclusion

This study analysed the connection between the depreciation and inflation of the national currency, which in turn was stipulated by the high dependency of the country's consumer market of the country on the import. The results of the study prove that the depreciation of the national currency is not often caused by the fundamental economic factors. Therefore, it is unpredictable and results in an increase in the prices of imported goods. The current situation is particularly severely reflected on the regional economy as it increases the cost of goods and services, and accordingly the prices, the prime costs of which have the component of the imported goods. The analysis revealed that the monetary policy of the NBS can not maintain the stability of the prices. According to the research outcomes, for the country with such a small economy like Georgia where the currency market turnover is also low, determination of the national currency rate through the Bloomberg Trading System is distinguished with its weaknesses and can not ensure the sustainability of the monetary market that causes inflation.

The results of the analysis enabled us to draw the following conclusions

- 1) Inflation is stipulated by the depreciation of the national currency rate and the high dependency of the domestic market on the imports. Therefore, for the sustainable development of the regional economy it is necessary to reduce the inflationary burden on economic agents and create various opportunities to develop production based on the local resources that would gradually reduce dependence on imports. For this purpose, it is necessary for the National Bank to change the currency exchange rate mechanism through the Bloomberg Electronic Trading System. Thus, that

would eliminate the fluctuation of the national currency rate due to non-fundamental factors in the currency market and the stability of the currency market would be achieved.

- 2) To stimulate national production, differential legislative interventions are required according to regions that would ensure efficient use of existing resources. Excessive and unused resources of the most regions are represented in agriculture. To develop this sector, in the conditions of an open economy, tax privileges are to be imposed. Namely, the companies processing the agricultural products should be exempt from the VAT. It would facilitate development of the real sector of the country's economy.

Bibliography

1. Balance of Payments of Georgia (2016). p.12. Retrieved: https://www.nbg.gov.ge/uploads/publications/balanceofpayments/2015/bop_2016_eng.pdf. Access: 20.04.2018.
2. DAILY SABAH (2018). Turkey's Inflation Rate Hits 15.39 percent in June – Retrieved: <https://www.dailysabah.com/economy/2018/07/03/turkeys-inflation-rate-hits-1539-percent-in-june>. Access: 14.09.2018.
3. Danilov, Yu. A., Pivovarov, Danil. A. (2018). Financial Structure in Russia: Conclusions for State Policy. *Issues of Economics*. 2018, No 3, p. 31.
4. Decree of the Government of Georgia (2018). №1292, 11 June, *Tbilisi, on the approval of the Regional Development Programme of Georgia for 2018-2021*. Retrieved: http://www.mrdi.gov.ge/sites/default/files/2018-2021_regional_development_programme_of_georgia_unofficial_translation.pdf. Access: 05.09.2018.
5. Entrepreneurship in Georgia (2018). *Statistical publication* Retrieved: [http://geostat.ge/cms/site_images/_files/georgian/Mewarmeoba %20saqartveloshi %202017.pdf](http://geostat.ge/cms/site_images/_files/georgian/Mewarmeoba%20saqartveloshi%202017.pdf). Access: 05.12.2018.
6. Gomez, M. I., Gonzalez, E. R., & Melo, L. F. (2012). Forecasting Food Inflation in Developing Countries with Inflation Targeting Regimes. *American Journal of Agricultural Economics*, 94(1), pp.153–173. Retrieved from <http://search.ebscohost.com/login.aspx?direct=true&db=bsh&AN=70250573&site=ehost-live>. Access: 11.10.2018.
7. Joseph E. Stiglitz (2012) Globalization and its discontents. Translation from English, Tbilisi 2012.
8. Josifidis, K., Allegret, J.-P., & Pucar, E. B. (2011). Inflation Targeting and Exchange Rate Regimes in Serbia and Selected Transition Economies. *Eastern European Economics*, 49(4), pp. 88–105. Retrieved from <http://search.ebscohost.com/login.aspx?direct=true&db=bsh&AN=66237930&site=ehost-live>. Access: 11.10.2018.
9. Kataranova, M. (2010). The Relationship Between the Exchange Rate and Inflation in Russia. *Problems of Economic Transition*, 53(3), pp. 45–68. Retrieved: <https://doi.org/10.2753/PET1061-1991530303>. Access: 02.10.2018.
10. Kondrat'ev, V. (2018.) New Globalization Phase: Key Elements and Perspectives. *World Economy And International Relations*. No 6, p. 8.
11. National Bank of Georgia (2008-2018). *Committee decisions*. Retrieved: <https://www.nbg.gov.ge/index.php?m=554&lng=eng>. Access: 02.02.2019.
12. National Bank of Georgia (2017). *Statement Of The National Bank Of Georgia, Regarding The Currency Rate Fluctuations Within The Foreign Exchange Market*. Retrieved: <https://www.nbg.gov.ge/index.php?m=340&newsid=3223>. Access: 11.04.2018.
13. National Bank of Georgia (2018). *Official And Market Exchange Rates Of Lari*. Retrieved: <https://www.nbg.gov.ge/index.php?m=340&newsid=3262>. Access: 23.03.2018.
14. National Bank of Georgia (2018). *Statistical Data. Exchange Rates*. Retrieved: <https://www.nbg.gov.ge/index.php?m=306&lng=eng>. Access: 02.02.2019.
15. National Bank of Georgia (2018). *statistical data, external sector*. Retrieved: <https://www.nbg.gov.ge/index.php?m=306&lng=eng>. Access: 02.02.2019.
16. *National Statistics Office of Georgia (2010-2018). external trade*. Retrieved: http://geostat.ge/index.php?action=page&p_id=134&lang=eng. Access: 25.01.2019.
17. *National Statistics Office of Georgia(2010-2018) consumer price index*. Retrieved: http://geostat.ge/index.php?action=page&p_id=128&lang=eng. Access: 16.01.2019.
18. Ozemir, Y. (2015). Political Conditions for Successful Inflation Stabilization: comparing Brazil and Argentina. *Revista Brasileira de Política Internacional*, 58(1), pp. 63–83. Retrieved: <https://doi.org/10.1590/0034-7329201500104>. Access: 02.10.2018.
19. Pestova, A.A. (2018). On the Effects of Monetary Policy in Russia: The role of the space of spanned shocks and the policy regime shifts. *Issues of Economics* No 2, p. 34.
20. Tax Code of Georgia (2017). *Article 188*, Tbilisi 2017.

BIOECONOMY

INNOVATION OF THE GREEN ECONOMY

Katarzyna Brodzinska¹, PhD habilitated; Zbigniew Brodzinski², PhD habilitated

¹Department of Agrotechnology, Agricultural Production Management and Agribusiness, University of Warmia and Mazury in Olsztyn, Poland; ²Department of Environmental Economics, Real Estate and Agribusiness, University of Warmia and Mazury in Olsztyn

Abstract. The innovativeness of the green economy can be considered both in relation to total innovation and eco-innovation. The aim of the research is to assess the level of innovation of enterprises operating in the green economy sectors, with particular emphasis on eco-innovation. The research was carried out in 2017, using CATI (Computer Assisted Telephone Interviewing) technology, among 578 randomly selected enterprises of the SME sector directly related to the green economy, located in the Warminsko-Mazurskie Voivodeship. The analyzes were carried out in relation to data on innovativeness of enterprises collected by the Central Statistical Office and Eurostat data regarding the development of this sector in EU countries.

The analyses show that the level of innovativeness of companies in the green economy sector in the Warminsko-Mazurskie Voivodeship is low and process innovations are the ones that are most often introduced which are related to the search for resource-efficient production technologies and services (eco-innovation). Authors' research and literature review indicate that there are No universal recipes for increasing innovation and competitiveness of economies; however, the high level of innovation, including eco-innovativeness is characterized by the economies of countries that invest in research and development, human and social capital and mobilize various institutions around common purposes.

Key words: green economy, innovation, eco-innovation.

JEL code: R11, R58.

Introduction

The "green economy" in recent years has become synonymous with the necessary changes related to the search for new directions of economic development including ecological aspects, and in particular the so-called low-emission technologies (Green Growth 2017, Gorka Luszczuk 2014, Unmünbig 2012). It is not only about the reduction of gas and pollution emissions, but also about increasing the efficiency of energy and raw materials use, protecting biodiversity and the ecosystem, while increasing income and employment. In this context, the ability of green economy enterprises to implement innovative solutions is particularly important.

The aim of the research is to assess the level of innovation of enterprises operating in the green economy sectors in the Warminsko-Mazurskie Voivodeship. The research was carried out in 2017, using CATI (Computer Assisted Telephone Interviewing) technique, among 578 randomly selected enterprises of the SME sector directly related to the green economy, including those engaged in agri-food processing, provision of services, production and rural tourism (according to the PKD section). The size of the research sample was calculated using the following formula:

$$n_b = \frac{N}{1 + \frac{4d^2(N-1)}{z_\alpha^2}} \quad (1)$$

where:

n - size of the research sample, N - population size,

d - margin of error, z - critical value for the confidence level.

A confidence coefficient of at least 95 % was assumed and a maximum estimation error of not less than 5 %. Survey research concerned the assessment of innovativeness of enterprises in the green economy sector according to the areas of their economic activity.

¹ Corresponding autor tel.: 48895233923; E-mail address: katarzyna.brodzinska@uwm.edu.pl

² Corresponding autor: E-mail address: zbr@uwm.edu.pl

The research hypothesis assumes that enterprises in the green economy sector are innovative. Own research was analysed in relation to data on innovativeness of enterprises collected by the Central Statistical Office in Poland, which allowed to evaluate the innovative activity at the level of individual voivodships. In the international context, the Eurostat secondary statistics on selected green growth indicators and data collected by the Eco-Innovation Observatory were analysed.

Research results and discussion

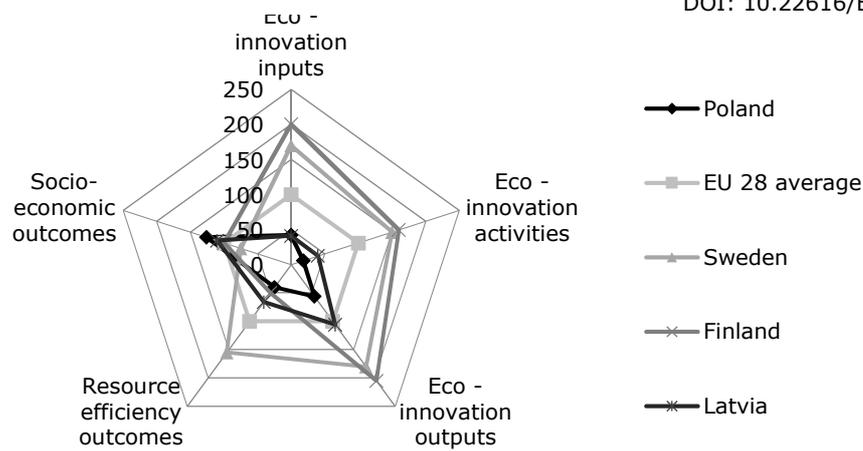
Determinants of green growth

The concept of green economy, as a pragmatic approach to the implementation of sustainable development, implemented by EU countries brings tangible results. The Eurostat data shows that green sectors generate increasingly more turnover and create more jobs because they are labour-intensive (e.g. organic farming).

Sectors included in the green economy include in particular renewable energy, low-emission transport, energy-efficient construction, clean technologies, improvement of waste management, sustainable agriculture, forestry fishing (Hamdouch and Depret 2010, UNEP 2011), but in fact virtually all areas of human activity can be included here that affect the natural environment in any way. The background to the deliberations on the possibilities of stimulating green growth is the innovative activity in the broad sense of innovation, as well as in relation to eco-innovations, which have a beneficial effect on economic development, environmental protection and create the foundations of sustainable development. Their introduction is supported by business, social and environmental factors (Romanczyk 2010, Wegrzyn 2013). Five types of eco-innovations are the most common in the literature: technological eco-innovations (products and production processes), social eco-innovations (behaviour change, consumption habits), organizational eco-innovations (eco-audits), institutional eco-innovations (cooperation platforms, informal groups, networks established to deal with environmental issues), marketing eco-innovations (eco-labels) (Sinclair-Desgagne et al., 2003).

Among the EU countries, Scandinavian countries as well as Germany and Luxembourg have the highest ability to build eco-innovation. According to Eco-Innovation Observatory data¹, in 2017 Eco-innovation index was Sweden - 144, Finland - 141, Germany - 139, Luxembourg 139. Latvia in this ranking was on the 22nd position (eco-innovation index - 73), and Poland in the 26th position (59), ahead of Cyprus (45) and Bulgaria (38) (Eco-innovation ...). The high level of eco-innovation of the Scandinavian countries results mainly from high expenditures on eco-innovations, undertaken activities, achieved results, and in the case of Sweden, also achieved environmental effects. In countries with low eco-innovativeness ratios such as Poland and Latvia, the area of socio-economic effects and achieved results is the strongest (Fig. 1).

¹ Eco-innovation at the heart of European policies https://ec.europa.eu/environment/ecoap/indicators/index_en
Access 28.01.2019



Source: Data of Eco-Innovation Observatory (https://ec.europa.eu/environment/ecoap/indicators/index_en Access. 25.01.2019.)

Fig. 1. Eco-innovativeness index (5 areas) in selected EU countries

The unfavourable position of Poland in the ranking may result from many factors, including among others financial barriers on the part of entrepreneurs and consumers, low level of awareness in the scope of benefits resulting from the implementation of ecological innovative technologies or low expenditure on R&D (Kulyk, Gasiorek-Kowalewicz, 2018). The analysis of expenditures incurred for research and development in the years 2002-2016 indicates that the greatest potential for innovation development is created in Sweden, and the important aspect of it is that the level of expenditure has been maintained in this country at a high level since 2002 and is gradually increasing. In turn, in Finland, expenditures on research and development activities were at a lower level in this period, and since 2011 they have been showing a downward trend. Poland in this ranking is ranked 20th among the 28 countries of the European Union. Despite the observed trend of successive expenditure growth from USD 73.7 per capita in 2002 to USD 264 in 2015 (No data for 2016), this is a relatively low amount, although still much higher than e.g. in Latvia (113 USD) (Tab. 1).

The process of economic changes aimed at increasing resource efficiency, improving efficiency and minimizing the negative impact of economic activities on the natural environment requires, as already mentioned, adequate financial outlays for research and development and time. On the one hand, it is about the time that is needed to develop pro-environmental technologies and, on the other, the re-evaluation of priorities in which environmental protection will be as important as the company's financial result. The low level of expenditure on research and development in Poland is accompanied by a low level of innovation in the economy.

Gross domestic expenditure in research and development activity (R&D) - per capita (USD)

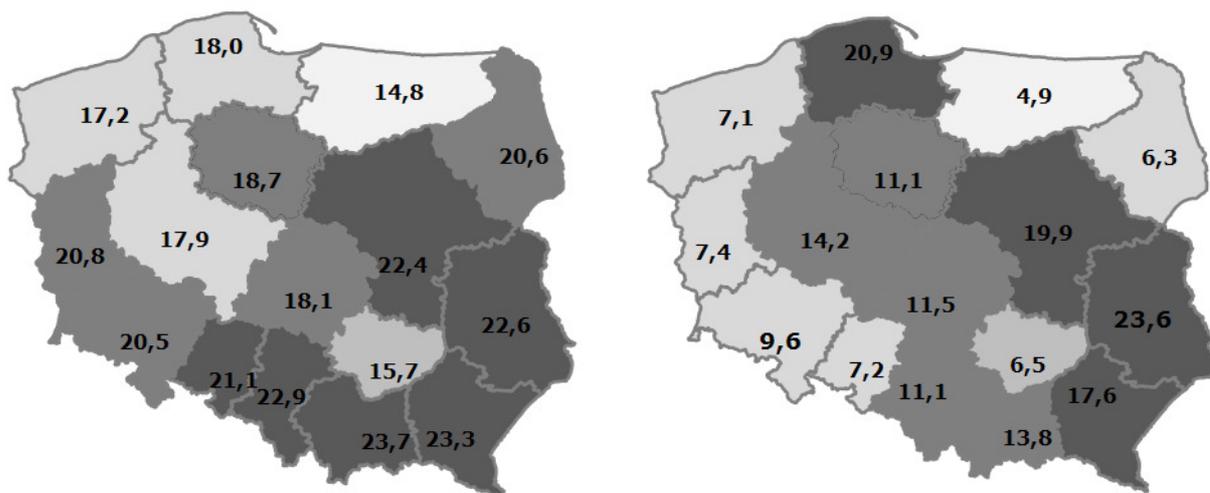
Country	2002	2010	2011	2012	2013	2014	2015	2016
	USD per capita							
Sweden	1161	1 339	1 422	1 468	1 510	1 464	1 564	1592
Austria	644	1 147	1 187	1 355	1 417	1 498	1 523	1559
Denmark	748	1256	1308	1336	1389	1396	1440	1408
Germany	716	1 084	1 194	1 250	1 276	1 353	1 395	1439
Luxembourg	871	1 286	1 343	1 165	1 241	1 276	1 304	1269
Finland	931	1445	1480	1389	1357	1314	1218	1191
Belgium	576	822	893	968	1 021	1068	1 124	1159
Netherlands	601	768	877	906	951	973	993	1027
France	621	784	821	840	885	914	920	930
Ireland	372	690	701	730	763	786	831	853
United Kingdom	470	599	613	604	648	678	796	720
Slovenia	292	571	698	744	769	730	691	655
Czech Republic	200	369	448	518	579	637	646	583
Italy	311	425	435	454	469	484	491	493
Estonia	82.7	341	565	551	473	414	428	381
Spain	234	431	425	412	414	417	425	432
Portugal	147	419	390	365	370	371	367	388
Hungary	143	246	272	292	340	345	357	322
Slovakia	74.9	153	171	215	230	255	347	241
Poland	73.7	150	168	207	213	238	264	b.d.
Greece	11.7	169	176	177	212	224	258	266
Latvia	41.2	107	138	141	139	164	153	113
Rumania	27.1	77.65	89.2	91.6	76.8	78.8	105	111
Bulgaria	?	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.
Croatia	?	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.
Cyprus	?	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.
Lithuania	?	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.
Malta	?	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.

Source: <http://stat.gov.pl/statystyka-miedzynarodowa/porownania-miedzynarodowe/tablice-o-krajach-wedlug-tematow/nauka-spoleczenstwo-informacyjne-innowacyjnos/> (Access: 25.01.2019) Explanation: n.d. - No data.

Innovation of enterprises in Poland

Large diversification of the level of innovation in the economy in Poland (Fig. 2) may result from the so-called contextual conditions that have a significant impact on the ability of enterprises to undertake innovative activities. The most important factors include the settlement network, population density, as well as the natural conditions that create material and non-material components of enterprises and their ability to create innovative solutions (Brodzinski, Brodzinska, 2018). It is also worth emphasizing that innovations are rarely found in isolation, it is a highly interactive process of cooperation between companies most often through partnership, alliances and joint ventures with external entities or by concluding contracts for conducting R&D works or purchasing a license. The cooperation most often includes research institutes, universities, consulting companies, private R&D institutions, other companies belonging to the same group of enterprises (Weresa 2014, Kisielnicki, 2016).

In the innovation ranking covered by the research, the Warminsko-Mazurskie Voivodeship is on the last position. This applies to both the percentage of innovation-active industrial and service enterprises as well as the share of revenues from the sale of new or significantly improved products in the value of total sales revenues, which is also the lowest in the country. Low innovativeness of the economy in the Warminsko-Mazurskie Voivodeship can be explained by the low level of socio-economic development and the low share of industrial enterprises. The cooperation of enterprises in the field of innovative activity is related to the size of the enterprise, i.e. the larger the enterprise, the more often it cooperates in the field of innovative activity. The percentage of large industrial enterprises (250 and more people) that cooperated in innovative activities was almost three times higher than smaller enterprises (from 10 to 49 employees). In relation to the above, it is obvious that the regions in which large industrial enterprises dominate are higher in the innovation ranking.



Source: Innovative activity of enterprises in years 2014-2016 p. 20
https://stat.gov.pl/files/gfx/portalinformacyjny/pl/defaultaktualnosci/5496/2/15/1/dzialalnosc_innowacyjna_przedsiębiorstw_w_latach_2014-2016.pdf Access. 04.02.2019.

Fig. 2. Industrial and service innovation active enterprises in the years 2014-2016 by voivodships (%)

Barriers to innovation in enterprises in the green economy sector - results of authors' research

The low level of innovativeness of the economy in the Warminsko-Mazurskie Voivodeship is reflected in the results of research conducted among entities included in the green economy in the rural areas of this region. As it was observed, the general trend of the surveyed companies was passivity in the area of innovation implementation, as many as 78.4 % of enterprises did not introduce any innovative solutions. The low level of innovation of companies included in the green economy may indicate their more traditional approach to the issue of resource management and a lower competitive position in this respect. It is also worth emphasizing that in the future this may lead to the deepening of the differences in the development of green economy in individual regions of the country.

Among the enterprises that declared the implementation of innovations, the ones that noticed were: product, process, and organizational innovations (Olso Manual). Product innovations which are understood as the introduction of a new product or service or its significant improvement. Innovations in the production processes of a product / service were most often introduced to reduce production or delivery costs, increase quality, increase production efficiency. In turn, organizational innovations were perceived most often as a certain additional element or as solutions ensuring adaptation of technical and technological innovations in the enterprise. However, it is worth

emphasizing that in recent years, the entrepreneurs' approach to organizational innovations has changed and is also treated as a significant source of growth in the efficiency of the company's operations. This applies to a large extent to companies from the SME sector, which in the category of low-cost organizational innovations may perceive important opportunities and opportunities for development (Lachiewicz, 2014).

Observed tendency regarding the low level of activity in the field of innovation implementation by the enterprises of the green economy operating in rural areas of the Warminsko-Mazurskie Voivodeship that were covered by the research concerned basically all enterprises - regardless of their area of economic activity. The percentage of enterprises that have not been active in the field of innovation implementation, ranged from 64.2 % in manufacturing enterprises to 80.2 % in service enterprises.

Production companies (including those producing wooden products, furniture, boilers, etc.) most often implemented innovations in the field of modernization of product manufacturing processes (20.0 %) and product innovations (18.3 %) (tab.2). In enterprises from the renewable energy sector, mainly process innovations aimed at improving energy storage systems were introduced. Renewable energy is the least stable source of energy, and it is the potential interruptions in its supply that are the biggest problem of this sector in the dissemination of renewable energy. In the enterprises from agri-food processing covered by the research, 21.4 % of enterprises implemented innovative solutions, which included both product and process innovations (14.3 % each).

In the tourism industry which is very important for the region covered by the research, 20,5 % of enterprises implemented innovative solutions. The changes introduced most often had the character of product innovations (12.8 %), less frequently process (7.7 %). To a small extent, they concerned modern solutions in the scope of work organization (5.4 %) and customer service (5.1 %). From the point of view of the tourism sector, strong competition and the need to adapt companies to changing conditions requires undertaking frequent innovative actions. It must be remembered that an important aspect of innovation as a factor of competitiveness is their social usefulness. Better satisfaction of the needs and expectations of the modern tourist translates into achieving better efficiency of tourist activities (Mielcarek, Szalczyk, 2013).

The low level of innovation in the tourism industry in the region as attractive as the Warminsko-Mazurskie region is difficult to explain in principle. The level of innovation of other service enterprises was close to the tourism industry and was at the level of 19.8 %. Most often, enterprises in this industry introduced innovations in the scope of a new service, as a product (8.8 %) and work organization (7.3 %). Few introduced innovations regarding service delivery processes (5.2 %) and customer service (4.9).

Table 2

**Types of innovations according to areas of economic activity of enterprises
 [%]**

Specification	Agri-food processing	Service-providing	Production	Renewable energy sources	Tourism
Product innovation	14.3	8.8	18.3	0.0	12.8
Process innovation	14.3	5.2	20.0	25.0	7.7
Organizational innovation	0.0	7.3	5.8	0.0	5.1
The company didn't introduce innovation	78.6	80.2	64.2	75.0	79.5

Source: authors' research

Conclusions, proposals, recommendations

There are No universal recipes for increasing innovation and competitiveness of economies. However, it is known that the economies of the countries which are at a high level of innovativeness, attach great importance to improving the efficiency of public administration, invest in human and social capital and mobilize various institutions around common goals. The system of financing research and development activities as well as cooperation between industry and research centres plays a large role in this respect.

The percentage of companies in the green economy sector surveyed in the Warminsko-Mazurskie Voivodeship which implement innovative solutions ranged from 19.8 % (service companies) to 25 % (RES enterprises). The low level of innovativeness of these companies, regardless of the areas of economic activity may indicate the traditional way of their management and low innovation potential of these companies. Therefore, there is a justified concern that this may lead to further deepening of the differences in the ability to create innovative solutions in the green economy in the region covered by research in relation to other regions of Poland.

Bibliography

1. Brodzinska, K., Brodzinski, Z. (2018). The Role of Environment in Stimulating the Development of Green Economy. Proceeding of the 2018 International Conference „Economic Science for Rural Development” NO 49, Jelgava, LLU ESAF, DOI 10.22616/ESRD.2018.114, pp. 25-31.
2. Eco-innovation at the Heart of European Policies
https://ec.europa.eu/environment/ecoap/indicators/index_en Access 28.01.2019
3. Gorka, K., Luszczuk, M. (2014). Green Economy and Knowledge-based Economy and Sustainable Development. Optimum. Studia ekonomiczne 3 (69)
4. Green Growth Indicators (2017). OECD Green Growth Studies, Paris https://read.oecd-ilibrary.org/environment/green-growth-indicators-2017_9789264268586-en Access 24.01.2019
5. Hamdouch, A., Depret, M.H. (2010). Policy Integration Strategy of the „Green Economy”: Foundations and implementation patterns. Journal of Environmental Planning and Management, vol. 53, issue 4, pp. 473-490.
6. Innovative Activity of Enterprises in years 2014-2016. GUS, Warszawa-Szczecin 2017
https://stat.gov.pl/files/gfx/portalinformacyjny/pl/defaultaktualnosci/5496/2/15/1/dzialalnosc_innowacyjna_przedsiębiorstw_w_latach_2014-2016.pdf, Access. 04.02.2019.
7. Kisielnicki, J. (2016). The Innovativeness of Polish Economy on the Background of Selected Countries of the European Union and the World, Studia Ekonomiczne, Zeszyty Naukowe Uniwersytetu Ekonomicznego w Katowicach (281) pp.67-79.
8. Kulyk, P., Gasiorek-Kowalewicz, A. (2018). Development of the Green Economy on the Example of the Visegrad Group, Zeszyty Naukowe SGGW, Problemy Rolnictwa Swiatowego, t. 18 (XXXIII)(2), pp. 193-206.
9. Lachiewicz, S. (2014). Organizational Innovations in Small and Medium Enterprises, Studia Ekonomiczne (183) pp. 153-161.
10. Mielcarek, B., Szalczyk, A. 2013. Innovation as a Factor of Competitiveness of the Tourist Sector in the Conditions of Globalization in: Contemporary Conditions and Problems of Tourism Development. Pawlusinski R. (ed.), IGiGP UJ, Kraków: pp. 199-206.
11. *Oslo Manual, Rules for collecting and interpreting innovation data, Ed.* Eurostat/OECD, 2008 http://www.nauka.gov.pl/mn/_gAllery/43/46/43464/20081117_OSLO.pdf Access 25.01.2018
12. Romanczyk, A. (2010). Eco-innovations, PARP, Warszawa
13. Sinclair-Desgagne, D. Feigenbaum, É. Pawlak, The Integrated Product Policy and the Innovation Process: An Overview, Scientific Series, CIRANO, Montréal 2003.
14. UNEP (2011). Towards a Green Economy: Pathways to Sustainable Development and Poverty Eradication. New
15. Unmünbig, B., W, Sachs, T. Fatheuer (2012). Critique of the Green Economy Toward Social and Environmental Equity, Vol. 22. Heinrich Böll Foundation
https://us.boell.org/sites/default/files/downloads/Critique_of_the_Green_Economy.pdf. Access 25.01.2019
16. Wegrzyn, G. 2013. Innovation as a determinant of structural changes in the labour market in: Economic Systems and their Evolution: Macro- and Meso-economic Aspects. Studia Ekonomiczne Uniwersytetu Ekonomicznego w Katowicach Economic Studies at the University of Economics, Katowice, 145: pp. 211-212.
17. Weresa, M. (2014). Innovative Policy, WN PWN, Warszawa.

SMART SPECIALIZATION STRATEGY MONITORING: THE BIOECONOMY

Sergejs Gemma¹, MPA; Zane Vitolina², Dr.oec.
^{1,2}Latvia University of Life Sciences and Technologies

Abstract. To achieve the goal of the Latvia 2030 strategy – to be the leader in the EU in terms of preservation, replenishment and sustainable exploitation of natural capital –, it is required to address the role of the bioeconomy in Latvia. In order for the Bioeconomy Strategy of Latvia 2030 (LIBRA strategy) of Latvia to be sustainable and ensure efficient use of natural resources, it is necessary to apply an integrated approach to knowledge-based growth as well as to symbiotically integrate the other areas into agriculture, forestry and fisheries, observing the basic principles of a circular (sustainable) economy. Accordingly, under the Bioeconomy Strategy of Latvia 2030 the rural areas and regions have prospects for development. The research aim is to identify the proportion of the bioeconomy in the economy of Latvia at municipality level.

Key words: smart specialization strategy, bioeconomy, innovation.

JEL code: R11; O31; P48.

Introduction

The existence of a national strategy for smart specialization is an ex ante conditionality for the use of the European Union (EU) Structural Funds from 2014 to 2020. The aim of the strategy in Europe is to become competitive in the global economy by concentrating resources in research and innovation (R&I) and linking them to priority economic areas. The main aim of the smart specialization strategy (RIS3) in Latvia is to increase innovation capacity and to create an innovation system that promotes and supports technological progress in the economy (Informativais ziņojums „Par ...”, 2013). RIS3 is a strategy of economic transformation towards higher added value, more efficient use of resources, specialisation of the existing resources of territories. According to the previous research studies (Gemma, Vitolina, 2017; 2018), Research and Innovation Strategy for Smart Specialisation (RIS3)-based overall growth (in national priority areas) is quite vague, as No total correlation and effects on the national economy are observed.

The research examined the situation at bioeconomy enterprises (as one the RIS3 knowledge specialization areas is Knowledge-intensive bio-economics) by employing the latest available data – Lursoft data for 2017.

Lursoft is a database providing data of the information system of the Register of Enterprises in Latvia. It provides access to the general national legal information database and also supplies a range of services. The authors used data on industries and economic sectors. The data selected allowed identifying the main change in the growth of bioeconomy industries in municipalities and cities.

The research aim is to identify the proportion of the bioeconomy in the economy of Latvia, based on the number of enterprises in municipality level. The specific research tasks are as follows: 1) to identify the number of enterprises engaged in the bioeconomy in 2017; 2) to calculate the proportions of bioeconomy enterprises in the total enterprises in the municipalities of Latvia; 3) to analyse the situation in accordance to the tendencies of the innovative entrepreneurship as one of the RIS3 overall goals.

The research employed the following methods: monographic, comparison, the graphical method and statistical analysis. The data acquired in the National Research Program 5.2. „Economic Transformation, Smart Growth, Governance and Legal Framework for the State and Society for Sustainable Development – a New Approach to the Creation of a Sustainable Learning Community (EKOSOC-LV)“.

Research results and discussion

The Sustainable Development Strategy of Latvia until 2030 (Latvia 2030) states that in Latvia, natural capital is in relatively good condition, yet it is insufficiently efficiently exploited and managed. To achieve the goal of the Latvia 2030 strategy – to be the leader in the EU in terms of preservation, replenishment and sustainable exploitation of natural capital –, it is required to address the role of the bioeconomy in Latvia. This issue is included both in the Smart Specialization Strategy (RIS3) measures and The Bioeconomy Strategy of Latvia 2030 (LIBRA strategy).

LIBRA strategy envisages the promotion and preservation of employment in the bioeconomy industries, higher value-added of bioeconomic products and an increase in exports of the bioeconomic products.

The bioeconomy is part of the national economy that exploits renewable sources to produce food and feed, industrial products and energy in a sustainable and prudent way (European Commission, 2012). The bioeconomy industries are agriculture, fisheries, food manufacturing, forestry, wood-processing, pulp and paper manufacturing as well as some segments of the chemical industry, the energy industry and the biotechnology industry. The world's population is projected to increase, resulting in higher market demand, yet at present, the consumption of resources by mankind exceeds the capacity of the Earth to renew the resources in a sustainable way. This leads to global dependence on fossil resources, which could be reduced by broader use of bioresources and replacement of the fossil resources. The global demand for bioresources is surely projected to increase (Muller et al., 2007).

Being aware of the importance of bioeconomic development, more than 50 world countries, to a greater or smaller extent, support and contribute to bioeconomic development by means of various programmes, strategies, action plans and other policy documents. Most of these countries are EU Member States. In 2012, the EU designed a bioeconomy strategy Innovation for Sustainable Growth: a Bioeconomy for Europe and actively promotes growth in this sector.

Accordingly, one more way how Latvia can distinguish this specialisation and make it a priority of the national economy is the European Union Smart Specialisation Strategy whereby the country can nationally prioritise the areas it is going to specialise at the EU level in the future in order to develop the national economic environment in conjunction with other areas. To induce the change and growth the RIS3 has outlined seven investment priorities and defined five specialization areas in Latvia. The investment priorities are: 1) High added value products; 2) Productive Innovation System; 3) Energy Efficiency; 4) Modern ICT; 5) Modern education; 6) The knowledge base; 7) Polycentric development. The knowledge specialization areas are: 1) Knowledge-intensive bio-economics; 2) Biomedicine, medical technologies, 3) Bio-pharmacy and biotechnologies; 4) Smart materials, technologies and engineering systems; smart energetics; 4) Information and communication technologies (ICT)

In Latvia, the bioeconomy encompasses many industries, which might be divided into several groups (Table 1). The first two of these groups are considered to be traditional bioeconomy sectors.

The kinds of economic activity registered by enterprises are specified by NACE codes. NACE is an abbreviation in French „Nomenclature statistique des activités économiques dans la Communauté européenne” or the standard classification of productive economic activities in the European Union. Every NACE code corresponds to some kind of business any enterprise is engaged in (What is a..., s.a.).

By selecting the industries shown in Table 1 according to the corresponding NACE codes pertaining to the bioeconomy, the authors selected enterprises operating in 2017, which allowed assessing the

development of the bioeconomy based on the number of bioeconomy enterprises in Latvia. A comparison of the number of enterprises engaged in the bioeconomy between the RIS3 introduction year and 2017 (Table 2) revealed that the number of enterprises in the bioeconomy rose and this sectors gradually expanded.

Table 1

Classification of bioeconomic activities in Latvia

Group	Economic sector and NACE code
Bio-resources primary production	<ul style="list-style-type: none"> • agriculture (A01) • forestry (A02) • fisheries (A03)
Bio-processing industry, where activity has largely or completely dependent on bio-resource	<ul style="list-style-type: none"> • food and feed production (C10, C11, C12) • leather products (C15) • manufacture of products of wood and of articles of straw and plaiting materials (C16, C17) • manufacture of furniture (C31)
Bio-processing industry in which bio-resources competes or is an alternative to other materials	<ul style="list-style-type: none"> • textiles (C13, C14) • chemicals (C20) • pharmaceutical industry (C21) • energy (D35)
Service industries which based on bio-resources	<ul style="list-style-type: none"> • construction (F41, F42, F43) • catering (I56) • accommodation (I55)

Source: authors' construction based on Background study analysis..., 2017.

Table 2

Number of enterprises in the bioeconomy in 2014 and 2017

Year	Traditional	Other	In total
2014	10001	14829	24830
2017	9948	15075	27040

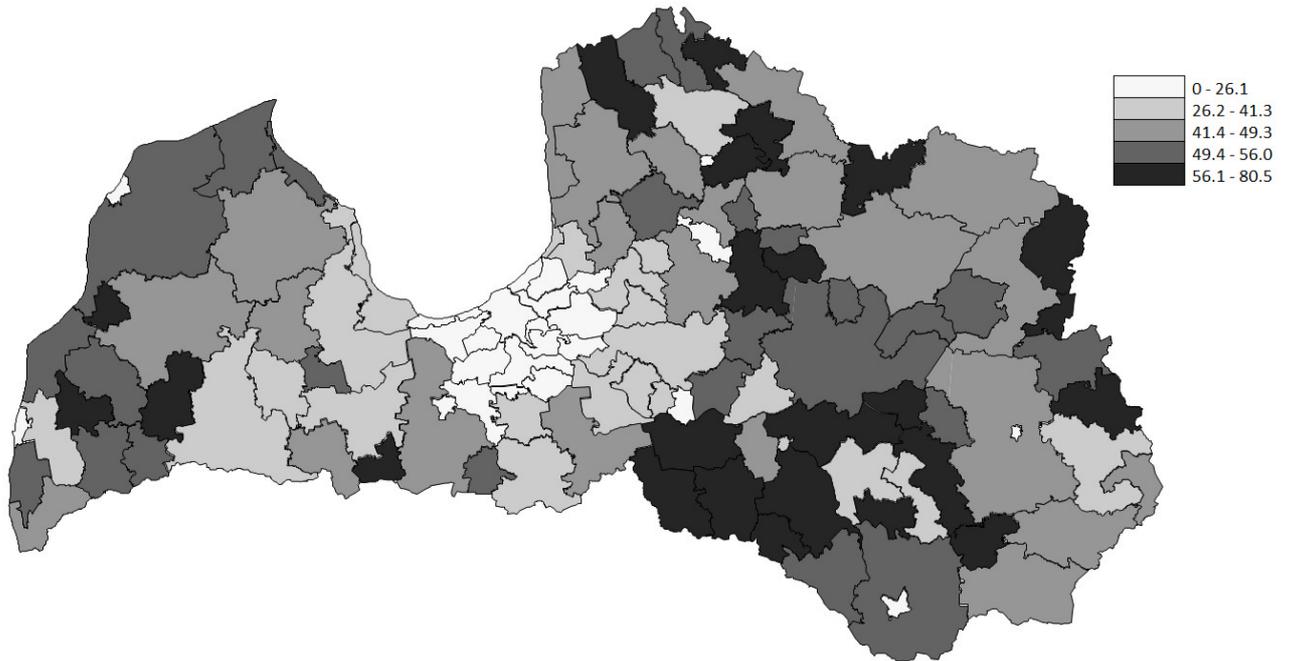
Source: authors' calculations based on Lursoft data

Traditional bioeconomy sectors are first two groups of Table 1 - bio-resources primary production and bio-processing industry, where activity has largely or completely dependent on bio-resource. As other enterprises are the bio-processing industry in which bio-resources competes or is an alternative to other materials and service industries which based on bio-resources.

In 2017 in Latvia, the number of enterprises engaged in the bioeconomy represented 43.6 % of the total enterprises. Figure 1 shows that the most bioeconomy enterprises were located in rural areas, and the absolute leader was Varkava rural territory where 80.5 % enterprises were engaged in the bioeconomy sector. Urban areas are industrialised, and the areas around the capital city – Riga – are industrialised as well. The contribution of traditional bioeconomy industries – agriculture, forestry, fisheries, food manufacturing as well as wood-processing – to the production sector accounted for 54 % of the total value-added of the goods-producing industries (Informativais zinojums „Latvijas..., 2017). This fact substantiates the concentration of the bioeconomy in rural areas.

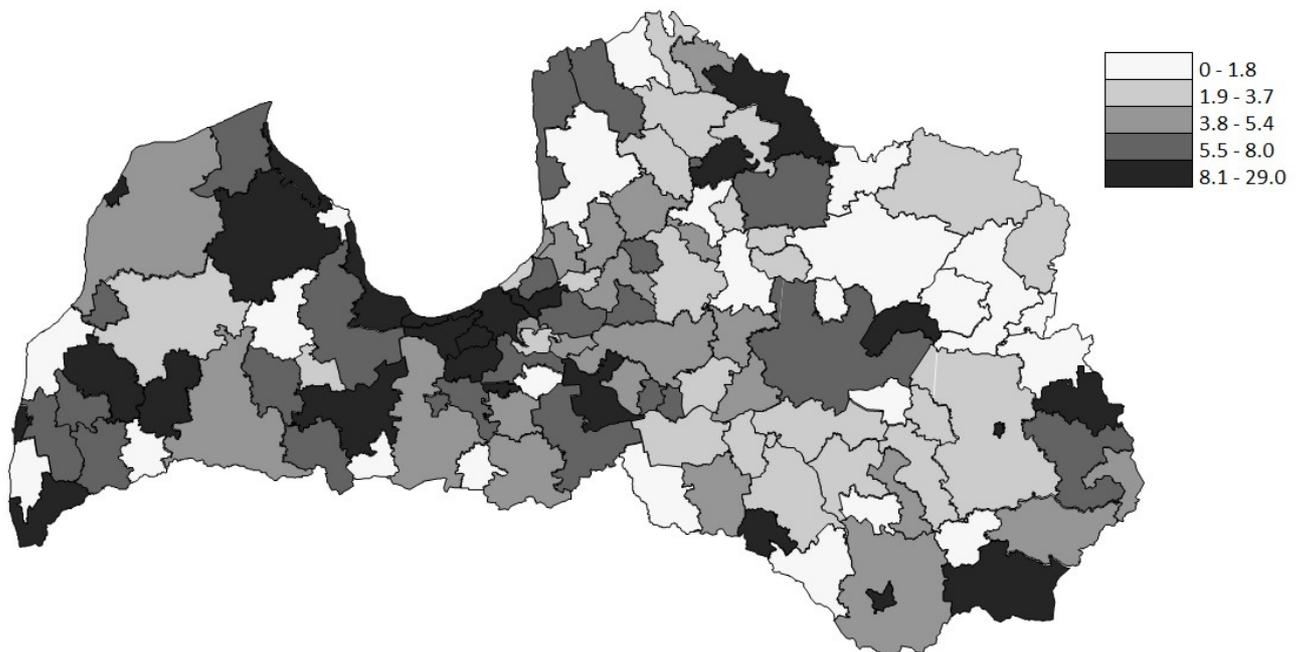
Rural areas as a necessary component of living space for the population is an increasing focus both in official documents of various EU institutions and in research investigations. Both the documents and the research papers stress the necessity to enhance and maintain the viability of rural areas. The viability of rural areas is ensured by employment opportunities and the readiness of residents for active and innovative economic activity (Rivza, Kruzmetra, 2017). Development in rural areas also maintains growth in the bioeconomy nationally.

At the same time, there is strong mono-centric development in Latvia, as concluded in the previous research studies (Gemma, Vitolina, 2017; 2018), and this creates unfavourable consequences in the environment for business in the regions.



Source: authors' calculations based on Lursoft data

Fig. 1. Proportion of bioeconomy enterprises in the total enterprises in a municipality in 2017



Source: authors' calculations based on Lursoft data

Fig. 2. Proportion of foreign-invested bioeconomy enterprises in the total enterprises in a municipality in 2017

Even though the number of bioeconomy enterprises is very small in Pieriga region and major cities, foreign investments in bioeconomy enterprises in these administrative territories are considerable.

This can contribute to the one of RIS3 priorities - Identification and specialisation of the existing resources of the territories, raising prospects for economic development, and directions, including leading and prospective business directions in municipal areas.

In 2017 in most of the municipalities, foreign investments were made in not more than 10 % of the total number of bioeconomy enterprises in the municipalities, and only in Rucava municipality almost a third of bioeconomy enterprises (29 %) or 9 out of 31 had 100 % foreign investment.

Although there are favourable conditions for bioeconomic development in Latvia, the current trend indicates stagnation. In 2017 compared with 2014, personal income tax revenues from the bioeconomy industries rose by 8.3 % (in view of the fact that the total number of employees in the bioeconomy in the LIBRA areas in the analysis period declined by 7.4 %, totalling 202159) (authors' calculations based on Lursoft data). This indicates that the total multiplier effect was larger and amounted to EUR 278054.6, yet this increase was insufficient to raise earnings, social guarantees and other determinant factors that would improve the overall wellbeing of bioeconomy employees. Bioeconomic development in Latvia requires a set of measures contributing to efficient use of bioresources. This is the case both for traditional bioeconomy industries that currently represent an economic pillar of the national economy and have large potential for growth and for new bioeconomy industries. Therefore, achieving the goals of the Bioeconomy Strategy involves five key integrated and complementary groups of measures:

- attractive business environment for entrepreneurship in the bioeconomy;
- result-oriented, efficient and sustainable resource management;
- knowledge and innovation development in the bioeconomy;
- promotion of production in the bioeconomy;
- socially responsible and sustainable development (Latvian Bioeconomy Strategy 2030, 2017).

RIS3 aim to foster the economic transformation of regions, building on regional competitive advantages. The planned outcome - increased capacity of innovations – includes increase in share of innovative enterprises in municipalities, shifting additional resources to both internal research and innovation capacity-building, and acquainting of technologies and knowledge on the outsourcing base in collaboration with research bodies, as well as by encouraging the formation of new innovative companies with rapid growth potential and attraction of funding in their early development phase (Knowledge capacity Assessment, 2013).

The RIS3 monitoring shows quite slow progress towards the overall goals. During the three year period (2014-2016), the number of innovative companies increased by 0.06 % in high and medium high industries and by 0.71 % in knowledge intense service on average. As shown in Table 2 – the number of innovative companies is decreasing in 2017 comparing with 2013, indicating that RIS3 goals will not be achieved.

Table 3

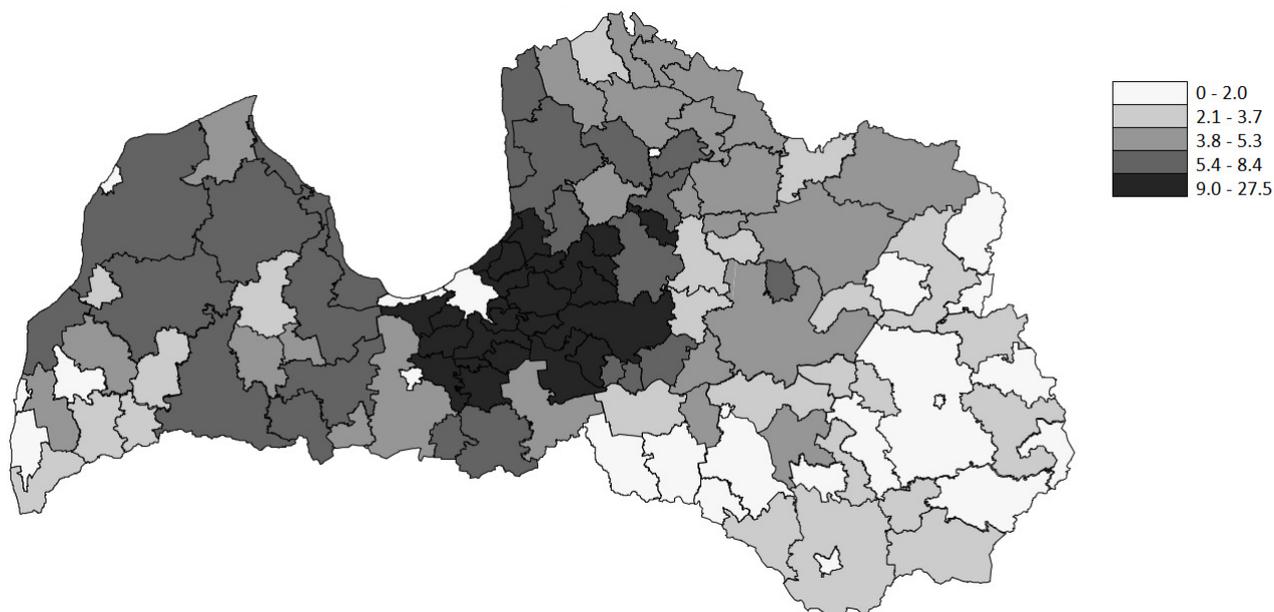
RIS3 progress in Latvia

RIS3 overall goals	2013 Base value	2017 Real	Progress	2020
Proportion of innovative companies (% of all companies)	30.4	23.4	66.9 %	40
Proportion of high-technology and medium-technology sectors in the export of Latvian goods (%)	23.8	31.6	117 %	31

Source: authors' calculations

Innovation and entrepreneurship are an important component of RIS3 and territorial development. Innovative entrepreneurship is one of the decisive aspects of the overall implementation of RIS3. In analysing the innovative enterprises in the municipalities of Latvia and comparing the situation with previous Figures one can conclude that those municipalities with high share of enterprises in bioeconomy have smaller share of innovative enterprises. In 2016 there was

one municipality with zero innovative enterprises and 26 municipalities where number of innovative companies were less than 10 (in comparison – in 2014 there were 31 municipalities with less than 10 innovative enterprises).



Source: authors' construction

Fig. 3. **Share of innovative enterprises in the total number of enterprises in municipalities, 2016, %**

This suggests that there is a lack of innovations in these municipalities that can lead to the stagnation in terms of sustainable development and economic growth. On the other hand – if municipalities will be able to foster the effective use of natural resources, implement principles of circular economics and focus on knowledge-based development, the specialization in bioeconomics can result in sustainable development. Figure 1 and Figure 3 show the municipalities with the emphasis on bioeconomy have low levels of innovation.

Conclusions, proposals, recommendations

- 1) The bioeconomy is part of the national economy that exploits renewable sources. The global demand for bioresources is surely projected to increase due to increasing population so there is a necessity to increase bioeconomy development. Bioeconomic development is mainly associated with the production, regeneration and efficient processing of bioresources. Exact the development of rural areas maintains growth in the bioeconomy nationally.
- 2) In Latvia in three-year period (2014-2017) the bioeconomy is slowly being developed. In 2017 in Latvia, the number of enterprises engaged in the bioeconomy represented 43.6 % of the total enterprises. However, bioeconomic development in Latvia requires a set of measures contributing to efficient use of bioresources.
- 3) Even though the number of bioeconomy enterprises is very small in Pierīga region and major cities, foreign investments in bioeconomy enterprises in these administrative territories are considerable.
- 4) The RIS3 monitoring shows quite slow progress towards the overall goals. The progress towards the innovation is insufficient and there is high possibility that in 2020 the planned goals will not be achieved, and Latvia will score low on the European innovation scoreboard threatening sustainable development and economic growth.

- 5) The low level and monocentric trend of innovations in Latvia shows that there are significant weaknesses in the existing innovation system. The municipalities with the emphasis on bioeconomy have low levels of innovation. Strengthening the innovation capacity will improve the bad situation about monocentric development in Latvia. Also the regional policy must be priority in next policy planning period to stabilise the uneven development and foster balanced and more harmonised development of regions and country at all.

Bibliography

1. Background Study Analysis for National Bioeconomy Strategy (2017). Retrieved: https://www.interregeurope.eu/fileadmin/user_upload/tx_tevprojects/library/file_1504269344.pdf Access: 28.12.2018.
2. European Commission (2012). *Innovating for Sustainable Growth: A Bioeconomy for Europe*. p. 64. Retrieved: <https://publications.europa.eu/en/publication-detail/-/publication/1f0d8515-8dc0-4435-ba53-9570e47dbd51> access:28.12.2018.
3. Gemma S., Vitolina Z. (2018). *Smart Specialisation Development in Latvia*. 24th Annual International Scientific Conference Research for Rural Development Jelgava, Latvia (accepted for publication).
4. Gemma, S., Vitolina, Z. (2017) *Smart specialization strategy in Latvia, Estonia and Lithuania*. *Economic Science for Rural Development*, 45, 71-78.
5. *Informativais ziņojums „Latvijas Bioekonomikas stratēģija 2030” (Latvian Bioeconomy Strategy 2030: informative report)*. (2017). Retrieved: <http://tap.mk.gov.lv/lv/mk/tap/?pid=40433525&mode=mk&date=2017-12-19> Access: 22.01.2019.
6. *Informativais ziņojums „Par viedas specializācijas stratēģijas izstrādi” (Development of a Smart Specialization Strategy for Latvia: informative report)*. (2013). Retrieved: <http://tap.mk.gov.lv/mk/tap/?pid=40291636> Access: 28.12.2018.
7. Knowledge Capacity Assessment (2013). Ministry of Education and Science. Retrieved: <http://www.izm.gov.lv/en/Science/smart-specialisation-strategy> Access: 12.11.2018.
8. *Latvija 2030 (2019)*. Retrieved: <http://www.pkc.gov.lv/lv/valsts-attistibas-planosana/latvijas-ilgtspējīgas-attistibas-stratēģija> Access: 22.01.2019.
9. Muller A., Schmidhuber J., Hoogeveen J., Steduto p. (2007) *Some Insights in the Effect of Growing Bio-energy Demand on Global Food Security and Natural Resources*. Paper presented at the International Conference: „Linkages between Energy and Water Management for Agriculture in Developing Countries”, Hyderabad, India, 28-31 January 2007. Retrieved: http://www.globalbioenergy.org/uploads/media/0701_FAO_Mueller_-_Some_insights_in_the_effect_of_growing_bioenergy_demand_on_global_food_security_and_natural_resources_01.pdf Access: 28.12.2018.
10. *Latvian Bioeconomy Strategy 2030 (2017)*. Short Summary. Retrieved: https://www.llu.lv/sites/default/files/2018-07/Latvian-Bioeconomy-Strategy-Summary-WEB_0.pdf Access: 26.12.2018.
11. Rivza B., Kruzmetra M. (2017). Through Economic Growth to the Viability of Rural Space. *Entrepreneurship and Sustainability Issues*, Entrepreneurship and Sustainability Center, 2017, 5 (2), .283 - 296.
12. What is a NACE code? Retrieved: <https://siccode.com/en/pages/what-is-a-nace-code> Access: 25.01.2018.

EMISSIONS OF CARBON DIOXIDE (CO₂) AND GROWTH THE TOURISM INDUSTRY: CASE STUDY OF LATVIA

Tamara Grizane¹, PhD.; Gusca Julija², Dr.soc.ing.; Aija Sannikova³, Dr.oec. and Inguna Jurgelane-Kaldava⁴, Dr. oec.

^{1,2}Riga Technical University, VASSI; ³University of Economics and Culture; ⁴Riga Technical University

Abstract. In terms of Kyoto protocol, the reduction of CO₂ emissions of the transport used in tourism is an important goal for Latvia. Based on a top-down and a bottom-up approach, the CO₂ emissions of tourism transport and its types were estimated, while analysing the relation between the CO₂ emissions from tourism transport and the relevant input of the tourism transport as part of GDP and vice versa. The results concerning the period 2010 till 2017 showed that the CO₂ emissions caused by tourism transport rose from 996.8 x 10³ kg/km to 1527.3 x 10³ kg/km. The aviation transport associated with the increased tourism activity is the main cause for the increase of CO₂ emissions in Latvia. The connection between the CO₂ emissions from tourism and the contribution of tourism transport to GDP is linear. The trend in increase of CO₂ emissions in the tourism industry is similar to that of other industries.

Key words: CO₂ emissions, tourism, transport, GDP.

JEL code: Q350, L830, R4, EO10.

Introduction

The European Commission has set a goal to decrease the greenhouse gases (GHG) emissions of the transport sector in comparison to 1990 by at least 60 % until 2050 (European Commission, 2011).

Unfortunately, the tourism industry tends to be an increasingly important contributor to the GHG emissions. In these settings the tourism has to comply with the global system for reduction of negative effects set in the Kyoto protocol i.e. the growth of the tourism industry has to be sustainable (WTO, 1996, 21).

The analysis of the corresponding scientific literature indicates to one of the main impacts of the tourism industry: the CO₂ emissions associated with the transport contribute to 65-73 % of the overall energy consumption within the tourism industry (Pigram, 1980; Hunter, 1995; Butler, 2000; Gosslings, 2002; Becken et al., 2003; Holden, 2007).

There is a need to evaluate the CO₂ emissions of the tourism industry, connection between the development of tourism and the GDP, thus allowing the policy makers to make the most appropriate decisions when provided with a timely and precise information, and the public and private transport providers to reduce the CO₂ emissions.

The CO₂ emissions analysis of industries in Latvia does not separate the role of the tourism within from other industries, thus causing hardship for monitoring and policy of this industry in regards to emissions. Taking into account the lack of research on the connection between the CO₂ emissions and the development of tourism industry, the authors set the following **aim of the research**: to determine the CO₂ emissions (kg/km) of the tourism industry and their relation to the development of tourism industry in Latvia, i.e. the contribution of the tourism transport to the GDP growth. In order to reach this aim, the following tasks were set:

- 1) to determine the CO₂ emissions (kg/km) from the transport involved in provision of the tourism service;
- 2) to evaluate the connection between the CO₂ emissions (kg/km) tourism transport and the contribution of tourism transport in terms of GDP growth;

¹ tamara.grizane@inbox.lv

² Julija.Gusca@rtu.lv

³ aija.sannikova@inbox.lv

⁴ Inguna.Jurgelane-Kaldava@rtu.lv

3) to estimate the connection between the contribution of tourism transport in GDP and the CO₂ emissions (kg/km) from tourism transport.

The methods applied: The research is based on literature studies, the method of analysis as well as synthesis were used in the current study. The research methods are: monographic, comparison, abstract-logical method, synthesis and analysis, induction and deduction, statistic data analysis, top-down and bottom-up approach to determination of CO₂ emissions (kg/km) from tourism, correlation and regressions analysis.

Novelty of the study: Until now in Latvia No research has focused on CO₂ emissions (kg/km) in relation to transport vehicles utilized in tourism, as well as No study has been carried out on the interdependence between the CO₂ emissions and the number of tourists, as well as on the interdependence of CO₂ emissions and the corresponding GDP.

Research sources and materials: the research includes documents from the European Commission, EUROSTAT, STATISTA, CSB of Latvia, international organizations, other statistical materials and research has been carried out. The research is based on previously published reports and analysis the official statistics, as well as author research on emissions of CO₂ and growth the tourism industry.

Research limitations: The following factors, the partial availability of data on tourism transport trip distance for transport by its type, as well as the incoherence of data units, were taken into account. Since in Latvia in terms of the water passenger transport the dominant type of transport is sea fares and there are No data available on the transportation of passengers in the inner waters, only data on the sea transport passengers was used. The overall number of tourists was selected out from the total number, based on the percentage distribution of tourists by means of transport from the year 2017. The research includes data on years 2010 till 2017.

1. CO₂ emissions and transport

The interrelationship between the transport and the tourism is one of the most important relations in tourism system (Lohmann, Duval, 2011). In Latvia tourists tend to use four types of means of transportation: (1) railway (*rail*); (2) aviation (*avio*); (3) sea transport (*sea*) and (4) road vehicles (*road*).

Railway connections (*rail*) are available from Russia, Belarus, Ukraine and Lithuania (LR Satiksmes ministrija, 2019a). Currently aviation is the mass transport industry which ensures connections between Latvia and the rest of Europe and other countries. The airport service (*avio*) in Latvia are carried out by the state capital company (SCC) „Starptautiska lidosta „Rīga,“, SCC „Latvijas gaisa satiksme“ and other service providers (LR Satiksmes ministrija, 2019b).

The sea transportation (*sea*) fares in Latvia are mainly provided by the three largest harbours of Latvia in Riga, Ventspils and Liepaja. The main influx of tourists is provided by the ferries connecting Latvia with the harbours of Sweden and Germany (LR Satiksmes ministrija, 2019c). Regarding the road transport, the tourists mostly are transported by bus coaches, a segment in which from 2010 to 2017 in total of 28 companies 410-438 licenced tour-operators from Latvia were present (Autotransporta direkcija, 2019).

Since the CO₂ emissions cause serious risks for the environment, it is important to examine the amount of CO₂ emissions caused by the transport in tourism sector. The calculation of emissions commonly is pursued while following methods and parameters based on the guidelines by the *Intergovernmental Panel on Climate Change (IPCC) (IPCC, 2018)*.

In order to estimate the quantity of CO₂ emissions being produced from transport in tourism industry, researchers had commonly used two approaches, namely, the top-down and the bottom-up (DEFRA, 2007; Perch-Nielsen, Sesartic, Stucki, 2010; Peeters, Dubois, 2010; Tao, Huang, 2014).

The authors chose to mainly use the bottom-up approach, i.e. to use the information acquired from the research area. The bottom-up approach allows for synthesis of the collected data from different regions when conducting similar studies in the future, which is important in Latvia's case. The top-down approach in the meantime allows to use the statistical data and other information based on European and global information sources and transport policy makers (Nicholls, Barnes, Acrea, Chen, Buluç, and Parker, 2015). The authors describe the proposed approach as a hybrid approach between the bottom-up and the top-down approaches.

Based on the analysis of literature, it was decided to estimate the CO₂ emissions by the transport in tourism while using the hybrid approach (top-down and bottom-up) and a modified formula, based on Chen, Thapa, Yan (2018). The formula for estimation of CO₂ emissions from tourism transport is as follows:

$$C_{s;t} = \sum_{s=1}^n D_{s;t} \times \beta_{s;t} \quad (1)$$

Where:

$C_{s;t}$ – the total CO₂ produced by the transport in tourism during time t (year) according to the type of transport s (rail, air, road, sea), kg/km;

$D_{s;t}$ – number of visitors (tourist) per each type of transport during time t (year) ;

$\beta_{s;t}$ – CO₂ emissions per one unit (per each type of transport), kg/pkm.

Explanation: Passenger kilometre (pkm, is a unit of measure that represents the transport of one passenger by a particular mode of transport (road, rail, air, sea, inland waterway, etc.) that exceeds one kilometre (EUROSTAT, 2016).

Literature studies indicated that for estimation of CO₂ emissions the average emissions per one unit (transport vehicle) in g/km or kg/km can be used (Defra, 2007; Smith, Rodger, 2009). However based on information on the differentiation of the incoming international tourists by types of transport the following percentage can be used: *avio* – 57 %, *road* – 37 %, *sea* – 4 % and *rail* – 2 % (Statista, 2017).

2. CO₂ emissions and growth the tourism industry

In the energy economics, especially in countries like China, which was responsible for almost 50 % of total global increase of CO₂ emissions in 2018, the connection between the tourism growth and CO₂ emissions is studied (CarbonBrief.org., 2018; Chen, Thapa, Yan, 2018). The studied literature indicate that there are different causality types: (1) unidirectional causal flow from tourism to economic growth (the tourism-led growth hypothesis); (2) unidirectional causal flow from economic growth to tourism (the growth led tourism hypothesis); (3) neutrality, where neither of the variables influences the other and (4) bidirectional causal relationship exists between tourism and economic growth, which is known as the feedback hypothesis (Squalli, 2007).

Examples of the first type are as follows: Arslanturk and Atan (2012) use input-output analysis to examine the tourism and economic growth in Turkey. The study gives evidence that tourism significantly contributes to the growth of the economy. The study of Chiu and Yeh (2016) investigated the tourism development–economic growth nexus and found a linear positive impact of international tourism receipts on economic growth, which confirms evidence of the tourism-led growth hypothesis. However, the fourth types are the most commonly used (Table 1).

Summary of main studies on carbon emission and tourism growth relationship

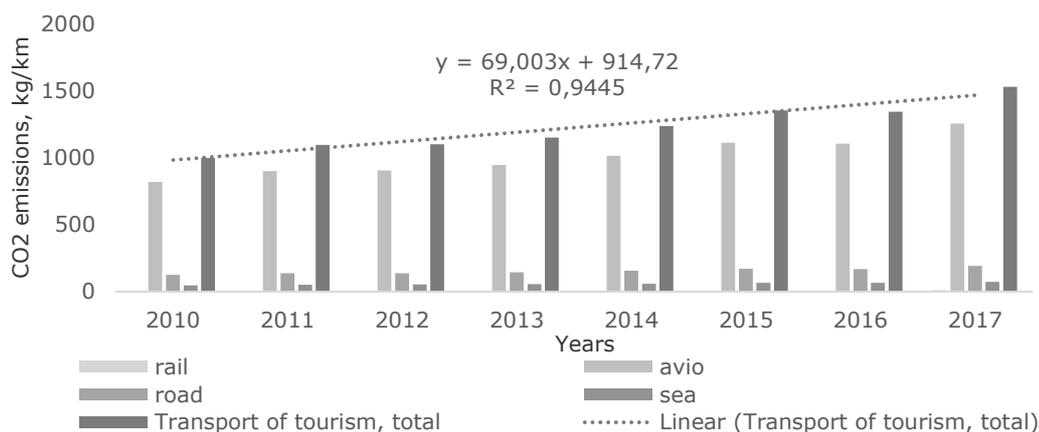
Authors	Variables	Causality
Lee, Brahmašrene (2013)	<ul style="list-style-type: none"> • CO₂ emissions • Tourism growth 	bi-directional
Katircioglu et al. (2014)	<ul style="list-style-type: none"> • CO₂ emissions • Energy Consumption • Tourism growth 	bi-directional
Paramati, Samsul, Lau (2018)	<ul style="list-style-type: none"> • CO₂ emissions • Economic growth 	bi-directional
Chen, Thapa, Yan (2018)	<ul style="list-style-type: none"> • CO₂ emissions • Tourism growth • Economic growth 	bi-directional
Tuggu, Topcu (2018)	<ul style="list-style-type: none"> • CO₂ emissions • Tourism growth 	bi-directional

Source: author's extrapolated based on Lee, Brahmašrene, 2013; Katircioglu et al., 2014; Chen, Thapa, Yan, 2018; Paramati, Samsul, Lau, 2018; Tuggu, Topcu, 2018.

Summary of main studies on CO₂ and tourism growth relationship (Tabula 1) indicate of an existing causality between the economic growth and CO₂ emissions depending on the level of interdependence of the causality feedback. According to the tourism growth hypothesis, the tourism is the key growth component which should manifest in GDP growth. In order to check this assumption, the total amount of CO₂ emissions from tourism transport in Latvia was calculated (Fig. 1).

Research results and discussion

The total changes to CO₂ emissions (kg/km) from 2010 to 2017 were linear, which is depicted in (Fig. 1) the regression equation. The Fig. 1 shows an annual growth in CO₂ emissions (kg/km) in sectors of tourism growth, with the exception of a moderate decrease in 2016, when in comparison to 2015, when due to economic factors the number of foreign tourists decreased by 0.7 %. The largest reduction in 2016 in number of tourists by countries was observed in tourists from Sweden (-37 %), Belgium (-34.6 %), the Czech Republic (-23.4 %) and Russia (-20.3 %) (LR CSB, 2016).



Source: author's calculations based on Defra, 2007; Smitt, Rodger, 2009; UNWTO, 2011, 2017; Statista, 2017; Autodirekcija, 2019; LR CSB, 2019; LR SM, 2019; World Bank Group, 2019

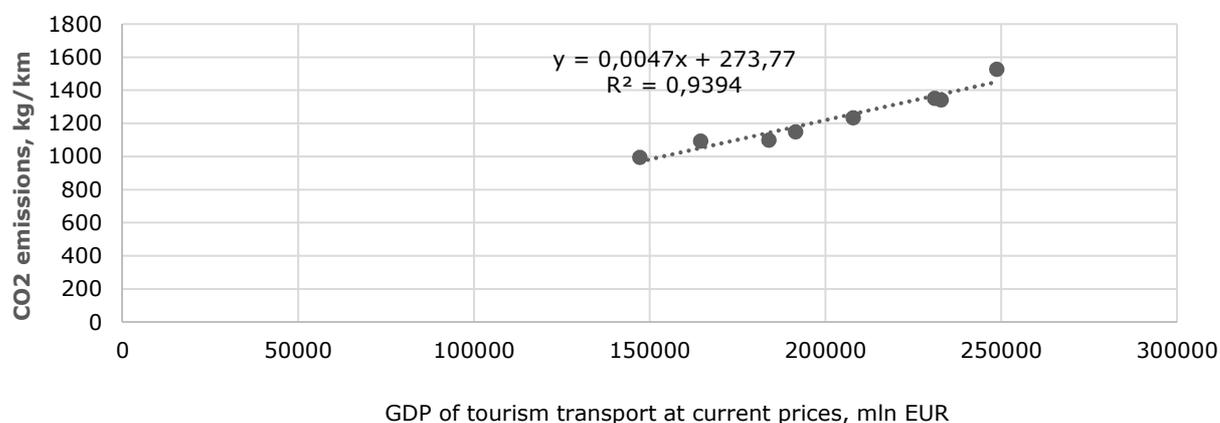
Fig. 1. CO₂ emissions from tourism transport in Latvia from 2010 to 2017, kg/km

The changes to CO₂ emissions (kg/km) in tourism transport field in an annual comparison tend to be stable – in 2013 in comparison with 2012 the increase in CO₂ emissions (kg/km) in rail was 4.49 %, avio – 4.54 %, road – 4.54 %, while sea – 4.53 %. In 2017 in comparison with 2016 the CO₂ (kg/km) increase in rail was 13.69 %, avio- 13.66 %, road -13.66 %, while sea – 13.64 %. This

can be explained by not only the increase in number of tourists, but also with the comparably similar modernization trends in the given transport type industry. Meanwhile in 2016 in comparison to 2015 CO₂ emissions (kg/km) decreased in every transport type industry on average by 0.65 %, which can be explained by the decrease in the total number of tourists 0.65 %.

In comparison with the 2010, in 2017 the total number of tourists using every type of transport increased by 53.20 %, meanwhile over this period the CO₂ emissions (kg/km) increased by 53.22 %. In addition, the changes to both the number of tourists and the CO₂ emissions were almost equal. Thus it can be concluded that the changes in number of tourists impact the total CO₂ emissions (kg/km) by different types of transport.

When determining the interrelation between the CO₂ emissions (kg/km) of tourism transport and the GDP of tourism transport growth (Fig. 2), i.e., between the factorial and resulting indication functionally strong linear connection was estimated ($R^2=0.939$; $R=0.969$; $F=93.042$; $p= 0.000$) (Fig. 2). Thus 93.9 % of total changes to CO₂ emissions from the tourism transport emissions can be explained by a linear regression model, however since the F-test p-value is 0.000, then it can be concluded that the model is statistically relevant at the significance of 99.9 %.



Source: author's calculations based on Defra, 2007; Smitt, Rodger, 2009; UNWTO, 2011, 2017; Statista, 2017; Autodirekcija, 2019; LR CSB, 2019; LR SM, 2019; World Bank Group, 2019

Fig. 2. Relationship between CO₂ emissions (kg/km) of tourism transport and GDP of tourism transport at current prices (mln EUR) in Latvia from 2010 to 2017

As a result, the dependence of CO₂ emissions (kg/km) (Fig. 2) from the GDP of tourism transport growth can be expressed by the equation (1):

$$Y_t = 273.77 + 0.0047\chi_t, \quad (2)$$

Where:

Y_t – CO₂ emissions in t (year) period, kg/km;

χ_t – GDP of tourism transport growth in t period at current prices, mln euro;

R – determination coefficient.

When determining the causality between the GDP increase the tourism transport growth and the CO₂ emissions caused by the tourism transport, the causality between the variables can be observed in a linear equation:

$$Y_t = -42135.487 + 198.362\chi_t \quad (3)$$

Where:

Y_t – CO₂ emissions in t (year) period, kg/km;

χ_t – GDP of tourism transport growth in t (year) period at current prices, mln euro;

R – determination coefficient.

Despite the fact that the model indicates of an existing linearity, however when analysing the significance level of the free coefficient and regression coefficient it was determined that the value for the free coefficient $p = 0.148 > 0.05$. Thus it is to be concluded that the coefficient does not sufficiently explain the causality and further CO₂ emissions estimations should be made.

Such a causality found in this research gives evidence to the assumption that the GDP is an economic growth indicators, which was indicated by multiple authors, but which did not comply to a previously diagnosed causality (Table 1). Thus the acquired results on the causality further base the tourism growth hypothesis (Lee, Brahmasrene, 2013). Previous research indicates that the growth of tourism industry increase the CO₂ emissions (Katircioglu, 2014). The results of this research did not prove the given assumption. Therefore, it is necessary in the future research to examine the reasons for such incompliance.

However, although the increase in the number of tourists using transport vehicles increase the CO₂ emissions, there are multiple ways for them to be reduced. The authors believe that due to the diversity and use of multiple research limitations and the use of specific methodology, that in the results could vary in different settings, however the research indicated the development trends and new field for possible future research. Altogether this research indicates of a necessity for the tourism policy planners to pay larger attention to the reduction of CO₂ emissions in terms of development tourism transport policy.

Conclusions, proposals, recommendations

- 1) Based on the case study of Latvia, this quantitative research estimated the CO₂ emissions (kg/km) from the use of transport vehicles utilized within the tourism industry and it's dynamic from 2010 to 2017, which accounted for 996.8×10^3 kg/km until 1527.3×10^3 kg/km. The avio transport was the main source of increase in terms of CO₂ emissions in Latvia. The CO₂ emissions increased due to the increase in the number of tourists and possibly due to the lack of renewal of transport vehicles.
- 2) When analyzing the causality between the CO₂ emissions from the tourism transport and the investments of tourism within the GDP a strong linear causality was observed – the increase of tourism contribution to the GDP increases the CO₂ emissions ($R^2=0.939$). The research approved that the increase of number of tourists in the use of transport further the increase of CO₂ emissions in tourism transport.
- 3) The policy planners of tourism should pay more attention to the impact of CO₂ emissions when preparing tourism development policy papers, thus ensuring a timely change for the use of less CO₂ emissions intensive vehicles within the tourism industry.

Bibliography

1. Arslanturk, Y., Balcilar, M., Ozdemir, Z. A. (2011). Time-Varying Linkages between Tourism Receipts and Economic Growth in a Small Open Economy. *Economic Modelling*, Volume 28, pp.664–671.
2. Autotransporta direkcija (Road Transport Authority) (2019). Licenceto pasazieru parvadataju skaits Latvija. Pasazieru parvadajumi. Autotransports Latvija. (Number of Licensed Passenger Transporters in Latvia. Autotransport in Latvia). Passenger Transportation. Retrieved: <http://www.atd.lv/sites/default/files/rtil%20-%202019%20LV%20v1.pdf#overlay-context=lv/jaunumi/autotransports-latvij%25C4%2581> Access: 10.02.2019.
3. Becken, S., Simmons, D.G., Frampton, C. (2003). Energy Use Associated with Different Travel Choices. *Tourism Management*, Volume 24, pp. 267–277.
4. Butler, R.W. (2000). Tourism and the Environment: A Geographical Perspective. *Tourism Geographies*, Volume 2(3), pp. 337-358.
5. CarbonBrief.org. (2018). Analysis: Fossil-fuel Emissions in 2018 increasing at Fastest Rate for Seven Years. Global Emission. Retrieved: <https://www.carbonbrief.org/analysis-fossil-fuel-emissions-in-2018-increasing-at-fastest-rate-for-seven-years>. Access: 10.02.2019.

6. Chen, L., Thapa, B., Yan, W. (2018). The Relationship between Tourism, Carbon Dioxide Emissions, and Economic Growth in the Yangtze River Delta, China. *Sustainability* 2018, 10(7), 2118.
7. Chiu, Y., Yeh, L. (2017). The Threshold Effects of the Tourism-Led Growth Hypothesis: Evidence from a Cross-sectional Model. *Journal of Travel Research*, Volume 56(5), pp.625-637.
8. DEFRA (Department of Environment, Food and Rural Affairs (UK) (2007). Act on CO₂ Calculator: Public Trial Version Data, Methodology and Assumptions Paper (June 2007). Retrieved: <http://www.defra.gov.uk/environment/climatechange/uk/individual/pdf/actonco2-calc-methodology.pdf> Access: 10.02.2019.
9. European Commission (2011). White paper. Mobility and Transport. European Strategies. Retrieved: https://ec.europa.eu/transport/themes/strategies/2011_white_paper_en Access: 1.02.2019.
10. EUROSTAT. (2016). Glossary: Passenger-kilometre. Retrieved: <https://ec.europa.eu/eurostat/statistics-explained/index.php/Glossary:Passenger-kilometre>. Access: 10.03.2019.
11. Holden, A. (2009). The Environment-tourism nexus: Influence of Market Ethics. *Annals of Tourism Research*, 36(3), pp. 373-389.
12. Hunter, C., Green, H. (1995). *Tourism and the Environment: A Sustainable Relationship?* London and New York: Routledge. p. 212.
13. IPCC (Intergovernmental Panel on Climate Change) (2018). Summary for Policymakers of IPCC Special Report on Global Warming. Retrieved: https://report.ipcc.ch/sr15/pdf/sr15_spm_final.pdf Access: 1.02.2019.
14. Katircioglu, S.T. (2014). International Tourism, Energy Consumption, and Environmental Pollution: The Case of Turkey. *Renewable and Sustainable Energy Reviews*, 36, pp. 180-187.
15. Lee, J.W., Brahmasrene, T. (2013). Investigating the Influence of Tourism on Economic Growth and Carbon Emissions: Evidence from Panalysis of the European Union. *Tourism Management*, Volume 38, pp.69-76.
16. LR CSB (2016). 2016. gada arvalstu celotaji Latvija uzturējas ilgāk, bet tērēja mazāk. (In 2016 Foreign Tourists Were Staying Longer, but Paying Less) Retrieved: <https://www.csb.gov.lv/lv/statistika/statistikas-temas/transports-turisms/turisms/meklet-tema/2213-arvalstu-celotaji-latvija-2016-gada> Access: 10.01.2019.
17. LR Satiksmes ministrija (Road transport authority) (2019a). Aviācija. Jomas raksturojums. (Aviation. Detailed Outlook of the Industry). Retrieved: <http://www.sam.gov.lv/satmin/content/?cat=425> Access: 10.01.2019.
18. LR Satiksmes ministrija (Road Transport Authority) (2019b) Dzelzceļi. Jomas raksturojums. (Railway. Detailed Outlook of the Industry). Retrieved: <http://www.sam.gov.lv/satmin/content/?cat=88> Access: 10.01.2019.
19. LR Satiksmes ministrija (Road Transport Authority) (2019c). Jurnieci. Jomas raksturojums. (Seafarers. Detailed Outlook of the Industry) Retrieved: <http://www.sam.gov.lv/satmin/content/?cat=106> Access: 10.01.2019.
20. Nicholls, D., Barnes, F., Acrea, F., Chen, C., Buluc, L.J., M. Parker, M. (2015). *Top-Down and Bottom-Up Approaches to Greenhouse Gas Inventory Methods. A Comparison between National- and Forest-Scale.* General Technical Report (GTR) Gen. Tech. Rep. PNW-GTR-906. Portland, OR: U.S. Department of Agriculture, Forest Service, Pacific Northwest Research Station. 30 p.
21. Paramati, S.R., Samsul, Lau, C.K.M. (2018). The Effect of Tourism Investment on Tourism Development and CO₂ Emissions: Empirical Evidence from the EU nations. *Journal of Sustainable Tourism*, Volume 26(9), pp. 1587-1607.
22. Peeters, P., Dubois, G. (2010). Tourism Travel under Climate Change Mitigation Constraints. *Journal of Transport Geography*, Volume 13, pp.131-140.
23. Perch-Nielsen, S., Sesartic, A., Stucki, M. (2010). The Greenhouse Gas Intensity of the Tourism Sector: The Case of Switzerland. *Environmental Science & Policy*, Volume 13(2), pp.131-140.
24. Pigram, J.J. (1980). Environmental Implications of Tourism Development. *Annals of Tourism Research*, Volume 7(4), pp. 554-583.
25. Smith, I.J., Rodger, C.J. (2009). Carbon Emission Offsets for Aviation-generated Emissions due to International Travel to and From New Zealand. *Energy Policy*, Volume 37, Issue 9, September 2009, pp. 3438-3447.
26. Squalli, J. (2007). Electricity Consumption and Economic Growth: Bounds and Causality Analyses of OPEC. *Energy Economics*, Volume 29, pp.1192-1205.
27. Statista (2017). International Inbound Tourism by Mode of Transport in 2017 (%). Retrieved: <https://www.statista.com/statistics/305515/international-inbound-tourism-by-mode-of-transport/> Access: 12.01.2019.
28. Tao, Y.G, Huang, Z.F. (2014). Review of Accounting for Carbon Dioxide Emissions from Tourism at Different Spatial Scales. *Acta Ecologica Sinica - International Journal*, Volume 34, No.5, pp.246-254.
29. Tuggu, C.T., Topcu, M. (2018). The Impact of Carbon Dioxide (CO₂) Emissions on Tourism: Does the Source of Emission Matter? *Theoretical and Applied Economics*, Volume XXV, No. 1(614), Spring, pp. 125-136.
30. UNWTO (2011). *International Tourists to hit 1.8 billion by 2030*. Retrieved: <http://media.unwto.org/en/press-release/2011-10-11/international-tourists-hit-18-billion-2030> Access: 12.01.2019.
31. UNWTO (2017). *2017 International Tourism Results: the Highest in Seven Years*. Retrieved: <http://media.unwto.org/press-release/2018-01-15/2017-international-tourism-results-highest-seven-years>. Access: 12.01.2019.

32. World Bank Group (2019). International Tourism, Number of Arrivals. Retrieved:
<https://data.worldbank.org/indicator/ST.INT.ARVL?end=2017&start=1995&type=points&view=chart>
Access: 12.01.2019.
33. WTO (World Tourism Organization) (1996). *Agenda 21 for the Travel and Tourism Industry: Towards Environmentally Sustainable Development*. GB: London, World Travel and Tourism Council.

THE CHALLENGES OF BIOECONOMY IMPLEMENTATION CONSIDERING ENVIRONMENTAL ASPECTS IN THE BALTIC STATES: AN INPUT-OUTPUT APPROACH

Genovaitė Liobikiene¹, dr; Janis Brizga², dr

¹Department of Environmental Sciences, Vytautas Magnus University, Vileikos st. 8, LT-44404 Kaunas, Lithuania; ²University of Latvia, Department of Environmental Sciences, Jelgavas iela 1, Riga, Latvia

Abstract. Bioeconomy is an important element of European Union political agenda. From all the three Baltic States, only Latvia has endorsed its bioeconomy strategy. However, these strategies and related discussions are mostly focused on the social and economic aspects of bioeconomy, but environmental aspects are not sufficiently addressed. One of the important elements of environmental sustainability of bioeconomy is resource efficiency. However, to the best of our knowledge, none of the researchers has analysed this aspect of bioeconomy. Therefore, in this study, we are aiming to evaluate the bio-resource usage and efficiency in the Baltic States – Estonia, Latvia and Lithuania in 2015 by applying the environmentally extended multiregional input-output analysis. The results showed that in Latvia and Lithuania half of the resources used in the production are bio-resources, meanwhile in Estonia - only one third. Considering the consumption-based resource usage only one-third of these resources (in Estonia only 19 %) were bio-resources. Referring to land footprint results, the biggest consumption and production based land footprint is associated with the forest land, followed by the cropland and the pastures. Furthermore, Estonia is a net-exporter of the land footprint, but in Lithuania the situation was inverse and the highest share of the produced land footprint was consumed nationally. The highest efficiency of the land footprint was also observed in Lithuania, meanwhile, in Estonia, the main challenge remains how to enhance the bio-resource efficiency. To improve sustainability countries should stimulate higher value-added bioeconomy activities at the national level, intensify the substitution of the non-renewable resources and improve eco-efficiency of bioeconomy.

Key words: Bioeconomy, input-output, land footprint, bio-resources, efficiency.

JEL code: Q57, R15.

Introduction

Bioeconomy is one of the main aspects of green growth and a key to sustainability (D'Amato et al, 2017; Loiseau et al., 2016). According to the conventional definition of bioeconomy, it comprises all economic activities related to the development of renewable resources and use of biological products and process (Loiseau et al., 2016; Ingrao et al., 2018; Nayha, 2019 and etc.). The development of bioeconomy contributes to food security, promotion of renewable resource, climate change mitigation, economic growth and job creation (EC, 2012; Wozniak and Twardowski, 2018; Balezentis et al., 2019; Budzinski et al., 2017; D'Amato et al., 2017; Ingrao et al., 2018 etc.).

Bioeconomy first time was mention in the document „Biotechnology for sustainable growth and development“ (OECD, 2009) in 2009. Meanwhile, in the European Union (EU), the European Commission launched a strategy „Innovating for sustainable growth: A bioeconomy for Europe“ (EU, 2012) in 2012. However, experts stated that the sustainable supply of biomass is not sufficiently addressed in bioeconomy strategies (European Bioeconomy Panel, 2014) and the scope of the actions of the bioeconomy strategy has to be refocused. Thus, the EU bioeconomy strategy has been renewed in 2018. Subsequently, many European countries published or are preparing a national bioeconomy strategy (Ladu and Blind, 2017). Considering the Baltic States, only Latvia accepted its bioeconomy strategy. In Lithuania and Estonia, such strategies are under development.

Taking into account the goals of Latvian bioeconomy strategy, they are divided into three main groups: „1) advancement and retention of employment in the bioeconomy sectors for 128 thousand people, 2) increasing the value added of bioeconomy products to at least EUR 3.8 billion in 2030, 3)

¹ Contacts to be added to the author, as a footnote at the bottom of the first page (6 point Verdana font)

² Contacts to be added to the author, as a footnote at the bottom of the first page (6 point Verdana font)

increasing the value of bioeconomy production exports to at least EUR 9 billion in 2030" (Latvian Bioeconomy Strategy, 2018). These goals reveal that in the strategical level the most attention is paid for the social and economic aspects. Considering that sustainable development encompasses economic, social and environmental areas, the ignorance of environmental aspects is blasting. Despite the fact that bio-resources are renewable, biomass supplies are not endless as it takes time for supplies to regrow. The increased demand for biomass in a growing bioeconomy is expected to create biomass scarcity at the global level (Borgstrom, 2018). Particularly it concerns the EU where a local biomass supply is limited (Sleenhoff et al., 2015; Henning et al., 2016). Therefore, a steep increase in the demand for biomass and unsustainable biomass consumption could hinder the sustainability of bioeconomy (Bezama, 2018; Hildebrandt et al. 2018).

The evaluation of bioeconomy is very important because policymakers need to have baseline information representing the status of the bioeconomy at a certain time period when developing adequate policy measures. Evaluating the environmental aspects a large number of authors used land footprint approach (Hubacek and Feng, 2016; Schaffartzik et al., 2015; Bruckner et al., 2015; O'Brien et al., 2015; 2017; Kastner et al., 2014) or life cycle assessment (Sieber et al., 2018; Martin et al., 2018). Other authors as Budzinski et al. (2017) applying multi-regional input-output analysis evaluated German wood-based economy, Asada and Stern (2018) assessed the bioeconomy sectoral competitiveness. In this paper by applying both input-output and land footprint analyses, we assessed the main environmental indicators embedded in consumption, production and trade in the Baltic States.

Furthermore, seeking sustainability it is not enough to evaluate the tendencies of bio-resource usage. Schutte (2018), Scheiterle et al. (2017), Davaney and Henchion (2018) and Zabaniotou, (2018) stated that sustainable bioeconomy should focus on resource efficiency and biomass conversion must retain a high efficiency. The concept of the bio-economy has brought an objective to achieve higher efficiency in biomass usage, by maximising the value added of the produced goods (Ingrao et al., 2018). However, to the best of our knowledge, none of the researchers did analyse the bio-resource efficiency in bioeconomy sectors. Therefore, in this study we are aiming to evaluate the bio-resource usage and efficiency in the Baltic States – Estonia, Latvia and Lithuania in 2015, by calculating the main environmental indicators, coupling them with economic indicators - value-added¹ and employment.

Methodology

There are several tools available to perform a sustainability impact assessment of bioeconomy, e.g. cost-benefit analysis, input-output (IO) methods, life cycle analysis (LCA) methods, material flow analysis (MFA) and multi-criteria analysis (MCA) (Karvonen et al., 2017). In this research, we are using environmentally extended multi-regional input-output (MRIO) analysis, which is based on a globally harmonized set of input-output (IO) tables and bilateral trade data, taken from EXIOBASE 3 database (Stadler et al., 2018), covering 165 industries, 200 products, 48 countries, and regions for the years 1995–2015.

The basic linear input-output (IO) model is based on the classic Leontief demand-style modelling (Leontief, 1986) where the vector of total output x can be calculated using the following equation:

$$x = (I-A)^{-1}y = L (1)$$

¹ In Exiobase 3 Gross Value Added is decompose into 3 components: i) compensation of employee, ii) operating surplus, iii) indirect tax and subsidy on products.

where, y is the final demand vector, A - the inter-industry coefficient matrix and I - the identity matrix of A , and L is the Leontief inverse or total requirements matrix $((I-A)^{-1})$.

To calculate consumption (D_{cba}) land and material input footprints, we extend the MRIO framework with a vector of direct sectoral land and material input intensities, e , and calculated consumption-based emissions intensity matrix E :

$$E = e(I-A)^{-1} = eL \quad (2)$$

The total consumption-based footprints (D_{cba}) where calculated from the IO accounts by multiplying the consumption-based emissions intensity matrix E by the total expenditure on products that year:

$$D_{cba} = ELy \quad (3)$$

The total territorial or production land and material input footprints (D_{pba}) where calculated using the following equation:

$$D_{pba} = F + G \quad (4)$$

where F is a row vector of sectoral land and material input coefficients and G describe the impacts associated with final demand.

Research results and discussion

Here are the results of our analyses on land and material footprints in the Baltic States in 2015.

Material flows

Biological Raw Material Consumption (RMC) is one of the main indicators demonstrating environmental pressures of the industrial sectors of the bioeconomy. Our results demonstrate that bioeconomy is important resource consumer in all the Baltic States and biological resources embedded in production are generally bigger then resources embedded in the consumption, thus a big part of the biological resources are exported to other countries (Table 1).

Table 1

RMC of biological resources embedded in consumption, production and trade of the Baltic States in 2015 (volume in kt and percentage of biological resources from the total DMI)

	RMC, kt			The share of biological resources in the total RMC		
	Estonia	Latvia	Lithuania	Estonia	Latvia	Lithuania
Consumption	5 878	10 550	17 990	19 %	31 %	31 %
Imports	3 870	4 720	7 986	24 %	27 %	22 %
Production	9 562	18 725	19 469	33 %	58 %	52 %
Exports	7 553	12 894	9 465	52 %	86 %	62 %

Source: author's calculations based on EXIOBASE 3 database

For Latvia and Lithuania, biological resources account for more than 50 % of the total RMC embedded in the production, while in Estonia only 33 %. This result can be explained with the fact that in Estonia the share of agricultural land is only 23 % of all the land use, meanwhile, in Latvia and Lithuania it's 30 % and 47 % respectively. However, the forest area in Estonia and Latvia is more than 50 %, but in Lithuania only 34 %. Therefore, all the Baltic States has rather similar possibilities to develop bioeconomy and enhance bio-resource production, but the development of bioeconomy is only in the initial stage. Biological resources make also the main export flows for all the Baltic States. Forestry, logging and related service activities being the main biological resource export sector for all the Baltic States – accounting for 17 % of exported biomass in Lithuania, 32 % in Estonia and 45 % in Latvia. For Estonia and Latvia Forestry, logging and related service activities

are also the sectors with the highest land use embedded in the production. In Lithuania, Cattle farming comes out as the biggest production land use (for Estonia and Lithuania coming second).

Consumption-based RMC footprints are much more diverse in all the three Baltic States. However, non-renewable resources conversion of renewable biological resources into food, fuel, chemicals and fibre is rather vague in the Baltic States. Main biological resource consumption sectors in Estonia are *Processing of Food products nec, Processing of meat cattle* and *Construction* (responsible for 29 % of all the biological RMC). In Latvia 3 biggest consumption sectors are *Forestry, logging and related service activities, Processing of Food products nec* and *Processing of meat cattle* (responsible for 46 %), but in the Lithuania *Cattle farming, Processing of Food products nec* and *Forestry, logging and related service activities* are accounting for 30 % of the biological RMC.

Land footprint

Land footprint encompasses the main resources of biomass (cropland, pastures, and forests). This indicator has been defined as the land area used to produce the goods and services dedicated to satisfy the domestic final demand of a country (territory) regardless where this land was actually used (O'Brien et al., 2017). Table 2 demonstrates that production based land footprint is generally bigger than the land footprint embedded in consumption (Table 2). The smallest differences between these two are in Lithuania, which seems to be much more self-sufficient and have much smaller net-trade. In the case of Estonia production based land footprint is even bigger the whole territory of the country. It could be explained with the fact that in Estonia significant part of the land-intensive national production is meant for export. However, consumption-based land footprints are significantly smaller. Thus, Estonia instead of development of bioeconomy at the national level is a donor of bioeconomy resources to other countries.

Table 2

Land footprint embedded in consumption, production and trade of the Baltic States in 2015 (km²)

	Estonia	Latvia	Lithuania
CONsumption	21 040	32 172	43 958
IMPorts	11 884	16 490	19 653
PROduction	52 263	61 762	56 714
EXPorts	43 107	46 081	32 410
Country territory	45 227	64 589	65 300

Source: author's calculations based on EXIOBASE 3 database

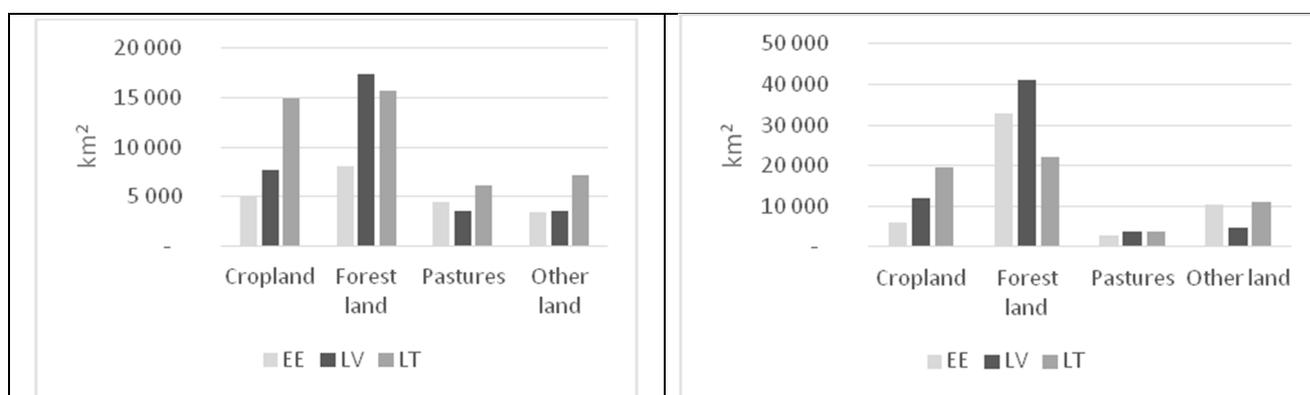
Industrial sectors accounting for 90 % of the production-based land footprint are similar to the sectors consuming most of the biological resources (Table 2) – most of the land is embedded in the forest activities, cattle farming and milk production as well as cultivation of cereals and oilseeds (Table 3).

**Main production-based land footprint sectors of the Baltic States in 2015
 (km²)**

Industrial sectors	Estonia	Latvia	Lithuania
Forestry, logging and related service activities	35 960	39 933	26 169
Raw milk	4 297		2 325
Manufacture of wood and of products of wood and cork, except furniture	2 531		
Cattle farming	1 908	4 603	6 095
Cultivation of wheat	1 885	5 669	6 836
Cultivation of cereal grains nec	1 700	2 599	5 376
Cultivation of oil seeds		3 073	3 854

Source: author's calculations based on EXIOBASE 3 database

The land footprint was allocated to the four land-use sectors contained in the Exiobase 3 sector classification – 'cropland', 'forest land', 'pastures' and 'other land'. If divided by these land type, the biggest consumption and production based land footprint is associated with the forest land, followed by the cropland and the pastures (Fig. 1 left and right).



Source: author's calculations based on EXIOBASE 3 database

Fig. 1. Consumption-based land footprint (left), production-based land footprint (right) in 2015 (km²)

Eco-efficiency indicators

Bio-resources are not infinite and when developing the bioeconomy policymakers should also consider planetary boundaries and the capacity of ecosystem service. Thus, seeking the sustainability bio-resources should be used more effectively and in some cases cap on the bioresource use is inevitable. To measure the eco-efficiency of the bioeconomy in the Baltic States, we looked at the following indicators:

- Material intensity per employees - kt DMC per 1000 employees;
- Land intensity per employees - km² land footprint per 1000 employees;
- Material productivity - Gross Value Added (GVA) in mln. EUR per kt DMC and GVA in mln. EUR per km² land footprint.

There are significant differences among countries in terms of DMC per persons employed. Biggest resource intensity per employee in bioeconomy sectors is in Estonia – 53.2 kt/1000 p, but the smallest is also in Lithuania - 36.45 kt/1000 p. In Latvia, material productivity per employee in bioeconomy sectors is similar as in Estonia - 51.24 kt/1000 p. Then comparing bioeconomy sectors with the highest resource consumption, *Forestry, logging and related service activities*, in Lithuania DMC intensity per employee is 240 kt/1000 p, but in Latvia and Estonia it's only 493 and 465 kt/1000 p, respectively.

Also when comparing land footprint per employee in the bioeconomy sectors situation is similar – Lithuania has the smallest land footprint intensity - 107 km² / 1000 p, followed by Latvia with 166.4 km² / 1000 p and Estonia with 3 times higher land intensity than in Lithuania - 326.1 km² / 1000 p. The biggest land footprint sector in all three countries is *Forestry, logging and related service activities* and land intensity per employee in this sector in Lithuania is 1 540 km² / 1000 p, in Latvia 2 147 km² / 1000 p, but in Estonia 3 179 km² / 1000 p.

Structure of value added shows that bioeconomy is the important economic sector in the Baltic States. In Lithuania, bioeconomy sectors contribute to 33 % of the GVA, but in Latvia and Estonia 26 % and 21 % respectively. Nevertheless, resource intensity in the Baltic States is low – In Estonia its 0.62 mln. EUR/kt, in Latvia 0.45, but in Lithuania only 0.35. Similarly, GVA per production based land footprint is the highest in Lithuania – 0.21 mln. EUR/km²; in Estonia it is 0.05 mln. EUR/km², but in Latvia 0.1 mln. EUR/km² (Table 4).

Table 4

Eco-efficiency indicators of the Baltic bio-economies

	DMC / EmpLOYee	Land-Use / EmpLOYee	GVA / DMC	GVA / Land-Use	BioE share in GVA
EE	53.20	435.38	0.45	0.05	21 %
LV	51.24	181.57	0.35	0.10	26 %
LT	36.45	106.17	0.62	0.21	33 %

Source: author's calculations based on EXIOBASE 3 database

Partly these differences can be explained by the fact that in all the Baltic States, but especially in Estonia and Latvia low added value sectors, e.g. *Forestry, logging and related service activities* and *Cattle farming* dominated the national bioeconomy production.

Conclusions, proposals, recommendations

- 1) Analysing the production, consumption and trade based bio-resources usage we observed the big differences in the Baltic States. In Latvia and Lithuania, half of the resources used in the national production are bio-resources. Meanwhile, in Estonia it's only one-third. Furthermore, considering the consumption-based resource usage in all the Baltic States only one-third of resources (in Estonia only 19 %) were bio-resources. Thus, one of the suggestions for policymakers should be to intensify the substitution of the non-renewable resources with bio-resources. But it is also important to keep the bio-resource harvesting within the sustainable levels.
- 2) Latvia and Lithuania in term of land footprint almost achieved the country territory capacity. In the case of Estonia production-based land footprint is even bigger than the whole territory of the country and Estonia is a donor of bioeconomy resources to other countries. Therefore, Estonia should pay more attention to the development of higher value-added bioeconomy activities at the national level. In Lithuania, the situation was inverse and the highest share of the produced land footprint was consumed domestically.
- 3) The agriculture and forest sectors are mostly related to bioeconomy and the biggest consumption and production based land footprint is associated with the forestland, followed by the cropland and the pastures. However, when developing the bioeconomy, policymakers should also consider other commitments e.g. sustainable development strategy and climate change policy. Furthermore, the agriculture and forestry sectors are sensitive to climate change consequences. Thus, it is crucial to anticipate the impacts of climate variability for landowners to implement strategies to adapt or respond to it by using new more sustainable agricultural practices, e.g. no-till farming, controlled drainage.

- 4) In the Baltic States the bio-resource efficiency differed significantly as well. In Lithuania, the land footprint efficiency was the highest, while in Estonia – the lowest. Furthermore, land intensity per employee was also highest in Estonia. Therefore, particularly in Estonia the main challenge remains how to enhance the bio-resource efficiency. One suggestion could be organic industrial waste reuse in biological processes for the generation of various bio-based products along with its remediation. O'Brien et al. (2015) emphasize the need for bioeconomy policies that support greater efficiency across the life cycle and reduce wasteful and excessive consumption practice. The investments in innovations and technologies and better adaptation to climate change are essential in order to increase the bio-resource efficiency as well.

Acknowledgement

This work was partly financed by the specific support objective activity 1.1.1.2. „Post-doctoral Research Aid” of the Republic of Latvia (Project No. 1.1.1.2/VIAA/1/16/065 „Developing New Tools for the Sustainability Assessment of the Bioeconomy”), funded by the European Regional Development Fund (project id. N. 1.1.1.2/16/I/001).

Bibliography

1. Arujanan, M. and Singaram, M. (2018). The Biotechnology and Bioeconomy Landscape in Malaysia. *New Biotechnology* No 40, pp. 52–59.
2. Asada, R. and Stern, T. (2018). Competitive Bioeconomy? Comparing Bio-based and Non-bio-based Primary Sectors of the World. *Ecological Economics*, No. 149, pp. 120–128.
3. Balezentis, T., Streimikiene, D., Zhang, T., Liobikiene, G. (2019). The Role of Bioenergy in Greenhouse Gas Emission Reduction in EU Countries: An Environmental Kuznets Curve Modelling, *Resources, Conservation & Recycling*, vol. 142, pp. 225–231.
4. Bezama, A. (2016). Let Us Discuss How Cascading Can Help Implement the Circular Economy and the Bioeconomy Strategies. *Waste Manag. Res.* Vol. 34 No.7, pp. 593-594.
5. Borgstrom, S. (2018). Reviewing Natural Resources Law in the Light of Bioeconomy: Finnish Forest Regulations as a Case Study. *Forest Policy and Economics*, Vol. 88, pp. 11–23.
6. Bruckner, M., Fischer, G., Tramberend, S., Giljum, S. (2015). Measuring Telecouplings in the Global Land System: a Review and Comparative Evaluation of Land Footprint Accounting Methods. *Ecol. Econ.* Vol. 114, pp. 11–21.
7. Budzinski, M., Bezama, A., Thran, D. (2017). Monitoring the Progress towards Bioeconomy Using Multi-regional Input-Output Analysis: The Example of Wood Use in Germany. *Journal of Cleaner Production* Vol. 161, pp. 1-11.
8. D'Amato, D., Droste, N., Allen, B., Kettunen, M., Lahtinen, K., Korhonen, J., Leskinen, p. Matthies, B.D., Toppinen, A. (2017). Green, Circular, Bio economy: A Comparative Analysis of Sustainability Avenues. *Journal of Cleaner Production* Vol. 168, pp. 716-734.
9. EC (European Commission) (2012). Commission Staff Working Document Accompanying Communication on Innovating for Sustainable Growth: a Bioeconomy for Europe. 2012 Available from http://ec.europa.eu/research/bioeconomy/pdf/201202_innovating_sustainable_growth_en.pdf.
10. EU (2012). Innovating for Sustainable Growth: A Bioeconomy for Europe. Communication from the Commission to the European Parliament, the European Economic and Social Committee and the Committee of the Regions. http://ec.europa.eu/research/bioeconomy/pdf/official-strategy_en.pdf.
11. European Bioeconomy Panel (2014). In: 2nd Plenary Meeting, 12e13 February 2014. Summary of Discussions.
12. Hennig, C., Brosowski, A., Majer, S. (2016). Sustainable Feedstock Potential a Limitation for the Bio-based Economy? *Journal of Cleaner Production* Vol. 123, pp. 200-202.
13. Hubacek, K., Feng, K. (2016). Comparing Apples and Oranges: Some Confusion about Using and Interpreting Physical Trade Matrices versus Multi-Regional Input–Output Analysis. *Land Use Policy* Vol. 50, pp. 194–201.
14. Ingraio, C., Bacenetti, J., Bezama, A., Blok, V., Goglio, P., Koukios, E.G., Lindner, M., Nemecek, T., Siracusa, V., Zabaniotou, A., Huisingh, D. (2018). The Potential Roles of Bio-Economy in the Transition to Equitable, Sustainable, Post Fossil-Carbon Societies: Findings from this Virtual Special Issue. *Journal of Cleaner Production*, vol. 204, pp. 471-488.
15. Karvonen, J., Halder, P., Kangas, J., Leskinen, p. (2017). Indicators and Tools for Assessing Sustainability Impacts of the Forest Bioeconomy. *Forest Ecosystems* Vol. 4, p. 2.
16. Kastner, T., Schaffartzik, A., Eisenmenger, N., Erb, K.H., Haberl, H., Krausmann, F. (2014). Cropland Area Embodied in International Trade: Contradictory Results from Different Approaches. *Ecol. Econ.* Vol. 104, pp. 140–144.

17. Ladu, L. and Blind, K. (2017). Overview of Policies, Standards and Certifications Supporting the European Bio-based Economy. *Current Opinion in Green and Sustainable Chemistry* Vol. 8, pp. 30–35.
18. Latvian Bioeconomy Strategy 2030, Short summary.
19. Leontief, W. (1986). *Input-output economics*. Oxford University Press, New York.
20. Loiseau, E., Saikku, L., Antikainen, R., Droste, N., Hansjurgens, B., Pitanen, K., Leskinen, P., Kuikman, P., Thomsen, M. (2016). Green Economy and Related Concepts: An Overview. *Journal of Cleaner Production* Vol. 139, pp. 361–371.
21. Martin, M., Royné, F., Ekvall, T., Moberg, A. (2018). Life Cycle Sustainability Evaluations of Bio-based Value Chains: Reviewing the Indicators from a Swedish Perspective. *Sustainability* Vol. 10, p. 547.
22. Nayha, A. (2019). Transition in the Finnish Forest-Based Sector: Company Perspectives on the Bioeconomy, Circular Economy and Sustainability. *Journal of Cleaner Production* Vol 1, pp. 1294-1306.
23. O'Brien, M., Schutz, H., Bringezu, S. (2015). The Land Footprint of the EU Bioeconomy: Monitoring Tools, Gaps and Needs. *Land Use Policy* Vol. 47, pp. 235–246.
24. O'Brien, M., Wechsler, D., Bringezu, S., Schaldach, R. (2017). Toward a Systemic Monitoring of the European Bioeconomy: Gaps, Needs and the Integration of Sustainability Indicators and Targets for Global Land Use. *Land Use Policy* Vol. 66, pp. 162–171.
25. OECD, 2009. *The Bioeconomy to 2030: Designing a Policy Agenda*
26. Schaffartzik, A., Haberl, H., Kastner, T., Wiedenhofer, D., Eisenmenger, N., Erb, K.H. (2015). Trading Land: a Review of Approaches to Accounting for Upstream Land Requirements of Traded Products. *J. Ind. Ecol.* Vol. 19, pp. 703–714.
27. Scheiterle, L., Ulmer, A., Birner, R., Pyka, A. (2018). From Commodity-Based Value Chains to Biomass-Based Value Webs: the Case of Sugarcane in Brazil's Bioeconomy. *Journal of Cleaner Production* Vol. 172, No, 20, pp. 3851-3863.
28. Schutte, G. (2018). What Kind of Innovation Policy does the Bioeconomy Need? *New Biotechnology* Vol. 40, pp. 82-86.
29. Siebert, A., Bezama, A., O'Keeffe, S., Thran, D. (2018). Social Life Cycle Assessment: in Pursuit of a Framework for Assessing Wood-based Products from Bioeconomy Regions in Germany. *The International Journal of Life Cycle Assessment* Vol. 23, No. 3, pp 651–662
30. Sleenhoff, S., Landeweerd, L., Osseweijer, p. (2015). Bio-basing Society by Including Emotions. *Ecological Economics* Vol. 116, pp. 78–83.
31. Stadler, K., Wood, R., Bulavskaya, T., Sodersten, C.J., Simas, M., Schmidt, S., Usubiaga, A., Acosta-Fernandez, J., Kuenen, J., Bruckner, M. (2018). EXIOBASE 3: Developing a Time Series of Detailed Environmentally Extended Multi-regional Input-Output Tables. *Journal of Industrial Ecology* Vol. 22, pp. 502-515.
32. Wozniak, E. and Twardowski, T. (2018). The Bioeconomy in Poland within the Context of the European Union. *New Biotechnology*, Vol. 40, pp. 96-102.
33. Zabaniotou, A. (2018). Redesigning a Bioenergy Sector in EU in the Transition to Circular Waste-based Bioeconomy-A Multidisciplinary Review. *Journal of Cleaner Production* Vol. 177, No. 10, pp. 197-206.

DIFFERENTIATION OF THE ECONOMIC VALUE OF POLLINATION OF APPLE ORCHARDS DEPENDING ON THE METHOD OF ESTIMATION

Janusz Majewski¹, PhD, Eng.

¹Warsaw University of Life Sciences – SGGW, Poland

Abstract. Pollinating insects are an important part of the environment. Pollination is an environmental service that affects the yield and quality of entomophilous crops and biodiversity. The aim of the study is to determine the value of pollination of apple orchards in Poland in the years 2005-2017. The following methods were used in the calculations: crop value method, dependency ratio method and replacement costs method.

The results obtained using each of the methods indicate an increase in the value of pollination of apple trees during the study period. In the case of the crop value method, the tested value increased from PLN 1.073 billion (USD 0.332 billion or EUR 0.267 billion) in 2005 to PLN 2.534 billion (USD 0.671 billion or EUR 0.595 billion) in 2017, in the case of the dependency ratio method, pollination value was equal to 90 % of the value obtained by the crop value method. In the case of the replacement cost method including labour costs at the minimum wage level, the value of pollination increased from PLN 0.648 billion (USD 0.2 billion; EUR 0.161 billion) in 2005 to PLN 2.837 billion (USD 0.751 billion; EUR 0.666 billion) in 2017. The highest pollination values were determined using the replacement cost method, taking into account the labour costs at the level of an average wage. These figures increased from PLN 1.82 billion (USD 0.562 billion; EUR 0.452 billion) in 2005 to PLN 6.054 billion (USD 1.602 billion; EUR 1.422 billion) in 2017. Similar changes were noted in the case of pollination values per hectare of apple orchard. This indicates that the increase in the cultivated area was not a factor determining the increase in the global value of pollination of apple orchards in Poland. In the case of methods taking into account the value of production, the increase in pollination value over time was determined by the increase in apple prices (with significant differences between the years) and the volume of production. In the case of the replacement cost method, the increase in pollination value was influenced by an increase in wages and a gradual intensification of horticulture.

Key words: beekeeping, pollination, apple orchards, pollination value.

JEL codes: Q01, Q51, Q57.

Introduction

The Industrial Revolution in England triggered adverse environmental changes in the world. They intensified in the 20th century. This is manifested by environmental degradation, global warming and depletion of non-renewable natural resources. These changes have led to public interest in the need to maintain balance in the management of natural resources. Various development concepts have been drawn up for this purpose. One of the first was the concept of *sustainable development* (Poplawski, 2013). This concept concerns mainly rural areas and is related to their multifunctionality and the concept of bioeconomy, which can be defined as a human activity that makes rational use of natural resources for the benefit of people and their environment (Kukula, 2015).

In addition to the possibility of replacing resources, agriculture and rural areas participate in the creation of public goods. When producing public goods, agriculture incurs the costs and does not receive any income from such production. In such case, the economic surplus flows from this sector to the external environment (Czyzewski and Kulyk, 2011). There is a visible market failure. Therefore, the creation of public goods by agriculture should be reflected in agricultural policy, including subsidies for fulfilling non-productive functions. This, in turn, means that the value of the public goods produced needs to be valued.

The pollination of plants by insects, mainly by bees, is a public good. The economic value of pollination is difficult to estimate. This is due, among other things, to differentiated results on the impact of pollination on yields (Breeze et al., 2011; Gallai et al., 2009) and their quality. This can

¹ Corresponding author. Tel.: +48 22 59 34 112; fax: +48 22 59 34 101. E-mail address: Janusz_Majewski@sggw.pl

lead to significant differences in the results obtained. The choice of the estimation method also has an impact on the estimated value of pollination of plants. The main methods used to determine pollination value include: market price method, crop value method (CV), dependency ratio method (DR), net income method, cost methods, including the replacement cost method (RC) and consumer surplus method (CS) (Hanley et al., 2015; Mburu et al., 2006; Melathopoulos et al., 2015; Winfree et al., 2011).

The aim of the study is to estimate the value of pollination of apple orchards in Poland in the years 2005-2017 using selected methods. An attempt was also made to evaluate the results obtained and to indicate the factors determining changes in pollination value over time.

The selection of apple orchards for research resulted from their greatest significance for fruit production in Poland. The paper uses data from the Central Statistical Office (GUS), the National Bank of Poland (NBP) and literature on the subject.

Research results and discussion

The pollination of plants determines the possibility of obtaining crops. In Poland, about 78 % of plant species are pollinated by insects, among which the bee dominates. Beekeepers are generally not paid directly for pollination by bees. Beekeepers' bee products, including honey in particular, may be regarded as payment. The global honey market in the years 2008-2018 grew at a rate of 2 % per annum (Popovych, 2018). However, not all agricultural crops requiring pollination have high honey yields. Therefore, non-market forms of support for beekeeping are also important. A form of aid for beekeepers is the programme introduced by the EU in 1997 to support the beekeeping industry. These funds have had a positive impact on the development of apiculture in EU countries (Jarka and Trajer, 2018; Pawlowski, 2018; Popescu, 2018).

Pollination of cultivated plants is a treatment increasing their yield-forming potential. This treatment may result in an increase in the volume of crops, as well as an improvement in their quality. Other measures, such as cultivation, fertilisation or spraying with plant protection products can only use the yield-forming potential of the plant.

The difficulty of estimating the economic value of pollination of plants results from the difficulty of precise determination of the effects of this measure and the valuation of these effects. For this purpose, a variety of methods can be used, which can most generally be divided into market and non-market ones. Market methods use information available on the market concerning the issue under examination. If the pollination value is determined in this way, it is necessary to collect information on rental prices (in the case of bees) or purchase (in the case of bumblebees) of pollinating insects. The value of pollination in this case will be equal to the price of renting or purchasing insects for pollination. In Poland this value will be low. According to research conducted by Pizlo, among the owners of orchards in the Grojec region only about 3 % of them rented bees for pollination of orchards (Majewski and Pizlo, 2012). This indicates low interest in the paid pollination service, which may result from relatively good natural conditions in Poland, and perhaps also from the lack of knowledge among fruit cultivators about the impact of insects on the yields of fruit plants.

Pollination value studies were carried out in many countries around the world (Table 1). For most of the studies the method of yield values obtained by pollination was applied. The results indicate that pollinating insects are of high importance for agriculture, ranging between GBP 121 and 165 billion per year. When comparing the results of different authors, one can notice a significant variation in the obtained values. This is particularly true of research in the USA. In the case of Poland, the results did not differ significantly (Table 1). Significant differences in some of the results obtained

may result from different approaches to research, the adoption of different assumptions or consideration of different sizes determining the impact of pollinating insects on the yield of cultivated plants. This indicates the need for further research in order to improve testing methodology.

Table 1

Value of pollination service in selected countries and worldwide according to studies by various authors, in GBP billion in 2010

Research Author(s)	Publication's year	Country	Pollination value, in GBP bln (2010)	Method of estimation*
Gill	1991	Australia	0.5–0.9	DR
Brading et al.	2009	Egypt	1.30	DR
Canadian Honey Council	2001	Canada	0.41	DR
Matheson and Schrader	1987	New Zealand	1.83	CV
Zych and Jakubiec	2006	Poland	0.52	DR
Majewski	2014	Poland	0.61	DR
Carreck and Williams	1998	Great Britain	0.32	DR
Robinson et al.	1989	The USA	12.4	DR
Southwick and Southwick	1992	The USA	2.5–8.3	DR, CS
Morse and Calderone	2000	The USA	12.1	DR
Losey and Vaughn	2006	The USA	2.3**	DR
Calderone	2012	The USA	10.6	DR
Pimtel et al.	1997	World	165.7	DR
Gallai et al.	2009	World	121.8	DR, CS

* CS - consumer surplus method, CV - crop value method, DR - dependency ratio method.

** Pollination value by indigenous bees. The pollination value of all pollinators was set at GBP 42.6 billion (Losey and Vaughn, 2006).

Source: Hanley et al. 2015; Majewski, 2014

In order to indicate the differentiation of possible results on pollination values depending on the estimation method used, the value of pollination was determined using three methods, i.e. crop value, dependency ratio and replacement costs. In the case of the replacement cost method, the value was identified in two options, which differ in the way in which human labour costs are estimated. In the first option (RC min.), labour costs are set at the level of the minimum wage, and in the second option (RC ave.) at the level of the average wage. In addition, it was assumed that the costs of preparing the workplace, the costs of acquiring pollen for pollination and other costs were included in the pollinating person's wage costs. The data concerning the level of salaries were obtained from the National Bank of Poland.

The pollination value was determined for apple orchards. Apples are one of the most important fruits in the world. They are grown on all continents where horticulture can be found. The choice of apple orchards also resulted from the importance of these crops in Poland and the possibility of applying the replacement cost method, as apple trees are pollinated by insects, mainly by bees (Cuthbertson and Brown, 2006). Information on the area of apple trees cultivation and apple prices was obtained from the Central Statistical Office in Warsaw. On the basis of the literature on the subject, the impact of pollinators on the apple tree yield was determined as 90 %. In the case of the replacement cost method, it was assumed that only men can serve as a replacement - this is the case in some parts of China (Mburu et al., 2006; Partap and Ya, 2012). In order to determine the number of people needed for pollination of apple orchards, it was assumed after Allsopp et al. (2008) that it takes on average about 45 minutes for 1 apple tree to be pollinated by a man. The pollination value was also given in dollars and euros to ensure the possibility of comparing the results with those of other authors. Average annual exchange rates from the National Bank of Poland were used for conversions.

Value of pollination of apple orchards by selected methods in Poland in the years 2005-2017

Method	2005	2010	2011	2012	2013	2014	2015	2016	2017
in millions of PLN									
CV	1 073.2	1 200.7	2 109.2	2 101.9	2 759.9	1 689.7	2 465.0	2 105.3	2 534.2
DR	965.9	1 080.7	1 898.2	1 891.7	2 483.9	1 520.7	2 218.5	1 894.8	2 280.7
RC min	648.5	1 224.1	1 461.8	1 735.0	1 959.6	2 005.6	2 274.8	2 506.5	2 837.1
RC ave	1 819.6	2 998.0	3 584.6	4 073.9	4 469.9	4 514.8	5 070.1	5 484.6	6 053.9
in millions of USD									
CV	331.8	398.2	711.7	645.3	873.2	535.5	653.8	533.9	670.8
CR	298.6	358.4	640.5	580.8	785.8	482.0	588.4	480.5	603.7
RC min	200.5	405.9	493.3	532.7	620.0	635.7	603.4	635.7	751.0
RC ave	562.5	994.1	1 209.6	1 250.8	1 414.2	1 431.0	1 344.8	1 390.9	1 602.5
in millions of EUR									
CV	266.6	300.6	512.0	502.2	657.5	403.7	589.2	482.6	595.2
DR	240.0	270.5	460.8	452.0	591.8	363.4	530.2	434.3	535.7
RC min	161.1	306.4	354.8	414.6	466.8	479.2	543.7	574.6	666.4
RC ave	452.0	750.5	870.1	973.5	1 064.9	1 078.8	1 211.8	1 257.2	1 421.9

Source: author's own calculation

The value of pollination of apple orchards in Poland, depending on the method used, in 2005 ranged from PLN 0.65 to 1.8 billion, and in 2017 from PLN 2.23 to 6.05 billion (Table 2). The lowest values were obtained for the dependency ratio method and the highest for the replacement cost method - RC ave. In the case of the crop value method and the dependency ratio method, the resulting pollination value is mainly influenced by the crop volume and unit price of the manufactured product, and in the case of the latter also by an indicator determining the share of pollination yield in the total yield. In the case of the replacement cost method, the result is influenced by the time spent on pollination of the unit of area of the crop tested and the cost of employing workers.

It should be noted that in the case of each of the compared methods there is No reference to the analysis of improvement (or deterioration) in the quality of the yield obtained, which also affects its value. Thanks to insects, visiting the same flowers many times for a few days, the resulting fruits are well-developed and healthy. The unit price of such fruit is usually higher than in the case of smaller fruit. On the other hand, pollen is usually supplied once for man-pollinated flowers, which can result in a poorer quality than if insects pollinated the crop.

The estimated value of pollination of apple orchards in Poland in the studied period was characterized by an increase in subsequent years. The fastest growth rate (more than 4-fold increase) of the studied value was recorded in the case of the replacement cost method with the use of the minimum wage (RC min.), which resulted from the relatively high growth rate of the minimum wage and the number of trees to be pollinated. In the case of the replacement cost method with the use of the average wage (RC ave.), the value of pollination of apple trees more than tripled between 2005 and 2017 and was twice as high as in the case of the RC min. method. In the case of the other two methods, the value of pollination increased more than twice during the considered period (Table 2).

In the case of the pollination value given in EUR and USD, the trends in all the methods used were similar to the values given in PLN (Table 2). Also the variability of the value estimated in all currencies was similar and ranged from 25 to 36 %.

Average pollination value per hectare of apple orchard in Poland in the years 2005-2017

Method	2005	2010	2011	2012	2013	2014	2015	2016	2017
in PLN per hectare									
PV	6 325.9	7 044.8	11 492.4	10 796.5	14 267.7	9 582.2	13 664.2	11 878.6	14 369.9
DR	5 693.5	6 340.5	10 342.9	9 717.0	12 840.7	8 623.9	12 297.7	10 690.7	12 932.7
RC min	3 822.6	7 181.9	7 965.1	8 912.1	10 130.3	11 373.8	12 609.8	14 142.0	16 087.7
RC ave	10 725.6	17 589.5	19 531.8	20 926.1	23 107.5	25 603.5	28 104.9	30 944.8	34 328.5
in USD per hectare									
PV	1 955.6	2 336.0	3 878.1	3 314.9	4 514.0	3 037.0	3 624.4	3 012.5	3 803.9
DR	1 760.1	2 102.8	3 490.0	2 983.4	4 062.3	2 733.4	3 261.7	2 711.0	3 423.3
RC min	1 181.8	2 381.4	2 687.9	2 736.3	3 205.1	3 605.1	3 344.8	3 586.7	4 258.5
RC ave	3 315.6	5 832.4	6 590.9	6 424.9	7 310.8	8 115.2	7 454.6	7 847.6	9 086.9
in EUR per hectare									
PV	1 571.5	1 763.6	2 789.6	2 579.8	3 399.1	2 289.5	3 265.9	2 722.9	3 375.1
DR	1 414.7	1 587.0	2 510.8	2 321.8	3 059.4	2 060.9	2 939.0	2 450.4	3 037.7
RC min	949.6	1 797.7	1 933.2	2 129.6	2 413.2	2 717.6	3 013.9	3 242.0	3 778.8
RC ave	2 664.3	4 403.2	4 741.0	5 000.5	5 505.1	6 117.9	6 717.3	7 093.3	8 062.9

Source: author's own calculation

In order to achieve comparability with other results and to better illustrate the changes in the pollination values of apple orchards, the pollination values per hectare of orchards were determined (Table 3). These values are characterised by a slightly lower trend (from 9 to 17 percentage points) in the increase in pollination value between 2005 and 2017 than in the case of the general data. This indicates that the increase in the value of pollination of apple orchards in the years under study resulted to a small extent from the increase in their area. It should be noted that in the case of estimates made using the replacement cost method, the value of pollination in most cases exceeded the value of production.

Conclusions

Pollination is an environmental service that is important from an agricultural and environmental point of view, as it ensures the maintenance of biodiversity. As a rule, the beekeeper does not receive any payment for its performance. This, in turn, causes their reluctance to place bee colonies close to agricultural crops with low honey yields, such as orchards. As a result, the yields of these plants can be low.

Worldwide studies use many methods to value pollination. Their results may vary and depend on the assumptions and approach to the concept of pollination value. The methods used in the study give different results. However, for all methods there is a clear tendency for the pollination value to increase over time. The highest values were obtained in the case of the replacement cost method and adoption of labour costs at the level of the average wage in the Polish economy. The value obtained by this method was at least twice as high in most of the years under study as in the case of other methods. Relatively high pollination value in the years 2016-2017 was also obtained using the replacement costs method taking into account the costs of the minimum wage. This was due to an increase in the minimum wage and the gradual intensification of orchard production in Poland, which included planting density.

The increase in the value of pollination under the crop value method and the dependency ratio method resulted from the upward trend in apple prices, which, however, was characterised by significant variability in individual years, and the volume of crop production.

It seems that the method that most fully reflects the value of pollination among the methods used is the dependency ratio method. The problem under this method may be the determination of the extent to which pollinators impact the amount and quality of crops, as pollination is only one of the many treatments that affect the amount of crops. Even in the case of good pollination of crops, the yield may be low due to unfavourable weather conditions, e.g. frost. On the other hand, the replacement cost methods is a hypothetical method because of the impossibility of replacing pollinating insects by humans, not least because of the short flowering period of apple trees and because of this need to employ a significant number of people who would have to deal with pollination.

The conducted research indicates the importance of pollinating insects in fruit production. The estimated values may serve as a basis for determining possible support for beekeeping for the provision of orchard pollination services. It seems necessary to carry out further research to improve the methods of determining this value.

Bibliography

1. Allsopp, M.H., de Lange, W., Veldtman, R. (2008). Valuing Insect Pollination Services with Cost of Replacement. *PLoS ONE*, 3(9) e3128, pp. 1-8.
2. Breeze, T.D., Bailey, A.P., Balcombe, K.G., Potts, S.G. (2011). Pollination Services in the UK. How Important are Honeybees? *Agriculture, Ecosystem and Environment* 142(3-4), pp. 137-143.
3. Cuthbertson, A.G.S., Brown, M.A. (2006). Vital Pollinators: Honey Bee in Apple Orchards, *Biologist* 53(2), pp. 78-81.
4. Czyżewski, A., Kulyk, p. (2011). Dobra publiczne w koncepcji wielofunkcyjnego rozwoju rolnictwa; ujęcia teoretyczne i praktyczne (Public Goods in the Concept of Multifunctional Development of Agriculture; Theoretical and Practical Approach), *Problemy Rolnictwa Światowego* 11(2), pp. 16-25.
5. Gallai, M., Salles, J.M., Settele, J., Vaissiere, B.E. (2009). Economic Valuation of the Vulnerability of World Agriculture Confronted with Pollinator Decline, *Ecological Economics* 68, pp. 810-821.
6. Haney, N., Breeze, T.D., Ellis, C., Goulson, D. (2015). Measuring the Economic Value of Pollination Services: Principles, Evidence and Knowledge Gaps, *Ecological Services* 14, pp. 124-132.
7. Jarka, S., Trajer, M. (2018). Support for the Beekeeping Sector in Poland and the European Union, *Problems of World Agriculture* 18(4), pp. 183-191.
8. Kukula, K. (2015). Porównanie międzyrankingowe państw UE ze względu na wybrane elementy biogospodarki (Comparisons between Ranking Arrangements within the EU Countries with Respect to Chosen Elements of Bio-Economy in 2012), *Problemy Rolnictwa Światowego* 15(3), pp. 93-101.
9. Losey, J.E., Vaughn, M. (2006). The Economic Value of Ecological Services Provided by Insects, *BioScience* 56(4), pp. 311-323.
10. Majewski, J. (2014). Economic Value of Pollination of Major Crops in Poland in 2012, *Economic Science for Rural Development* 34, pp. 14-21.
11. Majewski, J., Pizlo, W. (2012). Znaczenie gospodarcze pszczół w polskim sadownictwie (Economic Significance of Bees in Polish Fruit-Growing), *Wies i Rolnictwo* 1(154), pp. 146-159.
12. Mburu, J., Hein, L.G., Gemmill, B., Collette, L. (2016). Economic Valuation of Pollination Services: Review of Method, FAO UN, Rome.
13. Melathopoulos, A.P., Cutel, G.Ch., Tyedmers, p. (2015). Where is the Value in Valuing Pollination Ecosystem Services to Agriculture? *Ecological Economics* 109, pp. 59-70.
14. Partap, U., Ya, T. (2012). The Human Pollinators of Fruit Crops in Maoxim Country, Sichuan, China, *Mountain Research and Development* 32(2), pp. 176-187.
15. Pawłowski, K.P. (2018). Rola środków pochodzących z Unii Europejskiej w rozwoju pszczelarstwa na przykładzie Wojewódzkiego Związku Pszczelarzy w Poznaniu (The Role of Funds from the European Union in the Development of Beekeeping on the Example of the Provincial Union of Beekeepers in Poznan), *Problemy Rolnictwa Światowego* 18(4), pp. 382-394.
16. Popescu, A. (2018). Honey Production and Trade before and after Romania's Accession into the European Union, *Scientific Papers – Series Management Economic Engineering in Agriculture and Rural Development*, 18(4), pp. 229-247.
17. Popławski, L. (2013). Problem wyceny dóbr i usług środowiskowych na obszarach wiejskich (Problem of Environmental Goods and Services Valuation in Rural Areas), *Prace Naukowe Uniwersytetu Ekonomicznego we Wrocławiu* 317, pp.250-260.

18. Popowych, A. (2018). Zastosowanie modelu grawitacyjnego do analizy międzynarodowego handlu miodem pszczelim (The Application of the Gravitation Model for Analyzing of International Trade in Bee Honey), *Problemy Rolnictwa Światowego* 18(4), pp. 395-406.
19. Winfree, R., Gross, B.J., Kremen, C. (2011). Valuing Pollination Services to Agriculture, *Ecological Economics* 71, pp. 80-88.

ENERGY MIX AS THE BASIC REGULARITY OF THE PRINCIPLES OF SUSTAINABLE DEVELOPMENT

Ireneusz Miciula¹, Ph.D.

¹University of Szczecin, Faculty of Economics and Management, Institute of Finance

Abstract. Energy sources are a basic factor of economic development. Within the framework of the climate and energy policy of the European Union (EU), the rural areas that allow the use of renewable energy sources become more important. The aim of the article is to show the direct impact of contemporary EU policy in this area on the economic situation of states. At the same time, we are developing recommendations for the EU regarding future climate and energy policy by analysing empirical data developed by the world's largest organizations and institutions, such as the International Atomic Energy Agency, the World Nuclear Association, Eurostat and the International Energy Agency, and practices used by EU countries. The basis of the presented considerations and recommendations is a review of the subject literature and statistical analysis of empirical data. Conclusions are presented in accordance with the economic effectiveness of various energy sources and the principles of sustainable development.

Key words: EU energy and climate policy, energy sources, economic effectiveness, renewable energy sources.

JEL code: A11, C82, F5, F63, N5, O11, Q01, Q43.

Introduction

Energy mix is a combination of various types of energy production and consumption. Their diversity, i.e. various ways of generating and using energy, increases the security of a country in the event of a failure or depletion of one of the sources. The energy market operates according to economic rules, hence the possibility of choosing a source of energy, which undoubtedly contributes to an increase in competitiveness and a decrease in prices for end users. By promoting domestic energy resources, a country does not have to rely on energy imported from other countries, which has a number of economic and social advantages. Energy is supplied in the form of electricity, heat and fuel for operating machines and devices. In the case of electrical energy, primary energy produced from a particular source is processed so that it can be used and delivered to end users via an energy transmission grid. The case is similar with thermal energy, but a greater number of alternative sources of energy may be used for production, including regional resources, and its processing and transmission are less complex.

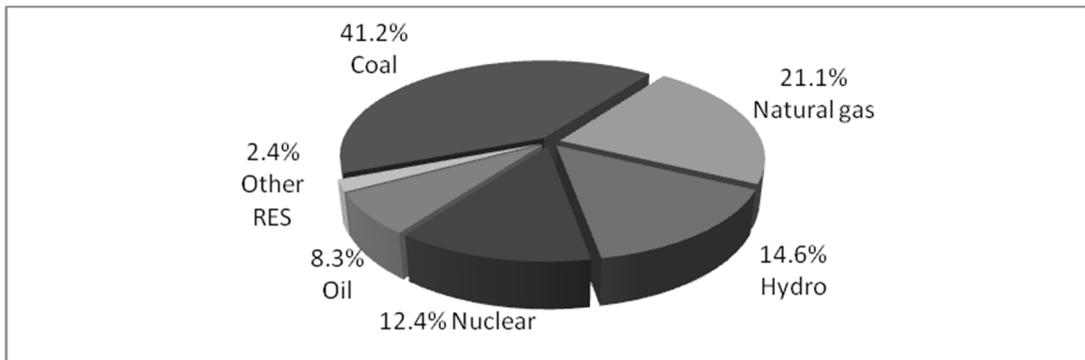
Access to energy sources undoubtedly constitutes one of the basic factors of economic development. Europe is increasingly dependent on oil and gas imports, with a constantly growing demand for these raw materials. Therefore, the problem is the lack of diversification of energy sources, as well as the issue of security of its supply, directly related to the dimension of external EU activities. At the same time, there is a need for Member States to build competitive internal energy markets and increase energy efficiency. In addition, the Union responds to global problems that arise from climate change. Undoubtedly, all EU countries want to pursue the goal of reducing CO₂ emissions. However, they differ in how they should be achieved. First of all, the strategy of limiting negative climate change must be effective globally and cannot significantly limit economic development and the well-being of societies. Therefore, as part of the EU's climate and energy policy, priority should first be given to the objectives to be achieved in the first place, since all tasks in the short term until 2030 cannot be achieved, including due to the limited resources. The nature of challenges in the sphere of energy security creates an unprecedented platform for enhanced cooperation and co-shaping the EU's climate and energy policy. The EU strategy consisting in the

¹ Ireneusz.miciula@usz.edu.pl, The project is financed within the framework of the program of the Minister of Science and Higher Education under the name "Regional Excellence Initiative" in the years 2019-2022, project number 001/RID/2018/19, the amount of financing PLN 10,684,000.00.

diversification of energy sources will contribute to the development of competition and will allow to take into account environmental protection requirements, and will also be the reason for balancing the interests of energy companies and energy consumers. However, attention should also be paid to the limitations and reality of EU plans for individual countries and the economic consequences that may occur as a result of introducing unfavourable processes forced by the EU. The impact of such activities on the functioning of economic entities will be huge. Therefore, it is necessary to take care of activities that will allow for the sustainable development of all EU member states and ensure energy security in a manner that will be based on the principles of rational and effective use of energy resources.

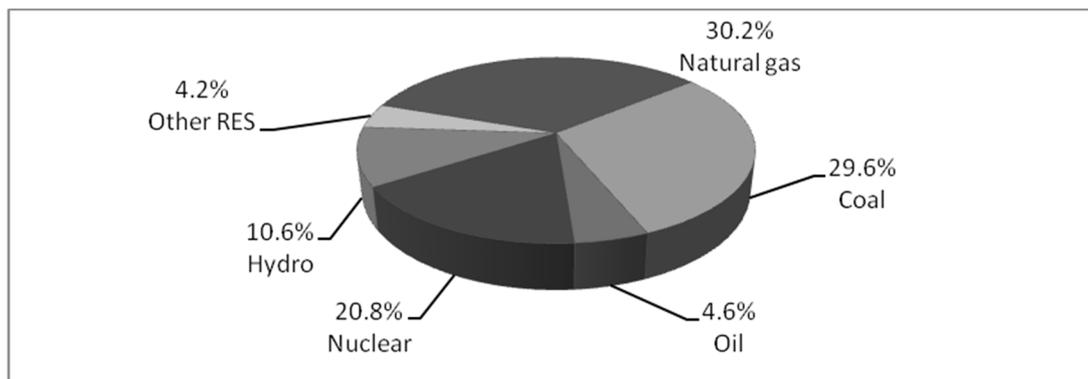
Research results and discussion

The charts below (Figure 1 and Figure 2) analyse electrical energy mix around the world and in EU countries and specify the main sources of energy in this category.



Source: author's calculations based on (International Energy Agency, 2018)

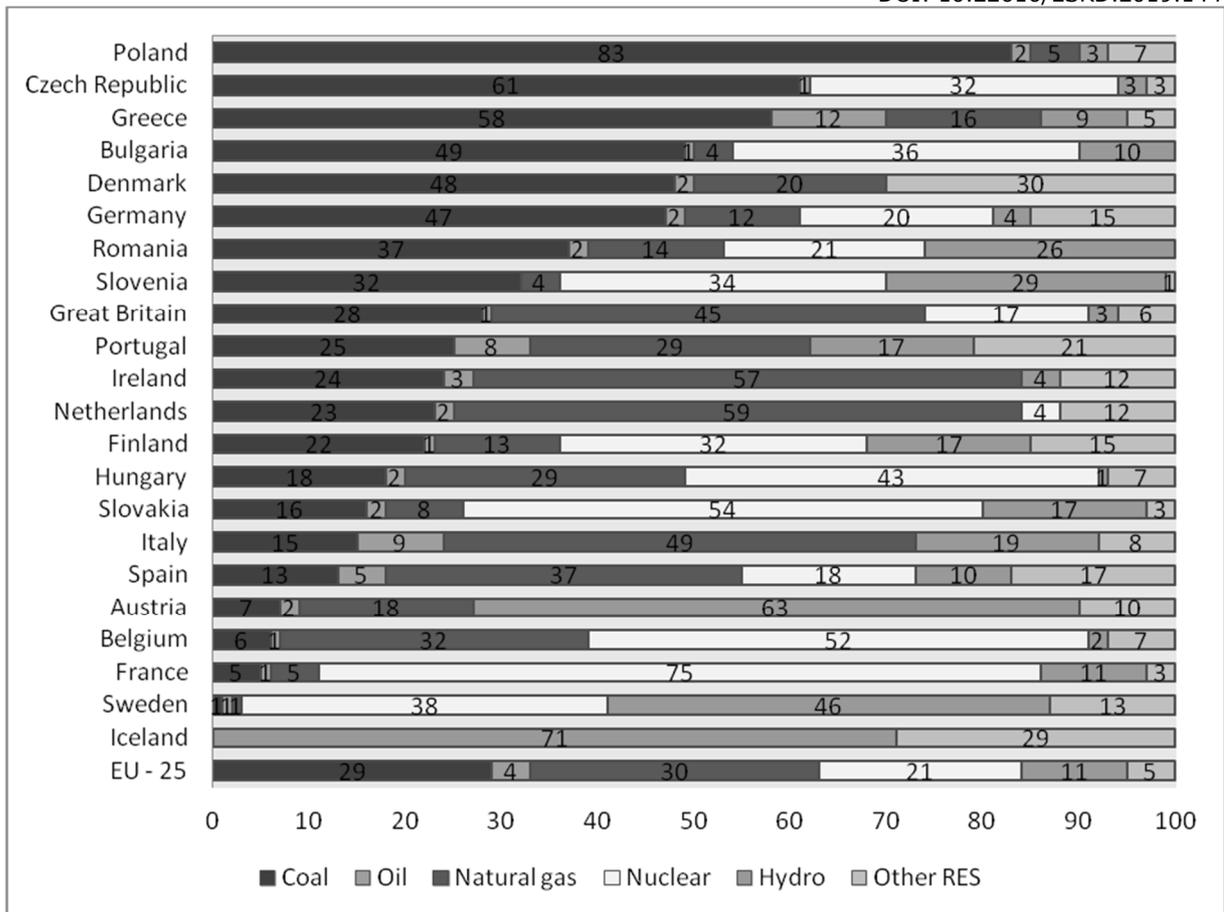
Fig. 1. Global production of electrical energy in 2016 (in percent)



Source: author's calculations based on (Eurostat, 2018)

Fig. 2. Production of electrical energy in the European Union in 2016 (in percent)

Given the depletion of coal resources in some EU Member States, the share of coal decreased to 30 % and is 11 % lower compared to electrical energy mix around the world. In spite of the intention to satisfy the demand with domestic resources, which manifests itself in a higher proportion of nuclear energy and RES, the share of gas needed to guarantee energy supply in EU Member States is 9 % higher than globally. As for oil and hydropower, their share is higher in the global production of electrical energy than in the EU because of countries with rich oil resources, on the one hand, and those with natural geographic conditions conducive to the construction of hydroelectric power plants, on the other.



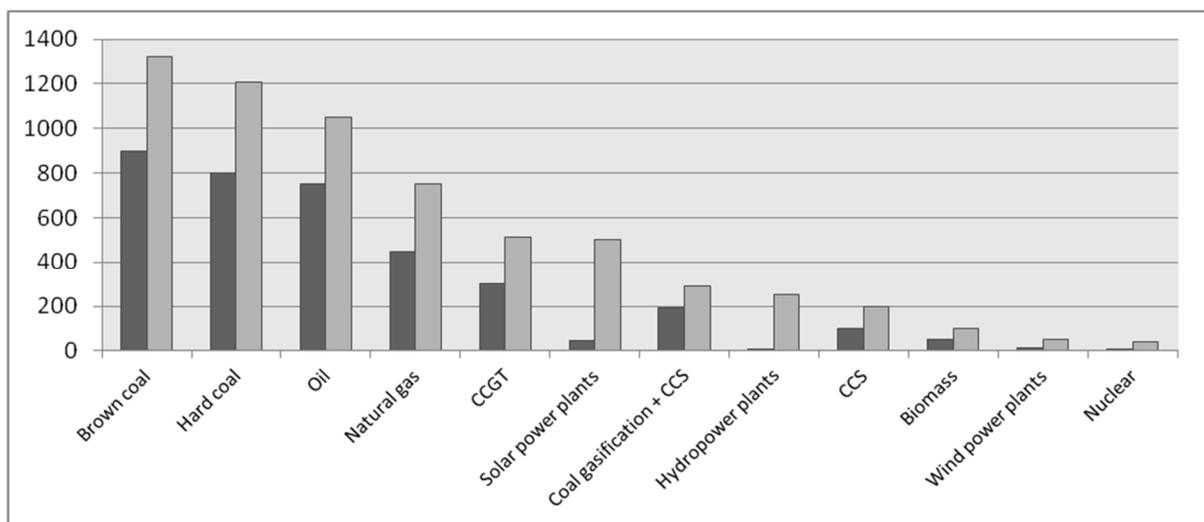
Source: author's calculations based on (Eurostat, 2018)

Fig. 3. Electrical energy mix in EU Member States in 2016 (in percent)

Figure 3 presents a detailed breakdown of electrical energy mix in individual EU countries in 2016. The average for the EU-25 is indicative of the changes concerning the main energy sources used for the production of electrical energy. Coal was replaced by gas at the top of the list, which means that the EU is now dependent on external supplies of this resource. It is possible to define the energy situation and strategy of particular countries in by analysing the energy resources used for the production of energy. For instance, many EU countries, due to the depletion of coal resources and the intention to use domestic resources without being reliant on external gas suppliers, opt for developing nuclear energy. These countries include: France (75 %), Lithuania (76 %), Slovakia (54 %), Belgium (52 %), Hungary (43 %), Sweden (38 %), and even Bulgaria (36 %), the Czech Republic (35 %), Slovenia (34 %) and Finland (32 %). Favourable natural conditions in Iceland and Austria allow for producing most of the energy in hydroelectric power plants, 71 % and 63 % respectively. Great Britain and Denmark have rich resources of gas and oil and countries such as Italy, Greece or Portugal do not produce nuclear energy due to lack of public support. Germany is currently moving away from nuclear energy because of concerns caused by the nuclear catastrophe in Fukushima, Japan, and replaces it with coal and RES. In spite of significant investments in RES, their share in electrical energy production in the EU-25 is only 5 % of. An analysis of the energy situation in Germany, which is mainly responsible for the direction of the current EU climate and energy policy, indicates there are many conflicts which can lead to abandoning EU objectives altogether. In spite of numerous controversies, at the last moment the government of Germany adopted an operating program, whose aim is to lower CO₂ emissions according to EU arrangements. However, when adopting the program, Barbara Hendricks (SPD), Federal Minister for the

Environment, Nature Conservation, Building and Nuclear Safety, came to the conclusion that it would not be implemented due to the plan to abolish nuclear energy altogether, which will translate into a true renaissance of coal power plants. In the upcoming years, Germany – the global leader in brown coal mining – will produce over 50 % of electrical energy from this resource. This is why Poland, with its coal reserves, should also opt for coal and increase its extraction so that it can be exported to EU Member States, which currently increase their imports of this resource from non-EU countries (Stepien and Miciula, 2016).

Given the vast reserves of gas in Great Britain and Denmark, and convenient access to external markets, countries such as Ireland, the Netherlands, Belgium, Italy, Spain and Portugal opt for gas as the main energy resource. However, it should be noted that gas, similarly to other main energy resources, is characterised by high emissions of greenhouse gases, as presented in Figure 4. New coal and gas technologies such as CCGT¹ and CCS² significantly contribute to a decrease in greenhouse gas emissions down to values similar to those associated with RES. This shows that the technology used for production and consumption, which affects efficiency, availability, emissions and financial costs, is of great importance in terms of selecting a source of energy (Balitskiy, Bilan and Strielkowski, 2014). Since there is a possibility of using various technologies, double bars in the Figure below correspond to minimum and maximum emissions for different plant constructions.



Source: author's calculations based on (International Atomic Energy Agency, 2018)

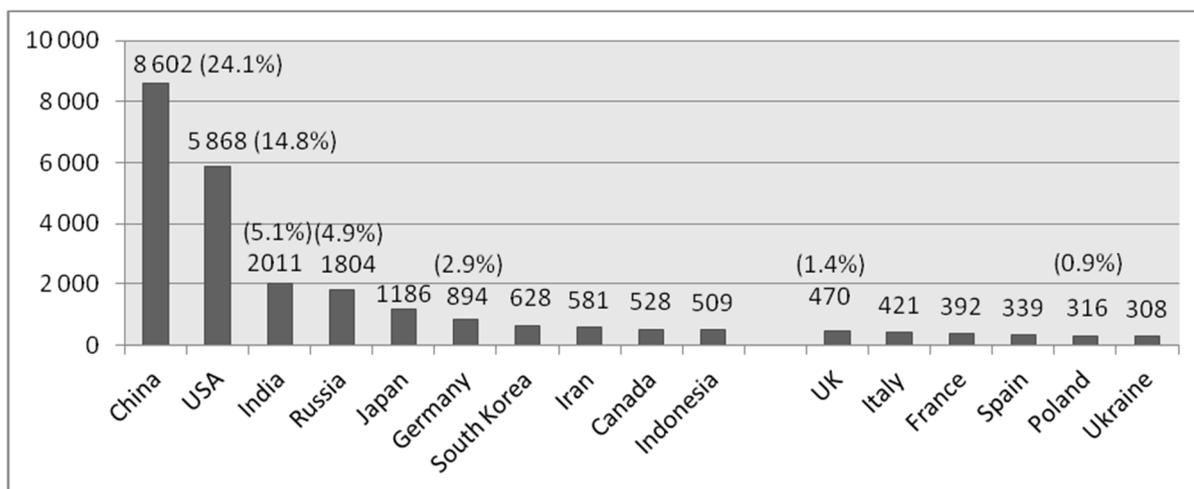
Fig. 4. Greenhouse gas emissions by energy sources (grams per kWh)

Forecasts indicate that the 21st century will see the beginning of diversification and due to the emergence of new technological possibilities, a new energy mix for operating machines and devices will be created. However, this will be a slow-paced process, because of the oil lobby hindering the development of alternative fuels. The second reason is the decrease in oil prices on the market resulting from the increasing extraction in Russia and the USA, where the ban on export is becoming less pronounced, and in Africa and North America, which at the same time caused a decrease in the share of OPEC in the global oil market from 50 % to 30 %.

When analysing emissions in individual economies, the share of EU's emissions in the global CO₂ emissions should be taken into account. The data below (Figure 5) clearly indicate that, although Germany ranks sixth in terms of global CO₂ emissions, the entire EU does not have a significant impact on global emissions. This is why measures whose aim is to reduce CO₂ emissions in EU Member States will not make any difference to global warming. The Figure 5 presents CO₂ emissions

¹ Combined Cycle Gas Turbine
² Carbon Capture and Storage

for individual economies, with the percentage of global emissions in brackets. The first eight countries account for 60 % of global carbon dioxide emissions. Responsible for 2.9 % of global emissions, Germany is the only EU country in the global top ten. Great Britain ranks second in the EU and fourteenth worldwide, with a 1.4 % share in emissions. Emissions generated by Poland constitute less than 1 % on the global market. Increasing energy effectiveness is an important tool in lowering CO₂ emissions, whose effects can be verified with the use of indicators demonstrating the ratio of emissions to GDP or to the population of a given country. However, as with many other indicators, detailed analyses must be performed in order to draw the right conclusions.



Source: author's calculations based on (BP Statistical Review of World Energy, 2017)

Fig. 5. CO₂ emissions in top 10 and selected countries in 2016 (in millions of Mg)¹

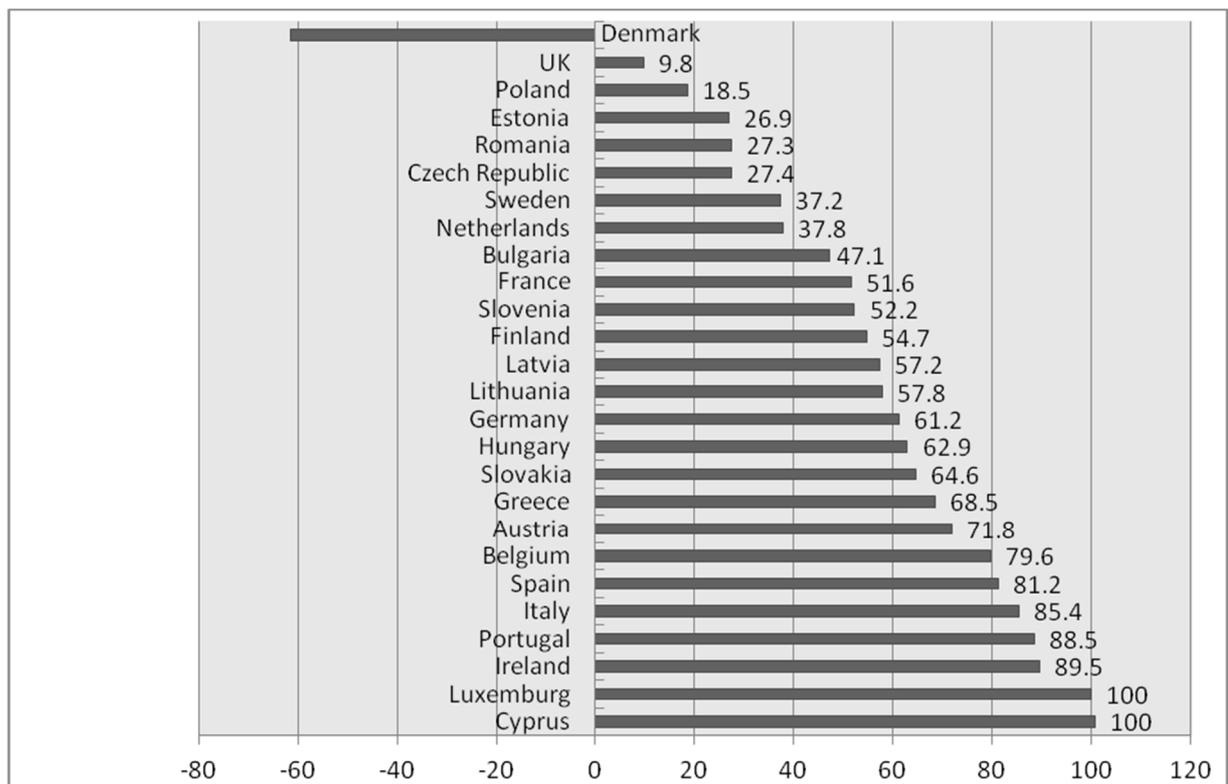
Given the above analysis, there is No doubt that the EU energy and climate policy will have to be changed and the period from 2020 to 2030, i.e. the time when the majority of instruments will have been in place and achievement of goals will have been verified, will be pivotal in determining whether there will be a complete overhaul of the policy. Future goals should be based on specific statistical data and indicators to accommodate all major objectives included in the so-called triad of objectives to guarantee long term, safe and predicTable framework for investment in further development of diversified sources of energy according to market rules and having regard to protection of the natural environment.

In the context of limited reserves of conventional resources in the majority of EU Member States, the EU needs to tackle two major problems: lack of energy safety and dependence on external suppliers, especially on a single supplier, e.g. Russia. At the same time, competitiveness is one of EU objectives as it would allow for lowering costs of energy production. Unfortunately, this is often contrary to the intention of becoming independent from external supplies as the cost of imported resources is lower than that of domestic sources. Therefore, in order for the policy to be coherent, priorities need to be determined. First, energy safety should be ensured, i.e. a particular country should have the necessary amount of energy at market prices (competitiveness) and only then should it pursue its own production objectives, provided that there is an economic justification for that. Especially that the energy market is undergoing constant changes and there is a tendency to create a market where the actual prices are those that charged at the moment of purchasing energy, as opposed to those specified in long-term contracts, which will be conducive to creating a market based on economic rules. Therefore, projects involving new sources of supply, new routes for transfer of

¹ Megagram (symbol Mg) is a derived unit of mass in the International System of Units which equals one million grams (commonly referred to as a ton). Megagram is a standard unit used in legal regulations.

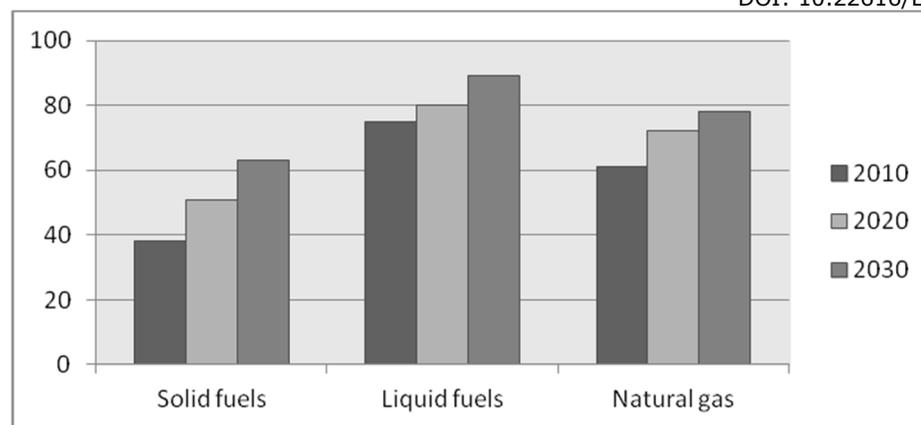
resources, and energy source diversification are implemented so that financial aspects will become decisive (The Economist, 2013).

The below (Figure 6 and Figure 7) analysis concerns resources which satisfy a given country's demand for energy in 80 %, i.e. solid fuels, oil and gas. In spite of increasing dependence on external supplies, the situation in the EU varies from country to country. Denmark, the major oil and gas exporter in the EU, is completely independent in terms of energy because of its rich natural reserves of these resources. The country has also the biggest share in the production of wind energy in the EU. It only imports solid fuels because it is financially beneficial. Great Britain also has access to oil and gas resources from the bottom of the North Sea, so it only imports solid fuels, which means that its dependence on import is as low as 10 %. Countries such as Poland, the Czech Republic, Estonia, Romania, Bulgaria, Slovenia, Greece and Germany have natural reserves of solid fuels, mainly coal, and therefore they are more independent in this respect than other EU countries, whose dependence on imports of solid fuels exceeds 90 %.



Source: author's calculations based on (Eurostat, 2017)

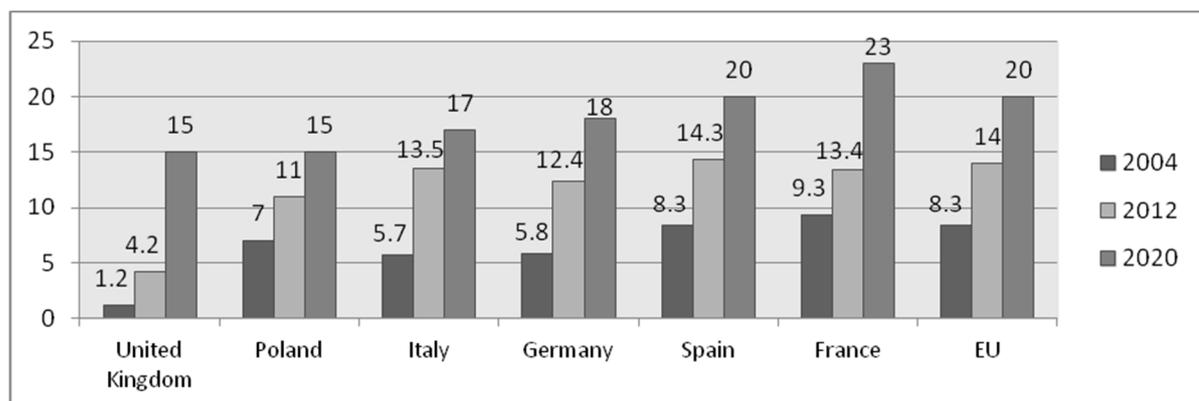
Fig. 6. Dependence of EU countries on imports of conventional fuels in 2015 (in percent)



Source: author's calculations based on (European Commission, 2010)

Fig. 7. Share of imported fuels in total demand for energy products in the EU-25 and the forecast by the European Commission for the years 2020 and 2030 (in percent)

Given the current state of technology, the global promotion of RES seems paradoxical because energy management in practice shows there is No justification for the use of RES when it is not profitable (Miciula and Miciula, 2014). Moreover, the analysis demonstrates that the use of RES is not particularly conducive to climate protection for several reasons, namely: combustion of biomass and deforestation account for 10 % of greenhouse gas emissions, and smaller surface of forests means less CO₂ purification. Moreover, transporting biomass also causes emission of CO₂ to the atmosphere. Due to the current conditions, regulations implemented by the EU and financial reasons, there has been an increase in biomass transportation, which in turn increases CO₂ emissions. The chart below (Figure 8) presents progress in reaching the targets for to the share of renewable energy in total consumption of energy, which are to be met by 2020.



Source: author's calculations based on (Eurostat, 2017)

Fig. 8. Total share of energy from RES: electricity, gas and fuel and EU target (in percent)

In 2012, the EU average was 14 %, so the EU would still need 6 % to meet the target. However, it should be pointed out that these shares would not have been achieved if it hadn't been for EU subsidies, which means that the change is not permanent and most probably after the results have been assessed, the shares will start decreasing (Glachant, Finon and Hauteclouque, 2014). Moreover, some of the EU Member States will have problems meeting the targets and some of them will definitely not meet them, an example being the share of transport biofuels. Great Britain for instance is a country that has struggled with reaching this target.

Conclusions, proposals, recommendations

Moreover, the very fact of achieving the 20 % target cannot be treated as a success. A detailed analysis of data and effects of this task points to the conclusion that the costs of achieving this objective are high and entail a number of negative phenomena and, most importantly, that the result

is unstable. The intention to reduce CO₂ emissions resulted in the introduction of subsidies for energy crops and then the obligation to co-fire biomass with fossil fuels in power plants. In practice, the CO₂ balance is significantly less advantageous than what follows from theoretical calculations due to emissions during processing (production of pellets) and transportation of biomass (The Economist, 2013). Because of the insufficient supply and high prices in Europe, import of biomass from outside the EU e.g. from Africa, Asia and South America is the practical consequence of EU regulations, which undermines the benefits related to reduced emissions (Perez-Arriaga, 2014). Green policy and investments in RES lead to a number of unexpected paradoxes.

- 1) There is an increase in the share of "dirty" energy. For instance, German suppliers, in order to balance the costs of green energy, buy the cheapest electricity generated from brown coal. Efficiency-wise, Germany produces 30 % of their energy from brown coal and builds new units to ensure a permanent source of electricity in the event of fluctuations in the production from renewable sources. This is the so-called paradox of energy transformation, i.e. in spite of an increase of the share of RES in energy consumption, the CO₂ emission is increasing (Research Institute Agora Energiewende, 2019).
- 2) Energy is expensive, i.e. technologies for producing RES will remain costly for a long time. In Germany, due to such heavy investments in RES the prices of electricity are the highest in Europe and Figures show that over 300 000 households are being disconnected from the grid for unpaid bills. This phenomenon is referred to as "energy poverty".
- 3) With some green technologies, the long-term carbon footprint is higher than that associated with old "dirty" technologies. For instance, due to the enormous number of batteries used, electric cars have a negative impact on the environment.
- 4) According to EU regulations, electricity generated by biomass (primarily wood) and coal co-firing is considered clean. Businesses in the energy sector have considered it a good business opportunity, so now wood is imported in large quantities from other parts of the world to the extent that new sawmills are built in North America to handle exports to Europe.
- 5) Strategic aspects of energy safety in the new geopolitical situation require key investments, such as the Nabucco pipeline project, whose aim is to diversify supply sources and offer market-led possibilities to select energy sources. Significance of these investments reflects the dependence on Russia, which entails lack of security and competitiveness. Therefore, what should be done is use domestic resources and gain access to the entire market.
- 6) Countries which are world leaders in producing energy from coal are the ones that make most investments in green technologies.

Therefore, the „3x20“ plan will no longer be implemented so rigorously because it may turn out to be a pipe dream, at least when it comes to the 20 % decrease in energy consumption. The demand is certainly increasing and energy efficiency does correspond to ambitious EU plans. Commissioner Oettinger said that in order to remain competitive, the European industry needs cheap energy (Oettinger, 2011). Renewable energy sources are expensive, unstable and require major investments in energy systems, especially in transmission grids. Therefore, while coal reserves are being depleted, many EU countries decide to develop nuclear energy, which is already the dominant source of energy in some of them.

Bibliography

1. Balitskiy, S., Bilan, Y., Strielkowski, W., (2014). Energy Security and Economic Growth in the European Union, *Journal of Security and Sustainability Issues*, Vol, 4, No. 2, pp. 123–130

2. BP Statistical Review of World Energy, (2017). Retrieved: <https://www.bp.com/en/global/corporate/energy-economics/statistical-review-of-world-energy.html> Access: 14.11.2018.
3. Eurostat, Retrieved: <http://ec.europa.eu/eurostat/web/energy/statistics-illustrated> Access: 20.11.2018.
4. European Commission, (2010). *European Energy and Transport Trends to 2030 – update 2009*, Brussels: EC.
5. Glachant, J.M, Finon, D., Hauteclocque, A., (2014). *Competition, Contracts and Electricity Markets – a New Perspective*, Firenze: Loyola de Palacio series on European Energy Policy.
6. International Atomic Energy Agency, Retrieved: <http://www.iaea.org> Access: 23.10.2018
7. International Energy Agency, Key World Energy Statistics 2016, Retrieved: <http://www.iea.org/publications/freepublications/publication/> Access: 22.11.2018.
8. Miciula, I., Miciula, K. (2014). Energia odnawialna i jej aspekty finansowe jako element zrownowazonego rozwoju Polski (*Renewable Energy and Its Financial Aspects as an Element of Sustainable Development of Poland*), Prace Naukowe Uniwersytetu Ekonomicznego we Wroclawiu, No. 330, pp. 239 – 247 (*Scientific Works of the University of Economics in Wroclaw, No. 330, pp. 239 – 247*).
9. Oettinger, G. (2011). *UE Proposes Tough Energy Efficiency Package*, Brussels: News from Business Green.
10. Perez-Arriaga, I., (2014). *Regulation of the Power Sector*, Firenze: Loyola de Palacio series on European Energy Policy.
11. Research Institute Agora Energiewende, Retrieved: <http://www.agora-energiewende.de/Paradox.pdf> Access: 21.01.2019.
12. Stepien, P., Miciula, I., (2016). Liberalization of the Polish energy market and the EU commitments, *Czech Journal of Social Sciences, Business and Economics*, vol. 5 (2), no. 25.
13. The Economist, (2013). *The fuel of the future: Environmental lunacy in Europe*, Retrieved: <http://www.economist.com/news/business/21575771-environmental-lunacy-europe-fuel-future> Access: 10.02.2019.
14. World Nuclear Association, Retrieved: <http://www.world-nuclear.org/> Access: 15.01.2019.

AGRICULTURAL AND ENVIRONMENTAL FUNCTIONS OF SUSTAINING LAND USE IN POLISH PROTECTED MOUNTAIN AREAS

Kamila Musiał¹, PhD; **Wiesław Musiał²**, Prof.

¹National Research Institute of Animal Production, Department of Production Systems and Environment, ul. Krakowska 1, 32-083 Balice, Poland, email: kamila.musial@izoo.krakow.pl; ²University of Agriculture in Krakow, Department of Agricultural Economics and Organisation, Institute of Economic and Social Sciences, al. Mickiewicza 21, 31-120 Krakow, Poland

Abstract. The main purpose of the paper was the analysis and evaluation of the economic and natural significance as well as the functions of protected areas within three mountain ranges in Poland. These are: Carpathians, Sudetes and Swietokrzyskie Mountains, where in total there are located 182 rural and rural-urban municipalities, that characterize different shares of individual forms of nature conservation.

Key words: protected areas, functions of mountain areas, southern Poland.

JEL code: Q5, Q57.

Introduction

The knowledge of environmental values of a specific area, gained through a thorough examination of their structure and resources, is the basis for the rational use of specific space for economic purposes, at the same time retaining its most precious natural elements. Although, Poland is described as a lowland country, with mountain regions located in the south, it is the latter that tend to have more valuable natural resources. For this reason, various forms of nature conservation have been established in such areas (Kondracki J., 2009; Musiał W., and Musiał K., 2017).

The subject of study was evaluation of various legal forms of protected areas with regard to the assessment of significance of farmlands in rural and rural-urban municipalities in Polish mountain regions. The studied area included three main mountain ranges: the Carpathians, the Sudetes and the Swietokrzyskie Mountains. From the administrative point of view, they cover 5 voivodships. Analysis of data from the Main Statistical Office for the period 2012-17 covered a total of 182 municipalities, with regard to the proportion of protected farmlands, with the indication of specific forms of nature conservation. The analysis included: national and landscape parks, nature reserves, protected landscape areas and those parts of the Natura 2000 network that are not included in other forms of nature conservation. The number of such forms and their share in the individual mountain ranges and voivodships was defined on the basis of data for the year 2019 shared by the General Directorate for Environmental Protection. What was noted was the role of these areas, the dominant types in individual voivodships and how the share of such areas changed in the period between 2012-17.

The analysis also covered the layout of these areas as regards the so called vertical distribution of the land use, especially in the areas where the landscape includes high altitudes above the sea level and major differences in relative altitudes. The evaluation covered a number of municipalities as well as the area and proportion of the legally protected land within individual mountain ranges, as well as their main agricultural and natural functions. Adjusting the study to the current institutional division mandatory in agricultural policy, the studied areas were broken down into: mountain areas, foothill areas and partial foothills (PROW, 2007-13). A mountain area is understood as an area where more than 50 % is situated higher than 500 m above the sea level, foothill area has more than 50 % of the area situated higher than 350 m above the sea level, but lower than 500 m above the sea level, while partial foothills have less than 50 % of the area below 350 m above the sea level. In order to illustrate a natural framework, these divisions were superposed on vegetation belts, within which it is possible to identify some economic layers as well.

The purpose of the paper was the analysis and evaluation of the economic and natural significance as well as the functions of protected areas within three mountain ranges in Poland.

Research results and discussion

1. Functions of mountain areas in Poland

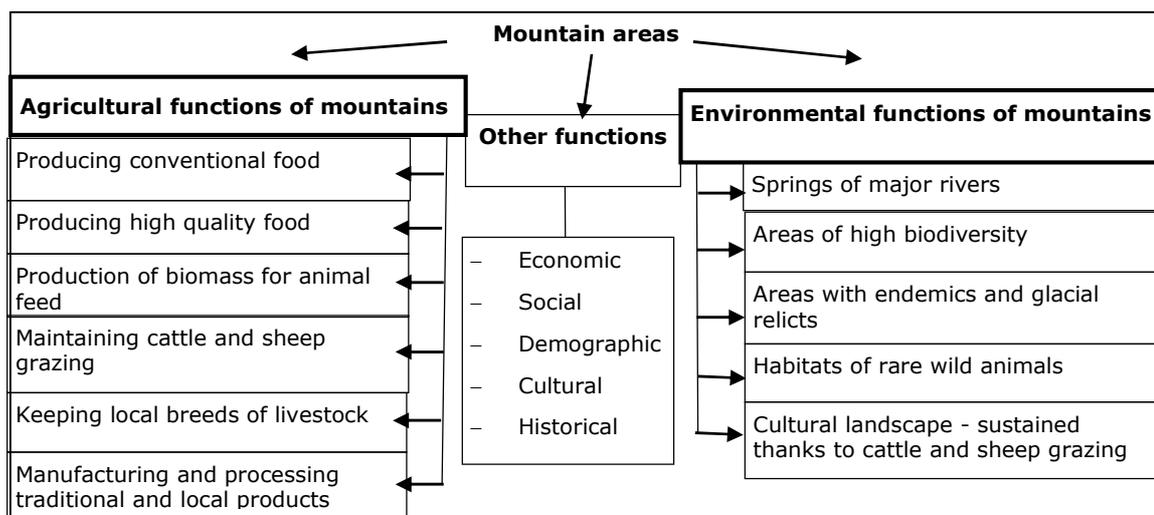
Although, agricultural production in the mountains used to provide a wide range of services, its significance in many regions is becoming gradually reduced. This inspires questions about a new place and position of agriculture in the mountain areas in Poland (Heldak M., 2008). It is possible to distinguish three main functions, which are important for mountains: economic, environmental and social (Czudec A., 2013). One of the reasons why the productive function of agriculture in the mountains is reduced is its low competitiveness, and this is due to difficult natural conditions, low intensity and lower cost-efficiency (Kata R., 2010). On the other hand, mountain areas in Poland are a valuable natural asset, and sustaining their economic functions is important also to maintain the proper role of natural environment. This meaning of functions is a specific sort of benefit, which follows both from the natural conditions and from the intentional management of the environment and agricultural production. These functions may be the same as those of other regions, or separate and characteristic of the individual areas: in this case, these are mountain areas.

Among the most important agricultural functions, food production should be mentioned in the first place, both conventional and of a higher quality (Fig. 1). Since subregions of Carpathians are highly populated, livestock production is significant for the local and regional markets as well (Knapik J., and Musial K., 2017). This entails farming livestock of local breeds and livestock grazing in the mountains. Especially in the Carpathians, local breeds of cattle and sheep are maintained, adjusted to the specific local conditions. For many centuries, dairy and meat products have been produced here in the form of various traditional and local specialties, which is a result of keeping that ruminants (Molik E., Dobosz J., Kordeczka K., and Peksa M., 2017). Since the mountain areas in Poland are situated in the moderate climate zone and mostly on moderate altitudes, they are a good place to produce biomass for animal feed. The biomass comes in a variety of natural and seminatural grasslands and agrocenoses. In the foothills, the most important is production of usable legume species, cereal, fruit and vegetables grown, with the help of extensive technologies. This is why a significant problem is the maintenance of agricultural, open mountain areas in the production space, i.e. mountain areas shaped historically and environmentally, forming a kind of landscape with a high share of farmlands (Musial K., Szewczyk W., and Grygierzec B., 2015).

Mountains also have important environmental functions, which constitute the daily experience of both, the inhabitants of these areas and tourists. Since the annual average precipitation is higher and water retention is low, these are spring areas for most of the major Polish rivers. Thanks to a variety of existing habitats, which follows mainly from the vertical shape of the area, an important environmental function of the mountains is maintaining high biodiversity. The most specific element of this diversity, which is a decisive factor of the natural identity especially in the Carpathians, are endemics (Mirek, Z., and Piekos-Mirkowa, H., 2009; Zemanek B., 2009). These taxa are usually species and subspecies, whose range is limited to a very specific, small area: in this case, it would be the Tatra mountains, especially their higher parts. From among 2500 local species and subspecies of the Polish vascular plants, 170 are endemics or subendemics, which makes up about 7 % of the national flora. Most of these are encountered in mountains, because in order to classify and identify them we need certain geographical barriers and spatial isolation (Piekos-Mirkowa, H., and Mirek, Z., 2010). It is also a factor behind the existence of rare animal species. The total image is

complemented by the maintenance of the cultural landscape, which includes seminatural plant formations, such as pastures and meadows in the lower and upper montane belt. Their structure and physiognomy depend on the maintenance of ruminants, especially the local breeds (Musiał K., and Kasperczyk M., 2013; Knapik J., and Musiał K., 2017).

Other functions of the mountains include: various economic services, social and demographic functions, and cultural and historical ones. Economic functions include i.a. obtaining and processing wood, the production of aggregates and construction materials, as well as providing location for non-agricultural companies. Such activities are often opposed to the traditional understanding of agriculture and therefore give rise to conflicts of environmental and economic interests. Both in Poland and in most of the affluent countries in Western Europe, mountains are regions with considerable demographic burden, because people willingly inhabit such areas. However, it also happens that such regions are subject to depopulation, like the Sudetes in the second half of the 20th century (Latocha A., 2009). People living in the mountain areas usually display considerable cultural distinctness, which is related to the fact that these areas used to be rather isolated in the past. Nowadays this is a factor determining the cultural capital of the region, often expressed in the attachment to the unique tradition (Musiał K., 2018). This also entails strong attachment of the rural population to the land, which includes small farms, passed down from generation to generation (Musiał W., 2017; Musiał W., and Musiał K., 2018). When confronted with the contemporary market economy, such behaviour is often reviewed, which impacts the way of using farmlands.



Source: authors' study, 2019

Fig. 1. Main functions of mountain areas in Poland

2. Significance of sustaining the agricultural use of land in protected mountain areas

Apart from the high-mountain range of the Tatras which is of relatively small area, the Polish Carpathians cover the area of mid- and low mountains, such as Beskidy, Bieszczady and widespread foothills. The foothills are traditionally agricultural zone with a low proportion of woodlands (ca. 20-30 % of the land). On the other hand, the Beskidy zone is situated on higher altitudes above the sea level. The dominant forms include steep slopes with a greater share of woodlands, i.e. between 30 and 70 % (Starkel L., 1990; Bucala A., and Starkel L., 2013). The total area of the Polish Carpathians is ca. 19.5 thousand km², i.e. 76.8 % of the mountain area and ca. 6.3 % of the area of the whole country (Twardy S., 1993). The Carpathians spread over three voivodships: Lesser Poland, Podkarpackie and Silesian. The Polish part of the Sudetes, including the foothills, occupies ca. 9.3 thousand km² within the Lower Silesian voivodship. On the other hand, the Swietokrzyskie

Mountains, situated in the Swietokrzyskie voivodship, include old, paleozoic fold structures. Since absolute and relative altitudes of this range do not match the definitions of mountains, its classification is about the geological structure rather than the actual landscape (Kondracki J., 2009).

Since the Carpathians are the mountain range that occupies the largest area in Poland, they include 141 rural and rural-urban municipalities with a total area of 14.55 thousand km² (Tab. 1). The Sudetes include 34 municipalities with the total area of 3.98 thousand km², and the small range of the Swietokrzyskie Mountains includes 7 such municipalities, which occupy a total of 0.73 thousand km². With regard to the area of the farmlands covered with various forms of protection, the figures are as follows: the Carpathians - 298.1 thousand ha, the Sudetes - 90.6 thousand ha, and the Swietokrzyskie Mountains - 28.5 thousand ha. In 2017, the total proportion of land subjected to legal nature conservation was respectively as follows: 76.0 %, 27.2 % and 92.6 %.

Table 1

Number of municipalities with their area and the share of farmlands legally protected in the mountain regions

Studied area	Total number of municipalities	Total area (thousand km ²)	Area of farmlands subject to various forms of protection (thousand ha)	Share of land subject to legal protection in the total area (%)		
	2010	2010	2010	2002	2012	2017
Carpathians - total	141	14.55	298.1	74.6 %	71.4 %	76,0 %
Mountain area	48	6.14	88.4	85.8 %	86.8 %	88,6 %
Foothills	50	4.92	107.0	77.9 %	70.1 %	72,8 %
Partial foothills	43	3.49	102.7	50.3 %	46.1 %	55,5 %
Sudetes - total	34	3.98	90.6	31.0 %	25.2 %	27,2 %
Mountain area	10	1.05	28.8	34.6 %	30.7 %	33,9 %
Foothills	16	2.18	54.0	34.4 %	27.0 %	27,0 %
Partial foothills	8	0.74	7.8	15.8 %	12.0 %	15,6 %
Swietokrzyskie Mts. - total	7	0.73	28.5	79.4 %	92.7 %	92,6 %
Foothills	1	0.06	2.0	88.8 %	88.8 %	87,0 %
Partial foothills	6	0.67	26.6	78.5 %	93.1 %	93,1 %
Total mountain areas	182	19.25	417.3	65.8 %	62.6 %	66,5 %
Poland	2173	312.67	6113.0	33.0 %	32.5 %	32,5 %

Source: authors' study (2019) based on: Musiał W., Sroka W., further based on the Regional Data Base (GUS) and the National Agricultural Census (2012)

On various types of farmlands in mountain regions, several forms of environmental protection can be found, the most important of which are: national parks, natural reserves and landscape parks. In the analysed Polish regions there are 9 national parks (Tab. 2) covering 7.3 % of a total area (Tab. 3). The largest share in the total size of the protected area, according to database of the Main Statistical Office (2012), is attributed to the areas of protected landscape together with the Natura 2000 (56.5 %) and the national landscape parks (35.2 %). Although in the mountain ranges natural reserves account for the largest representation of protected areas (in total 124), they frequently cover smaller surfaces, and their total share in such regions is only 1 %.

Number of individual forms of legal protection within the mountain regions

Studied area	Number of individual forms of legal protection within the total area (%) in 2012				
	National parks	Nature reserves	Landscape parks	Protected Landscape Areas	Natura 2000 Areas
Carpathians - total	6	93	14	16	66
Podkarpackie voivodship	2*	31	7	10	30
Lesser Poland voivodship	5*	43	4	5	30
Silesian voivodship	0	19	3	1	6
Sudetes - total	2	26	8	3	4
Lower Silesian voivodship	2	26	8	3	4
Swietokrzyskie Mts. - total	1	5	0	0	1
Swietokrzyskie voivodship	1	5	0	0	1
Total mountain areas	9	124	22	19	71

* Magurski National Park is situated in both: Lesser Poland and Podkarpackie voivodships

Source: authors' study based on Directorate General for the Environment Protection (2019), the forms are quoted for the mountain regions together with foothills.

Protected areas represent various shares in the area of the regions defined as mountains, foothills as well as partial foothills (Tab. 3). In case of the Carpathians and Sudetes, the largest share of national parks was found in the mountain regions: respectively 10.9 % and 7.4 %. The Swietokrzyskie Mountains which, in fact, are rather of the upland character, had only two regions of observation, foothill and partial foothill, accounting for respectively 9.6 % and 8.4 % of the share of particular forms of environmental protection, in contrast to the total area of protected mountain regions in Poland.

Table 3

Share of individual forms of nature protection in the total area of the mountain regions in Poland

Studied area	Share of individual forms of legal protection in the total area (%) in 2012			
	National parks	Nature reserves	Landscape parks	Other forms*
Carpathians - total	7.4 %	0.9 %	33.8 %	57.9 %
Mountain area	10.9 %	1.0 %	33.6 %	54.4 %
Foothills	4.3 %	0.7 %	35.1 %	59.8 %
Partial foothills	2.3 %	1.1 %	31.3 %	65.3 %
Sudetes - total	5.8 %	1.4 %	57.9 %	34.9 %
Mountain area	7.4 %	2.0 %	61.9 %	28.7 %
Foothills	5.8 %	1.2 %	55.6 %	37.4 %
Partial foothills	0.0 %	0.5 %	58.7 %	40.7 %
Swietokrzyskie Mts. - total	8.5 %	0.8 %	24.2 %	66.5 %
Foothills	9.6 %	0.0 %	44.2 %	46.1 %
Partial foothills	8.4 %	0.9 %	22.4 %	68.2 %
Total mountain areas	7.3 %	1.0 %	35.2 %	56.5 %
Poland	3.1 %	1.6 %	25.7 %	69.6 %

* other forms embrace first of all the areas of protected regions and the areas covered by the Natura 2000, which are not included in other forms of the nature conservation

Source: authors' study (2019) based on: Musiał W., Sroka W., further based on the Regional Data Base (GUS) and the National Agricultural Census (2012)

On average, within the mountain areas, farmlands covered by any form of the environment protection embraced approximately 62 %. The largest share of this type of land was to be found in the Swietokrzyskie Mts. (over 90 %), and slightly smaller in the Carpathians and Sudetes. Moreover, significant diversity was observed within the particular mountain ranges, both within the Carpathians

and Sudetes. And so, for the Carpathians, huge diversity was observed between their eastern part (Podkarpackie) and western part (Silesia), versus central regions covering areas within the Lesser Poland. In the first group almost in 90 % of all municipalities, more than 50 % of all farmlands are covered by some kind of environmental protection, whereas in the central part of the Carpathians the same share of municipalities with protected farmlands was considerably smaller.

3. Rational land use on broad altitudinal range

In all three main mountain ranges, the total share of protected lands depends on the vertical location of municipalities. The higher and vaster the range is, the larger the share of protected area. This is related to reduced opportunity to implement activities connected with agriculture, but also with specific, frequently unique, landscape and natural values. On the other hand, the analysis of the farmlands covered by various forms of environmental protection showed a lack of strict relationship between the altitude of the municipality's location and the increase in the number and size of the areas with specific forms of nature conservation. In Carpathians' municipalities, which are situated especially on higher altitudes, the percentage of farmlands is comparatively lower. This is due to the high afforestation rate and concentration of protected sites. On the other hand, reverse trends can be observed in the Sudetes, where the majority of protected areas are situated on the farmlands.

While analysing and estimating the agricultural use of land in mountain regions, including method of land development, intensity of agricultural production, and progressive changes, what should be considered in the first place, are the types of terrain and the vegetation belts, as these are strictly connected with the type of soil and intensity of precipitation. All these factors play a crucial role in shaping agricultural functions in mountain regions. They are diversified in relation to the three analysed mountain ranges. In order to present the schematic explanation of the general regularities of the rational land use in altitudinal range, there has been presented an example of the Carpathians, with a highest part - the Tatras (Fig. 2). In submontane belt, which is situated up to 600 m above the sea level, which according to the institutional division can be assigned as the part of the foothill region, vegetation type is similar to the vegetation of the surrounding lowlands. Above this altitude, there are only mountain belts, that in institutional division include mountain regions. These are composed of the two forest levels: lower montane belt (up to 1000 m) and upper montane belt (up to 1350 m), where in the Tatras, in the natural process develops the forest vegetation. In the lower montane belt dominate formations of deciduous trees, historically classified as *Fagetum carpaticum* - fertile Carpathian beech (Pawłowski B., 1977), currently classified as *Dentario glandulosae-Fagetum*, which is a subendemic Carpathian plant association (Matuszkiewicz W., 2002). In the higher montane belt there is a coniferous forest, with the dominating *Piceetum tatricum* association. In the areas of human activity also seminatural vegetation can be found, which includes in both montane belts the hay meadows classified as endemic association of *Gladiolo-Agrostietum capillaris*. From the upper montane zone, typically highland vegetation start dominating, as the associations of *Adonestyletum alliariae* and *Aconitetum firmii*, in the subalpine belt (Matuszkiewicz W., 2002).

In deciding to introduce agriculture to the mountain regions, humans were bound to adjust their ways to the general regularities of the stratified composition of the soils, climate and vegetation, therefore various types of the environment use have been arranged in the characteristic economic layers. In the Carpathians and the Sudetes, within their low and medium foothills which are the most valuable for agriculture, there is quite a wide range of choice between the agricultural production in the form of green farming and arable lands, where cereals and potatoes are grown. Lower mountain region is less important for agriculture, yet shepherding gradually begins to dominate there, while

the regions from the upper montane zone up to the peak level are beyond the agricultural interest and so are dominated by shepherding likewise.

Altitudinal range	Altitude m above sea level	Vegetation belts	Economic layers	Agricultural significance	Vegetation types / land use
High mountains	Above 2200	subnival belt	none	of no significance for agriculture	
	ca. 2200	alpine belt			
Mid-high mountains with steep slopes	up to 1680 m	subalpine belt	pasturage	valuable only for pasturage	
Mountains with moderately steep slopes	up to 1350 m	upper montane belt			
Low and mid-mountains	up to 1100 m	lower montane belt	hay meadows	valuable mainly for pasturage	
Mid and high foothills with gentle slopes	550-600	submontane belt	growing oats and potatoes	valuable for agriculture and convenient for pasturage	
Low foothills	500-550		growing rye and wheat	highly valuable for agriculture	

Source: authors' study, based on Pawlowski (1972) and Starkel (1990)

Fig. 2. Rational use of land in various types of: terrain, altitudinal range and within various vegetation belts (example of the Carpathians)

Rational use of the land in lower foothills is balance or near-balance, therefore there should be ca. 50 % green farming and 50 % arable land (Starkel L., Pietrzak M., and Lajczak M., 2007). Forests may have quite a significant role when there is a considerable share of slopes and unfavourable terrain such as ravines and landslides. In case of the high foothills, the rational land use is valuable for both agriculture and shepherding. Recommended rates for the land use are: 30-40 % for the forests, app. 30-40 % for green farming and around 20-30 % for the crop rotary agriculture. In turn, higher mountain levels, in so called medium mountains, encompassing lower montane belt, increase unfavourable conditions for agricultural production with the use of plow. Therefore, the arable land account for only minimum share. Due to the existence of the associations of hay meadows, those areas are particularly valuable for breeding animals, including shepherding. In the structure of the farmland use, also where the landscape is dominated by forests accounting for 60-70 % of the area, there are various types of permanent grasslands. However, in recent years such proportions underwent considerable changes. With the decrease in the number of ruminants, some parts of the pastures undergo succession and visible changes occur in the borderline between farmlands and forests (Fatyga J., and Gorecki A., 2001). The final beneficiary of these changes are new woodlands, where progressive afforestation and growth of shrubs frequently approach residential areas.

Conclusions

The share of the areas covered with the various forms of nature conservation, in rural and rural-urban municipalities, serve as the evidence to the fact that the natural potential of the mountain regions in Poland is significant. The role of protected areas is connected with the maintenance of specific landscape values and biodiversity. Yet, in the opinion of the inhabitants, the use of the farmlands especially those covered with environmental protection programme, mainly seminatural meadows and pastures, is a factor which impedes the functioning and development of the agricultural production. Moreover, considerable share of the areas covered with various forms of environmental protection means numerous limitations of the possible agricultural use of the land, which

consequently limits the economic growth of particular farms. Although the issues caused by the coexistence of various forms of nature conservation as well as economic and agricultural activities in the mountain regions are similar to those in other parts of the country, yet in the mountains they become increasingly more important due to their larger scope.

Therefore, it is in those mountain regions, where such functions of economic benefits, brought by agricultural areas and those emerging from natural landscape beauty, should be implemented in a particularly reasonable way. Agricultural functions of mountains such as: biomass production, grazing ruminants and local food processing, are well adjusted to the priorities for the environmental function of the mountains. In order to ensure the environmental functions and the protection of the mountains, they are covered intensely by various forms of environmental and landscape protection. In the Polish mountain regions, up to 66.5 % of the area is covered by various forms of nature conservation, which constitutes twice the average value for the whole area of Poland. Apart from the forest areas, whose share is positively correlated with the height above the sea level, agriculture is still a crucial factor and the beneficiary of the mountain regions. Its important role, beside this of agricultural and economic nature, is to protect the seminatural ecosystems. Additionally, agriculture and in particular shepherding maintain the cultural landscape, prevent unfavourable changes on the borderline between farms and forests and foster biodiversity. Withdrawing the agricultural usage, particularly shepherding in the higher belt of the mountains, poses threat to the *status quo* of the agricultural and forest areas.

Bibliography

15. Bucala, A., Starkel, L. (2013). Postępująca recesja rolnictwa a zmiany w środowisku przyrodniczym polskich Karpat. *Przegląd Geograficzny*, No. 85 (1), pp. 15-29.
16. Czudec, A. (2013). Wielofunkcyjność rolnictwa gorskiego i podgorskiego (na przykładzie Bieszczad i Beskidu Niskiego). *Polish Journal of Agronomy*, No. 13, pp. 3-9.
17. Heldak, M. (2008). Przemiany funkcjonalne obszarów wiejskich Sudetów po integracji z Unią Europejską. *Infrastruktura i Ekologia Terenów Wiejskich*, PAN, No. 8, pp. 91-102.
18. Fatyga, J., Gorecki, A. (2001). Kształtowanie granic rolno-lesnej i darniowo-polnej w Sudetach, IMUZ, Falenty.
19. Kata, R. (2010). Sytuacja ekonomiczno-finansowa gospodarstw rolnych położonych w regionie gorskim. [in:] Czynniki kształtujące konkurencyjność regionu gorskiego (na przykładzie polskich Karpat); red.: Czudec A., Wyd. UR Rzeszów, Rzeszów, pp. 121-148.
20. Knapik, J., Musiał, K. (2017). Multifunkcyjność chowu owiec - próba nowego ujęcia problemu. *Roczniki Naukowe Zootechniki*, No. 44 (2), pp. 161-175.
21. Kondracki, J. (2009). *Geografia regionalna Polski*. Warszawa PWN, ed. III completed, pp. 273-368.
22. Latocha, A. (2009). Zmiany krajobrazu wiejskiego w Sudetach w okresie powojennym. *Polskie Krajobrazy Wiejskie Dawne i Współczesne*, Prace Komisji Krajobrazu Kulturowego, No. 12, pp. 130-138.
23. Matuszkiewicz, W. (2002). *Guidebook to Labelling Plant Habitats in Poland*. Warszawa PWN, ed. III., pp. 32-94.
24. Mirek, Z., Piekos-Mirkowa, H. (2009). Fitogeograficzne aspekty endemizmu w Polsce. *Wiadomości Botaniczne*, No. 53(3/4), pp. 7-30.
- 25.11. Molik, E., Dobosz, J., Kordeczka, K., Peksa, M. (2017). Cultural Sheep Grazing in the Tatra National Park as Example of Management Consistent with the Principles of Sustainability. *Problems of Small Agricultural Holdings*, No. 1, pp. 61-70.
26. Musiał, K. (2018). Cultural Sheep Grazing in the Area of Two Carpathian National Parks, Tatra and Pieniny. *Wiadomości Zootechniczne*, No. 56 (2), pp. 30-37.
27. Musiał, K., Kasperczyk, M. (2013). Changes in Floristic Composition of the Mountain Pasture Sward After the Abandonment of Sheep Grazing. The role of grasslands in green future. *Proceedings of the 17th Symposium of the European Grassland Federation*. Akureyri, Island, pp. 345-348.
28. Musiał, K., Szewczyk, W., Grygierzec, B. (2015). The Effect of Ceasing of Use on the Flora and Plant Associations in Meadows and Pastures of Selected Parts of the Western Carpathians. *Fragmenta Agronomica*. No. 32 (4), pp. 53-62.
29. Musiał, W. (2017). Problems of the Agriculture in the Polish Carpathians, Yesterday and Today-revisiting a 1913 Brochure for the Peasants of Podhale. *Problems of Small Agricultural Holdings*, No. 3, pp. 97-108.

30. Musiał, W., Musiał, K. (2017). Następstwa dezagrarnizacji w sferze produkcyjnej i ekologicznej na przykładzie wybranych powiatów województwa podkarpackiego. *Roczniki Naukowe Stowarzyszenia Ekonomistów Rolnictwa i Agrobiznesu*, No. 19 (5), pp. 149-157.
31. Musiał, W., Musiał, K. (2018). Economic and Ecological Potential of the Protected Areas in the Pieniny Mountains. *Proceedings of the International Conference „Economic Science for Rural Development”*, No. 49, pp. 48-55.
32. Pawłowski, B. (1972). Szata roślinna gór polskich [w:] Szafer W. Szata roślinna Polski. T. II, pp. 189-201.
33. Piekos-Mirkowa, H., Mirek, Z. (2010). Threat to Endemic Vascular Plants Occurring in Poland and Their Conservation. *Chronmy Przyr. Ojcz.*, No. 66 (1), pp. 15-26.
34. Rural Development Programme. (2014). Ministry of Agriculture and Rural Development.
35. Starkel, L. (1990). Ewolucja środowiska przyrodniczego Karpat w okresie działalności człowieka. *Problemy Zagospodarowania Ziemi Górskich*, No. 29, pp. 34-46.
36. Starkel, L., Pietrzak, M., Lajczak, M. (2007). Wpływ zmian użytkowania ziemi i wzrostu częstotliwości ekstremalnych opadów na obieg wody i erozję oraz ochronę zasobów przyrodniczych Karpat. *Problemy Zagospodarowania Ziemi Górskich*, No. 54, pp. 19-31.
37. Twardy, S. (1993). Warunki przyrodnicze a użytkowanie ziemi w Karpatach. *Postępy Nauk Rolniczych*. No. 3, pp. 51-60.
38. Zemanek, B. (2009). Phytogeographical Problems of the Carpathians. *Roczniki Bieszczadzkie*, No. 17, pp. 43-58.

SIGNIFICANCE OF LEGUMES AS A FEED SOURCE

Līga Proskina¹, Dr.oec.; Irina Pilvere¹, Dr.oec.

¹Faculty of Economics and Social Development, Latvia University of Life Sciences and Technologies

Abstract. The European Union faces a challenge to increase the production of domestic protein crops in order to lower its economic dependence on imports of protein crops, soybeans in particular, and the fluctuation of global prices on food. To solve the problem of self-sufficiency of protein in the EU, encompassing all the agro-climatic zones typical of European agriculture and all-level supply chains at the EU level, increasing the output of domestic protein crops, including legumes (faba beans, peas, lupine, soybeans etc.) has been set as a strategic goal. The research examined the kinds of protein crops used for feed and the self-sufficiency of the crops in the EU. The research examined the area under legumes for seeds, the yields and the protein yields of the crops in Latvia. The research aim is to examine the key characteristics of production of feed legumes in Latvia. To achieve the aim, the following specific research **tasks** are defined: 1) to examine the characteristics of production of protein feed crops in the EU Member States; 2) to analyse legume production performance indicators in Latvia.

Key words: protein feed, legumes, indicators.

JEL code: Q22.

Introduction

European livestock production systems must face the challenge to meet world animal products demands. According to FAO Food Balance data (FAO, 2019), global food consumption considerably increased in recent decades; at the same time, global food demand rose on average by 1.7 % annually (OECD - FAO, 2018). This contributes to livestock production intensification and an increase in the demand for feed, incl. high protein content feed (Westhoek et al., 2011). The demand for protein feed of plant origin is increased by the restriction imposed by Regulation (EC) No 999/2001 to use animal protein in feed to avoid the risk of spongiform encephalopathy as well as the limitation of EU support to oilseeds following the Blair House Agreement in 1992.

In Europe and Latvia, food of animal origin accounts for approximately 45 % of the total value of agricultural output (Westhoek et al., 2011). Accordingly, a regular and guaranteed supply of feed plays a large role in the competitiveness of the EU livestock industry. Despite the high proportion of livestock production, the EU Member States face a deficit of domestically produced feed protein for their livestock industries (FEFAC, 2018; DG AGRI, 2018), which is offset by imports from third countries. In accordance with Regulation (EC) No. 178/2002, requirements for the production, labelling, traceability and control of feed have been designed and integrated into the relevant legal frameworks of the Member States. However, the same legal restrictions in the areas of the environment, health and GMO do not apply to imported protein crops produced outside the EU as they do in the case of products manufactured in the EU. At the same time, the trends in the world market show that the prices of protein-rich feed rose (DG AGRI, 2018), thereby considerably affecting the overall feed price level and therefore livestock production cost. Agricultural trade statistical data indicate that in recent ten years, the prices of protein feedstuffs have constantly risen. In the recent decade, the average price of soybean flour on commodity exchanges fluctuated from EUR 223 to 519 per tonne, reaching EUR 317 per tonne at the end of 2018. The price on soybean flour imported from the USA rose from EUR 215 per tonne in 2007 to EUR 380 per tonne in 2018 (DG AGRI, 2018; IndexMundi, 2019). Overall, the prices on imported soybeans, rapeseed and sunflower flour rose by 43-65 % in this period. In 2018, the price of domestic feed-grade wheat in the ES-28 was on average EUR 191, in Latvia - EUR 180 per tonne. At the end of 2018, the prices of feed-grade peas and beans

¹ Contacts Tel.: +371 28206624
E-mail address: Līga.Proskina@llu.lv

in the EU was on average 219 EUR/t and 240 EUR/t, respectively, while in Latvia the prices of the pulses was on average 198 EUR/t and 202 EUR/t (*DG AGRI*, 2018).

In recent years in many countries research investigations into protein sources have been conducted, as a high protein content feedstuff is the most expensive component of a feed ration. The need for cheaper protein-rich feedstuffs has been referred to in a number of research studies owing to the problem of the high proportion of feed cost (Czulowska and Zekalo, 2016). A lower production cost can be achieved if using domestic products – cereals as a source of nutritional energy and faba beans and peas as a source of protein – in animal feed. It has to be emphasised that providing farming with domestic feed ensures higher independence of the agricultural industry from feed price fluctuations in the world market and sustainable use of the agricultural area.

The current agricultural intensification is oriented towards high productivity and is characterised by narrow specialisation (Emmerson et al., 2016), thereby contributing to a considerable decrease in the diversity of crops in the EU, which leads to a decrease in the area under legumes (Watson and Stoddard, 2017). At present, food-grade wheat and rapeseed dominate in the output of crops, while high-quality protein crops needed for livestock production are imported from third countries. Such an approach to agricultural production has negatively affected the self-sufficiency of feed protein as well as contributed to the degradation of ecosystems in the EU Member States.

Thus, the EU faces a challenge to increase the production of domestic protein crops in order to lower its economic dependence on imports of soybeans and the fluctuation of global prices on food. To solve the problem of self-sufficiency of protein in the EU, encompassing all the agro-climatic zones typical of European agriculture and all-level supply chains – local, regional, national and EU level –, increasing the output of soybeans and other protein crops, including legumes (faba beans, peas, lupine, soybeans etc.) and papilionaceous crops (alfalfa), as well as recognising sunflower and rapeseed meal as an important component of feed have been set as a strategic goal.

The EU Common Agricultural Policy (CAP) focuses on sustainable agricultural development. To achieve this goal, according to Davis et al. (2012), it is required to promote the diversification of crops. Zander et al. (2016) point out that the inclusion of legumes in crop rotation increases the economic efficiency of grain production, lowering the cost of agricultural chemicals by 20-25 % if the grains are grown as the aftercrop (Zander et al., 2016). Watson and Stoddard (2017) stress that the regional (domestic) production of legumes reduces greenhouse gas (GHG) emissions, increases the diversity of crops in crop production systems, contribute to biodiversity, enhance soil fertility and supply the livestock industry with protein sources of domestic origin (Watson and Stoddard, 2017). Crotty et al. (2018) point out that legume forages are fundamental in the development of sustainable livestock systems, building soil fertility and providing local protein for ruminant livestock (Crotty et al., 2018).

Livestock farming have built up experience in using legumes - in diets for pigs and poultry dried seeds (pulses) as a component of feed concentrate, in diets for ruminants in the form of both legume forage and pulses. However, a large role in the supply of feed protein is played particularly by legume seeds (pulses) and crops used mainly for oil extraction (e.g. soybean, rapeseed). The United Nations Food and Agriculture Organization (FAO) recognizes 11 types of pulses grown worldwide. Pulses are a type of leguminous crop that are harvested solely for the dry seed. Pulses do not include other feeds in the legume family, such as crops used mainly for oil extraction (e.g. soybean and groundnuts) and leguminous crops that are used exclusively for sowing purposes (e.g. seeds of clover and alfalfa). Historically, the use of pulses in animal feeds has been limited due to the presence of

antinutritional factors (Sherasia, Garg and Bhanderi, 2017), yet, recent advances in plant breeding have helped to reduce the presence of the factors. When pulses were introduced as a protein feedstuff in diets for animals, new varieties were created, which had with low-tannin, low vicine-convicine and low-trypsin inhibitor contents. Smith et al. (2013) indicates that pulses have been suggested as an alternative protein source to soybean for livestock in Europe (Smith et al., 2013). Therefore, it is required to identify the situation in the production of protein feed crops in the EU and the prospects for this industry along with conventional protein crops used in livestock production.

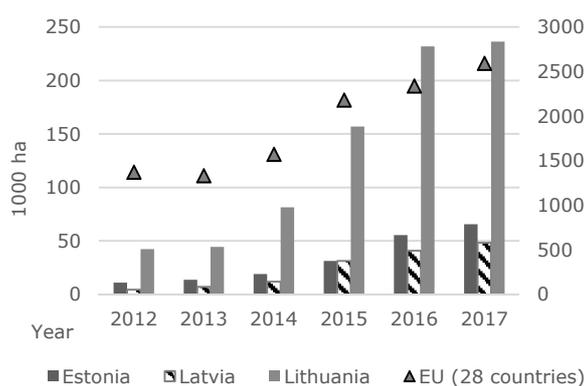
The **research aim** is to examine the key characteristics of production of feed legumes in Latvia. To achieve the aim, the following specific **research tasks** are defined: 1) to analyse legume production performance indicators in Latvia; 2) to examine the characteristics of production of protein feed crops in the EU Member States. The research examined the kinds of protein feed crops and the output of the crops in the EU. It also focused on the area under protein crops, including legumes, as well as the yields and the protein yields of pulses in Latvia.

Methodology and data. Analysis, synthesis, logical and construction, induction and deduction were employed to execute the research tasks. Scientific literature review was used as well.

Research results and discussion

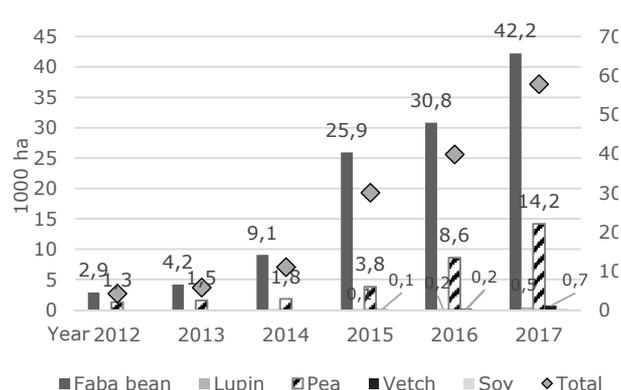
1. Areas and yields of pulses and protein crops

At the EU level, political discussions have focused on the production of protein of plant origin and the agricultural and food industries, issues related to domestic inputs, particularly the use of domestic protein crops as feed as well as the sustainable preservation of soil fertility, with a special focus on growing papilionaceous crops and legumes. As the EU CAP 2014-2020 prescribed that each Member State has to allocate 2 % of its support payments for growing protein crops, interest in the production of protein crops, incl. legumes, increased, and the area under protein crops significantly expanded. In 2017 compared with the period before the CAP reform (2012), the area under soybeans in the EU doubled and reached almost a million hectares; besides, the area under legumes also increased (EUROSTAT, 2018). In the neighbouring countries – Lithuania and Estonia – the areas under legumes and protein crops increased 6-fold in the same period and reached 236.2 and 65.5 thousand ha, respectively (Figure 1). In this period in Latvia, the area under protein crops increased as well.



Source: (EUROSTAT, 2018)

Fig. 1. Areas under legumes and protein crops (for the production of grain, including seed and mixtures of cereals and pulses), 1000 ha



Source: (RSS, 2019)

Fig. 2. Areas cropped with legumes in Latvia in 2012-2018, 1000 ha

In the period 2012-2017, the total area under faba beans rose about 13.7 times (from 2.9 thousand ha to 42.2 thousand ha). The two main kinds of legumes grown in Latvia are peas and faba beans (Figure 2), some legume species such as lupine, vetch and soybeans are cultivated in Latvia

rarely or not at all. The area under peas increased 10 times (from 1.3 thousand ha to 14.2 thousand ha); the area sown with less known feed legumes – lupines – rose about 5 times (from 80 ha to 480 ha) (RSS, 2019). Such a fast increase in the area under legumes was promoted by the EU's policy on the protection and improvement of biodiversity on farms (Regulation (EU) No. 1307/2013), yet it is not enough to reduce the deficit of feed protein.

Table 1

Yields of pulses and the crude protein content thereof in Latvia in 2015-2017

Feed materia I/ Year	Average yield, t ha ⁻¹			Total yield, 1000 t			Protein content, kg t ⁻¹		Protein yield, t ha ⁻¹			Total protein yield, t		
	2015	2016	2017	2015	2016	2017	min	max	2015	2016	2017	2015	2016	2017
Pea	3	2.6	2.1	11.8	23.1	29.5	198	230	0.65	0.56	0.45	2537	4967	6343
Faba bean	3.4	3.2	3.3	86.8	100.3	140.7	224	333	0.73	0.97	1.00	26344	30441	42702
Lupin	1.1	1.4	0.4	0.2	0.30	0.20	300	430	0.24	0.51	0.13	73	110	73
Soy*	0.68	1.61	1.21	0.07	0.07	0.26	288	337	0.21	0.50	0.38	21	21	83

* Area under soybeans in 2015 – 98 ha; 2016 - 42 ha; 2017 - 219 ha, average yields, depending on variety, are in the range of 0.28-2.04 t ha

Source: authors' calculations based on the CSB, 2019

In Latvia, faba beans and peas are the most significant legumes grown for seeds. Of the total area cropped with legumes, 96-98 % was regularly harvested. An exception was the year 2017 when only 68 % of the area under peas and 89 % of the area under faba beans were harvested (CSB, 2019), which could be explained by rainfalls and floods that hindered harvesting the crops. In 2015-2017 in Latvia, the average yields for faba beans was 2.6-2.1 t ha⁻¹ and 3.2-3.1 t ha⁻¹ for feed peas (Table 1).

The yields of pulses are determined by a number of factors: species, variety, climatic conditions as well as soil management quality. As regards legumes, some research studies state that the diversity of legume species and varieties is determined by the possibilities to grow them in vast climatic regions (Zander et al., 2016). Zimmer et al. (2016) explain the low proportion of the soybean area in the total area under protein crops in the EU by unfavourable climatic conditions for this crop in most of Europe (Zimmer et al., 2016). The data on the yields and crude protein contents of legumes grown in Latvia shown in Table 1 reveal that the highest protein yield per ha was produced by faba beans – in the range of 730 -1000 kg/ha and peas – 450-650 kg/ha. Experience in growing soybeans is small in Latvia, which is proved by the data, as the protein yield of soybeans was only 210-500 kg/ha.

According to the authors' calculations, the area under both faba beans and peas declared for Rural Support Service (RSS) support payments in 2017 can produce about 48 thousand tonnes of crude protein for feed, which is only a small share of the necessary annual amount of crude protein for livestock farming. For example, approximately 120 thousand tonnes of crude protein were necessary for dairy cows (producing 1 kg of milk requires 100-140 g of crude protein) to produce the quantity of milk, as stated in the Report on Latvia's Agricultural and Rural Development 2017 (1000 thousand tonnes). It should be emphasized that an increasing area cropped with pulses in Latvia can increase the proportion of domestically produced protein-rich feedstuffs, reduce protein feed imports and contribute to more efficient production.

2. Supply of protein feed crops in the European Union

In the EU, the consumption of feed annually increased. In the period 2015-2017, the total consumption of feed rose from 477 to 489 mln.t, of which 48 % were forages, 32.7 % industrial

compound feed, 10.8 % home-grown cereals and 8.3 % purchased feeding stuffs (FEFAC, 2018). The quantity of protein crops produced provided approximately 27 mln. t of crude protein needed for feed (DG AGRI, 2018), of which 34-35 % was used in pig production, 24-28 % in poultry, 14-18 % in milk and beef cattle production (Hou et al., 2016).

To meet the demand for feed protein, the EU annually imports about 17 mln. t of crude protein, of which 13 mln. t comes from soybeans. An analysis of the self-sufficiency of crude protein reveals that a deficit is observed across almost all the categories of feedstuffs, yet the deficit considerably varies by kind of feed material (Table 2).

Table 2

Self-sufficiency for protein-rich feed materials in the EU-28 in 2016/2017

Feed material	EU production (mln. t)	EU total feed use (mln.t)	EU feed use of EU origin (mln. t)	EU total feed use (mln. t proteins)	EU feed use of EU origin (mln. t proteins)	Self-sufficiency of protein (%)
Cereals	254.10	146.40	130.80	14.10	12.76	90
Pulses	4.40	3.00	2.80	0.77	0.71	92
Oilseeds	31.00	1.80	1.80	0.50	0.50	100
Soybean meal	1.60	29.00	1.50	13.37	0.67	5
Rapeseed meal	10.90	13.20	10.40	4.36	3.43	79
Sunflower meal	3.90	7.70	3.60	2.43	1.02	42

Source: DG AGRI, 2018

In the EU, most of the sources of feed protein are represented by grain (130.8 mln. t of grain or 14 mln. t of crude protein) with the self-sufficiency rate of 90 %, yet the rate for the second largest feed material – soybeans – is only 5 % (29 mln. t of soybeans or 13.37 mln. t of crude protein). It is known that soybeans represent a valuable component of feed mixtures, which is due to the high protein content (more than 40 %) and a balanced content of amino acids, yet the available research investigations indicate that also pulses contain moderately high levels of protein, and their amino acid profiles are generally comparable to that of soybean meals (Hanbury and Hughes, 2003; Nalle, 2009). Therefore, pulses can partly replace soybean protein, yet to date their use as feed has been insignificant – only 3 mln. t or 2 % of the total feed protein consumed (Table 2).

As intensification in the livestock industry increased, the output and consumption of industrial compound feed and protein feedstuffs rose as well. The market of industrial compound feed is convincingly the largest market of feed protein, yet it faces serious challenges in relation to the supply of inputs. To produce industrial compound feed, about a third of feed inputs are imported – mostly oil crop seeds and flour (incl. soybean) as well as by-products of the food and bioethanol industries (Table 3).

Industrial feed material consumption and imports in the EU-28, 2015-2017

Feed material / Year	Feed material consumption, 1000 t			Proportion, %	Feed material imports, 1000 t			Imports as % of consumption, 2017
	2015	2016	2017		2015	2016	2017	
Feed cereals	75063	78049	79877	54.3	10700	12850	14600	18.3
Co-products from food and bioethanol industry	17221	17157	18559	12.6	3962	4056	4499	24.2
Oilcakes and Meals	42769	41616	41251	28.0	25844	24425	25358	61.5
Pulses	2114	2259	2273	1.5	165	200	349	15.4
Others	4962	4845	5117	3.5	2272	2414	2318	45.3
Total	142129	143926	147077	100	42943	43945	47124	32.0

Source: FEFAC, 2018

As shown in Table 3, soybean flour contributes to 38 % of the total supply of protein (Table 2), while oil crop seeds and flour (incl. soybean) account for 28 % of the total amount of inputs needed in the production of industrial compound feed (Table 3); besides, most of them are imported. To reduce the large imports of feed protein, it is necessary to promote the domestic production of protein crops, as stated by the European Commission communication (COM(2018) 757 final) on the development of plant proteins in the European Union. In industrial compound feed, pulses make up only 1.5 % of the total amount of protein crops.

According to available research studies, such pulses as faba beans and peas are highly productive crops and their economic role is large. Seeds of faba beans and peas are prime quality feed concentrate for poultry and agricultural animals (Koivunen *et al.*, 2016; Sherasia, Garg and Bhandari, 2017; Harouna, Kawe and Mohammed, 2018), as they comprise 22–35 % protein (Nalle, 2009). An important feed quality indicator for ruminants is soluble protein that can produce the necessary amino acids in the organism one hour after the intake of feed. According to the results of tests done at the LLU Scientific Laboratory of Agronomic Analysis, a soluble protein content in the dry matter of faba beans grown in Latvia was, on average, 15.0 %, 12.5 % in peas and only 3.5 % in soybeans (Osmane *et al.*, 2016). This means that protein-rich feed comprising peas and beans is better digested in the animal organism and can raise economic returns from feedstuffs in farming, i.e. higher productivity at lower or the same resource cost. According to research investigations, an optimum share of pulses in diets for animals of various species is estimated at 15-30 % (Nalle, 2009; Volpelli *et al.*, 2012). This means that the use capacity of pulses allows considerably increasing the amount of pulses in diets and the self-sufficiency of protein in the European Union.

Overall, two thirds of industrial compound feed in the EU-28 is used in poultry production (34 %) and pig production (32 %) and slightly more (28 %) in cattle production (incl. sheep, goats) (Table 4). In Latvia, industrial compound feed is mainly used in poultry production (58 %) and in cattle and pig production, 18 % and 19 %, respectively. In the analysis period in Latvia, the output of compound feed for poultry significantly rose (by 17 %), which could be explained by increases in the output of eggs (14 %) and poultry meat (13 %). In contrast, the output of compound feed for pigs decreased by 22 %, and stagnation was observed in the output of feed for cattle, with a trend to remain at the same level.

**Industrial compound feed production in the EU-28 and Latvia in 2015-2017,
 mln.t**

Indicators	EU-28, mln.t			2017/2015, %	Latvia, mln.t			2017/2015, %
	2015	2016	2017		2015	2016	2017	
Cattle	42500	43213	44937	5.73	57	55	64	12.28
Pigs	50436	50310	51302	1.72	85	73	66	-22.35
Poultry	52887	54360	54807	3.63	173	178	202	16.76
Others	9191	8915	9086	-1.14	11	9	14	27.27
TOTAL	155014	156798	160132	3.30	326	315	346	6.13

Source: FEFAC, 2018

Poultry and pig feed mainly consists of maize, wheat and soybean flour; therefore, any increase in the price of cereals and protein feedstuffs in the world market undoubtedly influence the production cost of poultry meat. In Latvia, poultry enterprises provide the necessary amount of protein in feed, including broiler chicken feed, by means of mainly imported crude protein-rich feedstuffs. They are: feed yeast, soya, sunflower meals, maize flour etc. According to an analysis of production costs, the cost of feed is the key component, yet, a detailed analysis of production costs indicates that the highest proportion of production costs relates to imported feed and its components. For this reason, opportunities for the use of domestically grown protein crops for feed have to be assessed in order to minimise the cost of diets for agricultural animals and poultry.

Conclusions, proposals, recommendations

- 1) The key sources of feed protein are grain, soybean flour and rapeseed flour. In the period 2016-2017, the consumption of protein by the livestock industry totalled 27 mln. t, of which 17 mln. were imported. Most of the imports were comprised of soybeans – 13 mln. t of crude protein, which was comparable to 25-30 mln. t of soybeans.
- 2) Pulses are little used as feed, making up only 2 % of the total feed protein and 1.5 % of the total industrial compound feed consumed. Research investigations into the use of pulses as feed showed that an optimum share of pulses in diets for animals of various species was estimated at 15-30 %. This means that the use capacity of pulses could be increased at least 10-fold.
- 3) An increase in the area under protein crops was promoted by the EU's policy on the protection and improvement of biodiversity on farms (Regulation (EU) No. 1307/2013). Overall, the area sown with protein crops in the EU-28 under the CAP reform increased on average 2-fold, yet the self-sufficiency of the crops was insufficient. In Latvia, the area under protein crops (legumes) increased on average 12-fold.
- 4) Faba beans and peas were the most significant protein feed crops produced in Latvia. The highest protein yield per ha was produced by faba beans – in the range of 730 -1000 kg/ha and peas – 450-650 kg/ha. Experience in growing soybeans is small in Latvia, and the protein yield of soybeans was only 210-500 kg/ha.

Acknowledgements

The research received funding from the ERDF Post-doctoral Research Support Programme (project No.1.1.1.2/16/I/001) Research application „Assessment of the Bioeconomic Efficiency of Use of Legumes for Feed” (No.1.1.1.2./VIAA/1/16/181).

Bibliography

1. Crotty, F. V. *et al.* (2018). Increasing Legume Forage Productivity through Slurry Application – a Way to Intensify Sustainable Agriculture?, *Food and Energy Security*, 7(4). doi: 10.1002/fes3.144.

2. CSB (2019). *Central Statistical Bureau of Latvia. Databases. Agriculture, Forestry and Fisheries*. Retrieved: <https://www.csb.gov.lv/lv/statistika/db>.
3. Czulowska, M. and Żekała, M. (2016). The Impact of Commercial Concentrated Feedingstuffs Usage on the Profitability of Milk Production Wpływ żywienia przemysłowymi paszami treściwymi na opłacalność produkcji mleka', *Journal of Central European Agriculture*, 17(1), pp. 75–85. doi: 10.5513/JCEA01/17.1.1674.
4. Davis, A. S. et al. (2012). 'Increasing Cropping System Diversity Balances Productivity, Profitability and Environmental Health', *PLoS ONE*. Edited by J. p. Hart, 7(10), p. e47149. doi: 10.1371/journal.pone.0047149.
5. DG AGRI (2018) *Analysis. Statistics*. Retrieved: https://ec.europa.eu/agriculture/statistics_en.
6. Emmerson, M. et al. (2016). How Agricultural Intensification Affects Biodiversity and Ecosystem Services, *Advances in Ecological Research*. Academic Press, 55, pp. 43–97. doi: 10.1016/BS.AEER.2016.08.005.
7. EUROSTAT (2018) *EUROSTAT Data. Database*. Retrieved: <https://ec.europa.eu/eurostat/data/database>.
8. FAO (2019) *Statistics. Databases*. Retrieved: <http://www.fao.org/economic/ess/ess-home/en/>. Access: 20.01.2019.
9. FEFAC (2018) *The European Feed Manufacturers' Federation (FEFAC). Publications*. Retrieved: <https://www.fefac.eu/our-publications/statistics/> Access: 18.02.2019.
10. Hanbury, C. and Hughes, B. (2003) *Lathyrus Cicera as Quality Feed for Laying Hens, Lathyrus Lathyrism Newsl.*
11. Harouna, D. V., Kawe, p. C. and Mohammed, E. M. I. (2018). Under-Utilized Legumes as Potential Poultry Feed Ingredients : A Mini- Review', 1(1), pp. 1–3. Retrieved: <https://juniperpublishers.com/online-submission.php>. Access: 12.02.2019.
12. Hou, Y. et al. (2016). Feed Use and Nitrogen Excretion of Livestock in EU-27', *Agriculture, Ecosystems & Environment*, 218, pp. 232–244. doi: 10.1016/j.agee.2015.11.025.
13. *IndexMundi* (2019) *Commodity Prices*. Available at: <https://www.indexmundi.com/commodities/>. Access: 12.01.2019.
14. Koivunen, E. et al. (2016). Digestibility and Energy Value of Pea (*Pisum sativum* L.), Faba Bean (*Vicia faba* L.) and Blue Lupin (narrow-leaf) (*Lupinus angustifolius*) Seeds in Broilers, *Animal Feed Science and Technology*. Elsevier, 218, pp. 120–127. doi: 10.1016/J.ANIFEEDSCI.2016.05.007.
15. Nalle, C. L. (2009). *Nutritional Evaluation of Grain Legumes for Poultry*. Massey University, Palmerston North, New Zealand. Retrieved: <https://mro.massey.ac.nz/bitstream/handle/10179/1021/02whole.pdf?sequence=1&isAllowed=y>. Accessed: 12.02.2019.
16. OECD - FAO (2018) *OECD-FAO Agricultural Outlook 2018–2027 Special focus: Middle East and North Africa, OECD-FAO Agricultural Outlook 2018–2027*. Paris/FAO, Rome. doi: 10.1787/agr-outl-data-en.
17. Osmane, B. et al. (2016). Chemical Composition of Various Pea and Bean Varieties Grown in Latvia, *Engineering for Rural Development*, pp. 262–267.
18. RSS (2019). *Rural Support Service of the Republic of Latvia. Area Payments. (In Latvian)*. Available at: <http://lad.gov.lv/lv/statistika/platibu-maksajumi/>.
19. Sherasia, p. L., Garg, M. R. and Bhandari, B. M. (2017). *Pulse and their by-Products as Animal Feed*. Edited by T. Calles and H. p. S. Makkar. Rome: FAO. Retrieved: <http://www.fao.org/3/a-i7779e.pdf>. Access: 21.02.2019.
20. Smith, L. A. et al. (2013). Effects of Dietary Inclusion of Pea and Faba Bean as a Replacement for Soybean Meal on Grower and Finisher Pig Performance and Carcass Quality, *Journal of Animal Science*, 91(8), pp. 3733–3741. doi: 10.2527/jas.2012-6157.
21. Volpelli, L. A. et al. (2012). Pea (*Pisum Sativum*) and Faba Beans (*Vicia faba*) in Dairy Cow Diet: Effect on Milk Production and Quality, *Italian Journal of Animal Science*, 11(2), pp. 217–222. doi: 10.4081/ijas.2012.e40.
22. Watson, C. A. and Stoddard, F. L. (2017). Introduction - Perspectives on Legume production and Use in European Agriculture', *Legumes in Cropping Systems*, pp. 1–17.
23. Westhoek, H. et al. (2011). *The Consumption and Production of Meat, Dairy and Fish in the European Union, The protein puzzle*.
24. Zander, p. et al. (2016). Grain Legume Decline and Potential Recovery in European Agriculture: a Review. *Agronomy for Sustainable Development*, *Agron. Sustain. Dev.* Springer Verlag/EDP Sciences/INRA, 36(2), p. 26. doi: 10.1007/s13593-016-0365-y.
25. Zimmer, S. et al. (2016). *Effects of Soybean Variety and Bradyrhizobium Strains on Yield, Protein Content and Biological Nitrogen Fixation under Cool Growing Conditions in Germany, European Journal of Agronomy*. doi: 10.1016/j.eja.2015.09.008.

THE FLUCTUATIONS OF MAIZE PRICE IN YEARS 2010-2018 IN POLAND

Katarzyna Utnik-Banas¹, Dr hab. inż.

¹Institute of Economics and Enterprises Management, University of Agriculture in Krakow, al. Mickiewicza 21,
31-120 Krakow e-mail: rrbanas@cyf-kr.edu.pl

Abstract. The work determines the range of variability in the price of maize in 2010-2018 using time series decomposition. The nominal price of maize increased from 512 PLN/ton in January 2010 to 713 PLN/ton in December 2018. The decomposition of the time series for maize prices indicates regular seasonal and cyclic fluctuations as well as irregular random fluctuations. The seasonal variability of maize prices is highly statistically significant. In 2018, lowest prices of maize (91.7 % of the annual average) were in October, whereas the highest (107.1 %) in August. Changes in prices of maize in 2010 – 2018 were characterized by a cyclicity of 2 to 4 year-long cycles. Annually, on average, cyclic fluctuations amounted to 62 %, seasonal fluctuations 31 % and random 7 % of the total price variability for maize.

Key words: maize, price, variability, time series, seasonality, cyclic fluctuations.

JEL codes: E 30, Q 11, Q 13

Introduction

The price variability is a key aspect of price risk for all market members: producers, processors, as well as consumers (Figiel et al. 2012). The price levels of agricultural raw materials are mainly influenced by: the biological-technical character of agricultural production, low short-term elasticity of supply, inter-market relations and relations to world prices (Hamulczuk and Stanko 2011). Price variability is inevitable, however, it is crucial to know the causes lying behind the variability, which may allow foreseeing or preventing sudden changes in price levels. Characteristic elements of the price variability in agriculture include annual seasonal fluctuations or longer, periodically repetitive cyclic fluctuations. Best known are pig cycles in pork production (Szymanska 2012). Despite numerous studies and a relatively well described mechanism, the occurrence of „pig cycles” has not been eliminated.

Maize has increased economic importance in the world. In 90. of XX century it took third place after wheat and rice (Czulowska 2017). The area of cultivation of maize plant develops the most dynamically from all plants in cultivation in Poland country. Maize is grown in our country mainly for fodder and for the spirits industry. When it comes to feed use, two basic directions can be distinguished: intended for grain and for silage from whole plants, which is prepared for ruminants. In 2014, grain maize was grown on the surface above 678 thousand hectares, of which they were collected 4.48 million tons, in 2017 year – respectively 1191 thousand hectares and 4.02 tons. Grain and livestock production are closely related (Mruklik i Jodz 2012). The chemical composition of maize in comparison to other cereals is characterized by the highest stability and low variability in years. The energy value is the highest of all cereals, this is due to the amount contained in the starch grain, the low fibre level and the relatively high level of fat. Maize grain compared to other cereals, is characterized by a relatively low concentration of protein. The amino acid composition of the maize protein is far from optimal due to the lack of lysine and tryptophan (Boczar 2018). This fact must be taken into account when composing doses with a high proportion of maize and replenishing both amino acids to the necessary level. Maize grain is characterized by the best availability of energy among all cereals.

The aim of the paper is to present the type and the range of variability of maize prices in 2010-2018. In case to achieve the main goal of the study following tasks were formulated: (1)

¹ al. Mickiewicza 21, 31-120 Kraków e-mail: rrbanas@cyf-kr.edu.pl

characterized type of variability by calculation variability coefficient, minimal value and maximal value, maximal monthly change in price and the change in price indicator; (2) describe the type of price fluctuations using the time series analysis.

Research material and methods

The research material was monthly time series for prices of maize in 2010-2018. The prices came from the Integrated System of Agricultural Market Information (2019), whereas the level of maize production in Poland were obtained from the FAOSTAT Database (Faostat 2019).

The range of price variability in a year was presented with a variability coefficient, minimal value and maximal value (interval), maximal monthly change in price (increase or decrease) and the change in price indicator (in %). The analysis of the price variability for maize was conducted with a price time series decomposition. A time series includes the following elements (Dittmann 2008):

Developmental tendency – trend (T) – it shows the long-term tendency for one-way changes (increase or decrease) of the price. It is understood as the effect of the influence of a constant set of factors,

Cyclic fluctuations (C) – they are formed as long-term, rhythmically repetitive price fluctuations around the developmental tendency in time intervals longer than one year,

Seasonal fluctuations (S) – are price fluctuations of the observed variable (price) around the developmental tendency and repeat in a time interval not longer than one year.

Random fluctuations – random element – (I).

Given the mutual relation between the long-term trend (T) and cyclic fluctuations (C) formed by similar factors, the elements of the time series are treated in the paper as a whole trend-cycle element (T_tC_t). To describe the time series for maize prices, a multiplicative model was used in the form of the following formula (Stanko 2013):

$$Y_t = T_t C_t S_t I_t$$

where:

Y_t – price in time t ,

T_tC_t – long-term trend and cyclic fluctuations,

S_t – seasonal fluctuations,

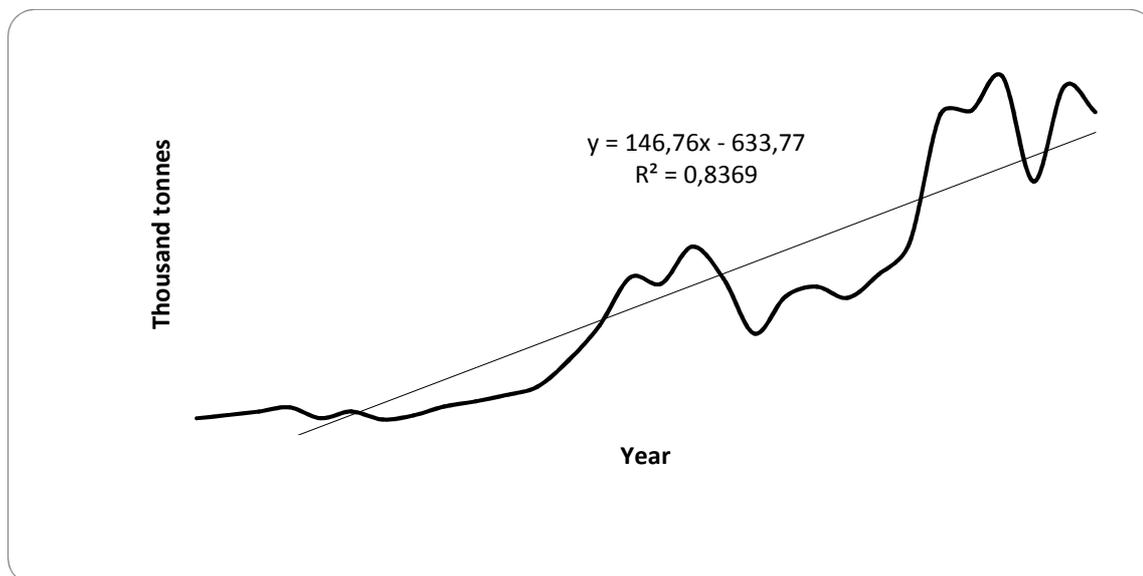
I_t – random fluctuations.

The Census II/X11 [Idzik 2009] method was used to determine the seasonality of indicators. The advantage of Census II/X11 is, among others, the ability to calculate seasonal fluctuations for each year separately, which allows for an analysis of possible changes in seasonality models in longer periods of time. In order to check the relevance of the seasonality indicators, a variance analysis was carried out for indicator values in particular months using the F test.

The influence of particular components of the time series, such as: seasonality (S), random fluctuation (I) and developmental tendency (TC) on the general variability of maize prices was determined in relation to the duration of changes. To this end, the share of variances for particular components of the series in the total price variance was analyzed. The calculations were carried out with a forecasting and time series analysis packet included in the computer program Statistica 9.0 (Kot et al. 2011).

Results

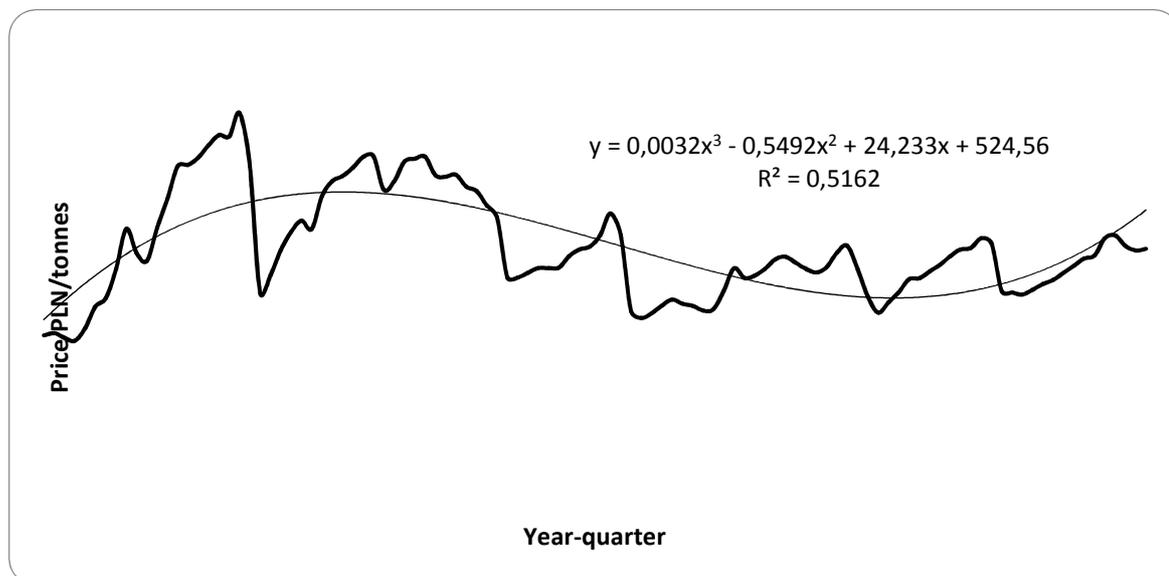
Production of maize in Poland in last three decades increased twenty times from the level of 204 thousand tonnes in 1988 to 4022 thousand tonnes in 2017 year (Fig. 1). The most intensive increase (187 thousand tonnes yearly) took place from 2000 year.



Source: author's calculations based on Faostat Database 2019

Fig. 1. Production of maize in Poland in years 1998-2017

Price of maize undergo significant fluctuations. Over last nine years, the nominal price of maize increased from 512 PLN/ton in January 2010 to 713 PLN/ton in December 2018 (Fig. 2).



Source: author's calculations based on Integrated System of Agricultural Market Information, 2019

Fig. 2. Level of nominal prices of maize in 2010-2018

The biggest monthly increase (14.1 %) took place in 2010, in which the price rose from 665 PLN/ton in August to 759 PLN/ton in September. The biggest monthly drop (-32.5 %), however, took place in 2011, in which the price decreased from 904 PLN/ton in September to 610 PLN/ton in October (Tab. 1).

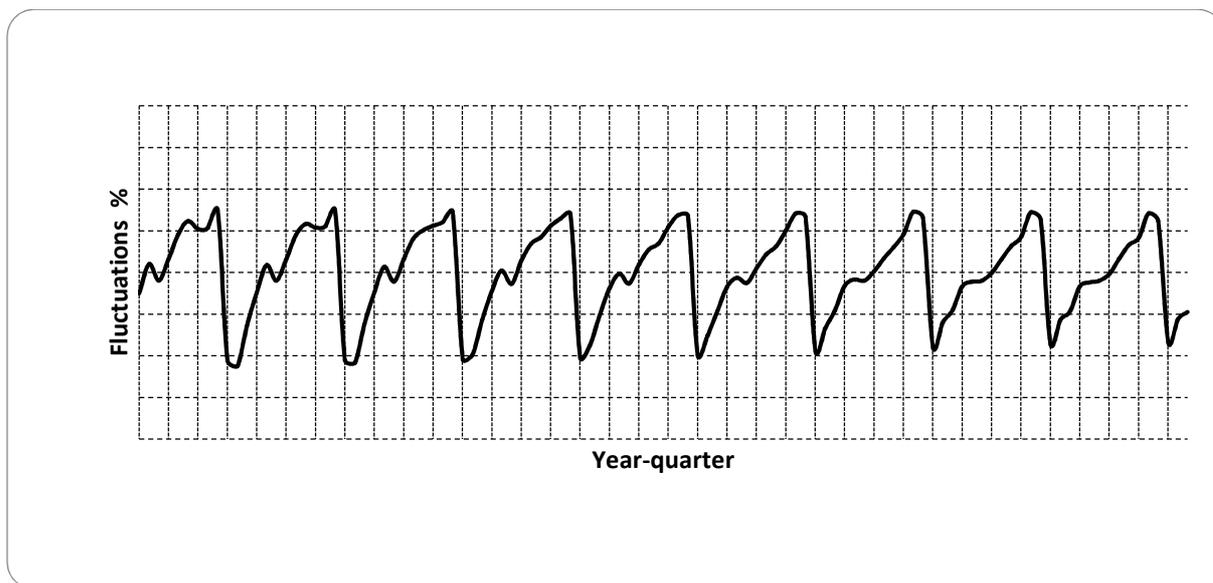
In 2010-2014 the price variability coefficient in a year was ranging between 11.6 and 16.5 %, (except year 2012 7.3 %) whereas from 2015 prices in a year were subjected to lower fluctuations, and the variability coefficient was about 7 %.

Variability of maize prices in 2010-2018

Year	Average	min	max	max/ min	Variability coefficient %	Max monthly %		Index of change	
	PLN kg ⁻¹					decrease	increase	yearly	January 2010=1
2010	609	499	762	1.5	16.5	-7.4	14.1	1.5	1.5
2011	865	610	1028	1.7	15.7	-32.5	9.2	0.9	1.4
2012	855	752	928	1.2	7.3	-8.4	10.0	1.2	1.8
2013	813	646	927	1.4	13.0	-17.7	1.7	0.7	1.3
2014	675	552	795	1.4	11.6	-23.8	6.9	0.8	1.1
2015	618	570	688	1.2	7.0	-3.3	8.5	1.2	1.3
2016	652	565	720	1.3	7.5	-9.6	5.0	0.9	1.2
2017	670	607	738	1.2	7.0	-15.3	4.9	0.9	1.2
2018	686	618	744	1.2	6.1	-3.2	5.7	1.2	1.4

Source: author's calculations based on Integrated System of Agricultural Market Information, 2016

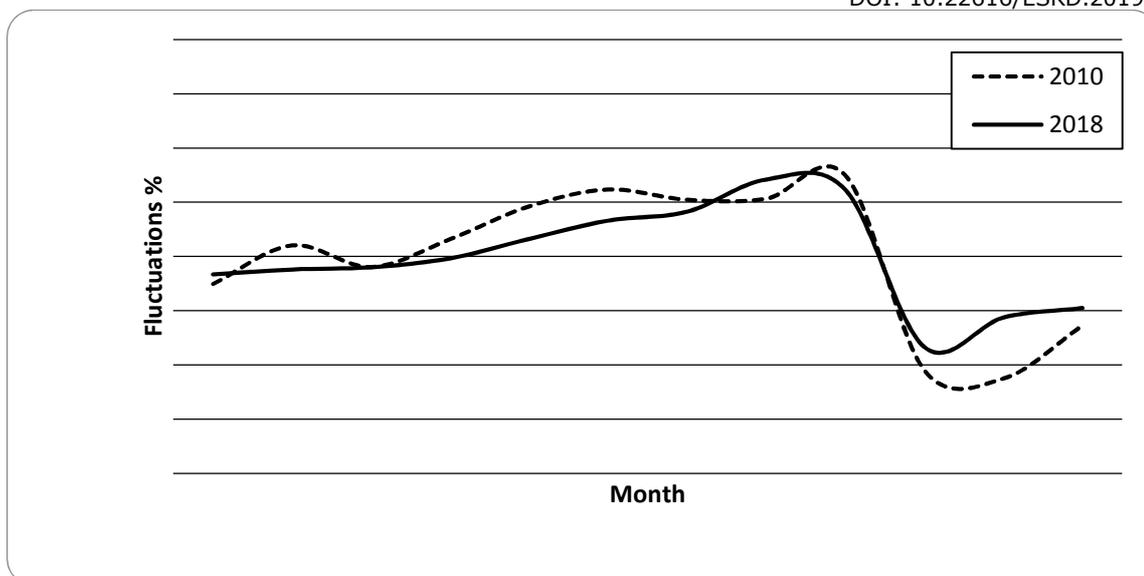
The decomposition of the time series for maize prices indicates regular seasonal and cyclic fluctuations as well as irregular random fluctuations. The steady seasonality test results proved that the seasonal variability of maize prices is highly statistically significant ($p < 0.0001$, statistics value $F = 27.68$). In the analyzed period there was a slightly change in the model seasonality and a decrease in the amplitude of seasonal fluctuations. In 2010 maize was cheapest (88.7 %) in November and in following months price gradually increased reached the peak (107.5 %) in September (Fig. 3, 4). The amplitude of seasonal fluctuations amounted to 18.8 %.



Source: author's calculations based on Integrated System of Agricultural Market Information, 2019

Fig. 3. Seasonal fluctuations of maize prices in 2010-2018

In the following years, there was a slightly decrease in the fluctuation amplitude. In 2018, lowest prices of maize (91.7 % of the annual average) were in October, whereas the highest (107.1 %) in August. The share of seasonal fluctuations in a monthly horizon amounted to 46 % of the total price variability, in two-month horizon it was 49 %, and the share dropped under 30 % in a horizon longer than half a year (Tab. 2).



Source: author's calculations based on Integrated System of Agricultural Market Information, 2019

Fig. 4. Changes in the price seasonality model of maize in 2010-2018

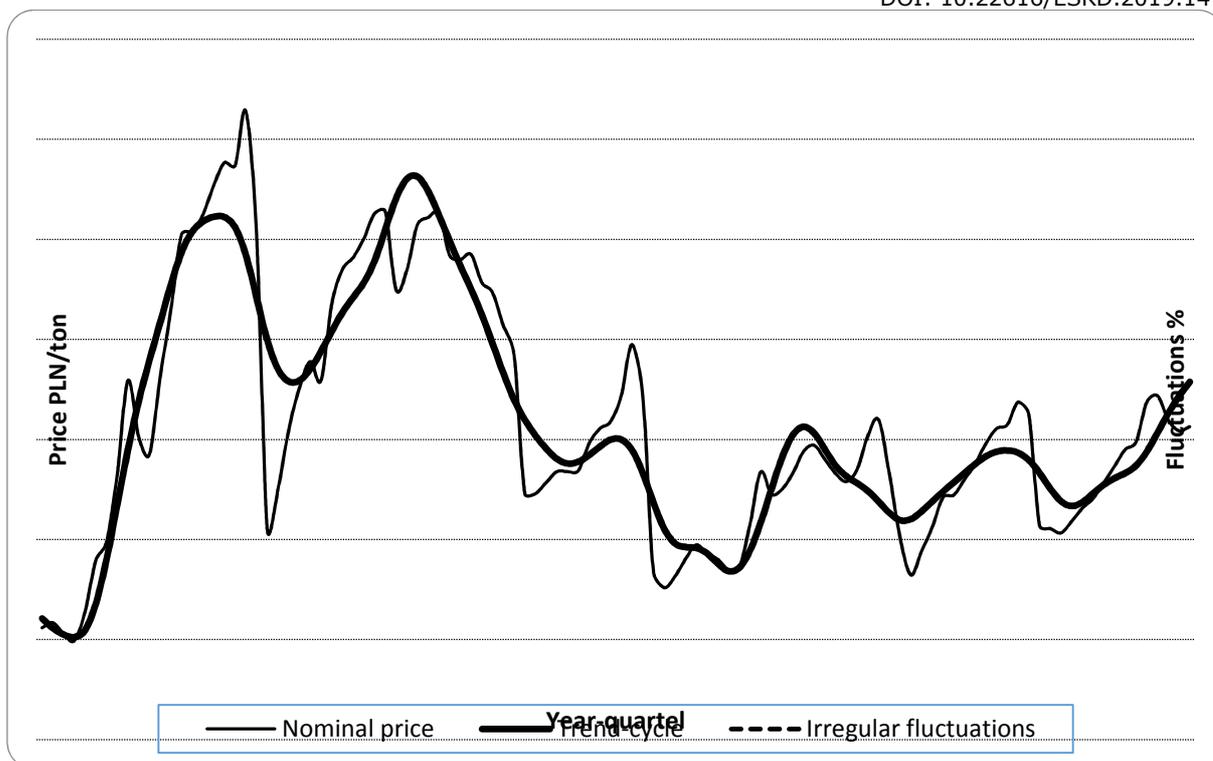
Table 2

Share of seasonal, cyclic and irregular changes in the total price variability of maize in 2010-2018

Horizon of changes (months)	Changes %		
	irregular	cyclic	seasonal
1	27	27	46
2	14	37	49
3	7	45	48
4	5	52	43
5	3	58	38
6	3	63	34
7	3	69	28
9	2	80	18
11	2	94	4
12	3	97	0
Average	7	62	31

Source: author's calculations based on Integrated System of Agricultural Market Information, 2016

Changes in prices of maize in 2010 – 2018 were characterized by a cyclicity of 2 to 4 year-long cycles (Fig. 5). Bottom turning-points occurred in: April 2010, December 2011, May 2015, October 2016 and January 2018. Top turning-points (peaks) occurred in: May 2011, October 2012, December 2015 and July 2017. The value of MCD = 5.04 indicates that after five months of one-way changes a new cycle occurs. Cyclic fluctuations in a month horizon of changes amounted to 27 % and in a 4 month period their share constituted more than half (52 %) of the total variability (tab.3). Irregular fluctuations in a month horizon of changes amounted to 27 % of the total variability, whereas in a four month horizon their share was 5 %. Annually, on average, cyclic fluctuations amounted to 62 %, seasonal fluctuations 31 % and random 7 % of the total price variability for maize.



Source: author's calculations based on Integrated System of Agricultural Market Information, 2019

Fig. 5. Results of the decomposition of the time series for maize prices

Discussion and conclusions

Price variability is characteristic of the free market, functioning based on the rule of balance between supply and demand (Figiel et al. 2012). Significant price fluctuations frequent in agriculture are rooted in a relatively poorly flexible in price demand influenced by slow changes and practically fixed supply in short-term, often influenced by quite rapid changes. Figiel (2002) points out that the range of price fluctuations depends greatly on the price efficiency of a given market, expressed as the ability to set a price quickly, objectively reflecting the demand-and-supply situation both at the present moment and in future determined for the given market.

The work determines the range of variability in the price of maize in 2010-2018 using time series decomposition. The nominal price of maize increased from 512 PLN/ton in January 2010 to 713 PLN/ton in December 2018. The decomposition of the time series for maize prices indicates regular seasonal and cyclic fluctuations as well as irregular random fluctuations. The seasonal variability of maize prices is highly statistically significant. In 2018, lowest prices of maize (91.7 % of the annual average) were in October, whereas the highest (107.1 %) in August. Changes in prices of maize in 2010 – 2018 were characterized by a cyclicity of 2 to 4 year-long cycles. Annually, on average, cyclic fluctuations amounted to 62 %, seasonal fluctuations 31 % and random 7 % of the total price variability for maize.

Acknowledgments

The paper was created with the grant support project NCBiR no. BIOSTRATEG2/297910/12/NCBR/2016

Bibliography

1. Boczar, p. (2018). Plant Protein – Sources, Production Costs and Quality. *Problems of World agriculture*, 18(4), 122-132, DOI: 10.22630//PRS.2018.18.4.103.
2. Czułowska, M. 2017. Comparative Analysis of Economic Results of Maize Cultivated for Dry and Wet Grain. *Roczn. Nauk. SERiA*, t. XIX, z.1, 32-37.
3. Dittmann, p. 2008. *Prognozowanie w przedsiębiorstwie. Metody i ich zastosowanie*. Oficyna Wolters Kluwer Business, Kraków.
4. Faostat 2019. <http://www.fao.org/faostat/en/#home> (downloaded 22.02.2019).
5. Figiel, S. 2002. Cenowa efektywnosc rynku towarowego na przykładzie zbóż w Polsce. Wydawnictwo Uniwersytetu Warmińsko–Mazurskiego, Olsztyn.
6. Figiel, S., Hamulczuk, M., Klimkowski, C. 2012. Metodyczne aspekty analizy zmienności cen oraz pomiaru ryzyka cenowego na towarowych rynkach rolnych. *Komunikaty, Raporty, Ekspertyzy*, nr 559, IERiGZ–PIB, Warszawa.
7. Hamulczuk, M. 2009. Analiza, prognozowanie i zarządzanie ryzykiem cenowym na podstawowych rynkach rolnych – możliwości stabilizowania dochodów producentów rolnych. *IERiGZ–PIB*, Warszawa, 149, 1-68.
8. Hamulczuk, M., Stanko, S. 2011 Prognozowanie cen surowców rolnych - uwarunkowania i metody, *Komunikaty, raporty, ekspertyzy* nr 547, IERiGZ-PIB, Warszawa. str. 5 – 43.
9. Idzik, M. 2009. Analiza struktury szeregów czasowych cen produktów rolnych. [W:] *Zarządzanie ryzykiem cenowym a możliwości stabilizowania dochodów producentów rolnych – aspekty poznawcze i aplikacyjne*. Red. M. Hamulczuk, S. Stanko. IERiGZ-PIB, Warszawa, 148, 15 – 47.
10. Kot, S., M., Jakubowski, J. Sokołowski, A. (2011) *Statystyka*, Difin, Warszawa, str. 335 – 357.
11. Mruklik, A., Jodz, K. 2012. An Application of the Correlation Analysis to the Cereals Production and Animal Production in Poland. *Uprawa zbóż i produkcja zwierzęca w Polsce – analiza zależności*. *Roczn. Nauk. SERiA*, t. XIV, z. 3, 278-281.
12. Olszanska, A. 2012. *Rynek żywności w Polsce (1955–2010) – zmiany strukturalne, koncentracja produkcji i wahania podaży*. Monografie i opracowania nr 214. Wyd. UE we Wrocławiu.
13. Rembeza, J. 2007. *Transmisja cen na rynku mięsa*. [W:] *Ewolucja rynku mięsnego i jej wpływ na proces transmisji cen*. IERiGZ-PIB, Warszawa, 73, 183 – 213.
14. Stanko, S. (red.) 2013. *Prognozowanie w agrobiznesie, teoria i przykłady zastosowania*. Wydawnictwo SGGW, Warszawa.
15. Szymanska, E. 2012. Zmienność koniunktury na rynku trzody chlewnej w Polsce. *Roczn. Nauk. SERiA*, t. XIV, z.1, 524–528
16. Integrated System of Agricultural Market Information. 2019. <http://www.minrol.gov.pl/pol/Rynki-rolne> [4.02.2019].

BIOLOGICAL PROGRESS AND THE USE OF NITROGEN BY CEREAL VARIETIES

Ludwik Wicki¹

Warsaw University of Life Sciences – SGGW, Faculty of Economic Sciences, Poland

Abstract. Nowadays, the need for sustainable development of agriculture is emphasized. The sector must not only supply enough food world population and provide income for farmers, but also reduce its impact on the environment. The possibility of achieving these two objectives together may result from the introduction of biological innovations in the form of new crop varieties, which use nutrients more efficiently or are better adapted to the production conditions. **The aim of the work** is to determine the changes in the level of nitrogen utilization from mineral fertilizers by winter wheat and rye varieties introduced for cultivation in Poland in 1998–2014. The results of varietal experiments carried out by RCCT were used in the research. The changes in the productivity level of nitrogen fertilization were determined for the tested varieties. It was found that newer varieties of winter wheat and rye were characterized by higher grain production per 1 kg of nitrogen in mineral fertilizers. Varieties from 2012–2014, compared to those from 1998–2000, were characterized by higher productivity by 4 kg of grain / 1 kg of N and 10 kg of grain / 1 kg of N, respectively for winter wheat and rye. This could significantly contribute to the reduction of emissions from agricultural production, since the estimated reduction in the use of nitrogen fertilizers in cereal production was over 5 % for the volume of production from 2017. It was found that introducing new varieties that use nitrogen fertilization more efficiently can be an important factor leading to reducing emissions from agriculture and to increasing agricultural production without increasing pressure on the natural environment.

Key words: biological innovations, external effects, bioeconomy, nitrogen emission, nitrogen productivity.

JEL code: Q01, Q16, Q55.

Introduction

Economy, including agriculture, is changing constantly. For many years, innovations introduced in various spheres of agricultural activity have led to a constant increase in productiveness of the production factors engaged (Wicki, 2018a). Innovations involve the production technologies applied, machines, fertilizers, plant protection agents, as well as plants and animals. In plant production, biological progress is ensured by cultivation and selection for agricultural production of plant varieties that are constantly being improved. Over the long-term perspective, in developed countries, about 50 % of increase in cereal yield has been achieved thanks to plant cultivation and new varieties (Duvick, 2005; Thirtle, 1995). In Poland, in years 2006–2017, introduction of innovations consisting of new varieties explained 20 to 60 % of increase in cereal yield, depending on the species (Wicki, 2017a; 2018b). In new varieties, various features are developed, including those associated with better use of nitrogen and its contribution to yield. On the average, agricultural plants use only 33 % of available nitrogen (Raun and Johnson, 1999). Modern varieties e.g. of wheat, although not always characterized by better nitrogen utilization, are usually more capable of using its high doses, which results in high yield, including under conditions of low-intensity and organic farming (Guarda, Padovan and Delogu, 2004). The genes of these plants are adapted to better use of nitrogen (Van Sanford and MacKown, 1986; Ortiz-Monasterio et al. 1997; Le Gouis et al., 2000). Traditional varieties, adapted to low nitrogen content in the soil, can be used in extensive farming and constitute a valuable source of genes in plant cultivation (Dawson, Huggins and Jones, 2008).

Increase in agricultural production is necessary due to the growing demand for food and limited land resources (Hitz, Clark and Van Sanford, 2017), which calls for use of high-yielding varieties (Stevenson et al., 2013) and engagement of high expenditures. This generates higher production costs and increases the risk of environmental pollution (Guarda, Padovan and Delogu, 2004).

¹ corresponding author: e-mail: ludwik_wicki@sggw.pl; dr habil., WULS professor, ORCID: 0000-0002-7602-8902

At present, an important objective is to achieve a higher level of utilization of nitrogen from mineral and organic fertilizers, translating to higher yield per unit of fertilizer. To produce 1 ton of nitrogen fertilizer, about 870 cubic meters of natural gas is used. There is also energy used in transport and in the fertilization process, as well as fuel and labour expenditures. In order to limit the costs of fertilizing and reduce the potential negative environmental impact, it is necessary to search for new solutions. These include precision farming, plant breeding oriented at varieties, which make better use of nitrogen and are characterized by a positive response to more intensive fertilization (Dawson, Huggins and Jones, 2008). This may contribute to reduction of plant demand for nitrogen while maintaining a constant yield of grain and protein, which, however, does not relate directly to the impact of excessive nitrogen fertilization on the environment. Moreover, it has been estimated that expenditures for fertilizers amount even to 50 % of cost of cereal production (Klikocka at al., 2011), and nitrogen balance in agriculture depends mainly on fertilization level (Jankowiak at al., 2010; Tkaczyk at al., 2018). Higher plant yield, on the other hand, is also associated with greater sequestration of atmospheric carbon by plants, and thus total greenhouse gas emission may grow at a slower pace than production (Faber and Jarosz, 2018). According to Kopinski (2018), in Poland, in years 2002-2016, GHG emission from agriculture was reduced despite increase in production. Factors that contributed to this were increase in utilization of modern plant varieties and their yield potential (Wicki, 2016; 2017b), and application of proper production techniques in farming.

The aim of improving effectiveness of use of fertilizers has some environmental aspects as well. At present, the level and causes of greenhouse gas emission from agricultural production is being analysed thoroughly, indicating the need to reduce emission (Lenerts at al., 2017; Naglis-Liepa at al. 2018). Some of the postulated actions would have to result in limiting of production and a disadvantageous change in land use structure. Achievement of environmental objectives in agriculture is usually accompanied by limiting of production objectives (Czyzewski and Staniszewski, 2018; Kraciuk, 2018), and from the perspective of sustainable development, it is necessary to search for solutions that would make it possible to generate environmental public goods by farming without limiting production (Danilowska, 2015; Golebiewska and Pajewski 2018; Malazewska, 2015). Another benefit of varieties improvement is the possibility of choosing better plants in terms of their adaptation to soil and climatic conditions, which reduces the production and economic risk in agriculture (Wicka, 2018).

Possibilities of achieving higher production thanks to more effective use of fertilizers are thus due to achievements in plant cultivation and application of proper farming techniques (Gastal at al., 2015). As a result, it is possible to achieve the objectives in productivity, economy and environment protection. Thus, these activities are aimed at sustainable development of farming.

Aim and methods

The objective of this study is to determine the changes in level of utilization of nitrogen from mineral fertilizers by winter wheat and rye varieties introduced to production in Poland in years 1998-2014.

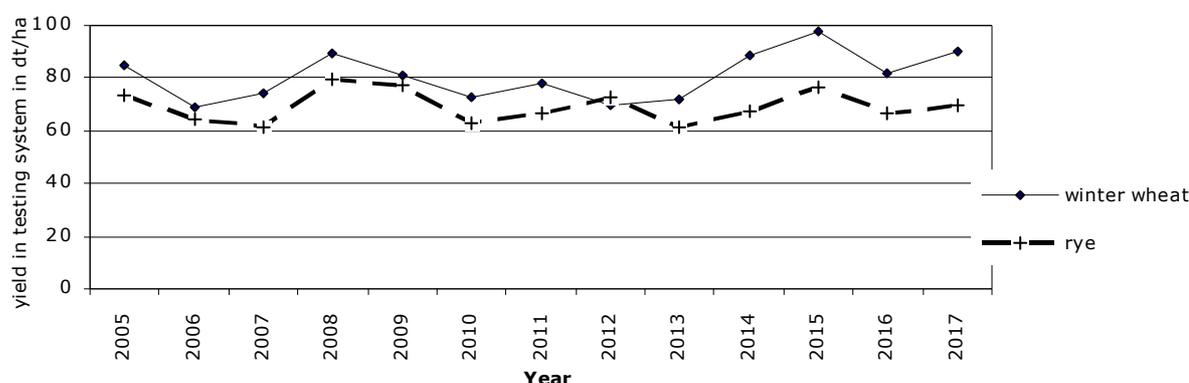
The following research tasks were completed: 1) gross productivity of nitrogen fertilization was determined for winter wheat and rye varieties introduced in individual years of the examined period; 2) the trend in gross productivity of nitrogen fertilization depending on variety age was specified.

The source of data was information published annually by the Research Centre for Cultivar Testing (RCCT) on yields of individual varieties under conditions of a field experiment. The analysis period encompassed years 2005-2017, and the comparison involved those varieties, which were tested for

at least two years. In total, the comparison included 40 varieties of rye and 101 varieties of winter wheat. Information was gathered on yield and fertilization level for each variety in each of the years analysed. For each variety and year, grain yield (Y) was determined per 1 kg of nitrogen in mineral fertilizer (N). Then, for each year analysed, average nitrogen utilization effectiveness was determined (Y/N) for varieties introduced in farming in a given year. Finally, dependence between year of introduction of variety to production and the nitrogen utilization effectiveness was determined using the linear regression function, estimated on the basis of the ordinary least squares method (OLSM).

Research results and discussion

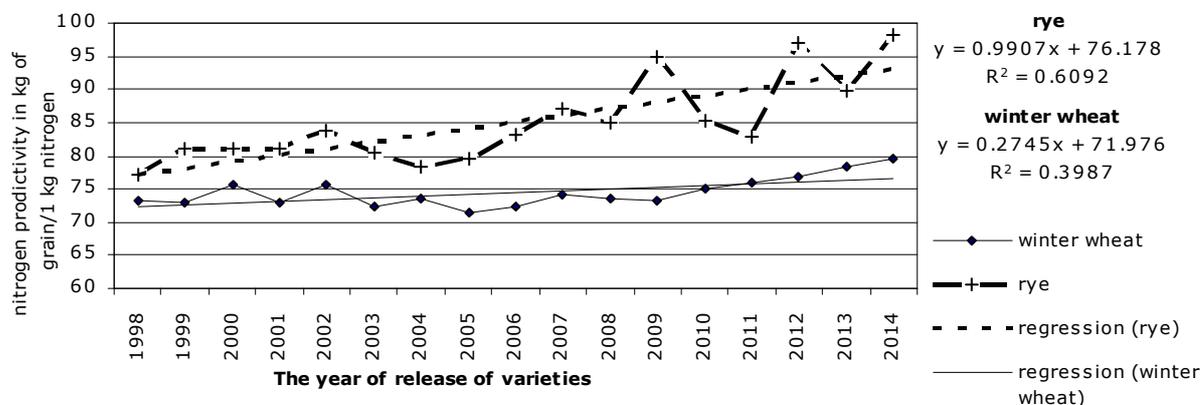
In field experiments conducted in Poland, the yields of different cereal varieties amount to 70-100 dt per hectare. Yield fluctuations are recorded depending on the weather, e.g. draught or severe winter conditions with very low temperatures. Figure 1 presents the level of yield of winter wheat and rye in field experiments in years 2005-2017. Fertilization intensity and production technology in the experiments did not change substantially in the period analysed. Nitrogen fertilization in individual years amounted to 80 to 90 kg N/ha for rye and 104 to 114 kg N/ha for wheat



Source: author's drawing based on data of RCCT (COBORU, 2005-2017)

Fig. 1. Cereals yield in field trials in variety testing system (2005-2017)

Figure 2 presents changes in the nitrogen utilization effectiveness indicator, expressed in kilograms of cereal per kilogram of nitrogen from mineral fertilizer. It should be kept in mind that this analysis does not take into account availability of nitrogen from other sources than mineral fertilizers.



Source: author's calculations based on data of RCCT (COBORU, 2005-2017)

Fig. 2. Nitrogen productivity ratio for varieties depending on the year of releasing of the variety for production (varieties released in 1998-2014) for winter wheat and rye varieties (nitrogen productivity is averaged for years of testing)

Results presented in Figure 2 show positive relationship between production of grain from 1 kg of nitrogen in mineral fertilizers and time of release of varieties. This relationship is closer for rye and weaker for winter wheat. The level of explained variability of nitrogen utilization effectiveness indicator by year of release of varieties equals about 60 % for rye and almost 40 % for winter wheat. Our findings indicate that introduction of new varieties causes growth of productivity of nitrogen fertilization.

For wheat varieties introduced in production in years 1998–2000, average nitrogen productivity amounted to 74 kg of grain per 1 kg of nitrogen. Varieties introduced in the subsequent years featured increasing productivity, wherein average productivity of nitrogen for varieties registered in years 2012–2014 was higher by 4.4 kg of grain per 1 kg N in comparison with varieties registered in years 1998–2000.

For rye, gross productivity of nitrogen fertilization was higher than for wheat, mainly due to introduction of high-yield hybrid varieties (F1). For rye varieties registered in years 1998-2000, average gross productivity of nitrogen fertilization amounted to about 80 kg of grain per 1 kg N. Varieties introduced in years 2000-2005 did not feature a substantially higher nitrogen utilization effectiveness. Only varieties registered since 2007, including hybrid varieties, are characterized by higher productivity. On the average, nitrogen utilization ratio for rye varieties registered in years 2012-2014 is higher by 14 kg of grain / 1 kg N in comparison with those registered in years 1998-2000. Like in the case of wheat, we can only refer here to an average tendency, as varieties introduced in the subsequent years did not always feature a higher value of the examined trait in comparison with the older ones. On the average, as the variety age reduced by one year, the nitrogen utilization ratio increased by 1 kg of grain / 1 kg N.

For rye, varieties can be divided into two groups: traditional and hybrid varieties. The first hybrid varieties of rye were introduced in Poland in years 2001-2003, and the subsequent - in years 2007-2014. Productivity ratio for nitrogen from mineral fertilizers for varieties from years 2001-2003 averaged 89 kg of grain /1 kg N, and for newer varieties, introduced in years 2012-2014, as much as 97 kg of grain/1 kg N. It should be kept in mind, however, that these varieties are not appropriate for low intensity production.

Traditional rye varieties were introduced throughout the entire period of analysis. Nitrogen fertilization productivity ratio increased for these varieties at the pace of 0.38 kg with decrease variety age by one year, taking into account the variety registration years. On the average, productivity of nitrogen from mineral fertilizers increased for population rye varieties introduced in years 1998-2014 from 79 to 84 kg of grain /1 kg N. This is half less than for all rye varieties together, which means that progress in terms of the cultivars being examined was mainly due to introduction of hybrid varieties.

On the basis of the recorded changes in utilization of nitrogen from mineral fertilizers by cereals, hypothetical reduction in nitrogen fertilizers in Poland was determined due to application of varieties introduced in years 2012-2014 instead of those registered in years 1998-2000. The reference level was the average area and level of production of cereals from years 2015-2017. For rye, it was assumed that in the first period, only traditional varieties were used, which in the latter period occupied 95 % of total cultivation area. This is a simplified calculation, as it does not take into account the response of each individual variety to changes in nitrogen fertilization level and the variety structure in field production. Thus, it was assumed that differences between the older and newer

varieties would be the same in production as in experiments. The calculation results have been presented in Table 1.

Table 1

Estimated reduction of nitrogen consumption from mineral fertilizers as a result of the introduction of new varieties on example of production volume in years 2015-2017

Item	Area of production in '000 ha	Production in '000 ton	Amount of nitrogen use in '000 ton			Change in nitrogen use in kg per 1 ha
			for 'older' varieties	for 'newer' varieties	difference	
Winter wheat	1975	9607	129.8	123.2	-6.6	-3,4
Rye	787	2295	28.9	27.2	-1.7	-2.3
Total	2762	11902	158.1	147.4	-8.3	-3.1

Source: author's calculations

The estimated influence of introduction of new varieties in production on the level of reduction of use of nitrogen in mineral fertilizers was determined to be 8.3 thousand tons per year. This indicates that progress achieved for new varieties in years 1998-2014 with regard to utilization of nitrogen from mineral fertilizers made it possible to reduce fertilizer use by 5.3 %. This means it is possible to achieve higher yields without increasing fertilizer use, but also to reduce the fertilization level without reducing production. This may reduce the pressure of agriculture on the natural environment despite increase in production. The above has been confirmed by conclusion of Kopinski (2018) concerning lower emission from farming per unit of production.

Conclusions

Agricultural production, although necessary to feed the human population, exerts substantial impact on the environment as any other human activity. Progress in agriculture may contribute to mitigation of negative external impact, including reduction in pressure on the natural environment due to emission of nitrogen from agricultural sources and emission of greenhouse gases. Biological progress in form of new plant varieties is one of the options for achievement of this objective. The following conclusions have been made in the study.

- 1) Cereal varieties introduced in Poland in the subsequent years of period 1998-2014 were characterized by increase in ratio of productivity of nitrogen use from mineral fertilizers.
- 2) The productivity of nitrogen from mineral fertilizers for varieties registered in 2012-2014 was 78 kg of grain per 1 kg of nitrogen for winter wheat and 84 kg of grain per 1 kg of nitrogen for rye varieties.
- 3) Throughout the examined period, average nitrogen productivity increased by 0.27 kg of grain /1 kg N with variety age decrease by 1 year for winter wheat and even as much as 1 kg of grain /1 kg N for rye. In the case of rye, hybrid varieties were characterized by a higher nitrogen utilization ratio in comparison with population varieties, but in both groups, an increase in the ratio was recorded for newer varieties.
- 4) As a result of replacement of varieties of winter wheat and rye from years 1998-200 with varieties introduced to production in years 2012-2014, it would be possible to reduce nitrogen use in mineral fertilizers by 5.3 % while maintaining cereal production at a constant level.
- 5) Introduction of biological progress in agricultural production is a substitute of use of inputs from non-renewable resources and contributes to reduction in emission of pollutants from agriculture

to the natural environment – both air and water, constituting an important aspect of sustainable development of agriculture.

Bibliography

1. COBORU (2005-2017). Wyniki porejestrowych doswiadczen odmianowych. Zboza ozime (Results of Post-Registration Variety Testing. Winter Cereals). Centralny Ośrodek Badania Odmian Roslin Uprawnych: Slupia Wielka.
2. Czyżewski, A., Stanisławski, J. (2018). Zrównowazona intensyfikacja rolnictwa jako kombinacja efektywności nakładów ekonomicznych i środowiskowych (Sustainable Intensification of Agriculture as the Composition of Economic Productivity and Environmental Pressure Measures). *Zeszyty Naukowe SGGW w Warszawie - Problemy Rolnictwa Światowego*, 18(33) (3), pp. 80-90. DOI: 10.22630/PRS.2018.18.3.68
3. Danilowska, A. (2015). Provision of Public Goods by Agriculture in Poland. *Economic Science for Rural Development*, No. 37, pp. 142-151. Available from: http://lufb.llu.lv/conference/economic_science_rural/2015/Latvia_ESRD_37_2015-142-151.pdf
4. Dawson, J. C., Huggins, D. R., Jones, S. S. (2008). Characterizing Nitrogen Use Efficiency in Natural and Agricultural Ecosystems to Improve the Performance of Cereal Crops in Low-input and Organic Agricultural Systems. *Field Crops Research*, 107(2), pp. 89-101. <https://doi.org/10.1016/j.fcr.2008.01.001>
5. Duvick, D. (2005). The Contribution of Breeding to Yield Advances in Maize (*Zea Mays* L.). *Advances in Agronomy*, 86, pp. 83-145. DOI: 10.1016/S0065-2113(05)86002-X
6. Faber, A., Jarosz, Z. (2018). Modelowanie emisji podtlenku azotu i amoniaku w skali regionalnej oraz w Polsce (Modeling of Soil Organic Carbon Balance and Greenhouse Gas Emissions on a Regional Scale and in Poland). *Zeszyty Naukowe SGGW w Warszawie - Problemy Rolnictwa Światowego*, 18(33) (2), pp. 70-81. DOI: 10.22630/PRS.2018.18.2.35
7. Gastal, F., Lemaire, G., Durand, J. L., Louarn, G. (2015). Quantifying Crop Responses to Nitrogen and Avenues to Improve Nitrogen-use Efficiency. In *Crop Physiology*, (Second Edition), pp. 161-206. DOI: 10.1016/B978-0-12-417104-6.00008-X
8. Gołębiowska, B., Pajewski, T. (2018). Positive and Negative Externalities of Management Illustrated by the Case of Agricultural Production. *Journal of Agribusiness and Rural Development*, (2 (48)), 113-120. DOI: 10.17306/J.JARD.2018.00395
9. Guarda, G., Padovan, S., Delogu, G. (2004). Grain Yield, Nitrogen-use Efficiency and Baking Quality of Old and Modern Italian Bread-wheat Cultivars Grown at Different Nitrogen Levels. *European Journal of Agronomy*, 21(2), pp. 181-192. DOI: 10.1016/j.eja.2003.08.001
10. Hitz, K., Clark, A. J., Van Sanford, D. A. (2017). Identifying Nitrogen-use Efficient Soft Red Winter Wheat Lines in High and Low Nitrogen Environments. *Field crops research*, 200, pp. 1-9. DOI: 10.1016/j.fcr.2016.10.001
11. Jankowiak, J., Bienkowski, J., Kolka, M. (2010). Wpływ intensywności produkcji rolnej na emisję azotu do środowiska (The Effect of Agricultural Production Intensity on the Nitrogen Emission Into the Environment). *Roczniki Naukowe Stowarzyszenia Ekonomistów Rolnictwa i Agrobiznesu*, 12(1), pp. 65-69.
12. Klićkocka, H., Glowacka, A., Juszcak, D. (2011). Wpływ zrozniczonych sposobów uprawy roli i nawożenia mineralnego na efekty ekonomiczne uprawy jęczmienia jarego (The Influence of Different Soil Tillage Methods and Mineral Fertilization on the Economic Parameter of Spring Barley). *Fragm. Agron.*, 28(2), pp. 44-54.
13. Kopyński, J. (2018). Ocena zmian organizacyjno-produkcyjnych w polskim rolnictwie w kontekście wybranych oddziaływań środowiskowych (Assessment of Organizational and Production Changes in Polish Agriculture in the Context of Selected Environmental Impacts). *Zeszyty Naukowe SGGW w Warszawie - Problemy Rolnictwa Światowego*, 18(33) (4), pp. 284-294. DOI: 10.22630/PRS.2018.18.4.118
14. Kraciuk, J. (2018). Bezpieczeństwo żywnościowe Polski na tle wybranych krajów Europy Wschodniej (Food Security in the Selected Countries of Eastern Europe). *Zeszyty Naukowe SGGW - Ekonomika i Organizacja Gospodarki Żywnościowej*, (121), 41-53. DOI: 10.22630/EIOGZ.2018.121.3
15. Le Gouis, J., Béghin, D., Heumez, E., Pluchard, p. (2000). Genetic Differences for Nitrogen Uptake and Nitrogen Utilisation Efficiencies in Winter Wheat. *European Journal of Agronomy*, 12(3-4), 163-173. DOI: 10.1016/S1161-0301(00)00045-9
16. Lenerts, A., Popluga, D., Rivza, p. (2017). Selection of Greenhouse Gas Emission-Reducing Measures with Analytical Hierarchy Process Approach: A Case Study From Latvian Crop Production Sector. *Economic Science For Rural Development*, No. 44, pp. 267-273. Available at: http://lufb.llu.lv/conference/economic_science_rural/2017/Latvia_ESRD_44_2017-267-273.pdf
17. Malazewska, S. (2015). Środowiskowe dobra publiczne w rolnictwie i na obszarach wiejskich (Environmental Public Goods in Agriculture and Rural Areas). *Ekonomia i Środowisko*, No. 1, pp. 132-147.
18. Naglis-Liepa, K., Popluga, D., Lenerts, A., Rivza, P., Kreismane, D. (2018). Integrated Impact Assessment of Agricultural GHG Abatement Measures. *Economic Science for Rural Development*, No. 49, pp. 77-83. DOI: 10.22616/ESRD.2018.121
19. Ortiz-Monasterio, R., Sayre, K. D., Rajaram, S., & McMahon, M., 1997. Genetic Progress in Wheat Yield and Nitrogen Use Efficiency Under Four Nitrogen Rates. *Crop Science*, 37(3), 898-904. DOI: 10.2135/cropsci1997.0011183X003700030033x
20. Raun, W. R., Johnson, G. V. 1999. Improving Nitrogen Use Efficiency for Cereal Production. *Agronomy Journal*, 91(3), pp. 357-363. DOI: 10.2134/agronj1999.00021962009100030001x

21. Stevenson, J., Villoria, N., Byerlee, D., Kelley, T., Maredia, M. (2013). Green Revolution Research Saved an Estimated 18 to 27 Million Hectares from Being Brought into Agricultural Production. Proceedings of the National Academy of Sciences of the United States of America, 110(21), pp. 8363-8368. DOI: 10.1073/pnas.1208065110
22. Thirtle, C. (1995). Technological Change and the Productivity Slowdown in Field Crops: United States, 1939-78. *Southern Journal of Agricultural Economics*, No. 17 (Dec.), pp. 33-42. DOI: 10.1017/S0081305200025036
23. Tkaczyk, P., Bednarek, W., Brodowska, M., Muszynski, p. (2018). Fosforany i azotany (V) w wodach gruntowych jako element zanieczyszczenia srodowiska przyrodniczego (Phosphates and Nitrates(V) in Groundwater as an Element of Natural Environment Pollution). *Annales UMCS sectio E Agricultura*, 73(4), pp. 149-159. DOI: 10.24326/asx.2018.4.13
24. Van Sanford, D. A., MacKown, C. T. (1986). Variation in Nitrogen Use Efficiency Among Soft Red Winter Wheat Genotypes. *Theoretical and Applied Genetics*, 72(2), pp. 158-163. DOI: 10.1007/BF00266987
25. Wicka, A. (2018). Crop Insurance With Subsidies in Poland – Do It Works? *Economic Science for Rural Development*, (49), pp. 178-186. DOI: 10.22616/ESRD.2018.134
26. Wicki, L. (2016). Wykorzystanie potencjalu plonowania zboz w produkcji rolniczej w Polsce (The Level of Utilization of Potential of Yielding of Cereals Species in Poland). *Roczniki Naukowe Stowarzyszenia Ekonomistow Rolnictwa i Agrobiznesu*, 18(5), pp. 267-273.
27. Wicki, L. (2017a). Postep w plonowaniu odmian pszenicy ozimej i zyta w doswiadczeniach odmianowych w Polsce. (Changes in Yielding of Varieties of Winter Wheat and Rye in Variety Testing in Poland). *Roczniki Naukowe Stowarzyszenia Ekonomistow Rolnictwa i Agrobiznesu*, 19(4), pp. 224-230. DOI: 10.5604/01.3001.0010.5191
28. Wicki, L. (2017b). Poziom i zakres wsparcia upowszechniania postepu biologicznego w produkcji roslinnej w ramach dzialan Agencji Rynku Rolnego (The Level and Scope of Support of Biological Progress Dissemination in Crop Production in Poland Within the Measures of Agricultural Market Agency). *Zeszyty Naukowe SGGW, Polityki Europejskie, Finanse i Marketing*, No. 18(67), pp. 259-271. DOI: 10.22630/PEFIM.2017.18.67.38
29. Wicki, L. (2018a). The Role of Productivity Growth in Agricultural Production Development in the Central and Eastern Europe Countries After 1991. *Economic Science for Rural Development*, No. 47, pp. 514-523. DOI: 10.22616/ESRD.2018.060
30. Wicki, L. (2018b). Znaczenie postepu biologicznego we wzroscie plonowania zboz jarych w doswiadczeniach odmianowych w Polsce (The Role of Biological Progress in the Increase of the Yield of Spring Cereals in Varietal Testing in Poland). *Roczniki Naukowe Stowarzyszenia Ekonomistow Rolnictwa i Agrobiznesu*, 20(2), pp. 162-168. DOI: 10.5604/01.3001.0011.8132