

ENTREPRENEURIAL UNIVERSITY MODEL: CASE OF KNOWLEDGE FLOW ANALYSIS IN VUC

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Abstract. In this paper we have presented the first of a series of three cases investigating technology commercialisation motives. University – industry knowledge and technology transfer becomes increasingly important. Analysed information and collected data provide additional information that made more clear the approach allowing to a systematic model of the entrepreneurial university on the bases of a case study analysis of the regional university college.

Therefore, we feel that the research merits continuation with the aim to investigate how knowledge created in regional universities and research institutes, is integrated into commercialization process. Moreover, it will help to find out whether all knowledge acquisition opportunities are used in order to utilise them successfully.

The main tasks of the paper are the following:

- to identify and analyze the main modes of knowledge transfer in the commercialization process;
- to examine and analyze collaborative facilities between the academic and business environment;
- to view and compare the Latvian and Finnish regional universities' development policy;
- to conduct a survey in several Business Incubator companies in Latvian regions to assess their performance in line with the production of innovative and knowledge intensive products;
- to develop proposals for knowledge transfer promotion between academia and business.

There exist preconditions that Ventspils University College might introduce framework of entrepreneurial university model and increasing collaboration with industry, as well as commercialisation processes will facilitate such transition.

Keywords: entrepreneurial university, technology transfer, technology commercialisation, open innovation, commercialisation process and university-industry collaboration.

Introduction

Innovation is a driver of companies' competitiveness and is crucial to increase productivity and efficiency of production. The role of knowledge creators like universities is consistently growing and obtaining new forms of operation. Several authors have outlined that since 1990s university-industry partnership was guided by interaction with government in a systematic way to promote economic and social benefits and outputs for society.

Triple-Helix theory [1] emphasizes entrepreneurial university model and distinguishes several routes of knowledge and technology transfer. More detailed approach considers importance of knowledge flows in regional or national innovation systems [2] and EC [3]. In essence, the model of interaction has more complex mode. Sometimes the best way how universities may transfer their knowledge to industry and society is via soft or indirect channels, like publications, exhibitions, conferences, informal exchange or unpaid advices [4]. One study informed that MIT graduates have funded 4000 companies with annual revenues for USD 232 billion worldwide [5].

Non-linear approach to innovation processes requires more wide focus to understand clear role of both industry and university [2]. Kautonen (2000) [6] presents several categories of companies involved: customers, suppliers, competitors and partners.

As a result of substantial private and public investment in research activities it is important to manage existing interactions in a way to get maximised return back [7]. Sources of new knowledge might be classified as follows: research organisations; customers; other research driven firms; intermediates (here we classify also educational and training institutions, it could be better to name it as external expertise class); individual persons.

The variety of existing technology transfer channels, the main routes for commercial return - B2R&D, B2B, B2C, R&D2R&D we described in our previous work, where we identified main TT channels between R&D and industry. There is growing importance of intangible components of technology transfer process: role of formal and informal linkages as well as skills and abilities to transfer, imitate and copy is increasing [8].

Dalkir (2005) [9] proposes three main steps in knowledge transfer and management model:

1. knowledge assessment, sharing and dissemination;
2. knowledge understanding, acquisition and application;
3. knowledge capture and / or creation including adjustment or update of captured one.

The primary aim of this paper is to understand better processes of industry-university linkages and emerging concept of entrepreneurial university and systemizing them into proper model scheme to allow much easier and faster assess factors of effectiveness of any university on its way to introduce elements of entrepreneurial university. In the first part of this paper we will analyse the concept of academic entrepreneurship, the second part is devoted to entrepreneurship models, but third section analyses case of Ventspils University College.

Research Methods

The following methods were used: desk research, analysis of literature and statistical data (Ventspils University College, Investment and Development Agency of Latvia), interviews, aggregation, adaptation and expert evaluation. .

Results and Discussion

Entrepreneurial university

Entrepreneurial university is characterised by its three missions: education, research and benefits to society. Institutionally this means that besides traditional university structure serving

traditional education and research functions, an innovation support structures like liaison with industry is in place (see Fig.1.).

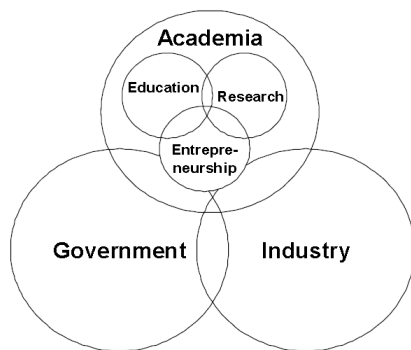


Figure 1. Core parts of entrepreneurial university in Triple Helix approach [10]

Preconditions of successful university with ability to transform towards entrepreneurship are strong will to attract foreign students and provide competitive educational and research services; available substantial financial assets, primarily in the form of land and buildings, to make investments and sustain independence; income from tuition fees stabilising university budget; university can attract industry financing for research projects employing PhD students and direct funding from state is comparable to world's leading universities [11].

Independence should be delegated also to department level. Instead of education sold to students by university or state, real academic partnership among teachers and qualified majority of students should be introduced where building of entrepreneurial spirit is merged with real research in institutes. Establishment of strong academic community should integrate willingness of alumni to contribute to their Alma Mater. This is a relatively undeveloped use of university's development potential in Europe and even more in Latvia [4, 11,].

The transformation of university's philosophy starts with the change of university-stakeholders relations and happens when a critical number of people agree to implement organised initiative how to change university within a medium term [11].

Creation of environment and entrepreneurial behaviour

Creation of environment for knowledge exploitation has dual character. Inside university the key determinant is university's intellectual property policy creating motivation among academics to think on spin-off companies and rules for university – industry interactions. Such policy also includes introduction of an entrepreneurial modules in the regular curriculum for university students and other related changes. External environment contains operations of

technological incubator, science park, pre-seed and seed fund. All university personnel should be engaged in the change of mindset and the optimisation of exploitation of university knowledge and technology. A relatively recent model of pre-incubation Reiner [12], Rajaniemi [13] Avotins [14] was introduced in universities. The nascent entrepreneurs obtain packed services from entity separated from and linked to the incubator in the same time, and can enter in incubator as new firm.

To stimulate entrepreneurial behaviour in the university community (undergraduate, graduate and PhD students, teachers, researchers, professional and administrative staff) specialised training programmes for each of these groups have to be developed and implemented. A university could introduce in the academic curriculum of the bachelor, master and PhD study programmes very practical in a sense of business performing readiness, design of a company business plan, financial and export plan.

Teachers and researchers should (at least) be entrepreneurial with a working knowledge of entrepreneurship and clear understanding what can or cannot be achieved at their university. If they prefer to set-up new firm themselves, there should also be opportunity preferably in university to treat them as other nascent entrepreneurs (to test the technical and market feasibility of the company). The task of professional and administrative staff is to support all three missions (teaching, research and entrepreneurship) at the university and this means, that they must also in reality, not in words, promote and encourage the entrepreneurial behaviour in the academic community [15].

Technology transfer managers serve as liaisons between two separate worlds – academics and entrepreneurs. We should keep in mind also firms and entrepreneurs to provide enough trust and appropriate culture to make collaboration motivated and encouraged [4, 15].

Many of university academics misunderstand the term “entrepreneurial university” as simply research commercialisation, or reduction of academic freedom in education and research [4, 11]. The solution might be the offer to academic community of informative and training seminars about entrepreneurial university. The bottom-up policy approach to start transformations towards entrepreneurial university might be more sustainable compared to top down approach [11, 15].

A number of studies covered by Perkman show that quality of research in departments of university correlates to engagement with industry [16]. Incentive policy for academics to engage in entrepreneurship is extremely important and usually is known as “university intellectual property policy” setting spread of any commercial income from owned by university intellectual property among researcher, department and university.

The Case of Ventspils University College

Ventspils University College (VUC) was the first university seriously thinking to establish efficient incubation system [14]. In 2011 new pre-incubator was established as a separate facility. The Business Incubator serves for up to 60 companies in ICT, electronics, machinery and space areas; it has a branch incubator in Talsi city and it is a founder of Kurzeme incubator with incubator facilities in Liepaja, Kuldiga and Saldus. VUC has several joint projects with incubator and promotes new techniques for new business idea generation, design of training schemes for investor readiness and creation of linkages with risk capitalists.

In 2006 VUC was among the first universities in Latvia to establish a targeted Technology Transfer Office (more precisely, Technology Transfer Contact Point (TTCP)). Its objective is to support commercialisation of VUC IP potential, inventors, commercial contacts of researchers, industry collaborative activities, licensing, spin-offs, and to operate as direct channel of interactions between academics and industry. The main actual and forecasted outcomes of the VUC are illustrated at the Table 1.

Table 1. Actual and forecasted outcomes of the VUC

Metric	2007	2008	2009	2010	2011*
Commercial offers	10	14	12	15	15
New Patents	1	2	1	1	1
License negotiated/sold	0	0	0	0	0
Start-ups**	11	18	24	24	28
BI firms benefitting from VUC	5	5	5	5	7
Industrial agreements	24	8	8	11	15
Income generated from contract research and consultancies vienības?	4	8	5	5	2
Study courses with integrated entrepreneurial modules	8	9	9	11	11
Available entrepreneurial training courses	8	9	9	11	11
Industrial / normal PhD students	8	18	21	22	27

* - estimation

** - only university related start-ups were presented (established by students, graduates, alumni or teaching / research staff)

Additional capacity for further development of the University College lies in its teaching, research and administrative staff of high qualification and numerical balance. Any of these three parts of the staff is equally important for ensuring development of the University College and the rational use of available resources. University College itself must be a key promoter of targeted preparation of the staff necessary for its development, through its capacity and links with partners - other academic institutions, businesses, professional associations and other organizations.

The University College development has to be formed to promote continuing education and retraining opportunities for the people living in the Ventspils city and area, and all the country in accordance with university college areas of expertise, its technical capabilities, as well as the labour market in Europe. Furthermore University College has to be more actively engaged in the formation of the labour market (from the demand side) in Ventspils, mainly on the basis of raising the action volume of its research institutes and social activities.

The next main challenge for the University College is an active involvement in the process of city economy diversification in collaboration with Ventspils city council and businesses promoting the raise of production industry proportion in Ventspils. For this purpose University College must take care of training engineering professionals (initially in Electronics and electrical engineering fields) within its competence, together with other partners, including other educational and research institutions, on the basis of the educational institutions, located in Ventspils. Such orientation of the University College means much stronger focus on the technological aspects of all its activities, i.e. much greater focus on the issues of how to transform knowledge and skills into economic values.

Essential task of the University College is to take care of attracting qualitative and positively motivated students for getting basic university studies, and the later stages of education - Master's degree and PhD. There are annual series of events organized to introduce potential students to the University College, implemented fields of studies and related work-life specifics to help applicants to choose the profession and as far as possible to prevent them from studying unsuitable profession.

To achieve its goals VUC and its departments have to organize its activities so, that its upcoming development was based on this academic strategic operating framework, maintaining the university academic culture and the fundamental ethical principles, consolidated since the University College establishment:

- qualitative, based on analytical approach and understanding of appropriate methods and technologies, stimulating delivery of knowledge and skills;
- developing the flexible, easily modified teaching program to provide students with wider opportunities on the labour market offering wider specialization;
- development of the new educational programs keeping in mind principle of logical and gradual succession, using available premises, informational and technical support and academic staff;

- increasing and educating Academic staff through the master's, PhD and internship opportunities in Ventspils University College, as well as in other Latvian and foreign universities with an established reputation and tradition in the corresponding field of science;

Providing paid education services according to the city and regional demand including providing life-long learning programs and consultancy services.

Science and practice based education, intellectual property, orientation on innovative economy and competitiveness on labour market are the values on which the work of University College is based and will be regarded as its ideological motives. Creating a VUC image it is essential to show Ventspils as a place with high growth in different fields and where production industry is developing lately. Consequently, the Ventspils University College should be presented as a part of dynamic city with a special environment where on the basis of cooperation with the city, businesses and government agencies and support structures - Ventspils High Technology Park, Business Incubators, Technology Transfer Centre of Kurzeme, Life-long learning Department, etc. creating empowering the development of creative personalities - students, lecturers, researchers and other groups, which is a necessary precondition for economic recovery and the balanced functioning, as well as ensuring state and local government functions.

If to base strategic decisions on the planned amounts of national and EU structural fund resources, universities cannot foresee any increase in new knowledge creation. The VUC Engineering Research Institute VSRC strong growth case is outstanding and rather exception if we take into account its ability to keep the line of ambitious aims and vision reached within last two – three years. The EU requirements to increase public and private funding for research is far away in Latvia and it is not clear when the existing decrease trend might stop and turn in increase.

The most effective way to analyse framework factors of entrepreneurial university to the VUC case study is to describe each factor and map the available indicators against factors as shown in Table 2 below.

Table 2. Application of entrepreneurial university framework factors to VUC case

Framework factor	Indicator	VUC application
Supportive administrative and strategy framework	Approved policy and set activities for implementation	VUC policy don't set establishment of entrepreneurial university as a priority. So far, without such policy several entrepreneurial activities were developed as isolated actions like pre-incubator type training projects "businessman in 5 days", venture cup, new idea generation methodology etc.
	Supportive decision-making level	New management team potentially would introduce changes but so far none of administration was responsible
	Team supporting changes	Very moderate
Advanced Research base	Excellence centres and infrastructure	planned
	Motivated to entrepreneurship researchers	Moderate changes
	Purchase of applied results developed in university	Slowly increasing in ERI
Financial assets	Real estate and buildings	Belong to city real estate company
	Investment in spin-offs traditions	none
Advanced innovation support infrastructure	Innovation support infrastructure	Pre- and BI
	Innovation system in place	Foreseen, but slow development, good collaboration with city and industry
	IPR support and transfer system	Formally approved
Entrepreneurial and innovation culture	Entrepreneurial spirit in teaching, research and societal return	low
	Collaborative to industry culture	changing
	Active entrepreneurial alumni community	Not developed
	Joint supervision by industrial researchers of master and PhD thesis	Not exist

There are little measuring systems developed of entrepreneurial universities. Some works outline indicator systems based on triple helix approach [17]. Tijssen has designed measurement model based on three stage product life cycle evaluation: science driven research, product oriented R&D services and market driven R&D activities up to contract with industry [18]. We have based our approach on measuring the main influencing operations of entrepreneurial university factors.

Conclusions

1. This paper is a first one from three in series investigating technology transfer was devoted to introduce and discuss concept of entrepreneurial university and analyse readiness of VUC to transfer to such format. Selected models of entrepreneurial university were discussed as a result of synthesis of literature on the researched subject.
2. Framework factors to describe entrepreneurial university were designed and applied to case of VUC analysis. This experience might lead to understanding of entrepreneurial university and used further to assess core processes of transformation of traditional

teaching school model to new one. It has become apparent that more social and economic value might be achieved from commercialisation and transfer of available in university knowledge by creating model of entrepreneurial university.

3. University networks could drive further value by applying entrepreneurial focused research, integrate open science. Whilst this paper examines university within the context of becoming entrepreneurial and existing technology transfer channels, there exist opportunities that universities could generate additional value from their knowledge networks as the role of universities is increasing in national and regional innovation systems. It is also important to further study open innovation knowledge transfer processes balanced with protected technology transfer processes based on university generated innovation ecosystem.

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