A FORMATION AND ANALYSIS OF THE SCENARIOS IN THE VOCATIONAL EDUCATION RESEARCH PROCESS

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Abstract

In the vocational education research, different methods including a formation and analysis of the development scenarios can be used. In the research of vocational education method of scenarios analysis is hardly ever used. In the article the chance to use the method of scenarios analysis in the research of vocational education in Latvia is evaluated. There is the AHP (Analytic Hierarchy Process) method for analysis of scenarios of the Latvia vocational education development used in the article. There are given methodological recommendations for the realisation of the formation and analysis of development scenarios.

Key words: vocational education, development scenarios, analysis methods

Introduction

Processes in the socially – economical sphere in Latvia become more dynamic and complicated; nevertheless, the system of formal education in its terms remains conservative. It aims to at stability and thoroughness. In the vocational education, there will always be the time difference between the moment when the demand of economy is formed and the moment when after the formation and realisation of the educational program in the labour market educated specialists appear. While researching the development of the vocational education, it is useful to form both development scenarios and models of system. In the research of CEDEFOP (Leney et al., 2004) it is stated that the formation and analysis of scenarios is frequently used in economics, but there are only few publications about the use of this method in the research and planning of the development of education.

The object of the present research: the vocational education in Latvia.
The subject: the research in vocational education.
The aim: to evaluate the possibility to use the scenario analysis method in the research of the development of the vocational education in Latvia.
The tasks:
1. To appraise the theoretical and methodological aspects of the Scenario analysis method;
2. To formulate and evaluate four scenarios of the vocational education development in Latvia;
3. To give some methodological proposals for realising vocational education scenario analysis.

Methods


Results and Discussion

In Thinking approach – statement that ‘We are in systems and systems are around us’ (Broks, 2000) is on the basis of modelation. Systemic thinking means to perceive and study system holistically: evaluating both causes and effects of interaction of its separate components and factors of macro setting and interaction of micro setting and macro
setting. In systemic thinking it is considered that each interaction between separate elements of the system always will lead to consequences that will influence function of the system in general. The objects of analysis are the given interaction and the potential changes. The approach of systemic thinking is developed further in Systemic Dynamical Approach. (originally: Forrester, 1961, see: http://www.valuebasedmanagement.net/methods_forrester_system_dynamics.html). Systemic Dynamical Approach differs from systemic thinking only with the graphical models which are made by computer as an analysis. The aim of systemic dynamical approach is not a definite model of the system but rather the solution of some particular problem. There are cases that in the solving process of problem it is necessary to return to the beginning phase of modelling and to define problem once again because it can turn out that firstly prognostic problem is a part or consequence of some larger problem.

The beginner of the scenarios method is USA futurologist K. Hahn (see: Sellin, 2004). Methodology of scenarios forming firstly was developed in 20th century beginning of seventies in the sphere of business (Wack, 1984; Porter, 1985; Shell, 2000, Leney et al., 2004). The method of scenarios forming is useful when it is necessary to better understand the nature and influence of motive factors of system development in some precisely marked time period in future. Nevertheless, as B. Sellin mentions (Sellin, 2004) the forming of scenario in the research of development of the vocational education does not mean to forecast future but to pay attention to the main factors that affect the development. Scenarios are defined as follows:

- Internally consistent aspects of the predictable future (Porter, 1985)
- The order of hypothetical action constructed purposely to concentrate attention to causative processes and decision making (Kahn, Wiener, see: Zanoli et al., 2000)
- The formation of scenarios usually includes the analysis of present situation, the choosing of several determinative factors, their analysis and prediction of variability for some definite period of time. In the strategic planning of the formation and analysis of scenarios, it is advisable to use, for example, forecasting, benchmarking, Delphi method, SVID analyse, STEEP analyse, etc.

Van der Heijden points out the necessity to choose method in order of period of time in future. From his point of view, it is derived that the defining and analysis of scenarios is useful in medium-term strategic planning.

The process of forming scenarios usually consists of the following stages:

- choice of experts
- the evaluation of the macro setting of the system (in the form of interviews or discussion)
- the grouping and clusterization of the viewpoints of experts
- the modelling of scenarios draft based on experts' viewpoints and priorities
- further development of the draft scenarios to definite scenarios
- defining the indicative factors for the evaluation of scenarios
- evaluation of scenarios

In the figure 1, one can see the author's Zanoli, Gambeli and Vairo (Zanoli, Gambeli, Vairo, 2000) adapted logical scheme of the formation of developmental scenarios which includes three main modules: analysis of present situation, the formation of description (scenarios) of developmental route and defining future situation and evaluation of the scenarios.
In this article the author's explorative route is different according to the model of Zanoli, Gambeli and Vairo taken as the basis, the analysis of the present situation and also the formation of scenarios was done by the author, whereas experts were asked to evaluate criteria and scenarios. In the time of analysis none of the presented scenarios was rejected but they were ranged; in the result, the global priority respectively to the most acceptable scenarios was chosen. For evaluation of macro setting STEEP method was used (see table 1).

**Table 1**

<table>
<thead>
<tr>
<th>Social factors</th>
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</thead>
<tbody>
<tr>
<td>Demographical situation</td>
<td>The decrease of the population in separate regions all over the country.</td>
</tr>
<tr>
<td>Migration processes</td>
<td>Inner migration in the country. Outer immigration and emigration.</td>
</tr>
<tr>
<td>Technological factors</td>
<td></td>
</tr>
<tr>
<td>New technologies</td>
<td>Both in traditional and in novel developed spheres the newest technologies are used</td>
</tr>
<tr>
<td>New electronical systems</td>
<td>Modern electronical systems involve the necessity of new knowledge for the personnel</td>
</tr>
<tr>
<td>Information and communication technologies</td>
<td>It is possible to have more effective communication between the subjects involved in vocational education. The speed of gaining information increases.</td>
</tr>
<tr>
<td>Economical factors</td>
<td></td>
</tr>
<tr>
<td>State’s economical development</td>
<td>The finances of the state and local government for the modernization of material basis of vocational education increases. Increase of salaries and social guarantees gives way to increasing motivation of teachers/lecturers’ work.</td>
</tr>
</tbody>
</table>
Social factors

Possibility to use EU supportive funds
The possibilities to use funds expand. In projects attached funding supports both the development of material base for learning, practice and mobility of students and mobility and training of teachers/lecturers.

School cooperation with companies
The interest of companies to cooperate with vocational schools increases. That provides direct interchange of information about the changes in necessary competences for workers.

Setting factors

Requirements of environmental protection
The requirements of natural resources and environmental protection become stricter. They are included in the content of educational programmes.

Political factors

Legislation
Legislative acts and other laws and regulations that directly or medially can influence function of the system of vocational education.

EU common trade market
Free workforce migration and possibility to get vocational education in any of EU acceding countries create new demands for communicative competences.

Employment policy of the country
The possibilities to predict the development of trade market and to evaluate the changes of workforce demand.

At the beginning of the research a hypothesis that one of the most important factors of negative influence of the development of vocational education can be insufficiently effective cooperation between the system of vocational education and all interested social partners was directed.

In the table 2 four scenarios of development of vocational education in Latvia are defined and characterised: Conventional, Economy-based, Sustainable and Co-operative scenarios.

<table>
<thead>
<tr>
<th>The Scenarios of Predictable Development of Vocational Education in Latvia</th>
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<tbody>
<tr>
<td><strong>Conventional Scenarios</strong></td>
</tr>
<tr>
<td><strong>Radical changes are not predictable. The present system of vocational education is not changed substantially. Cooperation between the ministries in charge mostly is formal. Number of vocational schools continues decreasing in several districts. In the preparation of standards of professions initiative of educational institutions dominates. The necessity of the formation of vocational education programmes is not based on systematic research of demands in labour market. The development of material basis is only in the limits of state and local government finances. The growth of salary for pedagogical staff is in the conceptual framing of the salary for workers in all state. The use of EU funds is in the initiative of governing body of each educational institution.</strong></td>
</tr>
<tr>
<td><strong>Economy-based Scenarios</strong></td>
</tr>
<tr>
<td><strong>The future of vocational schools is fixed by the economically beneficial criteria. The preference is given to such educational institution in which providing appropriate quality of vocational education the expenses are the lowest for one student. On the basis of economical calculations the number of vocational educational institutions continues reducing. Perspective schools overall continue working concentrating mostly in Riga and bigger cities. Economical profitability and state interests dominate over regional interests. In the cooperation of responsible ministries, the position of the Ministry of Economics dominates Not more than 5 vocational secondary schools/colleges and LLU offer agriculture programmes. The state actively supports involvement of private funds in the financing of vocational education.</strong></td>
</tr>
</tbody>
</table>
Economy-based Scenarios

The state fund donations mostly increase due to political resolutions about support of the development of some definite sphere as well as due to the closed vocational schools. The main task of primary vocational education programme is to form concrete basic competences. Preparing specialists for precise profession and also for new spheres of manufacturing (profession) is carried out in relatively short-term modules when educational institutions cooperate with manufacturing companies. The formation of new profession standards and educational programme is due to the employers’ initiative. Cooperation between educational institution and companies is realistic only if the company considers it to be economically profitable.

Sustainable Scenarios

The state supports and stimulates balanced development of all regions. That makes economical basis for existence of vocational school in a particular region. Deciding on some concrete school’s destiny interests of the local government and region are considered both from current and perspective aspect. Economical profit is not the main factor. The main task of primary vocational education programme is to form particular basic competences. Functioning of vocational schools becomes more varied. Donations of state/local government for support of schools and development of methodological base are equally increased for all vocational schools. State supports the growth of salary for pedagogical staff and real functioning of system of further education of vocational school teachers.

Co-operative Scenarios

State supports and stimulates different forms of cooperation between vocational education and all social partners. The function of vocational schools and also formation and development of study programmes is looked at from the point of view of interests both of sphere, regional, and state. State stimulates the flow of private funds in vocational education. Close cooperation between responsible ministries is realised both in the prediction of the demand of the trade market and in providing support of career development in vocational schools. Companies are interested in investing in the development of schools and in providing practice places in the company because they get possibility to plan their guarantee of human resources. In the formation of profession standards employers’ and professional association initiative dominates. The main task of the primary vocational education programme is to form basic competences. Vocational training is carried out in relatively short-term modules when educational institutions cooperate with manufacturing companies. The formation of vocational education programmes is based on systematic research and prediction of demands in trade market. The cooperation between vocational education institutions and local government, and local companies become more active within the framework of EU projects.

There where defined 11 criteria for the evaluation of scenarios: Reduction of social tension, Students’ interests, Parents’ interests, District interests, Regional interests, State interests, Quality of education, Principles of life-long education, Private finances, Use of EU funds and Cooperation with employers.

In the analysis of the scenarios of the development of vocational education was used method of Analytic Hierarchy Process (AHP). The author of present method is mathematician T. Saaty (USA). AHP is systematic procedure for hierarchic arrangement of elements of any problem. The problem is gradually divided in smaller segments that means the decomposition of problem is done. Experts compare these parts in pairs evaluating the level of intensity of interaction of problem elements in hierarchy. Experts’ deductions are announced in numbers. The hierarchy of the elements of problem form: aim, groups of criteria (1st interlevel), criteria (2nd interlevel) and enumeration of alternatives (3rd interlevel). As in this research the number of criteria is comparably small; the grouping of criteria was not done. All the elements of AHP system are grouped in 2nd figure.

For the evaluation of the scenarios 8 experts who...
represent both secondary and higher vocational education inter alia agricultural education, small, medium and large manufacturers, as well as representatives from Ministry of Education and Science and Ministry of Welfare where interviewed. The information about experts' professional status and their represented institutions are shown in 3rd table.

The evaluation of the vocational education development scenarios

<table>
<thead>
<tr>
<th>Reducing of social tension</th>
<th>Students' interests</th>
<th>Parents' interests</th>
<th>District interests</th>
<th>Regional interests</th>
<th>State interests</th>
<th>Quality of education</th>
<th>Principles of lifelong education</th>
<th>Private finances</th>
<th>Use of EU funds</th>
<th>Cooperation with employers</th>
</tr>
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<tbody>
<tr>
<td></td>
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</tbody>
</table>

Conventional scenarios  Economy-based scenarios  Co-operative scenarios  Sustainable scenarios

Figure 2 A hierarchy of evaluation of the vocational education development scenarios (adapted to T.Saaty)

Primarily all experts compared evaluation criteria of the vocational education development scenarios; thus, theoretically ranging them. Each expert results were treated separately and after that combined in the summary of evaluation.
#### The Professional Status of Experts of Evaluation of the Vocational Education Development Scenarios and Represented Institutions

<table>
<thead>
<tr>
<th>No</th>
<th>Position</th>
<th>Institution</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Director</td>
<td>Priekuli State Vocational School</td>
</tr>
<tr>
<td>2</td>
<td>Director</td>
<td>VAR-C Ldt, metal-working factory (50 employees)</td>
</tr>
<tr>
<td>3</td>
<td>Director</td>
<td>Priekuli Machinery Station Ldt, (7 employees)</td>
</tr>
<tr>
<td>4</td>
<td>Vice-director of the Department</td>
<td>Ministry of Welfare. Labour Department</td>
</tr>
<tr>
<td>5</td>
<td>Director of the Department</td>
<td>Department of Career Development at the Ministry of Education and Science</td>
</tr>
<tr>
<td>6</td>
<td>Director</td>
<td>Riga vocational school Nr 13</td>
</tr>
<tr>
<td>7</td>
<td>Docent</td>
<td>Latvia University of Agriculture</td>
</tr>
<tr>
<td>8</td>
<td>Director of the Department of Vocational Training</td>
<td>Domenikss Ldt, automotive trade and service (260 employees)</td>
</tr>
</tbody>
</table>

Data calculations were done by computer programme MS Excel. The results of data calculations are summarized in the 3rd figure as each factor’s minimum, maximum and medium vector coordinate of priority.

The picture shows that experts gave the highest rank for ‘Quality of education’. However, experts’ answers amplitude of absolute value can be seen as well. Next is ‘Students’ interests’ that is indicative in respect of human centred attitude and democratic fundamentals and also makes to pay more attention to students’ supporting questions of career development in the vocational education institutions. The criteria: ‘Reduction of social tension’ that shows that there is not only educative role but also social role of vocational school in Latvian society, ‘Use of EU funds’ and ‘Principles of lifelong education’ have received relatively higher evaluation by experts. The other criteria have got mutually similar, lower evaluation. In the following analysis experts compared mutually the scenarios of development of vocational education considering each criterion separately. Some expert results of calculation are summarized in the 4th table and the outcome is summarized in the 4th figure. The picture shows that the amplitude of dispersion is relatively big that means experts’ opinions differ giving the highest and lowest evaluation. However, the summary of evaluation clearly forms precise hierarchy of the development scenarios.
Table 4

<table>
<thead>
<tr>
<th>Alternative</th>
<th>Experts</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>8</th>
<th>Aver.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Conventional</td>
<td></td>
<td>0.093</td>
<td>0.092</td>
<td>0.070</td>
<td>0.056</td>
<td>0.098</td>
<td>0.286</td>
<td>0.137</td>
<td>0.069</td>
<td>0.112</td>
</tr>
<tr>
<td>Economy based</td>
<td></td>
<td>0.105</td>
<td>0.119</td>
<td>0.337</td>
<td>0.068</td>
<td>0.258</td>
<td>0.069</td>
<td>0.086</td>
<td>0.114</td>
<td>0.144</td>
</tr>
<tr>
<td>Sustainable</td>
<td></td>
<td>0.525</td>
<td>0.338</td>
<td>0.305</td>
<td>0.269</td>
<td>0.199</td>
<td>0.179</td>
<td>0.388</td>
<td>0.403</td>
<td>0.326</td>
</tr>
<tr>
<td>Co-operative</td>
<td></td>
<td>0.277</td>
<td>0.451</td>
<td>0.287</td>
<td>0.607</td>
<td>0.446</td>
<td>0.465</td>
<td>0.390</td>
<td>0.414</td>
<td>0.417</td>
</tr>
</tbody>
</table>

The Co-operative scenarios have received the highest evaluation by experts. Once more it is necessary to stress that in this scenario co-operative factor dominates over enlargement of finances for vocational schools. The results of experts’ evaluation with certainty confirm the speculation highlighted in the beginning that the present cooperation between the system of vocational education and all social partners was not enough fruitful and parties were not enough interested in it.

Figure 4 A Summary of the Evaluation of Development Scenarios in Vocational Education

Comparatively high rating the experts have given to ‘Sustainable’ scenarios but the lowest evaluation has got ‘Conventional’ scenarios which in the description were defined as scenarios that continue present progress in the development of vocational education. That convincingly approves the author’s hypothesis that with the present situation are not satisfied neither employers, nor representatives of vocational education, nor representatives of the government.

Some Methodological Recommendations

1. In the formation of scenarios two approaches can be used:
   a) Scenarios are made by one or more experts but analysis is done by other group of experts
   b) Scenarios are made and analysis is done by one group of experts

2. The purposefulness of the formation and analysis of scenarios and the quality of results can be influenced by criteria from which the expert team and the leader are selected – it is necessary to choose them very wisely.
3. The number of experts could differ in each case but if the experts are few, it will increase experts united mistake of action (Бешелев, Гурвич, 1973), but if there are too many experts that will be longer and more complicated, and more expensive in general.
4. The invited experts should be interested in the formation and evaluation of development scenarios of vocational education.
5. In expertsteam should be not only representatives from the micro setting of the system, but also representatives from macro settings of the system (responsible ministries, local government, employers and the Council of National Triangular Cooperation of Vocational Education).
6. If in the process of formation and evaluation of scenarios the probability of substantial change the present or formation of a new system is predicted, or if the tasks of the formation of the scenarios include the request for new, novatorical or untraditional solutions, then at least 2 as far as 50% of experts should not be connected with vocational education neither in present, nor in past. Thus, the principle that experts discussion would be ‘... free from experience and function’ (Lumann, Habermas, Klafke; see: Martial, 1996) could be held. In this case those participants of discussion who are not connected with the field of investigation most probably will be idea men but those experts who are connected with the field of investigation – positive critics. About influence of ‘in-box thinking’ in the formation of scenarios (in the evaluation of the scenarios it could be insignificant) involved experts', is already warned in for example in CEDEFOP research (Leney et al, 2004).
7. In the formation of scenarios one should avoid: perceiving them as prognoses, differentiate and define them in too simplified way, formation of them in too narrow view, perceiving scenarios as informal, institutional tool.

Conclusions
1. The method of formation the scenarios is useful when it is necessary to better understand the character of impulsive factors of the development of vocational education system and the influence in definite period of time in future.
2. The formation of scenarios in the research of the development of vocational education does not mean the future prediction but paying attention to more important, development influencing factors.
3. Before the formation of scenarios, it is necessary to define the factors of macro settings and evaluate their influence.
4. The results of experts' evaluation approve the projective speculation that the present cooperation between the system of vocational education and all social partners was not enough fruitful and parties were not enough interested in it.
5. With the present situation in the vocational education neither the employers, nor vocational schools, nor the representatives from government are satisfied.

References
