

INCREASE IN HIGHER EDUCATION EFFICIENCY AS A MAJOR FACTOR OF BUSINESS DEVELOPMENT

Irina Jevinga¹, Zoja Sundukova²

*Faculty of Engineering Economics, Riga Technical University, 1 Kalku Str., Riga, LV-1658, Latvia,
e-mail: ¹ zuk231950@inbox.lv; ² zoja.sundukova@rtu.lv*

Abstract. During the period of transition to the economy based on knowledge, education plays the most important role and, first of all, the higher education. The following article deals with the level of higher education in Latvia and its problems are defined. Due to the increase in the investments in the higher education, the estimation of the efficiency in the higher education becomes essential. The authors of the article suggested the quantitative method of estimation of the efficiency of investment in the higher education; investments in different higher schools in Latvia are compared. The comparative analysis of investments among the study programs of Riga Technical University. This method maybe used for comparison of the effectiveness of investments both in higher schools generally and in separate programs.

Keywords: knowledge based economy, human capital, higher education, effectiveness of investments, expenditures.

1. Introduction

The strategic goal of European Union is transition towards knowledge – based economy. Category “Economy of knowledge” has several meanings. First of all it includes the elements connected with one of the sectors of national economy, in which knowledge is produced and sorted out and also managed. The founder of “Economy of knowledge” as a subject is considered to be F. Machlup, the author of the book “Production and spreading of knowledge in the USA”, published in 1962 [1].

Nevertheless, with the increase of “the knowledge sector “under the conditions of the greatest economic growth, gained with the help of scientific research and innovations, with growth of education among the population, the term “the economics of knowledge” has acquired a second meaning, that later became more often used as “the knowledge-based economy” in the meaning of such type of economy, in which knowledge plays the decisive role.

In such meaning term was popularized by an American scientist Peter Drucker in the book “The Age of Discontinuity: Guidelines to our Changing Society” (1969), in which he showed the significance of application of knowledge for production of economic wealth [2]. Money, technical equipment, raw materials, buildings do not create an added value, but that is a person who does it, or more precisely human capital

The theory of human capital was made official as an independent section of economic analysis at the

end of 50 ties – beginning of 60 ties in the 20th century. The honour of suggesting this theory belongs to an American economist, the Nobel prize winner T.Schultz [3], and the basic model has developed in the book by Becker Garry S. (also Nobel Prize Laureate) “Human capital: Theoretical and empirical analysis, with special reference to education”[4].

Human capital is characterized as a capital in the form of knowledge, abilities and skills, obtained by a person in the process of education and practical activity and making it possible for him successfully accomplish his professional activity. This capital is developed in the process of education and is used by the person in a definite sphere of national economy. Therefore, education plays the main role in the formation of human capital

The object of the research is Higher education in Latvia as the main factor in the formation of Human capital, playing the decisive role in the development of the economy, based on knowledge. The goal of the given research is to define the quality level of Higher education in Latvia and to develop the quantitative methods of estimation of the efficiency of investments in a higher school. Traditional methods of economic analysis are used to achieve the set goal.

2. The role of education in the development of Latvia economy

Neither natural resources of Latvia, nor cheap workers will not be able in the course of time to become the main resource, securing the growth of the

state wealth. Our main resources, necessary to archive the Living standard of developed countries are: knowledge and wisdom of the people, skilful wage of them.

In such a model of development, knowledge defines the development of technologies, the usage of capital, and the quality of working resources. An educated society becomes a guarantee of internal and external safety of the country. Accumulation, spreading and wage of knowledge as a complex process becomes the basis of economic and social life, embracing the whole state and the society. Unlike other states, which can choose different ways of development or combine them, Latvia has no alternative variants in developing the economy of knowledge.

Latvian National Development Plan 2007–2013 emphasizes that the main resource necessary for the achievement of developed countries, living standards is the person possessing knowledge and skills to apply it. The challenge of this plan is to create prerequisites for transferring from the dominating model in the economy nowadays, which is characterized by usage of low – skilled man – power and production of products with low added value, to the model of innovative development [5].

Innovational economy, based on knowledge, becomes one of factors of ability to compete. Innovational development at the state level presents a non – stop planned process, the goal of which is to raise the productivity of labour, effective usage of resources, cutting of production costs and reentering services. This process can be characterized both as intellectualization of economics in the meaning also of a higher level of education, knowledge and practical skills of labour man – power resources and as intellectualization of machinery, more and more performing the functions peculiar to a man.

In this context, the main role in developing creative and purposeful personalities is given to the system of education of Latvia, ensuring knowledge and skills during the whole life.

The quality of education should be in line with more and more increasing demands of every individual to have a possibility of obtaining of general secondary and qualitative higher and professional educa-

tion Knowledge becomes the state strategic wealth and the main recourse of economic growth.

Qualitative general secondary and professional education makes up the minimum initial capital, without which it is impossible to integrate a person into the labour market and public activities. Higher education makes up a basis for the development of innovative thinking of a person that is necessary for a highly developed society

3. Qualitative and quantitative analysis of the higher education of Latvia

The analysis compiled from original sources [6] and [7]. At the beginning of the year of 2008 in Latvia functioned 60 higher educational institutions: 34 higher schools (19 states and 15 private); 26 colleges (18 states and 8 private), in which more than 700 education programs were used. In 1990 there were 172 students per 10,000 inhabitants. During the four years that followed, the number of students reduced to 138.

Beginning with the year of 1993, this index began to grow rapidly and in the year of 2006 reached 556 students per 10,000 inhabitants, but in the year of 2007 the index went down to 552. As to the number of students per 10,000 inhabitants, Latvia occupies the second place in the world. The higher index (580 students) is found in Canada, in the USA – 520, in CE, on the average, –371. Fig 1 demonstrates the change of correlation of students financed from the state budget and paying students during the academic years of 1995/96 – 2007/08.

As it was demonstrated in Fig 1, in the 1997/98 academic year the amount of paid students and state financed students was almost equal, but with the years coming, the share of paying students was constantly growing up and has reached the 77 %, however because of increasing of financing from the budget in the academic year of 2007/08 there appeared a contrary tendency.

The distribution of students among subject groups during recent years has not substantially changed. Every second students study social sciences. It should be noted that the number of students studying engineering and trained for building

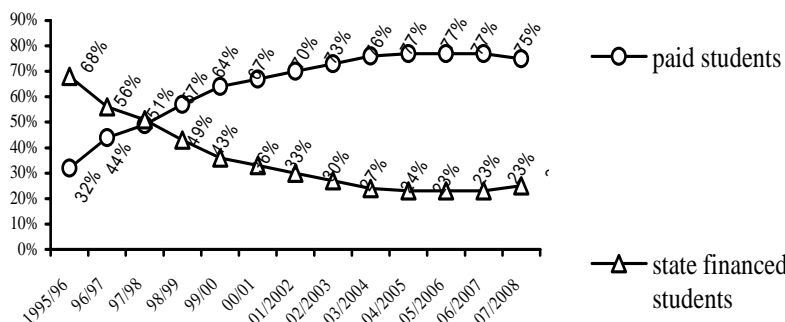


Fig 1. Dynamics of a parity of paid students and the students financed from the state budget during the years of 1995/96 – 2007/08

professions grows up slowly, in spite of budget financing grows from 9,2 % in 2004/05 to 10 % in 2006/07. To compare with 20.5 % in the academic year of 1997/98. In Latvia 5.1 % of the total number of students study natural and mathematical sciences, but in CE this index is equal to 12 %.

The number of paying students differs greatly among different thematic groups. The greatest numbers of students study social sciences and their specific share continues to grow. The number of paying students studying pedagogies grows rapidly, one to the fact that the major part of them already work as teachers, raising the level of their education. Their training is paid from the special fund of the budget.

In the academic year of 2007/08 42 % of the teaching staff had an academic degree.

During the recent 5 years in Latvia the number of those, working for doctor's degree is not enough. In the year of 2007 a doctor's degree obtained 146 persons. Efficiency of doctorates in Latvia is extremely low. At the same time during the recent five years there outlined a tendency of growth in the number of trained doctors.

The age character of academic staff has stabilized during the recent years. On the average, every 9th teacher is younger than 30 years old, every 4th is senior than 60. Nevertheless, it should be noted that in different educational institutions the situation is rather different. Younger staff works in comparatively recently opened educational institutions.

In the academic year of 2007–2008 the correlation of the number of students per teacher in comparison with the previous academic year a bit lessened. But it is still greater than the average CE index: 20 in Latvia, but 16 – in CE countries. Total financing of state and private higher schools in the year of 2006 made up 226 million euro that constituted 1.4 % from GDP. This correlation practically is in line with corresponding average index in the countries of EU.

The financing of state higher schools and colleges constituted 194 million euro or 86 % of total state higher schools and colleges financing and 32.7 million euro (14 %) is the financing of private higher schools and colleges.

Financing from the state budget in the year of 2006 constituted 119.4 million .euro or 53 %, that greatly exceeded the sum of the previous year (86, million euro). In Fig 2 is shown that the specific share of state money in GDP was considerable enhanced (0.74 %). In the year of 2005 this index was 0.68 % and in 2004 – 0.55 %. It is possible to draw a conclusion that the year of 2005 was a turning point in the financing, when due the increase of financing from the state budget and structural funds of EC the curve of the specific share of financing of Higher education, demonstrating the ratio of financing to GDP, has a tendency to increase. In spite of the increase of financing of private education, the specific share is going down. In the year 2006 private money constituted 76,6 million euro that was 34 % from the total financing of Higher education, in 2005 – 66.4 million euro, or 44 %.

Total average financing per one student in year of 2006 was 3010 euro, state financing per one budget student was equal to 4692 euro. During the recent two years this index has substantially grown up and reached the level of some, the so called, old European countries. Nevertheless, on the whole, the financing per one student in Latvia is still 3 or 4 times less than the average index in EU.

Summarizing the main quantitative and qualitative indices of Higher education in Latvia, it possible to define the following problems that need to be solved:

- a great number of students does not mean high level of quality, this can be proofed by the limited financing for one student in comparison with other countries of EC;
- not enough students study natural sciences, engineer and information sciences not only in comparison with EU, but also in comparison with our neighbors- Lithuania and Estonia;
- in Latvia we do not have a great number of Doctors of Science, able create a product, based on science;
- scientists grow older very rapidly;

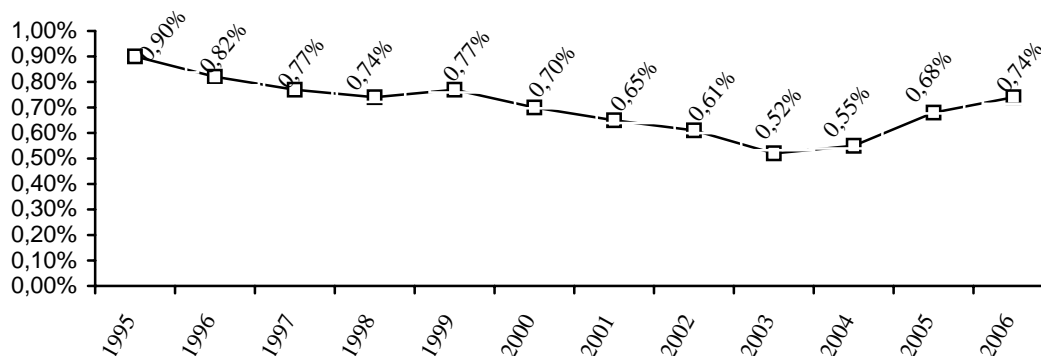


Fig 2. State financing of Higher education in percentage to GDP in the years of 1995 – 2006

- the state does not stimulate those, who work for doctor's degree, does not stimulate research work in higher schools.

There also exist other problems that are dealt with in this article, for instance, improvement of the material and technical bases, necessary for mastering of knowledge in accordance with rapidly changing demands of the labour market.

To solve the problems of education, including the Higher education, in Latvia it was developed "the Conception of the development of education for 2007–2013," defining the goals of development of the system of education and trends of their realization. The plan describes results of the activity, political results and indices of them being achieved.

In the process of development of the conception the recommendations of the Lisbon strategy of education were also taken into consideration, including of European educational space and also the experience of European countries in this sphere. Implementation of these planned goals will undoubtedly raise the quality of Higher education.

The authors of this article submit for consideration factors of raising the quality and efficiency of Higher education, that were not included in this conception.

4. Efficiency in higher education

Under the term "efficiency in Higher education" we mean gaining the maximum, the highest possible result in the quality of knowledge and skill among students with the least possible expenses, necessary for getting these knowledge and skills.

Modern economic analysis suggests dealing with the problem of investments in education as a particular case of the theory of investments [8]. Estimation of efficiency of investments in education should be made having in mind all aspects concerned: 1) the employee, 2) the employer, 3) the state, 4) the educational institution [9].

The employee estimates the efficiency of education comparing additional profits, received after finishing the education, with the cost of education. Annual income by age is higher for workers with more education than less. Investment in education yields a return in the form of earnings differences [10].

The employer estimates the efficiency of education comparing the profit of employing the specialist with expenses connected with him, including salary and expenses on his professional training.

The state estimates the efficiency of education from the point of view of its impact on the economy on the whole. All over the world the correlation between the profit per head and the level of education is observed.

In developed countries more than 80 % of the total income is gained due to the human factor, while in the countries of less developed economy the lion share of income is gained with help of raw materials.

The efficiency of investments from the point of state is getting benefits from the invested budget money in education higher than from investment in other branches of national economy.

Educational institutions estimate the effectiveness of their activity comparing expenses and profits gained from training different specialist.

In Latvia, in 2008, a group of experts conducted an analysis of efficiency of higher educational institutions activity [11]. The number of students per one teacher and profitability were taken as the basis to calculate the economic efficiency of higher schools. Judging by the number of students per one teacher private Higher school "Turība" was chosen the best: 59 students per one teacher; minimum students – 5 were in Riga Theological institute. However, it is hardly, possible to think these calculations to be correct enough. First of all, this method does not take into account specific character of training of students for different programs. Speaking about the programs of social studies, the level, naturally, will be greater in comparison with engineer programs, and, if to speak about art programs, it will be still lower.

Secondly, connecting this criterion with the quality of education, one should be in mind the opposite dependence, namely: the fewer students per one teacher, the higher are the quality of education. As it was already mentioned in this article, Latvia has not still reached the average European level by this index and one of aims of education is to reduce it.

The index of profitability, calculated as ratio of profits to incomes can be also applied to private higher schools. The highest level of profitability has Riga Higher juridical school – 56 %, the lowest in Latvian Christian academy – –22 %. The quality of education can be compared with the level of profitability only on condition that the major share of profits higher schools use for own development. State higher schools invest additional incomes completely in perfecting material, labour and information resources. Private higher schools capitalize only part of income.

The authors of this article suggest to estimate the efficiency of investments in education using such criteria as expenditures for one student, lost index and expenses for graduate.

For estimation of efficiency of investments in the Higher education it is reasonable to define cost of training of a specialist. With this purpose it is suggested to calculate the index of the investment content using the formula (1):

$$E = \frac{I}{S}, \quad (1)$$

where: E – expenditures per graduating student; I – investments in education; S – the number of graduating students.

While estimating the efficiency of using of investments in education, one should take into account that the financing of different programs are defined not only by the number of students, but also by the complexity of the program.

Every year in Latvia the Ministry of education approves coefficients of expenditures on educational programs on thematic fields of education, which are taken as the basis while defining the financing of the study programs.

Moreover, minimal optimum meanings of the coefficients are defined. Thus in the year of 2007 the minimum meanings of the coefficients on different programs fluctuated from 1.0 – the low for the humanities (in the English universities – the Arts), social science, business and administrating, to 6.0 – military programs, but optimum meanings exceeded the minimum by 10 % – 70 %.

Within the framework of the conception of development of education for the years 2007 – 2013 it is planned a yearly increase of the coefficient by 10 %.

To compare the higher educational institutions as to the efficiency of investments, the difficulty co efficiency of the programs should be taken into consideration; and the formula (1) should be changed into formula (2):

$$E_k = \frac{I}{\sum_{i=1}^n S_i k_i}, \quad (2)$$

where: I_k – corrected investments content; S_i – number of graduated students of i – program; n – amount of the programs; k – index of program complexity .

In Riga Technical University the corrected index of investment content in the year of 2006 equaled 2549 euro, in 2007 – 4975 euro (the investment content without corrections – 9754 and 10831 euro accordingly).

The investment content of a specialist visually exceeds the educational expenditures, as long as part of the students during the training time drop out or get their diplomas exuding the length of training.

To estimate the level of loses it is suggested to calculate the index of loses:

$$LI = \frac{E}{E_s}, \quad (3)$$

where LI –lost index ; E_s – expenditures for training of one student.

The Table 1 demonstrates the expenditures for one student in the state higher schools and private higher school of Latvia in 2006/2007 academic year.

The given table shows the fact that in state higher schools expenditures for one student are higher than in private higher schools, and differences in expenditures among state higher schools are greater than among private higher schools. For instance, expenditures for one student in Ventspils Higher school are six times higher than for one student of Pedagogical academy.

In the Table 2 the calculation of the lost index are represented, according to the groups of programs.

The table demonstrates that the highest expenditures for one graduating student were in the programs of chemistry – 20364 euro, the lowest – in the building programs – 8832 euro. The highest lost index is also in the programs of chemistry, in which expenditures for graduating student were two times more then for student. According to this index, the building programs are the most effective.

The average lost index on engineering programs of Riga Technical University is 1.47.

With the help of the index of losses it is possible to estimate the money lost as on separate programs as in the higher school on the whole.

$$W = E * S * (LI - 1), \quad (4)$$

where W - money lost in euro.

There is shown in Table 3 the calculation of money losses at the expense of overdraft of money on graduating students of engineering specialties of Riga Technical University.

The greatest losses in absolute meanings are in programs of chemistry and transport, at the same time it should be noted that the programs of chemistry trains the least number of graduating students in comparison with other programs. Apparently, those programs, mentioned here as the least effective, exist, to some extent, at the expense of other training programs, and the University face the problem of raising the efficiency of investments, first of all, in chemical programs. In the year of 2007 in comparison with the year of 2006, the losses increased by 1.5 million euro that is explained, first of all, by the growth of investments in education.

Table 1. Expenditures for one student in the higher schools of Latvia in 2006/2007 academic year

State High schools, academies and universities	Expenditures Euro	Private High schools and academies	Expenditures Euro
Ventspils Higher school	5266	Higher Juridical school	2940
Higher school of economics	5051	Institute of aero navigation	1114
Musical academy	4576	Higher school of business "Turiba"	1097
Art academy	3975	Higher school of administration	1082
Medical academy	3536	Institute of transport	771
Riga Technical University	2734	Higher school "Attistiba"	771
Sport academy	2519	Higher school of economy and culture	702
Latvian agricultural academy	2409	Baltic international academy	699
Academy of culture	2014	Higher school of informative systems	684
University of Latvia	1790	Higher school of social technologies	545
Higher pedagogical school	862	Higher school of psychology	452

Table 2. Expenditures of the state budget per one student and graduating students of Riga Technical University engineer programs for the academic year of 2006 – 2007

Programs	2006 year			2007 year		
	Expenditures for one student Euro	Expenditures for one graduating student Euro	Index of loses	Expenditures for one student Euro	Expenditures for one graduating student Euro	Index of loses
Power and electrical engineering	5296	8350	1,58	6561	9361	1,42
Electronics	4766	6534	1,37	6424	9348	1,45
Chemistry	7761	15134	1,94	10554	20364	1,92
Transport engine	4800	7130	1,49	6342	11080	1,74
Building	5260	6631	1,26	6770	8832	1,3

Table 3. Money lost on training of specialist of engineer programs of Riga Technical University

Programs	Losses (thousand euro)	
	2006	2007
Power and electrical energy.	710,8	742,8
Electronics	421,4	592,8
Chemistry	897,1	1330
Transport	700	1,384,2
Building	338,5	568,5
Total	3,067	4,618,1

The results of the research give us the reason to draw conclusions that the suggested indexes make it possible to compare the effectiveness of investments between different programs and higher schools; and also give the possibility to estimate losses on account of over drafting of money on training of specialists.

5. Conclusions

In economy, based on knowledge Human capital plays the decisive role. Human capital is made up in the process of education. In the national plan of development of Latvia it is stressed that knowledge presents the main resources of economic development; knowledge make it possible to work out innovations in all the spheres of national economy. Higher education plays the main role in the development of innovations thinking.

Analysis of quantitative and qualitative indices, characterizing Higher education, demonstrated the fact that in spite of positive tendencies of their change during the recent years, Latvia is still behind the average level of the analogous indices of the developed EU countries, and, in particular, by the level of financing per one student, although, in the year of 2006, in comparison with the years of 1995, total financing of Higher education was increased by six times.

Both – theorists – economists and Ministry of education and science of Latvia, practically pay no attention to the problems of estimation of the efficiency of investments, what should be estimated from

different points of view: of the state, of an employer, of an employee, of Higher school. The suggested methodic makes it possible to compose the efficiency of investments in education in the study programs, to define problem objects of low effectiveness in order to improve the use of financing.

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