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Faculty of Engineering Economics and Management
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DEVELOPMENT OF HIGHER EDUCATION FINANCIAL MANAGEMENT SYSTEM

Summary of Doctoral Thesis

Field: Management Science

Subfield: Entrepreneurship and Business Management

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DOCTORAL THESIS

PROPOSED TO RIGA TECHNICAL UNIVERSITY FOR THE PROMOTION TO THE SCIENTIFIC DEGREE OF DOCTOR OF ECONOMICS (Dr. oec.)

The Doctoral Thesis has been developed at the Department of Economics of Production and Entrepreneurship of the Faculty of Engineering Economics and Management, Riga Technical University. To be granted the scientific degree of Doctor of Economics, the present Doctoral Thesis has been submitted for the defence at the open meeting of RTU Promotion Council “RTU P-09” on 20 April 2012 – 1 p.m., at the Faculty of Engineering Economics and Management, Riga Technical University, 1/7 Mezha Street, Room 309.

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DECLARATION OF ACADEMIC INTEGRITY

I hereby declare that the Doctoral Thesis submitted for the review to Riga Technical University for the promotion to the scientific degree of Doctor of Economics, is my own and does not contain any unacknowledged material from any source. I confirm that this Thesis has not been submitted to any other university for the promotion to other scientific degree.

Ingars Eriņš _____

5 March 2012

The Doctoral Thesis has been written in Latvian. The Doctoral Thesis comprises an introduction, four chapters, conclusions and proposals and bibliography with 162 reference sources; it has been illustrated by 8 figures, 8 tables and 92 formulas. The volume of the present Thesis is 170 pages, not including 11 appendices.

The Doctoral Thesis and Summary are available at the Scientific Library of Riga Technical University, 10 Kipsala Street.

To submit reviews please contact the Secretary of RTU Promotion Council “P-09”, Dr.habil.oec., professor Anatolijs Magidenko; 1/7 Meza Street, Riga, LV-1007, Latvia
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GENERAL DESCRIPTION OF THE PRESENT RESEARCH

Topicality of the Research – nowadays the role of higher education has been growing steadily. It has become one of the most important prerequisites for the continuous development of the modern society. It determines the development of a full-fledged personality, influences the pace of scientific and economic advancement as well as has an impact on the development of culture and welfare of the nation. Unlike in the past, nowadays the issues of the perfection and development in the field of higher education are extensively analysed in different countries of the world.

The most widely investigated issues concern the financing of higher education, as it has the significant impact on the attainment of the educational goals, the development opportunities of the higher education, its priorities, quality and other factors. The correct financial management is related to the application of the appropriate mechanism, which may help acquire additional funds and ensure their efficient use. This, in its turn, demands the development of the economically justified, rational and efficient financial management system. There is a necessity for the models and methods for higher education financing, which would be in compliance with the aims of the higher education in the particular country, and thus, would increase the efficiency of educational inputs, draw in additional funds, enhance the quality of education and ensure its availability.

The topicality of the research is conditioned by the fact that there is no completed and commonly accepted higher education financing model neither in Latvia nor in other countries. Although new concepts are being introduced and novel financial management systems are being developed, there are still many unresolved theoretical issues. Nowadays, the theoretical issues on the goals of higher education, its cost-efficiency, fund allocation criteria, the social and individual benefits, the financing volume affecting factors, the autonomy of higher education institutions (HEI) and other aspects are being widely investigated. The rational allocation of funds for different levels of higher education and thematic fields, which are demanded at present and will be demanded in future, is one of the issues being considered today.

How to allocate funds among and within the higher education institutions, in order to achieve optimal results and get maximum output with minimal input? At a time of financial crisis, the main focus is on the rational and efficient use of financial resources allocated to HEI as well as on the opportunities of HEI to attract additional investments.

The improvement of the higher education financing mechanism in Latvia has been treated as a necessary prerequisite in many state and higher education strategic development documents. For instance, one of the objectives mentioned in the chapter on the project of strategy implementation within the framework of Latvian National Reform Programme “EU 2020”, is to improve the allocation of state funding to higher education and to use the acquired financial resources efficiently, in order to provide national economy with required knowledge and human base. On 5 August, 2010, the Cabinet of Ministers has approved the Action Plan for Necessary Reforms in Higher Education and Science (2010 – 2012), in which one of the courses of action envisages developing of the models of state budget funding allocation to higher education in compliance with the state budget capacity. The perfection of financing mechanism is also planned in Latvia’s Sustainable Development Strategy “Latvia 2030” and in other documents on the strategic development of the state.

Taking into account the abovementioned issues, **the author of the Doctoral Thesis puts forward the following aim:**

to provide methodology for the development of a higher education financial management system, as well as to substantiate the efficient Latvian higher education financial management system model for higher education institutions on the basis of the main theoretical guidelines analysed, the studies performed by the author and practical experience gained.

In order to achieve the aim, the following **tasks** have been set:

1. to investigate and analyse theoretical approaches to higher education financing, including the issues of higher education funding volumes, development of a financing mechanism, as well as the problems related to the financing concepts, methods, principles, approaches, affecting factors and existing tendencies, which determine the financing goals, types, directions as well as development of higher education.
2. to study and compare the higher education financing models and accumulated experience of the EU states and other major countries of the world.
3. to research and assess the higher education financing system in Latvia, both at the state level and at the level of individual higher education institutions.
4. to collect and systematize information on funding volumes, funding applications, types of costs, regulations, provisions and other aspects related to financing of the state budget funded higher education institutions in Latvia.

5. to analyse the financial management system of Riga Technical University and assess its efficiency.
6. to develop the methodology for rational and efficient allocation and use of financial resources.

The Object of Research is higher education financial management systems.

The Subject of Research is the methodological and methodical issues of the development and implementation of the financial management system.

The main focus in the research is on the methodical issues concerning the development and implementation of financial management systems, including the ways of efficient allocation and use of available state budget funding and funding acquired from other sources of finance as well as the funds earned by the HEI itself.

Research Limitations and Constraints – the research mainly focuses on the analysis of the issues related to raising, allocation and efficient usage of the funds to ensure continuous study process and scientific research. Other issues related to the development of the higher education financial management system, such as financial control, audits and financial supervision, have not been investigated in the present research due to the limited volume of the Thesis.

Methods of Research – the Doctoral Thesis has been developed applying the conventional methods of analysis, synthesis, induction and deduction; the economic methods of quantitative and qualitative data analysis, including mathematical and statistical methods and economic forecasting, as well as the methods of financial balance, comparative analysis, expert evaluation and other relevant methods.

The Theoretical and Methodological Foundation of the Research is based on theoretical and empirical findings on the issues of higher education financing by the following foreign (Allison G. S., Altbach P. G., Dougherty K. J., Douglass J. A., Ellison M., Freeman R. J., Fusai G., Goldsmith L. M., Greasley A., Roncoroni A., Sorenson R.D., Shoulders C. D., Schwarzenberger A., Tamblyn M. V., Seitz N., etc.) and Latvian authors (M. Auziņš, A. Baumanis, J. Čakste, J. Eglītis, L. Kavale, I. Knēts, J. Krūmiņš, J. Ķirsons, R. Ķīlis, E. Lavendels, A. Meļnis, L. Paņina, J. Pūce, A. Rauhvargers, B. Rivža, B. Sloka, R. Taraškevičs, T. Volkova, J. Vētra, etc.).

The informative basis of the research comprises the data obtained from the Central Statistical Bureau of the Republic of Latvia, materials provided by the Ministry of Finance and the Ministry of Education and Science of the Republic of Latvia, as well as the laws and

regulations of the Republic of Latvia and the data obtained from Latvian higher education institutions and Riga Technical University.

Thesis Statements to be defended:

1. When elaborating the higher education financing system, a definite methodology has to be used, which would allow implementing a complex and systematic approach to research and development of financing models. The approach offered by the author can help to evaluate the existing systems more successfully, as well as to solve problems of their further elaboration, improvement and development.
2. The system of decentralized allocation and use of financial resources in higher education institutions is more efficient. The methodology developed by the author is based on normative and decentralized funding allocation principles, it has been approbated at RTU and it is one of the most appropriate methodologies that can ensure rational use of resources, improve study quality and increase competitiveness of the higher education institution.
3. When elaborating the higher education financing model, indexes of higher education quality and excellence of studies have to be taken into account. One of these indexes for determining the volume of funding is the author's proposed efficiency ratio that is used in the formula for calculating state budget subsidies.

Scientific Novelty:

1. The methodology for elaboration of higher education financing management system for research and development of higher education economic and financial aspects has been substantiated, and that includes elaboration of levels and components of the financing model, their interconnection, general theoretical and methodological principles, specific calculation methods and methodologies.
2. A complex evaluation of higher education system in Latvia, the EU states and some of the biggest countries of the worlds – the USA, Canada, Australia, has been performed by determining common tendencies in the field of higher education financing by creating funding formulas, analysing advantages and drawbacks of financing systems, evaluating sources of financing, systems of study crediting and scholarships, as well as scientific research and innovation funding systems.

3. The state budget subsidy calculation formula has been improved. The formula is based on normative principles of financing for determining funding per one student, including efficiency ratio and providing its scientific substantiation.
4. The methodology for calculating base expenses per one student has been elaborated, taking into account real study costs at higher education institutions, changes in the taxation system, exact figures in separate expense items, changes in the legislation, impact of inflation and other factors.
5. Education level ratio for allocation and calculation of financing for college study programmes has been elaborated and practically substantiated.
6. On the basis of the defined general theoretical principles for allocation and use of financial resources, an efficient methodology for allocation and use of financial resources among structural units of a higher education institution has been elaborated, including methodology for allocation of state budget funding and tuition fee funding as well as methodology of structural unit income application, the detailed calculation algorithm for allocation of financial resources taking into account the requirements for elaboration of data provision.

The Approbation and Practical Use of Research Results

The methodology for allocation and use of financial resources at higher education institutions elaborated within the present research is being practically implemented at Riga Technical University. On the basis of the elaborated methodology an automatic accountancy and management system for allocation and use of funding was created for RTU structural units.

The results of the research have been applied in the designing of the study courses taught by the author – “Project Planning and Control”, “Project Planning Methods” and “Project Quality and Risk Management”. In 2006 the author of the Doctoral Thesis participated in the implementation of the project No R7076 “Development of Innovative Entrepreneurship on the Base of Economic Knowledge Management in Latvia” financed by the Ministry of Education and Science of the Republic of Latvia.

In 2011 the results of the Doctoral Thesis were discussed at the meetings of the Council of Higher Education, Ministry of Education and Science of the Republic of Latvia and Department of Higher Education, as well as at the meeting of administrative directors and finance managers of higher education institutions of Latvia “Management of Academic Institutions in Latvia and Other European Countries” on 25 November 2011.

Publications

The results of the research have been presented in 12 publications including 6 published in the recognised peer reviewed scientific proceedings (the USA, Italy, the Czech Republic, Bulgaria, Lithuania, Latvia), one of them is a scientific handbook presenting a methodology.

Articles published in the recognised peer reviewed scientific proceedings:

1. Eriņš I., Taraškevičs R. *Finanšu līdzekļu sadales un izlietojuma metodika augstākās izglītības iestādē* – Rīga: RTU Izdevniecība, 2011. – 60 lpp. (a scientific handbook).
2. Eriņš I., Kārkliņa S. *The Characteristics of Higher Education Funding Impact Factors in Latvia* // 17th International Business Information Management Association Conference IBIMA 2011, 14-15 November, 2011, Italy, Milan. – Milan: International Business Information Management Association (IBIMA), 2011 – pp. 1385–1397 (CD).
3. Eriņš I., Taraškevičs R. *Dynamic Financing Models of Tertiary Education According to Market Needs* // The 15th World Multi-Conference on Systemics, Cybernetics and Informatics, 19–22 July, 2011, the USA, Florida, Orlando. – Winter Garden: International Institute of Informatics and Systemics, 2011 – pp. 71–75.
4. Eriņš I., Taraškevičs R. *Ekonomiskā krīze un augstākā izglītība* // RTU zinātniskie raksti, 8. sērija, Humanitārās un sociālās zinātnes, 17. sējums. – Rīga: RTU Izdevniecība, 2010. – 9.–16. lpp.
5. Eriņš I., Roļskija S. *Activity of Hostels in Higher Educational Institutions in Latvia* // International Scientific Conference „Innovation Driven Entrepreneurship” BMRA2010, 14-16 October, 2010, Lithuania, Vilnius. – Kaunas: ISM University of Management and Economics, 2010. – 14 pp. (CD)
6. Jurenoks V., Jansons V., Erins I. *Modeling of Development of Latvian Republic Innovational Activity* // Proceedings of the 23rd ISPE, International Conference on CAD/CAM Robotics and Factories of the Future, Vol. 2, 16-18 August, 2007, Colombia, Bogotá. – Bogotá: Militar Nueva Granada University, 2007 – pp. 505–512.
7. Jurenoks V., Jansons V., Erins I. *Modelling and Analysis of Latvian Republic Innovational Activity* // V International Scientific Conference “Management and engineering’07”, 18-22 June, 2007, Bulgaria, Sozopol. – Sozopol: Technical University of Sofia, 2007 – pp. 420–423.

Other scientific publications:

8. Eriņš I. *Methodology of Effective Financial Management of a Higher Educational Establishment* // 16th International Conference “Economics and Management” ICEM 2011, 27-29 April, the Czech Republic, Brno. – Brno: Brno University of Technology, 2011 – pp. 354–355.
9. Eriņš I. *Finanšu resursu izmantošanas efektivitāte augstskolās* // 50. RTU starptautiskā zinātniskā konference, RTU IEVF Ekonomikas un uzņēmējdarbības zinātniskā konference (SCEE’2009), 2009. gada 15.–16. oktobris, Latvija, Rīga. – Rīga: RTU Izdevniecība, 2009. – 21.–22. lpp.

10. Eriņš I. *Ēku apsaimniekošanas funkciju realizācija RTU* // RTU 48. Starptautiskā zinātniskā konference „Tautsaimniecības un uzņēmējdarbības attīstības problēmas”, 2007. gada 11.–13. oktobris, Latvija, Rīga. – Rīga: RTU Izdevniecība, 2007. – 21. lpp.
11. Eriņš I. *Innovation Development in Higher Education Financing* // International Scientific Seminar “Development of Innovative Entrepreneurship Based on Knowledge Management”, 8 December, 2006, Latvia, Riga. – Riga: RTU Publishing House, 2006 – 12 pp.
12. Eriņš I. *Augstākās izglītības finansēšana* // Izglītības ekoloģija un profesionālās studijas: Rīgas Uzņēmējdarbības koledžas II zinātniski praktiskās konferences rakstu krājums, 2006. gada 12. decembrī, Latvija, Rīga. – Rīga: Rīgas Uzņēmējdarbības koledža, 2006. – 24.–29. lpp.
13. Eriņš I., Orlovskā A. *Ārvalstu tiešo investīciju ietekme uz Latvijas ekonomisko stāvokli* // Ekonomiskie pētījumi uzņēmējdarbībā: RTU IEF zinātniskie raksti, 4. sējums – Rīga: RTU Izdevniecība, 2006. – 52.–63. lpp.

The Doctoral Thesis was presented at 11 international and local **conferences** (the USA, Columbia, Bulgaria, Lithuania, the Czech Republic, Italy, Latvia):

1. 17th IBIMA Conference on Innovation and Sustainable Competitive Advantage „Creating Global Competitive Economies: A 360-degree Approach”, report – The Characteristics of Higher Education Funding Impact Factors in Latvia, 14-15 November, 2011, Italy, Milan.
2. 15th World Multi-Conference on Systemics, Cybernetics and Informatics: WMSCI 2011, report – Dynamic Financing Models of Tertiary Education According to Market Needs, 19-22 July, 2011, the USA, Florida, Orlando.
3. International Conference „Innovation Driven Entrepreneurship” BMRA 2010, report – Activity of Hostels in Higher Educational Institutions in Latvia, 14-15 October, 2010, Lithuania, Vilnius.
4. 16th International Conference “Economics and Management” ICEM 2011, report – Methodology of Effective Financial Management of a Higher Educational Establishment, 27-29 April, 2011, the Czech Republic, Brno.
5. 50. RTU starptautiskajā zinātniskajā konferencē, RTU IEVF Ekonomikas un uzņēmējdarbības zinātniskā konference (SCEE’2009), referāta nosaukums – Finanšu resursu izmantošanas efektivitāte augstskolās, 2009. gada 15.–16. oktobris, Latvija, Rīga.
6. 48. RTU starptautiskajā zinātniskajā konferencē „Tautsaimniecības un uzņēmējdarbības attīstības problēmas”, referāta nosaukums – Ēku apsaimniekošanas funkciju realizācija RTU, 2007. gada 11.–13. oktobris, Latvija, Rīga.
7. 5th International Scientific Conference „Management and Engineering’ 07”, report – Modelling and Analysis of Latvian Republic Innovational Activity, 18-22 June, 2007, Bulgaria, Sozopol.
8. 23rd International Scientific Conference ISPE, report – Modelling of Development of Latvian Republic Innovational Activity, 16-18 August, 2007, Columbia, Bogota.

9. Rīgas Uzņēmējdarbības koledžas II zinātniski praktiskajā konferencē „Izglītības ekoloģija un profesionālās studijas”, referāta nosaukums – Augstākās izglītības finansēšana, 2006. gada 12. decembris, Latvija, Rīga.
10. Starptautiskajā zinātniskajā seminārā „Uz zināšanu vadīšanu balstītas inovatīvas uzņēmējdarbības attīstība”, referāta nosaukums – Innovation Development in Higher Education Financing, 2006. gada 8. decembris, Latvija, Rīga.
11. 46. RTU studentu zinātniskajā un tehniskajā konferencē „Tautsaimniecības un uzņēmējdarbības attīstības problēmas”, referāta nosaukums – Starptautisko investīciju ietekme uz Latvijas makroekonomiskajiem rādītājiem, 2005. gada 29. aprīlis, Latvija, Rīga.

The content and volume of the paper

The Doctoral Thesis consists of four parts. The volume of the Doctoral Thesis is 170 pages, not including the appendixes. The paper contains 8 tables, 8 pictures and 92 formulas, as well as 11 appendixes that explain and illustrate the content of the research. During the elaboration of the paper 162 information sources listed in the bibliography have been used.

Chapter 1 **“Theoretical Aspects of the Development of Higher Education Financial Management System”** analyzes the goals of higher education financing, the factors that influence it and problems of funding mechanism development. A methodological scheme for research and elaboration of the financing system for higher education has been developed.

Chapter 2 **“Analysis of Higher Education Financial Management Systems of the Major States”** evaluates experience of higher education financing in European and other developed countries. Common tendencies concerning the sources of financing, study support systems, funding of research and innovations, as well as funding policy on the level of higher education institutions have been defined.

Chapter 3 **“Development of the Higher Education Financing System in Latvia”** characterizes the higher education financing system in Latvia, including regulations on funding allocation, student and study credits, procedure of granting scholarships and domestic financial policy of higher education institutions. Evaluation of a range of financial management system components: study level and thematic field indexes, the normative principle of funding, performance efficiency indicators, etc. Proposals for the development of higher education financing model have been elaborated.

Chapter 4 **“Methodology for Allocation and Use of Financial Resources at a Higher Education Institution”** defines general principles of allocation and use of financial resources, presents the elaborated methodological scheme for allocation and use of financial resources, the algorithm for methodology of state budget funding and tuition fee funding

allocation, calculation formulas, information base of methodology implementation and structural unit income allocation methodology. The results of implementation of methodology for allocation and use of financial resources at Riga Technical University are characterized.

THE MAIN SCIENTIFIC RESULTS OF THE RESEARCH

1. THEORETICAL ASPECTS OF THE DEVELOPMENT OF HIGHER EDUCATION FINANCIAL MANAGEMENT SYSTEM

The development of higher education financial management system is connected with a wide range of theoretical issues, which concern aims, sources, trends, factors, types, volumes and models of financing as well as the methodological and methodical questions of the analysis and elaboration of the financing system. The development of a well-grounded and substantiated financial management system, to a great extent, depends on the successful solution of the abovementioned theoretical issues. The detailed analysis of the theoretical aspects and the efficient solution of the theoretical problems may help improve the financial management system. Therefore, the author of the Doctoral Thesis observes a variety of key theoretical issues, including the factors and trends, which determine and affect the aims, volume and type of financing, as well as the methodology for the analysis and development of a financing model.

1.1. The Aims of Higher Education Financing

The development of the efficient financial management system should be based on the formulation of the sound aims, which are the foundation of the education system financing in any state. If the aims have not been established clearly, the elaborated financing system is going to be vague and ambiguous with wrongly set development priorities, state supported research directions, stimulating activities, financing sequence and other poorly or incorrectly defined issues. The identification of the financing aims is one of the major problems. Each state should formulate its own particular higher education aims, which may depend on the economic situation in the country, the development stages of the higher education, the level of education and other factors. There is a problem of identification and selection of the aims at the state level.

Nowadays, the aims, which have been formulated in different states are distinct and concern a wide range of issues, including education and training of specialists and meeting the demands of the labour market; personal development; development of democratic society; the

transfer of scientific discoveries into all domains of human activity; stimulation of economic growth; reproduction of higher education and scientific potential, in order to enhance the level of culture and education; development of culture, values, norms and traditions of the particular society as well as promotion of civil society education and development; regulation of the educational and cultural processes in socially significant domains; export of education services; widening student participation and other factors.

Being a member of the European Union, Latvia should define its educational aims in compliance with the norms and regulations of the joined Common European Education Space. Taking into account the documents on the strategic development of the state and laws and regulations of the Republic of Latvia (e.g. Latvian National Development Plan, Long-term conceptual document “*A Growth Model for Latvia: People First*”, Law on “Higher Education Institutions”, etc.), the author of the Doctoral Thesis has formulated the following most important aims:

1. personal development, development of democratic society, the transfer of scientific discoveries into all domains of human activity and meeting the demands of the labour market;
2. consolidation of the study programmes, which would promote the formation of the European identity in order to increase international student enrolment at Latvian higher education institutions;
3. providing different types of higher education, in order to acquire a variety of different skills ranging from the instrumental, which are related to professional competences, and even to the abstract or symbolic knowledge.

The author considers that when discussing the issues of formulating and attaining the aims of higher education, it is required to distinguish between the aims set at the state level and at the level of juridical and private persons. The aims of the juridical and private persons may be different from the aims of the state, which may influence the choice of the financing model.

1.2. Factors Affecting Higher Education Financing

Developing the financing system it is necessary to consider the aims of the higher education in connection with the factors, which affect the mechanism of the higher education financing. The author of the research has distinguished the following main factors:

1. Increasing globalisation;

2. Increase of the demand for higher education;
3. Higher education as the main engine that drives rapid national development;
4. Objective increase in the amount of per student funding;
5. Unsuccessful state policy aimed at increasing budget revenues;
6. Liberalization of economy;
7. The increasing role of revenues from tuition fees in the budgets of the state founded HEIs.

Analysing these factors it is necessary to point out that as the result of the *increasing globalisation*, the importance of the state borders is decreasing, as the number of students willing to study abroad is growing. The importance of international cooperation among HEIs is increasing, which allows them to become autonomous and less dependent on the state financing. In the academic year 2010/2011, 1,540 students, i.e. almost 5 % of the total number of students from all Latvian higher education institutions and colleges participated in the exchange programmes and studied at other HEIs abroad. To compare, in the academic year 2002/2003, only 589 students or 0.5 % of the total number of Latvian students chose the study programmes abroad. In the academic year 2010/2011, 1,949 international students were enrolled at the local higher education institutions, thus, the number of incoming students is greater than the number of outgoing students. Latvian higher education institutions, enrolling a larger number of international students, may acquire additional funding, thus ensuring the formation of Latvian knowledge-based economy and application of its principles and concepts empirically.

The increase of the demand for higher education is connected with the demographic situation in the world. The majority of the states, mainly with low GDP, experience the increase in the number of traditionally-aged university students. For the last eight years the total number of learners (ranging from pupils studying at the primary school to students of the Doctoral study programmes) has been decreasing in Latvia. However, the number of students at the Doctoral study programmes has been growing steadily mainly due to the implementation of the ESF co-financed project.

Taking into account the specific character of education and training of the specialists with higher education in Latvia and assuming that the existing tendencies shall be valid for the upcoming five years, the author of the paper forecasts that by 2015 there will be 442 thousand specialists with higher education employed in the national economy of Latvia. The number of specialists employed in the field of agriculture and in the engineering domains, in

particular, is decreasing. Its specific weight is forecasted to reduce by almost 10% from 24% in 2000 to 14.5% in 2015. Moreover, the specialists, who acquired education before 2000, should be retrained as they lack knowledge and skills in new, science intensive technologies. It can be positively evaluated that if the current tendencies remain, in 2015, 54.8% of the total number of specialists employed in the national economy will have completed higher education, which is in full compliance with the demands of developed economies and the aims of the EU. However, as the negative effect of this forecast, it should be mentioned that 51.8 % of them are going to be the specialists in the social and legal fields, as the labour market in these fields is already oversaturated.

Higher education is the main engine that drives rapid national development, which means that in order to establish an efficient framework for a stable improvement of the national economy there should be a continuous progress towards a knowledge-based economy. The knowledge-based economy promotes the national and individual welfare. Such factors as the transition from the traditional to the liberal (modernized) society, the expansion of the globalization, internationalization and political and cultural processes, the information boom, the technological bias, the ecological crisis and the crisis of humanity influence and even shape the contemporary socio-cultural transformation within the particular realia, which should be taken into consideration when analysing the problems of education and its financing.

The following factors influence the solution of the significant financial problem in the field of higher education, which arises due to the *objective increase in the amount of per student funding*:

- The development of technology promotes the decrease of salaries in the manufacturing industries, which, in its turn, causes the decrease of the prime cost per unit. At the same time technological development in the field of higher education causes the increase of the amount of per student funding;
- enduring changes and the pace of creation and development of new study programmes in higher education almost always surpass the liquidation of the outdated study programmes, thus not only preserving the initial number of academic staff, but also increasing it and/or its workload;
- Research costs are high and with a tendency to increase.

Not only in Latvia, but also in other countries, the governments have to deal with the *increasing burden on the state budget* – the expenditure for education, pensions, medical care,

infrastructure, security and other social welfare benefits is increasing. In many EU countries the social welfare expenses constitute from one third to a half of GDP of a particular state. Therefore, in addition to state budget financing, educational institutions try to generate revenues providing the fee-based services. The derived revenues do not influence the amount of state budget funding, however they are used for the development of the educational institution, purchasing of equipment and study materials, as well as for material stimulation of both the academic staff and students. It allows Latvian HEIs to increase the amount of the insufficient higher education funding by attracting investments, which are obtained applying the creative potential and initiative of the academic staff and scientists.

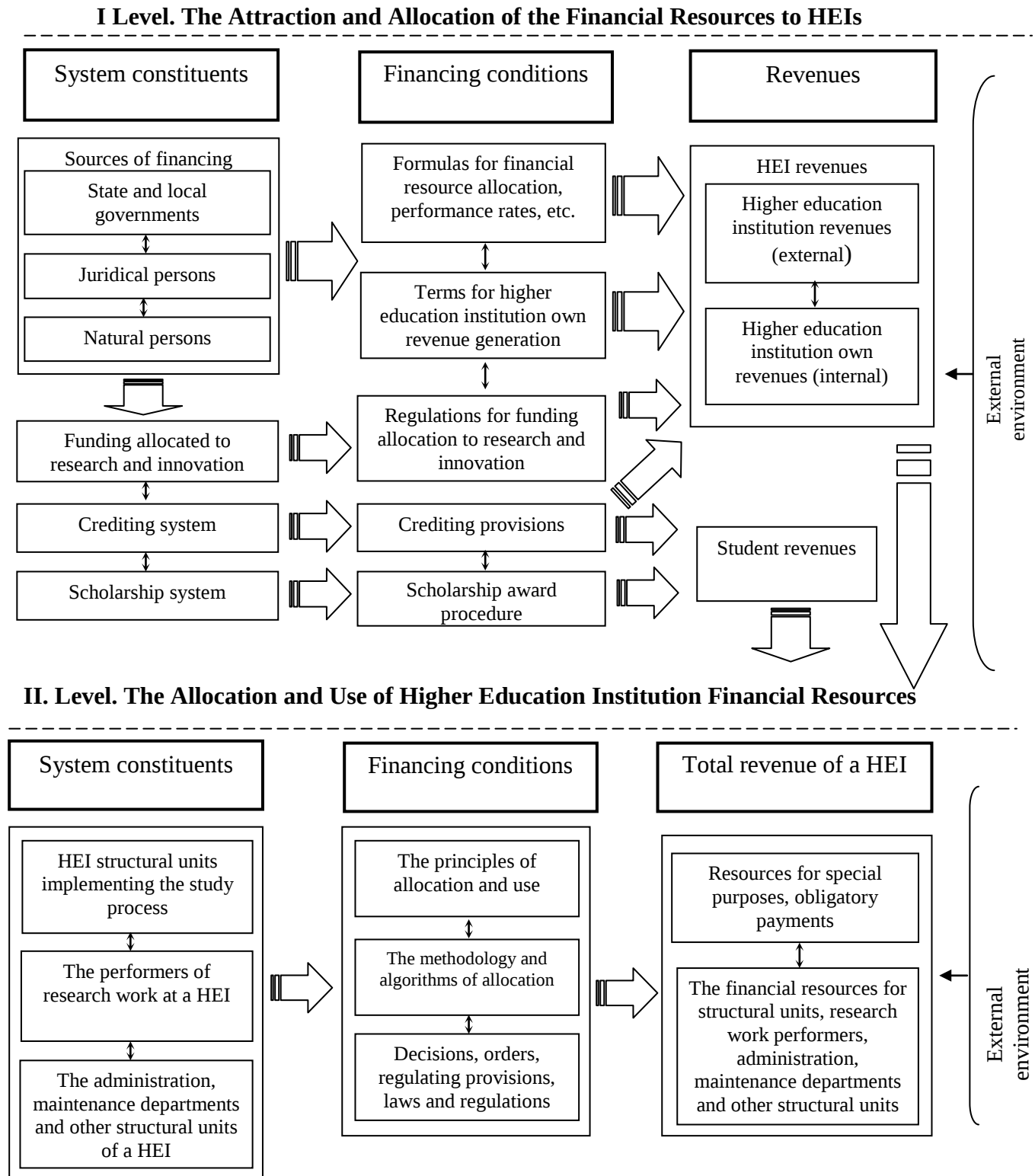
Liberalization of economy as the factor affecting higher education financing is commonly observed in the post-socialist countries. The higher education institutions remain state-owned and are strictly controlled; however, there is a tendency for increasing self-determination attracting the amount of additional investments, which is larger than the state budget funding. Therefore, the higher education institutions become more sensitive to different market conjunctures. As a result of higher education liberalization, the number of private higher education institutions (profit or non-profit) is increasing, as well as there is a necessity for establishing HEIs as derived public persons. New status of the higher education institutions allows them to attract and retain new sources of financing, employ specialists, sign agreements on the regular basis, undertake obligations, and perform other activities, which in their turn are connected with the issues of rational allocation and use of financial resources.

Nowadays, with an *increase of the higher education expenses* and limited possibilities of the state financing (after the crisis in 2008 the state subsidies in Latvia have halved and comprise only 41 million LVL), state founded higher education institutions have started to enrol students on a fee-paying basis and, thus, *the revenues from tuition fees in the budgets of the state founded HEIs are increasing*. They can comprise up to 70-80% of the budget of individual higher education institutions, or even 100% at the study programmes in some thematic fields. As a result, the issue of the allocation principles and methods of a fee-based study funding, which would promote the attainment of educational goals, is considered.

1.3. The Problems of the Development of the Higher Education Financing Mechanism

One of the most important theoretical issues of the elaboration of the higher education financial management system is connected with the development and improvement of the higher education financing mechanism. In order to design and develop adequate higher

education financing system (financing model), which would be in compliance with the interests of a society, the author of the Doctoral Thesis proposes and applies the particular methodology for the analysis and elaboration of such a system/model, which is schematically represented in Figure 1.



1. Fig. The general scheme of the analysis and development methodology of a higher education financing system model

In accordance with the designed methodology, the financing system is analysed at two levels. *At the first level* the financing mechanism is analysed, designed or elaborated, which determines the attraction, allocation and use of financial resources for HEIs. The sources of higher education financing, the funding allocated to research and innovation, the system of higher education crediting and the scholarship system are analysed.

At the second level the financing mechanism, suitable for the elaboration of a higher education institution internal policy, is analysed and developed. The main constituent parts at this level are the structural units of HEIs, which ensure the study process; the performers of the research work at the HEI; the administration of the HEI, maintenance departments and other structural units.

At the first level, in order to design an adequate financing model, it is necessary to develop both optimal and efficient mechanism for the attraction of the financial resources from different sources of financing, the guidelines for their allocation and use in compliance with the set aims, and the efficient scholarship system, as well as the system of crediting of the studies and students. The most important constituent part at the first level of the methodology is the mechanism of attraction and allocation of the funding from different **sources of financing** (financing conditions). At the first level the crediting system is analysed as well. It comprises types and sources of loans, determines who and under what conditions can obtain the loans as well as defines the system of payments for the obtained loans. **The scholarship system**, being one of the stimuli for the development of the higher education, is directly connected with the financing of higher education; it allows attracting both local and foreign talented, but indigent youngsters. **The funding allocated to research and innovation** is the inseparable part of a higher education financing system, as the development, sustainability and prestige of any HEI are dependent on the capacity and identification of its research schools.

At the second level the internal policy of HEI is analysed, which determines the allocation and use of all types of the financial resources obtained in order to organize and implement the study process and research.

At each of these levels and their forming systems (constituents) it is required to solve individual theoretical, methodical and empirical issues. Moreover, it should be considered that all these elements are interrelated as well as are related to the external (political, economic, international, social, informative etc.) environment and the factors affecting it. In compliance with the provided methodology, the author of the thesis analysing the higher education

financing mechanism envisages both “external” (in relation to the financing level at higher education institutions and external environment) and “internal” aspects (comprising the issues of the HEI’s internal financing policy) of the mechanism.

2. ANALYSIS OF HIGHER EDUCATION FINANCIAL MANAGEMENT SYSTEMS OF THE MAJOR STATES

In order to acquire an opportunity to apply the knowledge and experience accumulated by other states in the financial management of higher education in Latvia, the second chapter of the Doctoral Thesis provides the detailed description and analysis of the higher education financing systems, which have been elaborated in the most developed countries with the decentralised (market) economy. The UK, Germany, France and the Netherlands, i.e. the EU states with long standing academic traditions and high level of education quality, have been chosen for the comparative analysis. The author of the thesis decided also to investigate the higher education financing models of such states as the USA, Canada and Australia, as these states although being historically based on European higher education traditions, have managed to develop distinct, but efficient financial management systems, which allowed them to gain the major role in the global economy.

2.1. The Financing of Higher Education in Europe

Higher Education Financing Model in the UK. In the UK the state finances HEIs applying two methods: “money follow the student” – the government determines state budget subsidies for the full-time students annually; and the block grant method – through the regional higher education financing councils the higher education institutions are granted subsidies for all students. The higher education institutions obtain also scientific grants for individual and postgraduate research. The financing to support research infrastructure is allocated on a competitive basis, considering the information on the quality of a research, taking into account the results of the *Research Assessment Exercise (RAE)*. *RAE* focuses on the quality of published papers and research, comparing it to the criteria set in the national and international standards. The financing for the specific research projects is also available, when funding is allocated based on the expert evaluation. The laws and regulations allow HEIs to attract independent sources of financing. The obtained financial resources can be used at the discretion of a higher education institution.

One of the major drawbacks of the financing system in the UK is that the government sets to allocate the financing proportionally to the number of students. The structural units with the same number of students obtain the same amount of financial resources, irrespective of the distinct costs for educating and training of the specialists at different study programmes. This characteristic feature of the present financing methodology leads to the following negative effects, i.e., higher education institutions have unstable financial position, there is a lack of financial resources for renovation of study premises and modernization of equipment, the salary of academic staff is lower than at other higher education institutions in other developed countries. However the most important drawback is that there is unfair competition among higher education institutions as well as among the faculties (departments) within a HEI. Applying this kind of methodology for financial resource allocation, the higher education institutions and faculties, which educate and train specialists at the expensive study programmes – in the field of medicine, natural and engineering sciences – obtain relatively smaller amount of financial resources than those HEIs and faculties, which educate and train specialists in less cost-intensive fields – humanities, social sciences and pedagogy.

In order to characterise and analyse higher education financing models of the countries under discussion, the author has developed a general financial formula for each country considered. To characterise budget volume of the UK HEIs the author has developed the following formula:

$$N = S_v \times F^s + S_v \times F^1 + N_s^b + N_g^c + N_g^z + N_z$$

- Where: N – annual revenue of the HEI;
 S_v – the number of students, who completed an academic year, or the number of students financed by the state;
 F^s – state budget funding allocated per one full-time student in the respective year (in 2006 set at about 5000 GBP);
 F^1 – student co-financing (tuition fee), the upper limit of which for the respective year is also determined by the state (in 2006 the upper limit was set at 3000 GBP, in 2012 – at 9000 GBP);
 N_s^b – block subsidies, which cover all students of the HEI, including Doctoral Students (both full-time and part-time students) and which are paid to the HEIs through the intermediary of special financial institutions (local educational administrative institutions);
 N_g^c – central government grants;
 N_g^z – scientific research council grants for implementation of individual research projects and for support of postgraduate studies;
 N_z – donations, scientific research projects financed by enterprises and other funds raised.

Higher Education Financing Model in Germany. At present there are 394 HEIs in Germany. The majority of them are state HEIs, which receive state or municipal (federal land) financing. Private HEIs, which also receive state budget funding, constitute a certain part of the total.

Throughout the country average costs per one student are 8,000 EUR, but this sum is different in each federal land. Particular federal land governments are responsible for financial provisions and the development of HEIs. Particular federal land budgets cover 90% of funds allocated to HEIs. The remaining 10% are covered by central state budget, private individuals and organisations, which traditionally play a minor role in higher education financing in Germany (central state budget – 7%, private individuals and organisations – 3%). Almost 60% of state financing (excluding research funding) is used to ensure the study process; the remaining financing is used to support students including tax relieves.

In all federal lands financing is allocated to HEIs on the basis of performance and capacity indexes, however, the significance of the performance rate varies in different federal lands. Cooperation between federal land governments and HEIs includes special purpose agreements and cost and activity accounting. The terms of fund allocation for research, in turn, depend on the principles of a respective source of financing. The funds are mainly allocated on a competitive basis.

The advantage of this financing model is that a HEI can devote its full attention to performance of its direct functions: the development of scientific schools, research, education and training of specialists for the labour market, which assure the development and excellence of a higher educational institution. The disadvantages to be analysed are the same as in the UK – an equal sum of money is allocated for each student disregarding various costs necessary to ensure education at various study levels and in various study fields. In addition, in Germany there is a great variation in the amount of funds allocated per student in different federal lands. The fact that funds are allocated among HEIs and within HEIs very subjectively is another important drawback, as allocation is based on agreement rather than on strict workload criteria.

Higher Education Financing Model in France. In France the state almost fully funds higher education (up to 90% at all education levels). Such financing policy is adopted as it is considered that tuition-free education available to anyone is a basis of the French economy. In such a way both the formation of an educated society and harmonious development of science

are facilitated, and that, in turn, ensures steady pace of the national economy development. As a result, the French economy is the fifth largest economy in the world.

One of the specific features characteristic of the state is that all members of academic staff of HEIs are officially employed as officers of the Ministry of Education rather than as employees of definite HEIs. That is why almost 70% of higher education financing is allocated to payroll fund. The remaining funds are allocated in the following way: 10% are used to ensure student social support – scholarships, health insurance; approximately 3% are annually allocated to construction works and major repairs; 17% are directed as subsidies to HEI budgets, these funds are allocated according to the national normative system. The latter funds are used to develop infrastructure, facilitate the work of the academic staff, and maintain HEI activities.

The author of the thesis considers that the advantage of the French higher education financing model lies in the fact that the state takes full financial responsibility for the development of HEIs. Specific character of HEIs, i.e. categories (education levels) and thematic fields of the study programmes are taken into consideration. Academic staff is better protected socially. The disadvantage of such centralised financial management system is that the fate of each HEI depends on subjective judgements of politicians and state officials. This factor does not stimulate creativity and initiative of the academic staff and employees of HEIs. There are no precisely measurable workload parameters, that is why it is difficult to estimate whether the funds are used efficiently and whether they are sufficient. Such system existed in Latvia in 1970s-1980s. The Ministry of Education required to substantiate the necessity of each staff position, and the members of academic staff received salary according to definite rates irrespectively of whether their workload was large or there was no workload at all.

Higher Education Financing Model in the Netherlands. In the Netherlands higher education policy is coordinated by the Ministry of Education (except for programmes in agricultural studies, which are coordinated by the Ministry of Agriculture). These ministries determine both the volume of financing and HEI working policies. In the Netherlands HEIs receive revenues from the following sources: block grants – education and scientific activity budget financing (66–74%), scientific research grants awarded by the Royal Netherlands Academy of Arts and Sciences and scientific research institutions (5%), revenue from commissioned research activities in science and education (8–23%), tuition fee (6–18%), other revenues (5–10%).

Formal achievement system is implemented in the Netherlands. The system assesses the contribution and influence of the academic staff on the national and international scale – the number of publications in internationally recognised journals and peer reviewed editions taking into consideration the number of books published and citation index.

Education in the Netherlands is tuition free for the people below 18 years of age, any form of education for the people aged above 18 is provided on a fee-paying basis.

The fact that since 1991 student co-financing has been introduced in higher education in the Netherlands can be considered as one of the advantages of this financing model. Another advantage lies in the fact that HEIs can receive fixed amount of financing for many years in a row, and that ensures stable development of each HEI. At the same time, variable amount of financing allows HEIs to advance further. In the opinion of the author of the thesis, the fact that greatly different costs of education in various study fields are not taken into account should be considered as a disadvantage of the model. Tuition fee as a student co-financing is the same in all educational fields, that is why the mentioned cost variation should be considered while allocating state subsidies and investments to HEIs. It is not entirely correct that the higher education policy is determined by Ministry of Education officials. This financing model also is to a great extent prone to subjective human judgements.

2.2. Higher Education Financing in Other Countries

Higher Education Financing in the USA. Higher education establishment financing system in the USA is relatively diverse – there are non-profit, for-profit, public and private institutions. Respectively, the size, mission and governance of HEIs also differ. More than 75% of the students in the USA study at public HEIs, which receive a great portion of financing from separate state governments. It should be pointed out that in private non-profit universities and colleges the revenue per student is usually 30% higher on average than in state higher education institutions, respectively, they also charge a higher tuition fee.

HEIs receive financing from many sources, including state funding, tuition fees and donations. State government funding constitutes a great portion of all HEI revenue. The source of this revenue is taxes paid by the taxpayers in a respective state, that is why students from other states usually have to pay higher tuition fees than the residents of the respective state.

Traditionally, the funds are allocated to HEIs depending on the number of students enrolled. However, since financial problems have become a topical issue, allocation of funds

based on the number of graduates or other performance criteria has been more seriously considered.

There are problems with access to higher education in the USA, particularly among low-income population and ethnic minorities.

Higher Education Financing in Canada. There are various sources of university financing in Canada, the largest of them being federal government and provincial government funds and programmes, as well as tuition fees. Starting with 1999, universities have been using credit financing more actively to make capital investments. As a result, certain HEIs have to cover their liabilities from the general budget reducing the financing allocated to cover studies and other expenses.

Similar to other countries, in Canada there has been a transition in financing principles: earlier a greater proportion of financing came from the state budget, but nowadays it comes from private financing.

The greatest proportion of the state financing is allocated to HEIs in the form of block grants. Provincial governments finance HEIs in accordance with the planned number of students disregarding the actual number of students, as well as the level and complexity of the study programme. HEIs determine tuition fees for students whose studies are not financed from the state budget; the fees can be relatively high.

The “fund accounting system” is used at HEIs, it allows distinguishing between the funds allocated for designated purposes and those used to support a broader range of university activities. *CAUBO (Canadian Association of University Business Officers)* has developed the principles of the fund accounting system. Within this system HEI revenues are divided into the following funds: endowment fund, to which donations and interest income are transferred; ancillary fund; capital fund; sponsored research fund; special purpose and trust fund, and general operating fund.

One of the problems is the necessity to expand and renovate the existing buildings and equipment. Already at present the funding is not sufficient to cover all these needs, that is why financing for capital investments should be increased. Certain needs are covered using credit financing, but this approach simply shifts the demand for financing to the future.

Higher Education Financing in Australia. In 1989, state budget funds were the main source of state HEI financing in Australia, there were only few private HEIs. In the recent 20 years the Australian higher education policy has experienced several changes, for example, the relative number of educated individuals has increased, university financing sources have

been diversified, tuitions fees have grown, efficiency and effectiveness of higher education have increased, the financing system based on performance rates has been introduced, now state funding is allocated also to private HEIs. As the result of these reforms higher education is accessible to the wider public, it has become the third largest export industry. It is important to point out that only 55% of the state HEI budgets on average are financed with state budget funds.

Financing to ensure the study process is allocated also through different special purpose programmes. 70% of the financing is determined based on the number of students, 30% – research funding. Financing for capital investments can also be obtained from Education Investment Fund.

Another important proportion of financing comes from local student tuition fees. In Australia students are offered support in covering them. Numerous support programmes are available for students from different age groups, students with low socio-economic status, students from rural areas, and indigenous inhabitants. Full-time Doctoral students can receive Australian Postgraduate Awards (APAs).

Information on state higher education financing systems of the countries analysed is presented in Table.

Table

Description of the elements of higher education financing systems of the selected countries*

Country Elements of the System	The UK	Germany	France	Netherlands	USA	Canada	Australia
Direct state financing	Per each full-time student, block subsidies, designated purpose financing	90% federal land financing, 7% state budget, based on performance rates	Direct state financing, national normative remuneration system	Block grants – fixed amount + financing depending on the market share, designated purpose financing	Funding from the governments of particular states, according to the number of students, performance rates	Federal government funds and programmes, block grants according to the planned number of students	Budget funded students, designated purpose programmes, different performance rates
Indirect financing	Tax relieves	Tax relieves	...	Tax relief for parents	Income tax relieves, etc	...	...
Financial support for students	Accommodation allowances, HEI scholarships	Private and public institution scholarships, partially zero interest credit	More than 30 different grants	Base scholarships to all students, additional allowances for low-income students if they meet certain requirements	University, state and private scholarships (social and performance based), tuition fee discounts, etc.	Scholarships	Different allowances and scholarships, mainly to low-income students, students from rural areas
Crediting system	Loans to cover tuition fee, loans to cover accommodation	Loans on beneficial terms	Loans to cover tuition fees on beneficial terms	Low interest loans	Federal loans – it is planned to transfer the responsibility	...	Different terms apply

	costs on beneficial terms				from banks to the state		
Tuition fees	Up to 9000 GBP for any student	Mainly tuition free, maximum 500 EUR per annum	Registration fee 170 – 360 EUR, private HEI fees 5000 – 15000 EUR	Covered by everyone above 18 years of age – same to all (1538 EUR)	At colleges on average 10000 USD, particular state HEIs 20000 USD private HEIs up to 50000 USD	There are tuition fee limits	Discounts if tuition fee is paid as a single instalment at the beginning of the studies, restrictions defined by the state
Other financing for studies	TEMPUS, ERASMUS programmes, private financing	Private financing	Education tax, private financing	Private financing	Private financing	Private financing, loans	Private financing
Stability financing	Aligned funding to the institutions with greatest reduction in state subsidies	...	...	...	Defined proportion from the amount of pervious year financing, additional crisis financing	...	...
State research financing	Grants for individual research projects, funding allocated on a competitive basis, block grants	Federal land financing, pro rata state financing, different programmes and funds, on a competitive basis	Direct state payroll financing, national normative system	Base funding and scientific research grants	On a competitive basis with the intermediary of various departments and agencies	Mainly federal funds for science	On a competitive basis and as block grants based on performance rates, do not cover all project costs
Other research financing	Private financing	Private financing	Private financing	Revenues from commissioned research activities	Private financing	Private financing, which does not cover all costs	Private financing
Capital investment funding	For research infrastructure – on a competitive basis depending on quality	Federal land and state funding in equal proportion	State funding	State funding	Federal government	Certain proportion of project costs is covered, federal fund to support scientific infrastructure	Regular and one-time financing programmes

* Description is included if it refers to the entire country or only to its part; ... – no data available

As demonstrated in Table, state financing for higher education is provided in all countries considered, it is state financing allocation forms and volumes that differ. Indirect state financing is provided only in some countries. Study support systems are diverse with respect to scholarships and student crediting. Tuition fee is not charged in all countries, and in some countries it is relatively low. In all countries analysed private financing is attracted and considerable funding is allocated to scientific research.

2.3. Common Tendencies in Higher Education Financing

Taking into consideration the conducted analysis of the financing systems, as well as studying economic situation and financing systems in other EU states, numerous common tendencies in the change of higher education financing models and financing directions can be distinguished.

Regarding the *sources of financing* the following tendencies can be observed:

1. Acute problems in the field of higher education financing emerged in the 1990s, when the number of students in the majority of countries was growing more rapidly than the financing. At that time higher education financing models in many Western European countries were restructured, and the responsibility for certain proportion of financing was transferred to the students and alumni. It was considered that state funded higher education did not ensure equal opportunities and high efficiency. At the same time the relationships between private and state financing were widely discussed.

2. Financial formulas are used in the majority of European countries. Financial formulas are seen as a means to provide transparency of state financing, as they ensure well-grounded allocation of financing among the institutions. Formulas usually comprise the indexes that characterise the resources of an institution, e.g. the number of students enrolled, the number of staff, surface area of the premises, etc, as well as performance rates, e.g. research efficiency, or the number of students who received a degree in a definite period of time. The indexes included into the financing calculation formula point at the priorities of the respective states – using weighting methods it is possible to demonstrate what is considered to be the most important aspects in the education system in general and in a definite education establishment in particular: the qualification of the academic staff, the number of foreign students, scientific achievements, the relationships between the students and the academic staff.

3. Another common tendency that can be noticed is the trend to increase gradually the proportion of financing allocated to HEIs, which is performance or achievement based. In many countries financing to HEIs is allocated based on performance contracts. The sums stipulated in these contacts mainly depend on the performance results of the previous contracts, the number of alumni can also be specified as the subject of the contract.

4. There are various external sources of financing, e.g. donations, devises, loans, return on assets, position sponsoring, revenues from research or application of research results (the most widely used source), payment for commissioned services (the second most

important source), return on investments and revenues from business activities. External financing is also drawn in cooperating with enterprises, including the development of innovation parks, technology and research centres, attracting funds or other means of support for Master and Doctoral student research, or implementing joint research projects. In order to facilitate the attraction of private funding, different stimulation methods are used: tax relieves for HEIs, donators, sponsors and private partners; financial or other support of cooperation with private sector, and the opportunities for institutions to acquire intellectual property rights. In many countries the amount of raised private financing has an impact on the amount of state financing.

5. The introduction of tuition fees has resulted in objections expressed by low-income families since a fundamental human right to education and its accessibility are endangered. To avoid such a situation, several novelties were introduced – a long-term agreement on funding of various special programmes (access to education, minorities) and record keeping of financial position of students and graduates before allocation of scholarships or student credits, which is signed between the state and a higher education institution.

6. At present, in most European countries strategies are being developed in order to ensure financial sustainability of higher education. The solutions provided in the strategies vary in different countries; however, all of them have several joint mid-term aims: to increase state funding for higher education; to provide greater autonomy to education institutions in relation to the management of financial resources; to provide a direct link between performance rates and the volume of financing allocated; to promote diversity of financing resources, as well as establish cooperation with research institutes, enterprises and municipalities.

Evaluating the key trends of the **crediting system**, it should be noted that in the EU states, where higher education is financed by the state and education provided on a fee-paying basis is not developed, students can receive only consumer credits (student credits), but in many European countries (Austria, Belgium, Spain, Switzerland, and Ireland) there are no crediting systems. National student crediting systems (consumption, accommodation) are implemented in Denmark, Finland, France, Germany, and the UK. In some countries, not all students can receive credits, for example, in Sweden and Latvia – only those students who are enrolled to accredited study programmes and have good performance results.

When analyzing **a scholarship system**, it should be noted that except for state scholarships in all EU states there are different scholarship funds established by legal entities

and individuals, which are founded to ensure both study process and scientific research, and all of them have different criteria for the selection of applicants according to the founders' goals. To promote the development of education at Master and Doctoral levels, the EU allocates financial resources from the Social Funds to the EU states for Master and Doctoral scholarships, which are significantly larger than state scholarships. State scholarships, under or without conditions, may be awarded to foreign students and local students, who are willing to study at higher education institutions in other countries.

In Europe, countries allocating financial resources *for research and innovation*, use a variety of financial management mechanisms. In France, scientists' salaries are mainly paid by the state; in Finland and Iceland, the state funds specific research projects, which are important for strategic priorities of the national policy. In Denmark, with the help of performance agreement the state finances research, knowledge dissemination and knowledge sharing. In Estonia and Latvia, scientific research is financed based on a competitive basis, through the science councils. These various research and innovation financing mechanisms also differ in terms of performance assessment. The commonly used performance indexes are the following: number of academic publications, citation index, academic staff workload; Master and Doctoral Degrees granted in the previous period, the number of defended Doctoral Theses; state funding allocated on a competitive basis for specific research projects, amount of private funding for research and innovation projects; the number and type of research and innovation projects launched; the applicability of research findings (the number of licenses, copyrights), etc.

Considering *the financing policies of higher education institutions*, in several European countries for quite a long time higher education institutions have had a relatively high degree of autonomy in the management of financial resources, for example in the UK, the Netherlands and Iceland. In other countries, this experience has been taken over relatively recently. In several countries, higher education institutions are autonomous in determining tuition fees, while in some countries education authorities determine tuition fees or limits, within which higher education institutions may set the most appropriate tuition fees. In some countries, the HEIs can use tuition-fee funds at their own discretion, and it is especially important if the proportion of fee-based funding is sufficiently high, for example 20% in Italy and the UK, and 40% in Bulgaria. In other countries, these funds should be used for attaining the key aims of the institution or for student financial support.

3. DEVELOPMENT OF THE HIGHER EDUCATION FINANCING SYSTEM IN LATVIA

The current model of higher education financing system in Latvia started to develop in 2002, when the higher education financing system was radically changed, and the transition to the normative principle of financing occurred. Since 2001, a number of norms and regulations have been issued, which determine the structure and content of a new financing model in Latvia. Based on the abovementioned regulations, in this chapter the author provides a general description of the existing financing model in Latvia, considering higher education funding (financial resources) and financing conditions (both for higher education and scientific research), crediting and scholarship systems, as well as the issues of internal financial policies of a higher education institution. The system has been evaluated, and the issues related to the development and improvement of the higher education financing system in Latvia have been discussed.

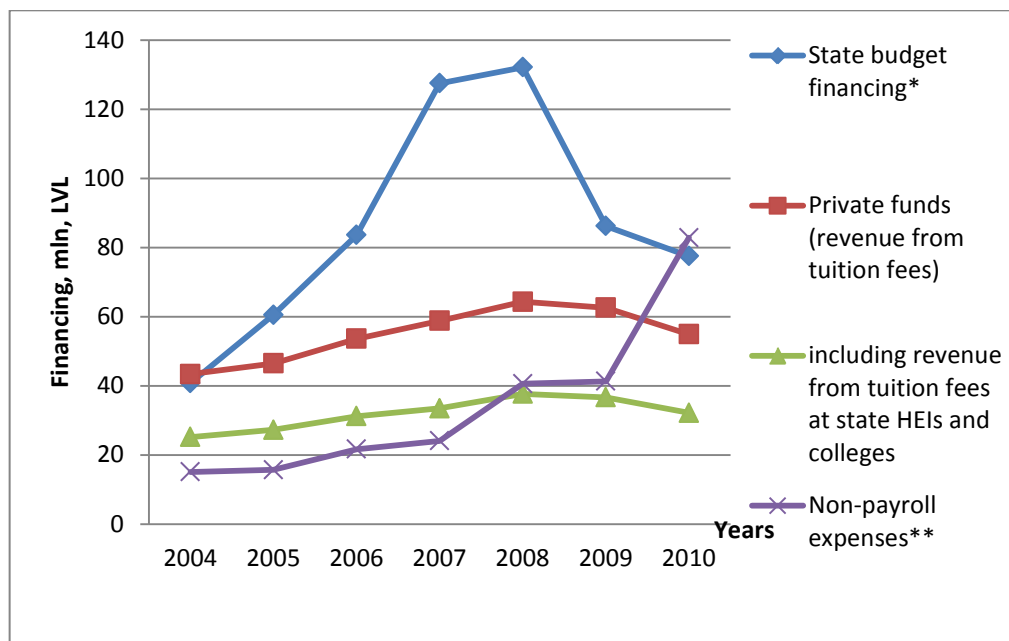
3.1. Analysis of Financial Management System

Financial Resources of Higher Education Institutions. According to the current higher education financing model in Latvia, funding for higher education (for study process and scientific activity) can be obtained from the state and municipalities, legal entities and individuals. According to the Law on Higher Education Institutions and the Regulations of the Cabinet of Ministers of the Republic of Latvia No. 994 as of December 12, 2006, “Procedure for Financing Higher Education Institutions and Colleges from the State Budget Funds”, state higher education institutions can receive *direct state funding*: from the state budget for education, from the tuition fees, which are covered by the state or received in the form of refundable or non-refundable credits and resources envisaged for achieving certain goals. In Latvia, *indirect state funding* is provided in the form of tax relieves.

Financial means of legal entities and natural persons form *the private funding* for HEIs. Mainly they are tuition fees covered by legal entities or individuals, who pay for studies at state HEIs or institutions founded by legal entities or individuals. Private funding also comprises financial means of legal entities and individuals, which are invested in HEIs for provision of their operation and development, as well as for scientific research, including financial resources obtained from private funds on a competitive basis.

The amounts of higher education financing in Latvia are shown in Figure 2. As it is seen in Figure 2, from 2008 to 2009 state budget financing reduced significantly. Private funds also

decreased, including state HEIs and colleges. In 2010 other funds for higher education increased considerably, mostly due to the EU funding.



* 100% of EU Structural Funds financing was included in the state budget financing in the period 2005 – 2006, but in the period 2007 – 2010 its proportion was 15%.

** Including financing from the EU Structural Funds in the period 2008 – 2010 in the amount of 85%.

Source: Ministry of Education and Science of the Republic of Latvia, Reports on higher education in Latvia: 2005-2011

Figure 2. The dynamics of funding higher education institutions and colleges in Latvia in the period 2004-2010, mln LVL

Conditions for Allocation of Funding for Higher Education and Scientific Research.

Allocating financial resources from state budget funds to accredited higher education institutions established by municipalities or other legal entities, the government contract method is used. It means that the Ministry of Education and Science of the Republic of Latvia and other ministries, which are in charge of higher education institutions, sign a contract for educating and training a certain number of specialists at a certain price.

To determine the volume of funding allocated, a certain formula is used in Latvia (the Regulations of the Cabinet of Ministers of the Republic of Latvia No. 994 as of 12.12.2006). The calculation is based on the number of students. Education of a certain number of students is financed with state subsidies, but only at licensed and accredited study programmes and state HEIs and institutions established on the basis of an international agreement.

One of the most important values of the calculation formula is base and social security expenses per student. Base expenses per student are calculated annually, and they show the prices of the cheapest Bachelor or professional study programmes for a respective period.

Thus, directly calculated base expenses per student form the price of the education in the cheapest thematic field at higher education Bachelor (academic or professional) level for the particular fiscal year.

According to the Regulations of the Cabinet of Ministers of the Republic of Latvia No. 994 as of 12.12.2006, funds for ensuring scientific activity at higher education institutions are formed with Doctoral study programme finances and resources awarded to scientists of HEIs and colleges on a competitive basis. Doctoral study programme funds are calculated using a formula with the indexes of base expenses and thematic field as for Bachelor, Professional and Master study programmes, only multiplied by 3.

However, the funds for ensuring scientific activity, which are awarded on a competitive basis, are calculated using the formula and taking into account the characteristic index of higher education institution or college and scientific domain index.

The Regulations of the Cabinet of Ministers of the Republic of Latvia No. 1316 as of 10.11.2009 stipulate the procedure of calculating base funding allocated from the state budget funds to state scientific institutes, state higher education institutions and scientific institutes of state higher education institutions recorded in the Register of Scientific Institutions. According to the abovementioned regulations, base funding is calculated by taking into account the financial resources for operating of scientific institutions, as well as the financial resources for remuneration of research staff and scientific institution development index.

Internal Financial Policy of Higher Education Institutions. In Latvia, there are no strict regulations on the procedure of allocating funds at HEIs. The Senate of each higher education institution determines the structure of financial resources. HEIs operate with the financial resources in accordance with the regulations related to non-profit organizations.

In Latvia, the practical implementation of the financial policy at higher education institutions differs. In general, the financial policy of higher education institutions in Latvia is developed according to the principles of centralization. Utility expenses are envisaged centrally, as well as the number of academic staff positions is centrally defined. Only special funds are at the disposal of the faculty administration. Thus, the faculties of Daugavpils University are responsible only for the management of the study process and scientific activity. The remuneration is mainly determined according to academic workload. At Latvia University of Agriculture, academic staff is motivated using the system of bonuses based on work quality. Greater decentralization of the financial policy is observed at the University of Latvia, where despite the fact that administrative expenses are envisaged centrally, payroll

funds of academic staff are determined by the faculties, which apply their own strategies in relation to the use of the funds.

Riga Technical University implements a fully decentralized financial management policy with the aim of successful management of all RTU financial flows, making them more predictable, transparent, manageable and controllable, thus reducing the human factor to a minimum.

Evaluation of the Financial Management System. To test how objectively study level and thematic field indexes are determined, the author calculated the engineering thematic field expenses for all study levels related to the study programme “Computer Systems” at 2010 values. It has been found out that study level and optimal thematic field indexes, which are stipulated in the Regulations of the Cabinet of Ministers of the Republic of Latvia No. 334 and No. 994, are correct. Average expenses at Bachelor study level calculated at 2010 values, where the index equals 1 with three years of study, are 2,286.02 LVL in the engineering thematic field. However, the author considers that there are inaccuracies in the Regulations of the Cabinet of Ministers of the Republic of Latvia No. 994 as of 12.12.2006, since the college education level has been used in the state higher education financing system as well as it has been allocated the study level index ($\alpha = 1$), which is equal to Bachelor study level index. If other expense items and thematic field indexes at college study programmes correspond to Bachelor (professional) study programme indexes, the main difference is the proportion of academic staff positions in the model, which affects such an important expense item as the average salary of academic staff per year and respectively obligatory state social security payments covered by the employer.

When analyzing the indexes, it is clear that in different thematic fields the indexes are not proportionally “compressed”. For example, the optimal index in law is “compressed” by 9% of its optimal value, but in computer sciences, mathematical and statistical sciences – by 40% of its value. Besides, indexes are “compressed” so that they are within the limits of the state subsidies allocated.

In Latvia, the higher education financing model envisages the financing of HEIs according to the costs per student in certain thematic fields, i.e. the normative principle is observed. This principle has several advantages, for example government contracting is facilitated in higher education; the costs of educating and training of one student demonstrate the type of education financed by the state; the volume of financing allocated, based on the number of students, allows universities to rely on the revenues as long as they educate and

train the required number of specialists; equal and transparent financing conditions are provided for all state funded students and all higher education institutions.

The advanced feature of the financial model in Latvia is determined by resultant or performance efficiency rates. To ensure the result based funding, the agreement related to education and training of a certain number of specialists is signed between the state higher education institution and the Ministry of Education and Science of the Republic of Latvia. However, no mechanism is developed in order to reduce the volume of financing allocated to a HEI, if it has not trained the number of specialists under the agreement (recorded in the minutes). Thus, the financing model is more focused on the study process. The model does not envisage the funding for excellence of a HEI.

Evaluating the crediting system, it should be realized that, in general, crediting terms are created to make higher education more accessible and affordable to the people of different social layers. Tuition fees can be covered with student loans guaranteed by the state, which is an economically effective way of obtaining a qualification or degree.

The difference between the interest set by a bank and paid by a student is covered from the state budget since the bank interest rate exceeds 5%. Thus, the state budget is relieved as the loans are issued from commercial bank funds. As a result, the number of student loans has increased significantly. Higher education institutions are given credit quotas, which are mainly spent; some HEIs require additional funding to their students. This policy promotes the sequential studying through the levels, because if the delay between the beginning and end of successive levels does not exceed 11 months, all credits should be repaid starting from 12th month after the completion of the final study programme.

Evaluating the scholarship system in Latvia, and comparing it with the systems implemented in the EU states, it is clear that the system in Latvia does not make higher education more accessible and affordable. Procedure of granting scholarships does not consider social criteria; they are taken into account only in case of similar assessment. There is no strict regulation on the procedure of allocating state scholarships to Latvian students for studies at higher education institutions in the EU states or other countries even in the thematic field set as a priority by a certain country. Regarding education and training of foreign students in Latvia, the situation is as follows: norms and regulations state that foreign students can be awarded scholarships from the state budget; however, the application procedure and criteria for selecting applicants are not stipulated. It should be admitted that the pool of state funded scholarship is insufficient; in part, this gap is reduced with donations of legal entities

and individuals to special scholarship funds. A large contribution is made by the EU Social Fund granting scholarships to Master and Doctoral students, but the drawback is that completing the studies, their salary will be significantly lower than the scholarships received.

Developing a financing model, the influence of external environment has almost been neglected, for example, how it affects the choice to study at higher education institutions abroad.

3.2. Improvement of the Higher Education Model in Latvia

Sources of Financing. The author considers that higher education should be funded by the state. Education has become one of the most important prerequisites for the continuous development of the modern society. Educational process enables transmission of knowledge about the world and natural laws to future generations. Higher education is one most important cultural values of any country; it is the prerequisite of society development and welfare. Higher education institutions play a key role in the training of highly qualified specialists. Consequently, the state should maximally support higher education; it should be one of the priority sectors. To make the structure and development of education system systemic in nature, society as a whole, that is, the country should retain this system under its supervision.

Taking into consideration deficiency of financial resources at the current stage the author proposes in addition to state funding, with the help of different methods and modes draw in private funding for higher education and in different ways develop opportunities of a HEI to earn resources on its own. To elaborate mixed financing model, where higher education institutions, besides state funding, would have ample opportunities to draw in financial resources from other sources including funds, donations, subsidies, as well as to develop wide range of services connected with higher education and science.

Financing Principle. As a result of the conducted analysis of state funding principles it can be concluded that one of the most rational principles is normative financing. This principle should be further developed and improved.

In this context the author puts forward the following proposal on improvement of financing formula.

In order to improve the existing higher education financing model it is necessary to redirect it towards performance and efficiency of the higher education institution. In this relation the author proposes:

1. The calculation formula of per student funding (Regulations of the Cabinet of Ministers No. 994; paragraphs 14, 17.2 as of 12.12.2006) should be supplemented with efficiency ratio (k_i^r):

$$F_s = T_b \times k_i^r [S(k_i \times n_i) + 1,5S(k_i \times m_i)] + S_b \times S(n_i + m_i)$$

$$F_d = 3T_b \times k_i^r \times S(k_i \times d_i) + S_d \times S_{di}$$

2. For determination of efficiency ratio (k_i^r) two methods can be used:

The first method: If agreement with Ministry of Education and Science of the Republic of Latvia on educating and training of specialists in the previous financial year was implemented fully (100%): (k_i^r) = 1.00 (for the following financial year); for 99%: (k_i^r) = 0.99; for 80%: (k_i^r) = 0.80; for 50%: (k_i^r) = 0.50. If the implementation of agreement is lower than 50% an issue on closing the study programme is considered (withdrawal of funding per one student). Financial resources acquired in such a way are legally substantiated and are not voluntary, by withdrawing 10%, 15% or 20% from the total funding, these resources can be allocated for the following financial year for those state founded higher education institutions that have shown distinction in the previous financial year (or academic year).

The second method: would be more precise and scientifically justified, but it is complex and demands additional research. Its essence is the following: number of graduates is attributed to the number of enrolled 1st year students during the period of acquiring the respective study programme. One more factor that seriously affects this process is whether the students pay tuition fees or are subsidised from the state budget. If there are set and approved drop-out norms for all study fields (that should be revised every five years), then the efficiency ratio (k_i^r) is determined in the following way.

For example, if in the fields of humanities and social sciences the drop-out norm is 10% but in the fields of natural and engineering sciences it is 20% and corresponding higher education institution is within the set limits, then its efficiency is accordingly: in the field of humanities and social sciences – 90% and (k_i^r) = 1.00; if 89%: (k_i^r) = 0.99; if 88%: (k_i^r) = 0.98. In accordance with the regulations of the first method, in the fields of natural and engineering sciences – 80%: (k_i^r) = 1.00; 79%: (k_i^r) = 0.99.

It is also necessary to specify base expenses per one student, taking into account changes in the taxation system, exact figures in separate expense items that have occurred due to changes in price and other factors. In this relation a more precise “Methodology for calculating base expenses per one student” is proposed (base calculation items per one student

and expenses at 2011 values). With the help of this methodology the following results have been obtained.

Base expenses per one student at Bachelor (academic, professional) education level at 2011 values are:

$$T_{b2011} = T_{b2011}^b = N_1^b + N_2^b + N_3 + N_4 + N_5 + N_6 + N_7 = 518.82 \text{ LVL} + 124.98 \text{ LVL} + 96.42 \text{ LVL} + 209.52 \text{ LVL} + 75.01 \text{ LVL} + 19.36 \text{ LVL} + 164.40 \text{ LVL} = 1208.51 \text{ LVL},$$

where N_1^b - employee remuneration;

N_2^b - obligatory state social security payments covered by the employer;

N_3 - work and business trip expenses;

N_4 - service expenses;

N_5 - materials, energy resources, water and inventory charges;

N_6 - purchasing of books and magazines;

N_7 - expenses for equipment purchasing and renovation.

Base expenses per one student at college education level at 2011 values are:

$$T_{b2011}^k = N_1^k + N_2^k + N_3 + N_4 + N_5 + N_6 + N_7 = 441.06 \text{ LVL} + 106.25 \text{ LVL} + 96.42 \text{ LVL} + 209.52 \text{ LVL} + 75.01 \text{ LVL} + 19.36 \text{ LVL} + 164.40 \text{ LVL} = 1112.02 \text{ LVL}$$

Thus, it is possible to calculate college education level ratio:

$$a^k = T_{b2011}^k / T_{b2011} = 1112.02 \text{ LVL} / 1208.02 \text{ LVL} = 0.92$$

Consequently – education level ratios should be as follows:

$a^k = 0.9$ college study level;

$a^b = 1.0$ Bachelor (academic, professional) study level;

$a^m = 1.5$ Master study level;

$a^d = 3.0$ Doctoral study level.

If the state has insufficient financial resources, it cannot be an argument for base funding cuts. The volume of base funding is an economic category and it depends on prices of goods and services in the respective country in particular year. The only right solution in such situations is to reduce the level of public procurement.

Crediting and Scholarship System. The system of state credit allocation should be reorganised, application of candidates should be organised at the end of spring semester – April or May, so that the long and bureaucratic chain could make the decision during summer and at the beginning of a fall semester student would know how to plan the financial liabilities. In order to improve the state study crediting programme, it is also necessary on a national level to analyze what are the reasons for not paying off a credit and what are the indexes of student academic quality (progress).

The elaboration of crediting conditions is also essential, especially if the tuition fee is attributed to all students.

The time period in which credit applications are considered is also essential. For a student to use credit when it is necessary to make payments an opportunity to apply for a loan on time has to be provided. One of the options is to submit all necessary documents, including results of the last exam session a few months before the date of tuition fee payment, and after completing all formalities, to submit results of the last exam session.

If a criterion “Proportion of Foreign Students” is introduced in the performance evaluation and funding allocation at HEIs, then an issue about whether and on what conditions foreign students have the rights to obtain scholarships and credits in Latvia has to be solved. The second issue to be solved whether young people from Latvia, willing to study at other EU higher education institutions, can obtain credits and scholarships guaranteed by the Republic of Latvia, what the conditions are and who can apply. Positive solution of these issues would allow attracting young people to Latvia and promote the development of the national economy.

From the mentioned above it can be concluded that for higher education financing in general and when choosing the most appropriate model for higher education financing in Latvia in particular, it is necessary to ensure diversity and stability of financial resources. It is essential to draw in private funding, during financial crisis it is important to use different financial resources. It is necessary to draw in funding in order to reach specific goals of higher education. Role of the state in student crediting has to be increased. Financing model can be gradually changed by increasing proportion of funding every year that is granted according to new formula, simultaneously eliminating stated drawbacks. The number of financial tools should not be too large, especially in small countries, for example, in Latvia because fragmented financing system is both boundless and requires comparatively large administrative resources.

4. METHODOLOGY FOR ALLOCATION AND USE OF FINANCIAL RESOURCES AT A HIGHER EDUCATION INSTITUTION

In this chapter the elaborated methodology for allocation and use of state budget subsidies and financial resources attracted by higher education institution is reviewed*. This methodology shows that state budget granted subsidies and non-budgetary revenues can be allocated and channelled for implementation of study process, taking into consideration set

* Eriņš I., Taraškevičs R. Finanšu līdzekļu sadales un izlietojuma metodika augstākās izglītības iestādē – Rīga: RTU Izdevniecība, 2011. – 60 lpp.

requirements and principles for more rational and efficient use of these resources. Elaborated methodology is based on a long-term approbation of it at RTU. In comparison with the previously used methodology[†], this methodology, with participation of the author, has been developed and improved eliminating several drawbacks of the previous methodology and taking into consideration theoretical statements set in the Doctoral Thesis and general principles of methodology elaboration.

4.1. General Principles of Allocation and Use of Financial Resources

The elaborated methodology for allocation and use of financial resources at higher education institutions is based on several general principles of allocation and use of financial resources that have to be observed while allocating all financial resources, which a higher education institution has at its disposal. The most important principles are the following:

1. First it is necessary to determine and choose to which units providing the study process and implementing other activities financial resources should be allocated and thus, who are the main receivers and users of these resources at a higher education institution.

The author considers that any resources intended for implementation of a certain job should be directed without any mediators to the structural units specialising in doing that job and responsible for it. Resources have to be immediately directed to direct performers of a particular task. This refers not only to state budget resources but to all resources that structural units have managed to attract on their own, of course in compliance with ethical norms of a higher education institution.

Only in this way it is possible to use corresponding economic methods in finance management and to implement methods of respective responsibility and economic stimulation later on, in order to promote initiative and creative potential of structural unit's academic staff and researchers in attracting and rational use of resources.

In general a decentralised approach to allocation of financial resources that is combined with corresponding methods for economic management and control is recommended.

2. Financial resources should be allocated to the chosen structural units according to unified methodologies and algorithms, according to a unified procedure that would ensure

[†] Taraškevičs R. Valsts budžeta dotācijas sadales metodika starp universitātes struktūrvienībām. – Rīga: RTU izdevniecība, 2000. – 38 lpp.

consistent and equivalent approach, unified, understandable, “transparent” and collegially accepted conditions for allocation and use of financial resources.

3. A methodology for allocation of financial resources cannot be too simple and at the same time it cannot be too complicated. If allocation of financial resources is implemented taking into consideration only one criterion, it cannot take account of the diversity of the study process. If the methodology is too complicated, it becomes non-transparent, hard to use, requires a lot of input information, prolongs the time of implementation, etc.

Taking into consideration these principles, the proposed general scheme of the methodology is graphically shown in Figure 3.

As it can be seen, first in accordance with the unified methodology state subsidies granted to higher education institution and tuition fee funding are allocated. Then – the rest of own revenues that are allocated depending on their type with the help of different methodologies.

By allocating all of these resources according to corresponding methodologies the total income of a structural unit is formed. Then, observing the principles of corresponding structural units on the resource use, the payments for public utilities are settled and other expenditures are covered. As a result the balances for separate structural units and the total balance of incomes and expenditures of higher education institution are formed.

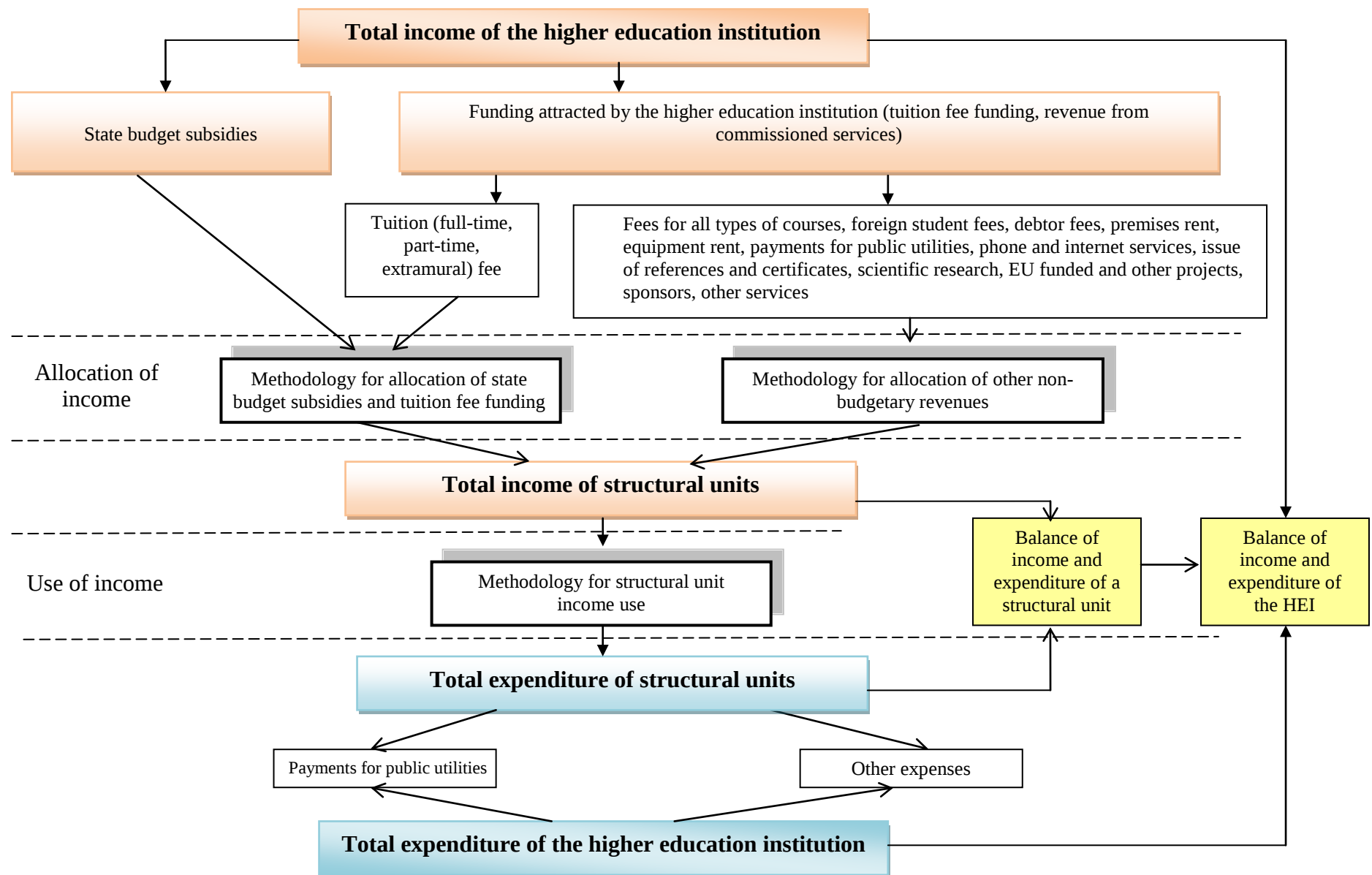
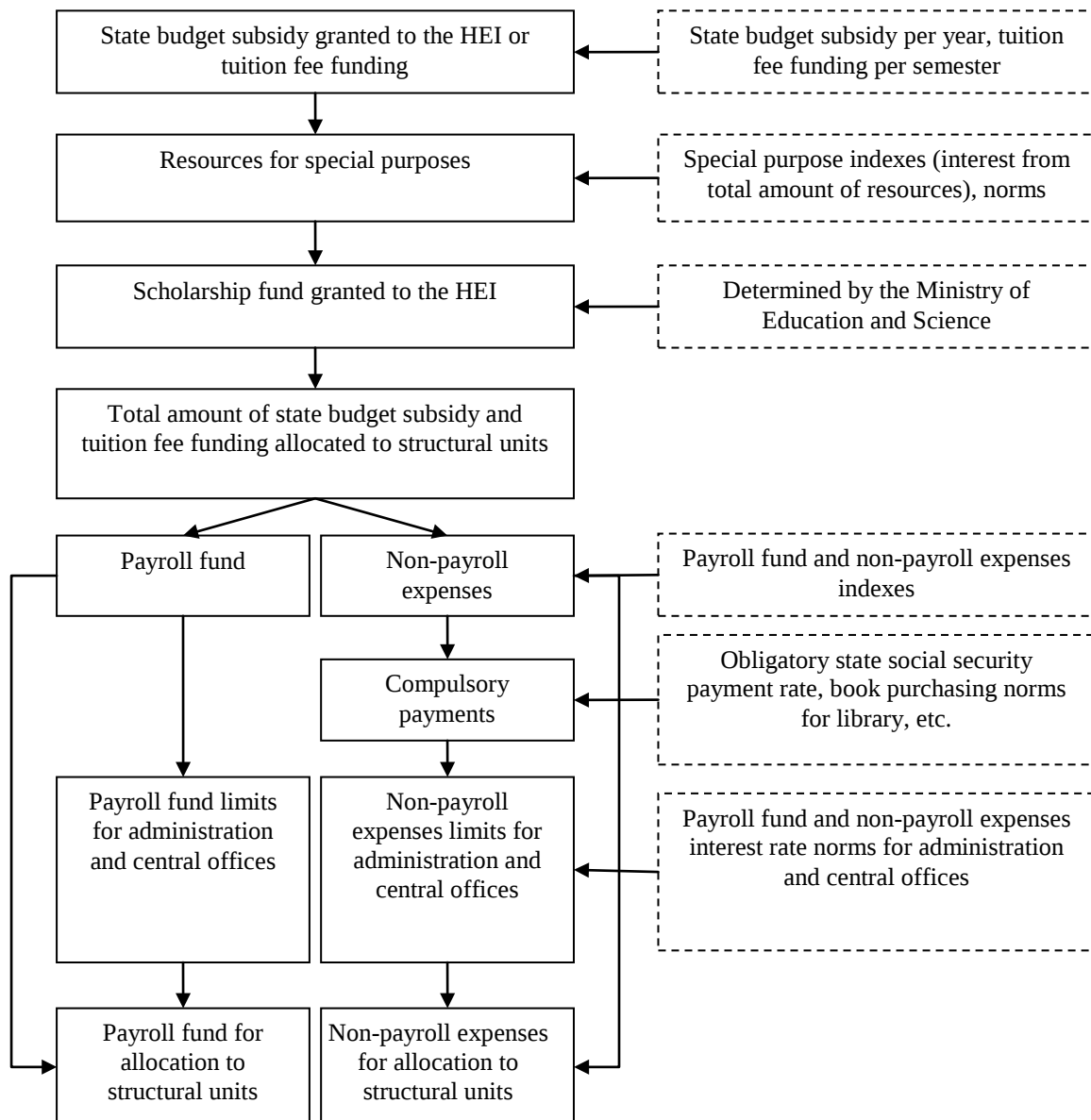


Figure 3. General scheme of the methodology for allocation and use of state budget subsidies and non-budgetary revenues

4.2. Methodology for Allocation of State Budget Subsidies and Tuition Fee Funding

Methodology Algorithm for Allocation of State Budget Subsidies and Tuition Fee Funding.

Methodology algorithm is schematically presented in Figure 4. As it can be seen from the scheme, state budget subsidies and tuition fee funding are allocated consecutively deducting different types of resources from the total amount, further allocating the residual part proportionally among structural units and different goals, or in some cases – by using other allocation principles. The scheme illustrates the main calculation sections and available information, the connection between calculations and the sequence of calculations is also presented. All financial calculation formulas within the framework of the methodology are presented in the Doctoral Thesis.



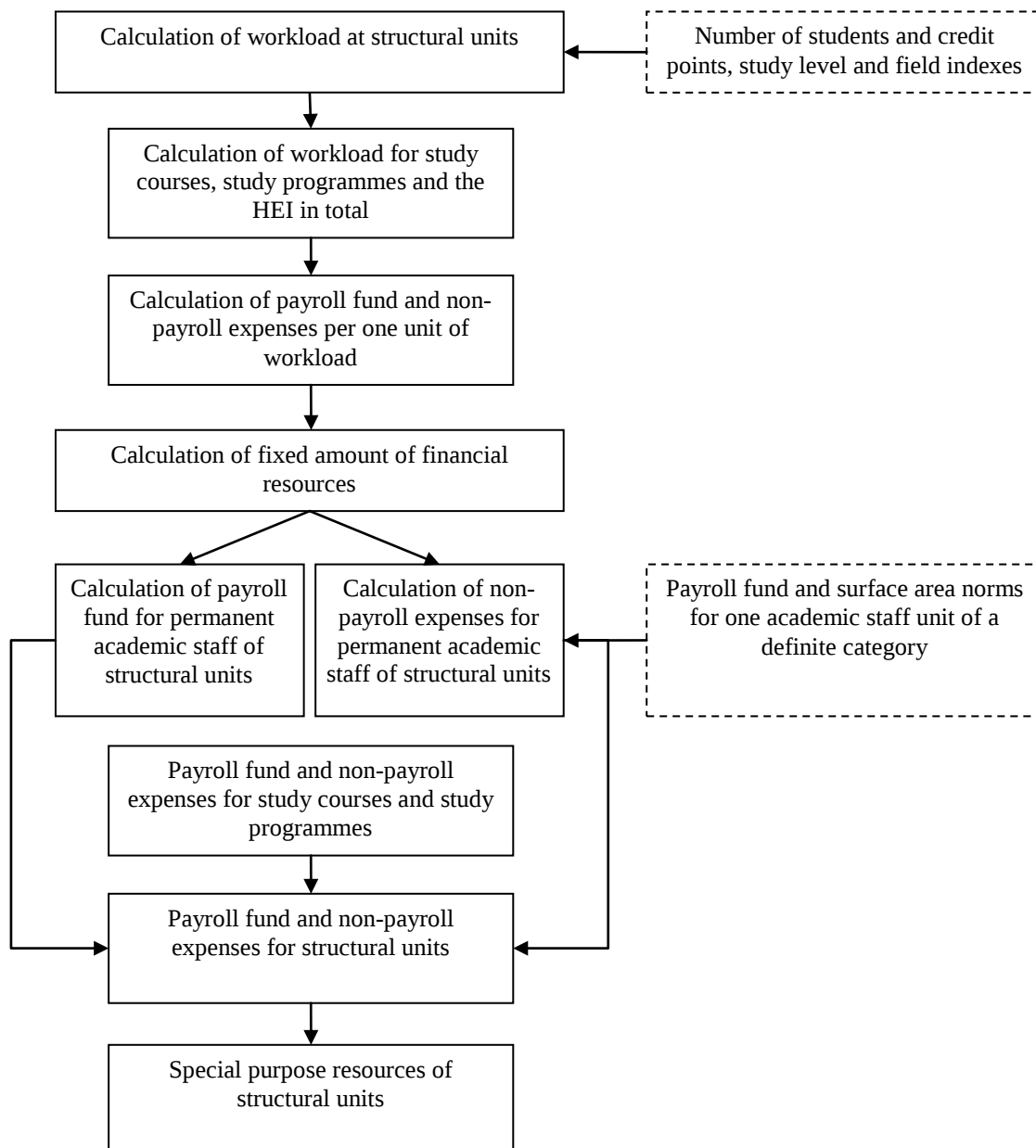


Figure 4. Allocation of state budget subsidy and tuition fee funding to structural units – general methodology scheme

Information Bases of Methodology Implementation

In order to implement the methodology described above, several information bases have to be created containing all numerical and other type of information to conduct calculations. The following information bases have to be created: the base of structural units of a higher education institution; base of employees; register of study courses; register of study programmes; base of basic calculation documents ; base of normative documentation on resource calculation.

4.3. Methodology for Structural Unit Income Use

Just as within the methodology for allocation of income, within the methodology for income use the amount of payroll fund and non-payroll expenses are listed separately. Resources have to be allocated proportionally to the surface area occupied by a structural unit, therefore at higher education institutions it is very important to do all the necessary preparatory work that is connected with inventory of premises and their attachment to each particular structural unit. To promote wider use of Internet structural units are recommended to share the costs of this service, taking into account structural unit's indexes that respectively show the impact of the number of computers and students, amount of financing and academic staff on costs of Internet services.

4.4. Implementation of Methodology for Allocation and Use of Financial Resources at Riga Technical University

Methodology for allocation and use of financial resources has been approved and is annually reviewed and if necessary adjusted by RTU Senate. The methodology is practically implemented and currently used at Riga Technical University. On the basis of the methodology a decentralised automatic RTU financing management system has been created. In compliance with the elaborated methodology financial resource limit is set for payroll fund and other needs, allocation of financial resources for special purpose needs is conducted, financial resources are allocated to administration, structural units, central offices and maintenance departments, library, RTU affiliations in Daugavpils, Liepaja and Ventspils.

In accordance with the requirements set for methodology and information provision, corresponding electronic information bases have been created. With the help of information from these normative bases the amount of state budget subsidy has been calculated for academic year 2011/2012.

All financial resource allocation calculations within the methodology are pre-programmed; and processing and calculation of data takes 2–3 hours. In the end three main final documents reporting on the study programme workloads, structural unit workloads and study course workloads are formed.

The head of each structural unit systematically controls incomes and expenditure of the structural unit and that allows minimising the possibility of mistakes. Such decentralisation of incomes-expenditure allows university to significantly improve management of its financial resources and increase efficiency of their use.

CONCLUSIONS AND PROPOSALS

Having studied theoretical aspects of the development of higher education financial management systems, having summarised the experience of the EU, other foreign countries and Latvia, having evaluated the quality of financial management at higher education institutions as well as practical results, which have been obtained while developing finance allocation and application methodologies at higher education establishments, the following **conclusions** have been made:

1. The development of higher education financial management systems and the design of the relevant financing model depend on the aims of higher education defined in each particular country. However, the aims are not always clearly formulated, some theoretical issues connected with the selection, revision and substantiation of the aims of higher education have still not been solved.
2. The analysis of the documents on the strategic development of the state and laws and regulations of Latvia demonstrates that the main aims of higher education in Latvia, the same as in the EU, comprise personal development, the development of democratic society, transfer of scientific discoveries into all domains of human activity, education and training of specialists and meeting the demands of the labour market, improvement of education programmes and development of diverse study forms in order to ensure that the students acquire both comprehensive theoretical knowledge and professional skills and competences.
3. At the present stage of social development the design of a higher education financing mechanism is determined by a range of new factors, such as increasing globalisation, the development of innovative economy, increase in the number of people willing to study, growing role of knowledge, increasing education costs, state budget deficit, growing proportion of education provided on a fee-paying basis, and other factors, which should be evaluated and considered developing higher education financing systems.
4. In order to develop an efficient higher education financing mechanism taking into consideration its multidimensional nature and the level of complexity, it is necessary to develop a methodology for its analysis and improvement. The methodology proposed by the author and used in the present Doctoral Thesis allows analysing higher education financing models in a consequent and comprehensive manner and

further develop them, considering separately theoretical and methodological issues, which are connected with raising, allocation and distribution of financing for higher education establishments (analysing sources of financing, terms of financing, study support systems, financing of research and innovation), and the issues, which are connected with internal allocation and application of financing within particular higher education establishments (allocation of financing among university structural units, performers of scientific research work, university administration, maintenance services and other structural units, and preparation of income and expenditure accounts).

5. Having studied higher education financing systems in the EU states and other developed countries (USA, Canada, Australia), it can be concluded that there are common tendencies in financing higher education and development of its models. The main tendencies are the following: raising financing from diversified sources, ensuring financial sustainability of higher education institutions, increase of the volume of state financing for higher education, facilitating financing for research and innovation, increasing the proportion of financing allocated to higher education establishments, which depends on their work outcomes or achievements, in order to establish a clear connection between results and the amount of financing allocated. Cooperation among universities and research institutions, enterprises and municipalities is being promoted.
6. Evaluating internal financial policies of HEIs it should be concluded that the autonomy of HEIs in usage of financing is growing. A growing number of HEIs determine applications of their financing independently. However, despite various costs required to educate and train specialists at different study programmes, at HEIs the funds are usually allocated in proportion to the number of students, whose education is financed with state subsidies and/or tuition fees, as well as in accordance with the amount of financing drawn in by the structural units during the study process and from research activities.
7. Analysis and comparison of higher education financing models of different EU states and Latvia demonstrate that the Latvian higher education financing system is one of the most advanced systems of state budget fund allocation in Europe. It is based on objective workload criteria. Determining the workload not only the specific nature of different levels of higher education (determined by education level indexes), but also the complexity of studies in each thematic field (fixed by the thematic field indexes)

are considered. The advanced character of the financing system is also conditioned by the fact that a normative principle is used in determining the amount of financing based on the costs of educating and training of one student. It is planned to allocate financing on a competitive basis for studies, scientific research and innovation, and infrastructure improvement. The elaborated crediting and scholarship system has been introduced.

8. Having analysed the role of different sources of financing and their impact on the accomplishment of the aims of higher education, the author has come to a conclusion that higher education in Latvia should be fully or at least partially financed by the state, as intellectual capital is a strategic resource at this stage of development of knowledge society. However, in order to manage the development process efficiently, such powerful tool as state budget financing is required. State budget financing should be allocated only to the higher education institutions established by the state, as it is the only mechanism for the state to implement its higher education policies.
9. As the demand of higher education institutions for financial resources is growing while state budget subsidies are being reduced, there is a tendency to reduce education and research financing. As a result the offer of less cost-intensive education levels and thematic fields is promoted, less qualified academic staff is employed, cheaper technical resource provision is used, practical classes, where the students can acquire professional skills, are replaced by theoretical courses, etc. If a country does not have sufficient budget funds, it is necessary to reduce the number of state funded students, rather than financing of education.
10. It is necessary to specify the base expenses per student taking into consideration the changes in the taxation system, exact figures in separate expense items, which were determined by price change and other factors. 'Methodology for calculating base expenses per student' elaborated by the author of the thesis allows determining adequately base expenses per student for a respective period. Base expenses at Bachelor (academic, professional) study level calculated according to the methodology at 2011 values are 1208.51 LVL per student per year. The figure includes employee remuneration calculated per one student annually – 518.82 LVL, obligatory state social security payments covered by the employer – 124.98 LVL, work and business trip expenses – 96.42 LVL, service expenses – 209.52 LVL, materials, energy resources, water and inventory charges – 75.01 LVL, purchasing of

books and magazines – 19.36 LVL, expenses for equipment purchasing and renovation – 164.40 LVL.

11. In education financing in general and while choosing the appropriate financing model in Latvia in particular, a number of key principles should be put forward: it is necessary to ensure diversity and stability of financial resources; it is necessary to take into account differences among higher education institutions – allocating funding to higher education institutions with similar mission the same conditions should be taken into account, funding has to be associated with the achievement of specific aims – resources invested in education have to provide returns, it is necessary to observe the regulatory principle in determining the amount of financing, as well as the principles of decentralization, cost-accounting, social justice, independence and responsibility.
12. In Latvia, the possible financing models have to be considered in the context of the EU. Within the EU, there is an opportunity for any student to study at any university under the same conditions as local residents. A major international competition has to be taken into consideration, including the increasing number of virtual higher education institutions. Developing financing models, the influence of external environment has almost been neglected, including the choice to study at higher education institutions abroad. The interrelation among separate elements of the financing models is not fully considered either. There is no defined relationship between education funding aims and substantiation of funding directions.
13. The developed methodology for fund allocation and use at a higher education institution enables the allocation of state budget subsidies or funds earned by the establishment fairly and in an economically feasible manner to structural units, which are the actual performers of the given work. The methodology can also help other state institutions providing social services to divide budget funds rationally. The methodology has been approbated demonstrating its application opportunities for various financing volumes.
14. The most important element of the developed methodology is the system of calculation formulas for fund allocation to the study subjects, study programmes and structural units of a higher education institution. The number of students, credit points, thematic field of study subjects and education level of study programmes are considered. The system of indexes ensures a universal long-term character of the methodology, and allows allocating the funds of a higher education institution in a

socially just and economically feasible manner in order to educate and train professionals at competitive study programs.

15. Economic methods are the most efficient means in financial management. The funds necessary for achieving a certain aim, using the same type of methodology, should be transferred directly without intermediaries to the parties who have performed the work, using the workload to be accomplished in a definite period of time as a basic criterion. If participation of intermediaries cannot be avoided, their number should be reduced to a minimum. The optimal variant is when the structural units, which are the actual performers of the given work, obtain funds and decide on the necessity of resorting to the intermediaries, allocating adequate financial means from their funds to the intermediaries.
16. The developed methodological and methodical approaches have been approbated at Riga Technical University, and their application, despite the lack of state funding, enabled to keep the scientific schools open and teaching staff employed, activating their initiative and the creative potential for fundraising, development of competitive study programmes, increase in the number of students, and modernization of scientific research and educational infrastructure.
17. The abandonment of the existing higher education financing system (fund allocation for education and research, student crediting, scholarships and grants, tax relieves), which has been created over the last 16 years, should be very carefully considered. By the transition to education on a fee-paying basis through student crediting, we are willing to solve current financial difficulties at the expense of the next generation earnings, which can hardly be socially just.

Based on study findings, the following **proposals** have been developed:

1. In order to improve the existing higher education financing model, state budget funds have to be redirected towards higher education institution performance and efficiency. The current state budget fund allocation methodology (Regulations of the Cabinet of Ministers No. 994) of higher education institutions should be improved because it is more oriented towards the study process, but not towards the results, despite the fact that it takes into account the specific nature of higher education levels and study programme thematic fields. In this context, as one of the solutions the author proposes that the calculation formula of funding per student (Regulations of the Cabinet of

Ministers No. 994; paragraphs 14, 17.2) should be supplemented with the efficiency ratio substantiated by the author, using the author's elaborated methodology for calculating this ratio.

2. In the methodology for state fund allocation among higher education institutions (Regulations of the Cabinet of Ministers No. 994, paragraph 14) it is necessary to change college-level index from $a = 1$, as it is now, to $a = 0.9$ (more precisely estimated value of the index $a = 0.92$). The thesis provides the detailed calculation of the index as well as its substantiation.
3. Taking into account the amendments to the Law on Higher Education Institutions concerning the proportion of staff with a Doctoral Degree elected to academic positions, the author proposes changing the position proportion of the academic staff for calculating base expenses per student: to increase salary rate for professors from 15% to 20%, for associate professors from 15% to 20%, assistant professors from 30% to 35%, lecturers from 10% to 15%, and to decrease salary rate for assistants from 15% to 10%.
4. The developed methodology for fund allocation and use at a higher education institution may be recommended to be used at higher education institutions both in state and private sectors, which "recognize" the principle of decentralization, taking into account the specific characteristics of each higher education institution.
5. The developed methodology envisages not only the allocation of funds, but also their use. Software has been developed for all processes, and they are completely automated. The developed closed automated financial management system of a higher education institution can be used not only in the field of higher education, but also to modify other sectors of the national economy.