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Social Educational Project of Improving Knowledge in Economics

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PROLOGUE

We are living in the 21st century, the century of communication and innovation! Nevertheless, many companies and educational institutions have not yet arrived there; teaching materials and teaching methods often have the status of the 90s.

International business, travel and education are now becoming increasingly important and are changing fast. The world knowledge doubles every four years nowadays, in some specialties as IT-Technology even faster.

This means that modern education must keep pace with the time, with new and innovative ways to share experiences as well as the improvement of skills in a rapidly changing global and modern scientific world.

Innovative development takes place simultaneously at all levels, not limited to issues, trends or activities. Stagnation means regression. Modern education and training needs new methods and modern forms, which must be adjusted to global communication and life-style.

Also globalization faces companies increasingly with new and greater challenges in competing for market share. The rapid development of technology and the change of customer behavior require complex and efficient operational management as well as innovative ideas as an existential necessity for the success of businesses today.

The European Union created the SBA, the Small Business Act to improve and create further small business as the spine of the economy. Our scientific works look forward to this act and will show examples as a first attempt to innovative ideas.

For this reason we are creating a network among European Universities, educational institutions and business entities to further research the impact of globalization, demographic development and other factors on the SBA and to publish the results in future common scientific publications.

The first article describes a new approach as *Sepike Academy as a modern education business institution in the future global market* based on the results of scientific research of the second article *needs and realities of innovative forms of learning in higher education*.

The third article describes the *principles of market demand*. We found it crucial for any further research and publication to basically express the needs and to rethink about nowadays modern needs of customers and consumers in the 21st century. Many companies have forgotten the needs of their customers and in particular their employees, the common thinking is only profit-orientated. How companies will make any profit in the future without thinking about their employees? And modern educational institutions need to think about customers, marketing, strategies etc. too to further attract students in a shrinking domestic market because of negative demographic development.

Old times are gone, only innovative and modern thinking institutions will survive and will find new profitable niches to establish and secure their future existence.

The next article *"estimating calculative rate of interest by simulation"* explains *motivating and stimulating facts in modern teaching and business*.

Brand of education as a potential economic development of countries as we described above is the need to rethink actual education and to strategically change them into a brand, the educational institution in the modern market need a name which everybody knows and talk about. Universities such as Harvard, Cambridge and Oxford show such example.

The SBA targets to secure and strengthen the economy in European countries, but how should young people create SMEs without specific and modern practical education? So the next two articles are focused on "criteria and parameters of labor efficiency" and "employment security of youth" which is crucial for reducing expenditures for the state and to increase taxes at the same time. Only modern education in economical sphere including practical experience for young students will give them the knowledge and possibility to create own businesses and to become young professionals. This is the loop back to the first and second topic of our publication showing crucial development and examples.

But despite of all positive efforts in modern life and business we also have to talk about "*business stress as a result of evolution of social and economic systems to strengthen innovative management*". Without thinking about such facts, all other efforts are worthless because time of decision making got shorter with modern technology as well as the pressure rises for management and leaders which we have to cope with. Modern sicknesses such as "burn out" are results of such changes and business stress damaging the economy year by year.

The last article of part two focuses on *global innovation economy: factors of its present day development* to underline above mentioned topics.

The third part of this publication is focused on practical examples of possible SMEs, such as: "*the tendencies of implementing managing systems of business relationships in Lithuania*", "*strategic development of innovative types of tourism in Ukraine*", "*organizational mechanism public-private partnership in waste management business*", "*development of innovation policy of Ukraine under structural reforms*", "*state protectionism as a modern alternative to economic liberalism*", "*cadastre appraisal of land and the peculiarities of conducting it in the republic of Belarus*" and "*balance of feed and food*".

Modern businesses are focused on topics where people a couple of years ago just smiled about and called it nonsense. For example network-marketing and recommendation-marketing came up several years ago and are quite successful in the sphere of wellness and food supplements. These kinds of business established a complete new way of trading and marketing without huge stores, shops etc. and are focused only on consumers' recommendation.

When we talk about other forms of modern business then we will find out that many countries changed governmental functions to private partnerships and such ways are possible to improve and to give positive examples to other countries. All those forms are possible to be done by SMEs. But one example of SMEs in the past and the future is tourism, which always was based on small enterprises, mostly family businesses when talking about hotels, restaurants, etc.

In this sphere, there is also a huge market and possibility to establish and create SMEs according to the SBA of European Union and many others.

Our aim is to further show practical examples and to work together in a network among universities to further establish SMEs as so called junior enterprises and to give young students the first real practical experience during their study.

We are thankful to all authors taking part in this publications and hope for further cooperation and research in this sphere according to the Small Business Act.

Part I: INNOVATION AND BASICS OF FUTURE COOPERATION AND RESEARCH

1.1 THE SEPIKE ACADEMY AS A MODERN EDUCATION BUSINESS INSTITUTION IN THE FUTURE GLOBAL MARKET

The 21st century is already well advanced and was named as the century of communication!

Nevertheless, many companies and educational institutions have not yet arrived there; teaching materials and teaching methods often have the status of the 90s.

International business, travel and education are now becoming increasingly important and are changing faster and faster. This means that modern education must keep pace with the time, with new and innovative ways to share experiences as well as the improvement of skills in a rapidly changing global and modern scientific world.

Innovative development takes place simultaneously at all levels, not limited to issues, trends or activities. Stagnation means regression, so we do not want to stand on a level reached by our project, but try to show new perspectives in order to find new and perhaps unusual ways. Modern education and training needs new methods and modern forms, which must be adjusted promptly to global communication and life-style.

Our project aims at a high level of scientific research and at the same time gaining practical experience, adapted to innovative and modern markets.

Globalization faces companies increasingly with new and greater challenges in competing for market share. The rapid development of technology and the change of customer behavior require a complex and efficient operational management including marketing, merchandising, logistics, customizing, human resources and many other integrated areas. New issues in quality management, controlling and in innovation are an existential necessity for the success of businesses today. But not only these factors play a crucial role in the field of education and training, but also issues such as demographic development, lack of skilled labor, youth unemployment, etc.

In the battle for qualification, budgeting and financing of modern colleges and universities, the fight for students will be the factor of the future. The times in which state colleges and universities haven't had to worry about existence or financing, are over in the 21st century.

Due to declining student enrolment, demographic development, globalization and other factors, it is also true to think more and more entrepreneurially and to develop new strategies, methods and marketing concepts for a long-term claim on the education market.

Reasons, developments and tendencies are rudimentary covered subsequently in this work we also show solutions and describe an innovative type of training, which includes the issue of integration of theory and practice to meet the needs of companies and the market.

Project Goals

Higher education as a key strategic objective in modern global requirements aims to reduce the outflow of domestic students and to attract foreign students through the use of modern teaching methods, scientific knowledge and practical training. The optimal preparation of students of tomorrow for a growing global labour market is an essential component in order to support domestic enterprises, thereby ensuring a strengthening and improving competitiveness.

In a globalized world where borders and distances disappear, students orient more and more to where they expect a better education, but also a better chance for their career paths.

Besides above mentioned "brain drain" of indigenous students it is to add that while negative demographic development, the number of students from year to year decreases, and thereby the struggle for new students, an increase of customers and market share will intensify.

It is visible that the quality of education among students is becoming increasingly important and students orient themselves in the global market to choose for the best deal, based on value for money.

Just as important in this context is the increasing availability of On-line courses and seminars, distance learning and On-line academies. But even here, only theoretical knowledge is taught and the teaching of practical knowledge is missing here completely.

As in all sectors counts also here the value for money, or in other words the cost-benefit factor of a particular product. The product formation was not evaluated in the past as a product, which is traded on the open market, but as a given state privilege. But this is no longer the case, education is a product that is available and can be obtained on the open market and thus utilizing the Quality Management (QM) and need marketing strategies to its customers (students) to advertise.

This change of thinking is necessary in the future to further continue to exist as a modern educational institution in a global market.

Impact of demography on education

The demographic development is composed of four fields: 1) The field of fertility (the number of births); 2) The field of mortality; 3) The field of migration; and 4) The field of population structure and population equivalents. The above-mentioned areas defined below the population structures, the natural population movement, population trends and population distribution and their changes, which in the context of globalization and the growing population in the African and Asian countries on the one hand, and a decline in population in the Western countries on the other hand is constantly changing and in the future will continue to change.

Thereby not only economic factors play a role, but also social aspects, as nowadays thanks to the Internet not only new professional and economic perspectives are given, but e.g. also develop the theme of building partnerships (Families) between the cultures which imply a continuing shift and change of these structures by themselves.

The economic theory of fertility can convincingly explain the observed in most industrialized countries, negative relationship between number of children and social position (Demographic-economic paradox) and the gradual disappearance of the multi-child family in conditions of equality of the sexes.

The increasing individualization in the modern global world raises prospects and development opportunities of individuals. But the formation of a partnership would affect precisely those freedoms, perspectives and individual personal development and career opportunities very strong, and this over longer term period.

Especially here, the topic location plays an important role, because nowadays the choice of employment also includes a choice of residence and career is often associated with a change of location, which further limits the theme of family and children.

For this reason, the probability to give up children and to marry or to alter that date as far back as possible increases, and thus education or career are more important.

The wealthier, freer and more educated a society becomes, the fewer children it gets. The causes of the decline in births are different. Individualized CVs, rising incomes, a vastly improved education and related employment opportunities, particularly for women have made a life without children more attractive, and at the same time, the world of work increases demands on mobility and employment of both partners and thus made it difficult to get create families.

Parallel on the one hand the costs for child care rose, and on the other hand, the opportunity cost of reproduction if the pursuit of professional goals is limited. The current mindset in modern social systems in most countries of Western Europe in the case of old age

and illness think that we do not longer dependent on children. However, this is not correct, because without young workers who pay the social security contributions might be missing this money later to their security in old age. Children are also in modern social systems the decisive factor for securing the benefits for sickness, unemployment, disability and retirement.

High separation and divorce rates with far-reaching financial consequences especially in the presence of children make the family planning unsure for both sexes, the demands on a suitable partner increase and parallel it reduce the likelihood of further children. Long training periods and difficulties entering the job market lead to a delay of family formation, which with increasing age of the person concerned and the demands on the partners grow.

The ever higher education of women who exceed men at High School meantime, constraints for educated women and poorly educated men the range of potential partners (since women previously rarely accept a far inferior man, and men seldom accept a far superior woman), yet exacerbated by the higher migration tendency particularly of well trained Eastern European women.

Additional there is also a declining of religiosity and an increasing of urbanization, unsafe expectant careers, lack of availability of suitable family living space in urban areas, and more.

Highly qualified staff wanted

The search for skilled workers and specialists abroad assumes new dimensions; more and more companies can no longer fill vacancies. This takes time, sales and profits and affects the further business development. Therefore companies, employment agencies, associations and recruitment agencies looking for new ways to bring e.g. specialists and young professionals, particularly in the STEM professions to Germany. But this raises new problems, which may not be meaningful in mainstream education systems and are therefore not given sufficiently importance in the training of young people in a global market. Among other things, this concerns the following areas:

- Overcoming language barriers,
- Cross-Cultural Management,
- Differences in culture, religions, traditions,
- Different work organization,
- Recognition of diplomas of various countries,
- Lack or different levels of knowledge and practical experience,
- Different demographic developments,
- Differentiated consumption and consumer behaviour.

Companies are increasingly looking for so-called "Young Professional" and therefore expect an increasing number of compromises, when it comes to their own ability to compromise in terms of demands on new employees. Meanwhile, the number of vacancies is increasing as well as the willingness to compromise on the site of the company.

But do compromises have to be real? Is it not time to move with the times and adapt to the modern needs of the labor market in the field of education and to focus modern workplace and practical training?

On both sides, the requirements and demands have changed. In a growing global market the demands and claims not only to candidates increase, but also to the company. Employees would like to work in an international company in order firstly to promote their career and on the other to obtain a long-term job security. But most young people are badly prepared for the tasks ahead; practical experience, which gives them an advantage, they can hardly show. But companies want ready-trained people, because they do not have the time or the money to invest in their career entry qualifications. But how can this gap be closed? What are the possibilities, advantages and disadvantages and what is innovation in education?

Innovative approaches in higher education

With our concept we will go one step further. We are of the opinion that the measures so far, to unite theory and practice with each other, are not enough, especially in the regions where the dual training system is largely unknown. Our idea of a new and innovative university not only combines theory and practice, but prepares students effectively and targeted to their subsequent activities and engages in parallel the issue of financing and cost-cutting.

Modern universities cost students or taxpayers a lot of money. But this money is important to ensure a high quality of training.

We also try to answer the question in our concept how future employees can be better prepared for their use? Often one talks about virtual companies, but are they really close enough to practice? We have discussed these issues intensively and have come to the following conclusions:

1. Students of tomorrow need sound on scientific research based knowledge
2. The need hands-on experience, and not only during a one-month internship, where they spend more time at the copier than really learn something useful.
3. The mixture of practice and theory must be complementary. The dual training system provides an excellent basis, but does not cover and convey all things.

Those students who could not find a company, for example, which gives them the practice, learn only the theory. But universities themselves can basically convey this practice, at least in subjects such as marketing, Human Resources, business administration, controlling, auditing, property management, and more.

4. Many companies are looking for young professionals and executives to expand in the international market. However, how does the current procedure works? One seeks employees or students in the domestic market, and then to send them in the "foreign market" to implement there the home concept one on one. The consequences of this strategy are enormous cost, high fluctuation, cultural differences, language barriers, lack of understanding of the mentality, etc.

Logically it would be better to recruit new employees already in the destination country and to form them in the home country of the company, to send them back after to the destination country. So target and actual requirements would better cover and allow implementing the conversion faster and cheaper.

So what would be if the university would even accept the practical training? The relevant departments are actually available, perhaps currently only rudimentary, but this could be expanded. Currently many people are employed in universities with administrative tasks, which could be partially or in whole acquired by students. This would on the one hand significantly alter the cost structure, and provide on the other hand the practical part enormously. Also it would add the possibility of each university to promote and to develop the theme of "entrepreneurship" stronger.

Often young people want to start their own business, the knowledge which they obtained in the study therefore is not sufficient. In an increasingly strong global market this direction is crucial for their future success.

Companies would thus save costs, since a long training period of young graduates would be deleted. Candidates would have profound practical knowledge, since they have provided not only practical work, but also have management experience. Here this kind of university has no limits.

All is permitted that is innovative and successful. And the success of students can be measured in the company's ("university") success. By connecting those kind of university will not be not only successful with practice but also with other universities from other countries as a kind of network, such topics as internationalization, globalization, intercultural management, etc. can be combined effectively and modern.

Summary and outlook

Innovation does not mean just to go with the time, but to be a little ahead of time. But this also means that there are resistances which must be overcome. Innovation means progress and progress means change. But changes for many people and above all the decision makers are connected with work, retraining, responsibility, risk and other negative things. However, without these steps there is no development.

The biggest hurdle lies in ourselves, because in most cases one has to hear: "we have always done so." That may be so, and it may be that it also worked well in the past, but it does not mean that tomorrow it will still work.

To change something, we must first change ourselves!

Likewise, the cost factor plays a critical role in every innovation. Because there is also a certain risk that the resources used cannot be covered.

Our concept includes a simple strategy, which also includes the issue of cost and financing, which is described in detail in the business plan. In summary, our approach is shown schematically:

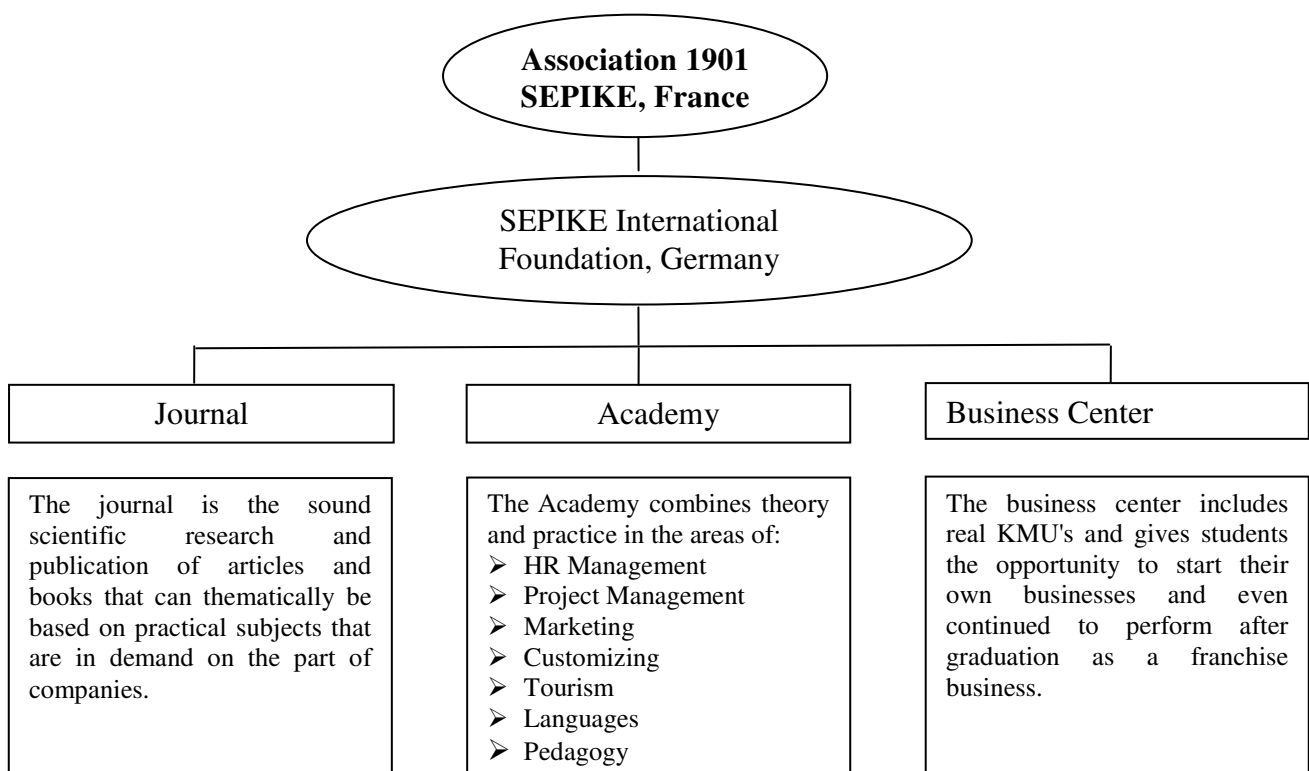


Figure 1.1.1: Scheme of Sepike Academy

Source: created by author

The above scheme provides unprecedented opportunities and prospects worldwide. Among others are also subjects to be considered, which provides collaboration with the Goethe Institute, the Chamber of Commerce, organizations such as TOEFL, IELTS, etc.

Hereby the courses are adapted to the Bologna process and provide study content according to international standards of professionals and professors.

The following conditions must be created:

1. International Certification and Diploma
2. The imposition of registration and recognition as an international university
3. The transcript of the statutes, study programs and curricula
4. Finding suitable partners and professionals who are willing to start this project and to organize it.
5. Location and financing
6. Application for Grants under the Horizon 2020 program

Our project is divided into several steps, which will be discussed here in further detail, which are listed in the following table:

Table 1.1.1

The structure and organization of operations in detail

Nr.:	Project Content	Status
Until end of August 2016		
1.	Create a concept and send it to potential partners	In progress
2.	Creating Business Plan	In progress
3.	Distribution of tasks for the partners to make: The division of responsibilities for joint scientific research and production of publications depends on the subjects and publications of each partner. The aim here is to further expand and jointly promote and support the commenced and planned research. A list of publications and research topics is the system.	In preparation
4.	Expand network	In progress
5.	Develop joint website and marketing	In preparation
6.	Prepare start-ups for real SMEs and discussing ideas with participating partners and students.	In preparation
7.	Attract students for the semester from September 2016	In preparation
8.	Applications for grants and grants for the project	In preparation
Goals in 1st year (September 2016 to June 2017)		
9.	Establishment of SMEs in Germany and organization of establishments in coordination with the partner universities and partner companies.	
10.	Accounting of SME's at the end of the fiscal year and automatic closure of establishments in consultation with the tax authorities within the project "Junior Enterprise".	
11.	Drafting the first joint research projects and publications of articles and books.	
12.	Development of a concept for a joint degree program and a common academic degree (diploma).	
13.	Establishing a Cooperative Academy in Germany and accreditation of joint degree program as coordinator and the parent institution for this project.	
14.	The profits of SMEs to the students and partner universities (if any)	
From September 2018		
15.	First joint semester for all participating universities and further successful expansion of the network in the global market	

Junior Enterprise

The PROJECT offers students the opportunity to start their own junior companies and so to better communication on economic and business closer than an international project.

The junior company received after it was founded 90 shares, each worth € 10. Thus, the start-up capital of the company is provided. As in real life Taxes, and Insurance contributions must be paid, generates reports, produced and marketed products or services are provided.

At the end of the year the company will be automatically dissolved and its shareholders paid dividends.

Specifically, this means that the participants are funded by the acquisition of knowledge and experience on their way to critical and responsible personalities and the impact of their decisions and their actions are aware of themselves and others. It should

always have the economic, environmental and social impacts are considered equally. In this way, young people will allow to perceive the needs of present and future generations and to consider these issues accordingly.

In addition to materials that are made available, advises and assists Association 1901 "SEPIKE" the Junior Company, organizes events and provides contacts with companies, schools and universities.

Table 1.1.2

The 10 countries with the highest quote of academian

Rank	Country	Quote	Cost
1	Russian Federation	53,5%	7.500 US Dollar
2	Canada	52,6%	23.000 US Dollar
3	Japan	46,6%	16.500 US Dollar
4	Israel	46,4%	12.000 US Dollar
5	USA	43,1%	26.000 US Dollar
6	Korea	41,7%	10.000 US Dollar
7	Australia	41,3%	16.000 US Dollar
8	Great Britain	41,0%	16.000 US Dollar
9	New Zealand	40,6%	11.000 US Dollar
10	Ireland	39,7%	
	Germany	28,0%	
	OECD Average	33,0%	

Source: OECD-Bildungsbericht 2014, <http://www.wiwo.de/erfolg/campus-mba/oecd-bildungsstudie-die-laender-mit-der-hoechsten-akademikerquote/10702910.html?p=10&a=false&slp=false#image>

The results of the OECD report show only the nominal number of academic degrees, but not the quality that has nothing to do with the real, viable and economically fit for education, because the level of academic qualifications is different.

A trainee mechanical engineer in Germany has a higher level than an engineer from Portugal. Whole professional groups, such as educators abroad often have an academic degree while in Germany it is only a normal professional degree with the same performance. This shows, for example, Germany's place in the world with respect to international economic competitiveness. The World Economic Forum (WEF) noted that Germany in the competitiveness is on the sixth place of ranking. Number one is the USA, followed by Switzerland, Singapore and Hong Kong. Apart from the United States none of these countries can be found among the top 10 countries in the world regarding the percentage of university graduates. The Federal Republic scores in this ranking, especially with highly skilled workers.

Russia, which place 1 adduced in this OECD report, relating to international economic competitiveness lies in the WEF report only at rank 64! These data clearly show that not the quantity of graduates for the economic development of a country is important, but the quality of education.

The SME Policy of EU (21/09/2011)

In Europe there are regular SME seminars, workshops and lectures on entrepreneurship, which are part of a package of measures with which the EU wants to support an SME-friendly business environment, as SMEs are the backbone of the European economy.

The 21 million SMEs in the EU represent 99% of all businesses and employ more than two thirds of all employees in the private sector (see table 1.1.3). 80% of newly created jobs in the last five years accounted for SMEs. SMEs are the main driving force for economic growth, innovation, employment and social integration in Europe.

Nevertheless, small and medium enterprises are facing difficulties. The large administrative burden, liquidity shortages and the global economic crisis make their lives

difficult. Therefore, the EU has launched a package of measures to support SMEs throughout Europe. The basis for this is the "Small Business Act" (SBA) for Europe, which was on a commission proposal adopted by the EU Council of Ministers in 2008. The SBA is an ambitious program consisting of legislative proposals and practical concrete actions at European and national level.

What is SME?

Both in the EU and in Switzerland SMEs are defined as enterprises which have fewer than 250 employees. Their annual turnover or annual balance sheet in total is not more than 50 million Euros. There are three types of SME:

- Micro-enterprises with fewer than 10 employees;
- Small enterprises with 10 to 49 employees;
- Medium-sized enterprises with 50 to 249 employees.

The "Small Business Act" aims to make the principle of "think small first" the guiding principle of policy-making in the EU. A key tool for this is the mandatory "SME test" to be applied in January 2009 by the European Commission in the legislative process. It checks how new EU policies and laws on small business impact with the aim to shape the SME friendly. Meanwhile almost half of the Member States spent on a similar test when drafting national legislation. Other Member States are currently considering the introduction of the SME test.

Against the same background, the EU has committed itself by 2012 to reduce the administrative burden on businesses by 25%. This includes, for example, the recommendation to the Member States to establish one-stop shops for starting a new business. So far 18 Member States have introduced such a body, making it possible to establish a limited liability company under a single authority visit.

Improving access to credit for SMEs is a key element of the "Small Business Act". Under the framework program for competitiveness and innovation (CIP), the EU has allocated financial intermediaries over 1 billion Euros to give to small and medium enterprises to easier access to loans and equity whenever the market cannot do this. Each euro spent under this promotion allows an average of six euro risk capital or up to 40 Euros for bank loans. So far, 110,000 companies have benefited from it. Average 1.2 jobs are created in each SME that receives a guaranteed loan in the EU.

In many Member States, the late payment of invoices by customers of SMEs is serious a liquidity problem. For this reason, the EU agreed in October 2010 on a revision of the directive on combating late payment. Public authorities have to pay bills within 30 days or else to pay a set at EU level minimum interest. General to creditors, in most cases SMEs get better protection.

The Commission encourages further SMEs' access to EU research programs. To ensure that 15% go (about five billion Euros) of the budget of the Seventh Research Framework Programme to SMEs, the Commission has set up special project tenders for SMEs. The participation of Switzerland in the EU's research program will also benefit Swiss SMEs so far.

The promotion of entrepreneurship is another vertex of the "Small Business Act". To encourage people of all ages and origins to consider starting a business as an interesting perspective, various actions have been launched. One is the SME Week.

In 2010 in Europe about 3.2 million people participated in 1,500 events in part, which was informed to support structures for SMEs and the opportunities for business creation.

Having more EU-funded programs and networks to exchange best practices of corporate promotion, the further goal is the exchange of experiences between young entrepreneurs and successful businesswomen.

Table 1.1.3

SME figures EU-27 (excluding financial sector, Eurostat 2010)

	Enterprises		Employees	
	Amount	%	Amount	%
SME	20.709.000	99,8	89.947.000	67,4
Micro-Enterprises	19.058.000	91,8	39.630.000	29,7
Small-Enterprises	1.424.000	6,9	27.652.000	20,7
Medium-Enterprises	226.000	1,1	22.665.000	17,0
Large-Enterprises	43.000	0,2	43.414.000	32,6
Total	20.752.000	100,0	133.362.000	100,0

Source: http://eeas.europa.eu/delegations/switzerland/press_corner/focus/focus_items/20110923_de.htm

In order to monitor the implementation of the "Small Business Act", in early 2011 an SME envoy was appointed for each member country under which representatives prevailed consensus on three specific areas of focus:

- In all Member States a business set up within three days should be possible for a maximum of 100 EUR.
- The availability and use of loan guarantees for SMEs has to be increased. In particular, it needs to take microloans in claim for start-ups and are generally easier for micro-enterprises.
- The duty to "SME test" in the introduction of new legislation should be EU-wide.

When looking at unemployment rates in different European countries, there is an advantage of vocational upper secondary education compared to a completion of the secondary level. And the proportion of young people who are neither in employment nor in education or training has fallen further in EU. Approximately 10% of young people (15 to 29 years old) in Germany were in 2012 neither in employment nor in education or training, a smaller proportion than the OECD average of 15%. Since the beginning of the economic crisis, Germany (together with Austria, Greece, Israel, Luxembourg, Mexico and Turkey) is one of the few countries where the proportion of young people who are neither in employment nor in education or training has decreased.

Between 2011 and 2012, this share has declined further in Germany by 1.1%, measured in % of the strongest declines under the OECD average (see Figure 1.1.2).

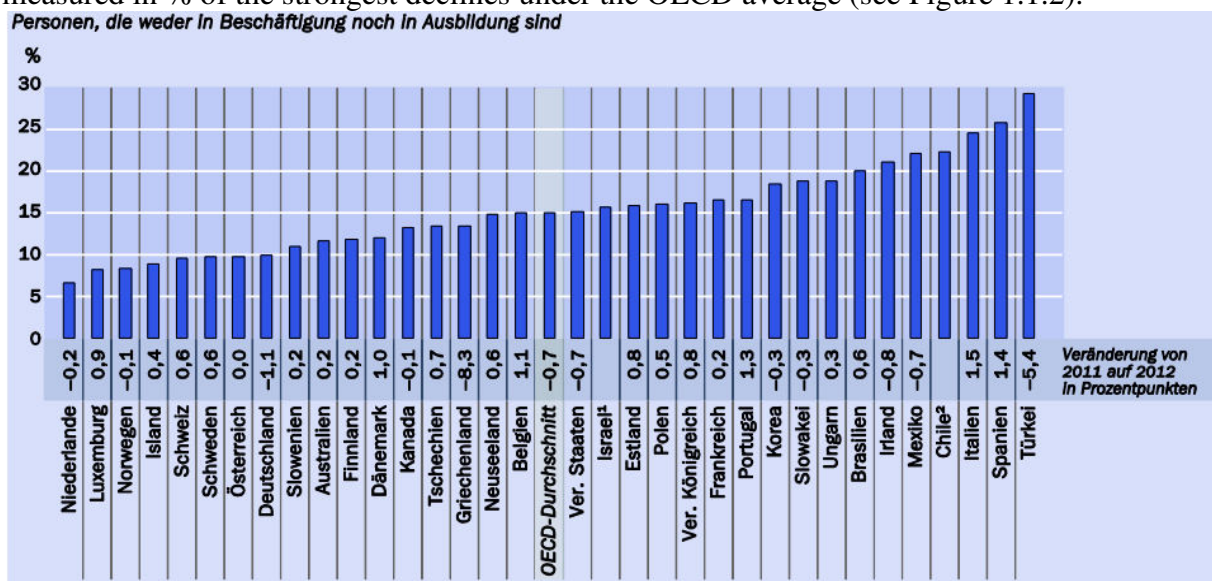


Figure: Percentage 15- 29 year old NEET in 2012 and change from 2011 to 2012

Source: <http://www.oecd.org/berlin/publikationen/bildung-auf-einen-blick-2014-deutschland.pdf>

The income benefit that brings a tertiary qualification is increasing since 2000, the gap

between the relative earnings of workers increased with tertiary education compared to earnings of workers with a degree of secondary or post-secondary non-tertiary education. In 2000, workers with tertiary education earned about 45% more than those without these statements (OECD average 51% more). In 2012 workers with a degree of lower secondary education in Germany earned 84% of the income of their peers with a degree of secondary or post-secondary non-tertiary education, which was still well above the OECD average of 76%.

But despite rising students and graduation rates at the tertiary level, Germany has not yet caught up with the other countries in the share of population with tertiary education.

To summarize above mentioned facts and developments, tables and workouts, it becomes clear, that it is not the quantity of students or graduates of third educational level, which rises the economy and the innovation, but the quality. In many countries, in particular in the post-Soviet-Union, the quality is missing and innovative methods in educational sphere are not implemented yet.

Our approach of education is to fill the gap between quantity and quality on the second and third level of education to train students real practical experience and to give enterprises the possibility to use this potential for further scientific research and innovations, to follow the idea of SMEs by implementing start-ups into educational programs not only virtually, but with real enterprises and businesses in a European network among universities in Europe.

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1.2 NEEDS AND REALITIES OF INNOVATIVE FORMS OF LEARNING IN HIGHER EDUCATION

This study is dedicated to the needs and realities of innovative forms of learning in higher education. The aim of the study is to identify the discrepancies between the needs of innovative forms in the educational process in higher education and their actual use. This goal is achieved through the implementation of three main stages. The first stage involves analysis of the development and understanding of the term "innovation", "innovation in the process of education" and the needs to implement innovative forms in the educational process in higher education. The second stage involves gathering information from students and teachers for the desired and used innovative forms in the educational process in higher education. The third stage involves analyzing the results and drawing conclusions. There are two main hypotheses of the study.

The first one is that there is a discrepancy between the desired and the used innovative forms of learning in higher education.

The second hypothesis is that the first year students of bachelor's degree will have greater requirements to the implementation of innovative forms of learning in higher education than the others.

Limitations of the study: The study was conducted among students (200 in total, by 40 students from first, second, third and fourth year of Bachelor's degree, resp. and 40 of Master's degree) and 30 teachers from state higher education institutions in Bulgaria in the field of economics and management.

The study sample does not claim to be representative, but the use of induction method assists drawing certain generalized conclusions. The survey intended for teachers contains 21 questions. The survey for students contains 11 questions. In order to carry out cross analysis of the responses, some of the questions in both surveys are the same.

We find a retrospective analysis of the concept of "innovation" in the study of Benoît Godin [16, p. 26]. According to his research, the first theory of innovation comes from the French sociologist Gabriel Tarde in the late nineteenth century (Tarde, 1890; 1895; 1898; 1902). Tarde made widespread use of the term innovation (and novation) as novelty, but with no explicit definition. In fact, he used a whole cluster of terms to discuss social changes: invention, ingenuity, novelty, creation, originality, imagination, discovery and initiative. In his analysis Benoît Godin [16, p. 24] found that the term "innovation" was also used in 1513, in the work of Machiavelli (*The Prince*, 1513) and F. Bacon (*Of Innovations*, 1625). Benoît Godin [16, p. 24] showed that the attitudes towards innovation goes through different periods. Particularly negative is the attitude and the opposition to innovation during the 18th and 20th centuries. This is the time during which innovations are rejected, they are considered heresy. The term "innovation" is more and more widely used between 1930 and 1970, (Hart, 1931; Nimkoff, 1957), and theories dedicated to innovation are increasingly developing (Rogers, 1962).

According to management guru Peter Drucker the criterion for innovation is "its impact on the environment" [9, p. 582]. According to Peter Drucker, "the most direct way to define new knowledge, technology is to clarify the need of significant change for the user" [9, p. 583].

The understanding of Robert Kaplan and David Norton also deserves attention. According to them, companies that "compete on the market of dynamically developing technologies need to develop to perfection their ability to anticipate the future preferences and needs of their customers by offering them a wide range of new products and services and operationally introduce new technologies in the production of goods and provision of services" [10, p. 7].

Michel Syrett and Jean Lammiman make a very important conclusion in relation to the ideas that are a prerequisite for development of the innovations. According to them "everyone

is sitting on a volcano of ideas" but in most cases these ideas are suppressed in the bud by criticism or skepticism of colleagues and managers" [11, p. 167].

Clarifying the nature of innovations is made also in the research at national level. What strikes in the national research is that the clarification of the nature of innovation is not limited only to technology or organizational processes. The culture of innovations, the innovations and their impact on the internal audit, the innovative methods in the study of human resources in public administration, the innovative approaches to recruitment and selection of staff and many others are also studied. These include definitions of innovations by Ianitsa Dimitrova, who defines innovations as "the generation and implementation of new business processes, business practices, products, systems, knowledge, findings in the organization" [7, p. 366]. Valeria Dineva examines innovations in two aspects: "innovations as subject of internal audit and innovations as a means of internal auditing" [8, p. 674]. According to her "innovations in the organizations provoke the internal audit by setting specific requirements for it, boost its development and add their perspective in shaping its modern image" [8, p. 669]. Valentin Vassilev and Stefan Novoselski focus their attention on innovative methods on the study of human resources management in the public administration, with particular attention turned to "good practices (benchmarking)", learning action "to form a project group (a team), distance learning, e-discussions and forums and other" [13, p. 2].

The analysis of the scientific theory shows that innovations occupy an increasingly important place in the process of education. According to Orlova and Gaponenko [14, p. 79] innovations in education are a reflection of the relationship between business and universities, research centres, libraries, innovation centres, professional federations.

A study [17, p. 13], conducted in leading global organizations shows that in the future the online learning (62 percent will offer it), the joint learning (62%) and the webinars (55%) will take some central place in their teaching.

Results from another study [18, p. 6] show that "Technology has had-and will continue to have a significant impact on higher education. Nearly two-thirds (63%) of survey respondents from both the public and private sectors say that technological innovation will have a major influence on teaching methodologies over the next five years. In fact, technology will become a core differentiator in attracting students and corporate partners".

In this study we used the survey method of gathering information. We developed questionnaires, some of which contained the same questions to students and teachers for the purpose of cross analysis of the results. The questionnaire for the students contained 11 questions, and that for the teachers were 21.

We used the results of the presented analysis of the scientific theory and practice in the field of innovations to shape the content of the questionnaires and formulate the specific questions. The analysis made led us to seven sets of questions that we put in the questionnaire for the students and the teachers.

- Nature of innovations in the process of education;
- Type of innovative forms currently used in the process of education;
- Attractiveness of e-learning;
- Choice between on-line and conventional training;
- Disadvantages of traditional training;
- Attitudes towards the quality of e-learning;
- The need to change the traditional training.

We asked the teachers some other questions aiming to establish:

- The motivation of the teachers to create online training and develop electronic textbooks;
- Advantages and disadvantages of electronic textbooks.

The results from the questionnaires for the students concerning the nature of the innovative forms of education are presented in Figure 1.2.1.

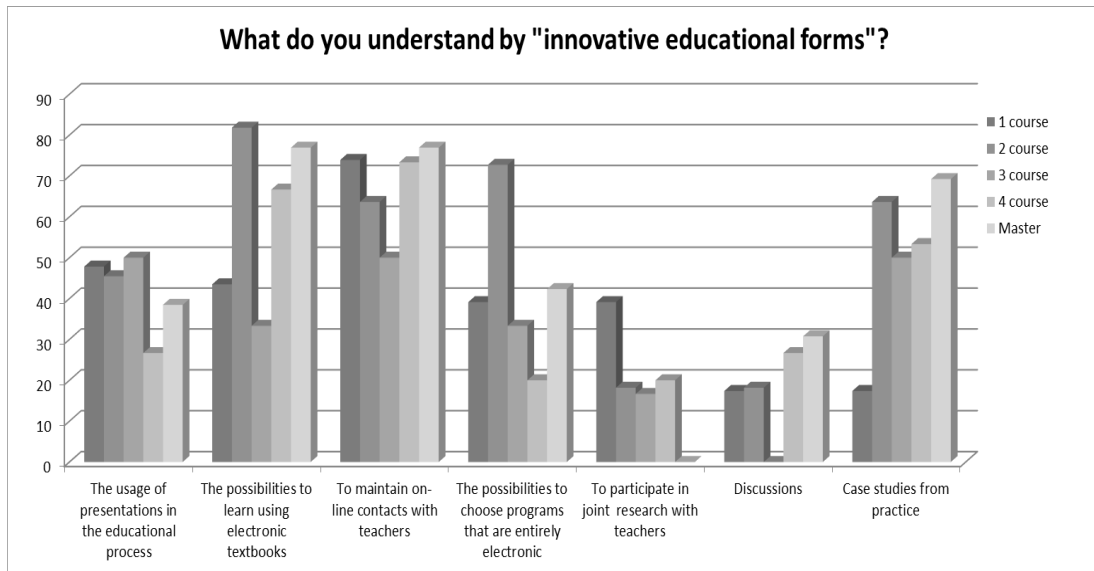


Figure 1.2.1: Results from the questionnaires for the students concerning the nature of the innovative forms of education

Source: created by authors

More interesting results from this question are related to the fact that 68% of the students indicated "maintaining online relationships with teachers" as the nature of the innovative training. The highest is the percentage of the first year students of Bachelor's degree (74%) and those of Master's (77%).

Next, the surveyed students (60%) indicate that by innovative forms of education they understand "getting the opportunity to learn from electronic textbooks".

On the third place the surveyed students (51%) indicate that by innovative forms of education they understand "case studies". The highest percentage in this group are the masters who apparently prefer training to be mostly practical oriented.

Same is the percentage of the surveyed students (42%) who indicate that by innovative forms of education they understand the "use of presentations in the process of education" and the ability to choose subjects which are entirely electronic. The desire is to choose subjects which are entirely electronic prevails among the first and second year students of Bachelor's degree and the Masters.

The answer of first year students to this question is interesting as by innovative forms of education they understand the "joint developments with teachers". The results from the answers of the teachers to the question concerning the nature of the innovative forms of education are presented in Figure 1.2.2.

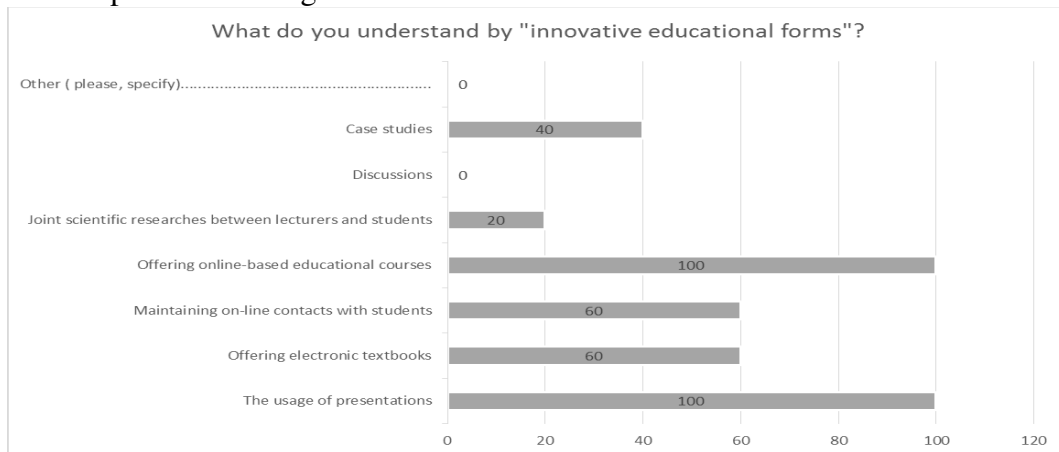


Figure 1.2.2: Results from the answers of the teachers to the question concerning the nature of the innovative forms of education

Source: created by authors

100% of the surveyed teachers indicate that they accept the usage of presentations and online-based courses as innovative forms in the educational process. 60% indicate also the maintaining of online contact with students and offering electronic textbooks.

Students' results in connection with the actual use of innovative forms in the process of education are presented in the following figures.

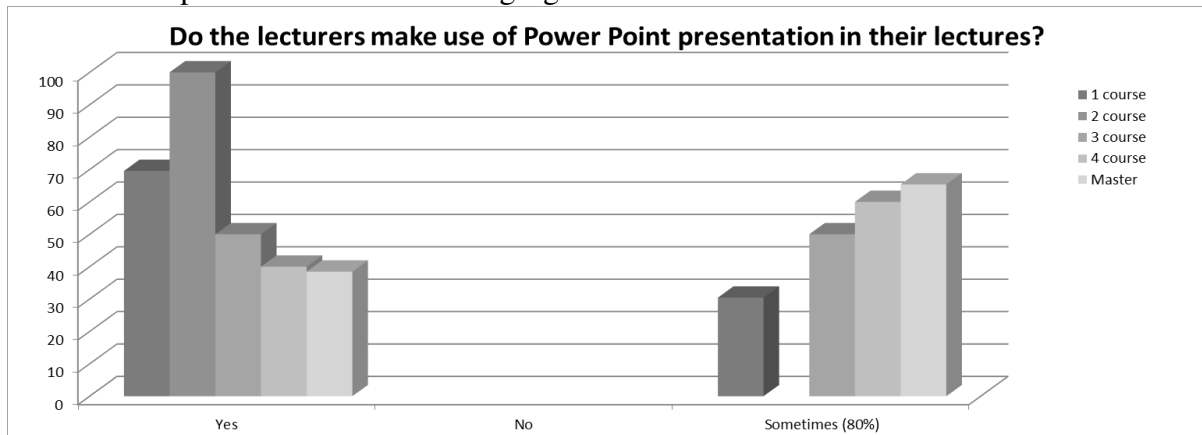


Figure 1.2.3: Results from the answers of the surveyed students to the question concerning if their lecturers use PowerPoint presentations in their lessons

Source: created by authors

60% of all of the surveyed students indicate the use of PowerPoint presentations in the educational process. The results of the teachers concerning the actual use of innovative educational forms are presented.

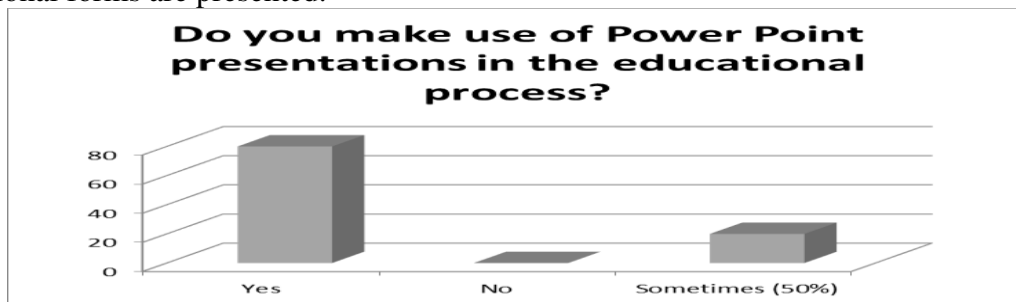


Figure 1.2.4: Results from the answers of the teachers to the question concerning the use of PPP in the educational process

Source: created by authors

80% of the teachers indicate that they make use of Power Point presentations.

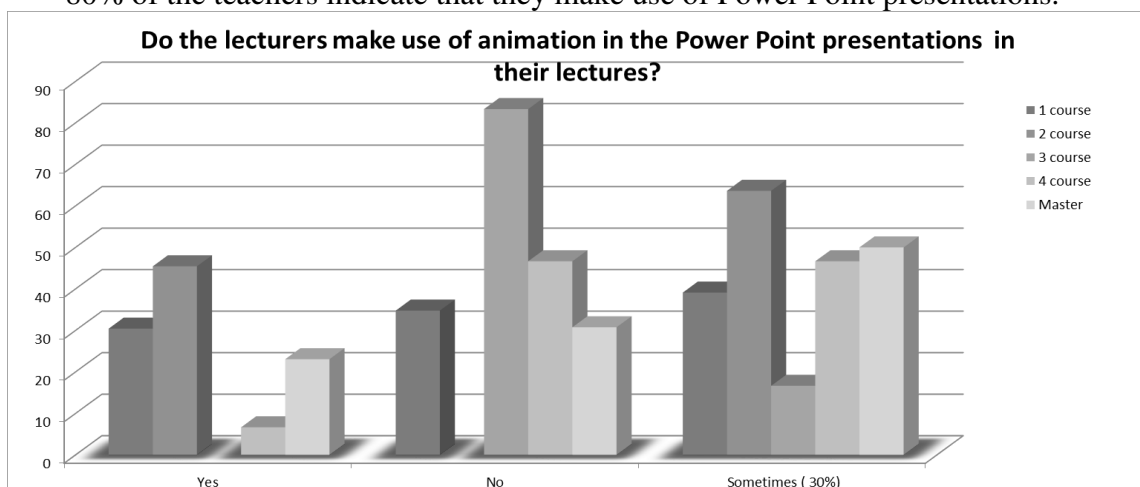


Figure 1.2.5: Results from the answers of the surveyed students to the question concerning if their lecturers make use of animation in their presentation

Source: created by authors

49% of all of the surveyed students indicate answer "no" and 54% of the surveyed students indicate that only 30% of the teachers make use of animations in their presentations.

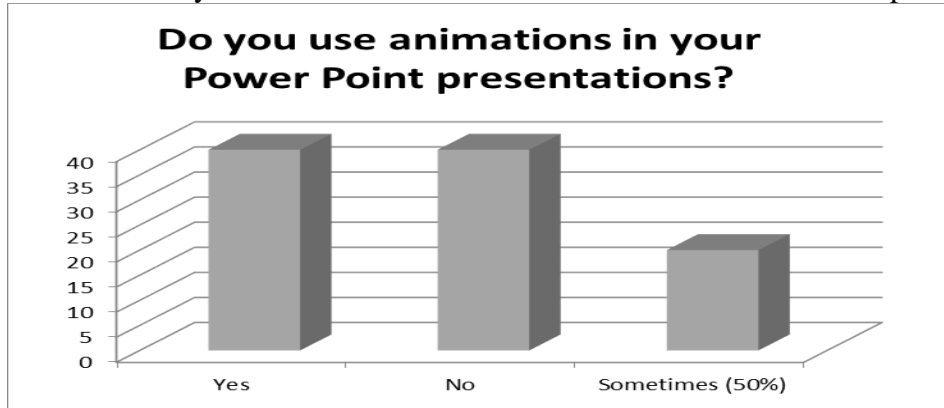


Figure 1.2.6: Results from the answers of the teachers to the question concerning the use of animation in presentations

Source: created by authors

40% of the teachers indicate that they do not make use of animations in their Power Point presentations and the same percentage indicate that they make use of animations.

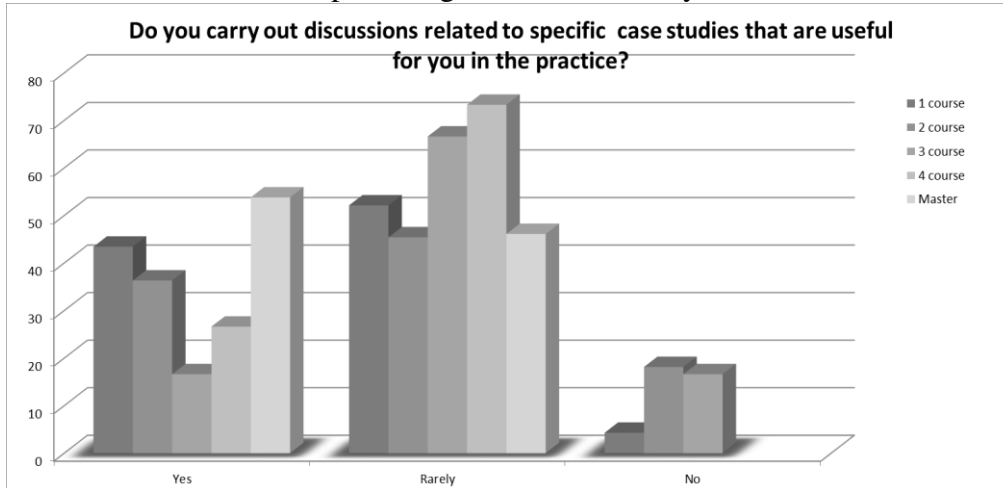


Figure 1.2.7: Results from the answers of the surveyed students to the question concerning carrying out discussions related to specific case studies

Source: created by authors

57% of the surveyed students indicate that this happens very rarely.

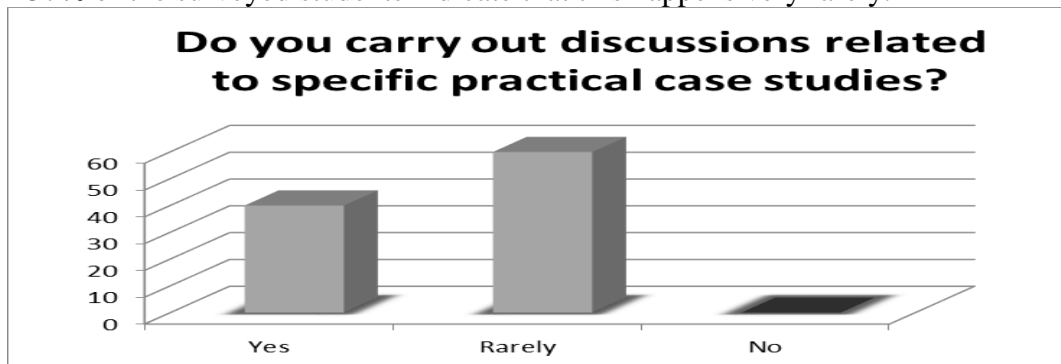


Figure 1.2.8: Results from the answers of the teachers to the question concerning carrying out case studies to practical topics

Source: created by authors

60% of the teachers indicate that they rarely conduct discussions on specific case studies.

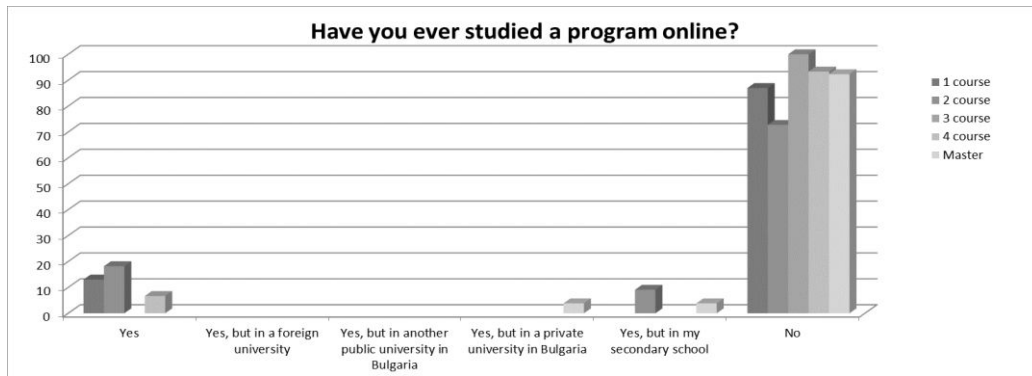


Figure 1.2.9: Results from the answers of the surveyed students to the question concerning ever studying online programs

Source: created by authors

Of the total surveyed 200 students, 89% respond that they have not studied subjects electronically.

The responses of teachers to the question whether they have developed online courses in subjects they teach are presented in Figure 1.2.10.

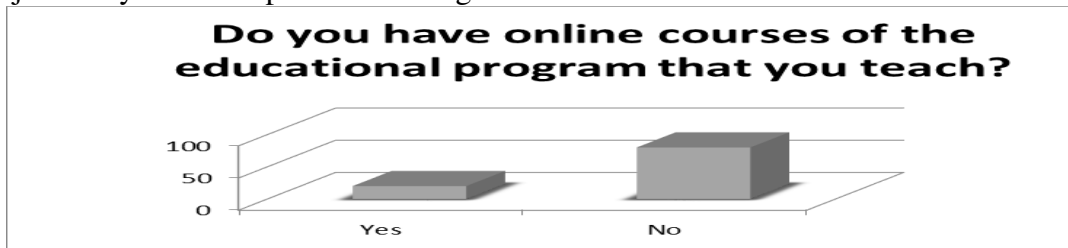


Figure 1.2.10: Results from the answers of the teachers to the question concerning teaching online courses in educational program

Source: created by authors

80% of the teachers indicate that they do not offer online courses in subjects they teach. The causes that make attractive e-learning results are shown in Figure 1.2.11.

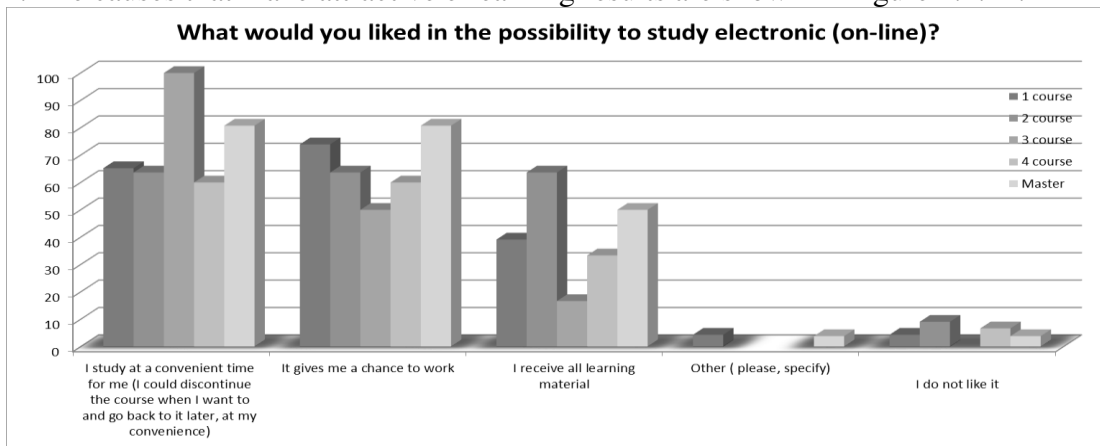


Figure 1.2.11: Results from the answers of the surveyed students to the question concerning the possibility to study on-line

Source: created by authors

74% of the surveyed students indicate that the advantage of e-learning is the opportunity to study at a time convenient for them (they can interrupt the course when they want to and go back to it later at their convenience). 66% of the surveyed students indicate as advantage of e-learning the possibility to work.

In connection with the choice between electronic and traditional training the results are presented in Figure 1.2.12.

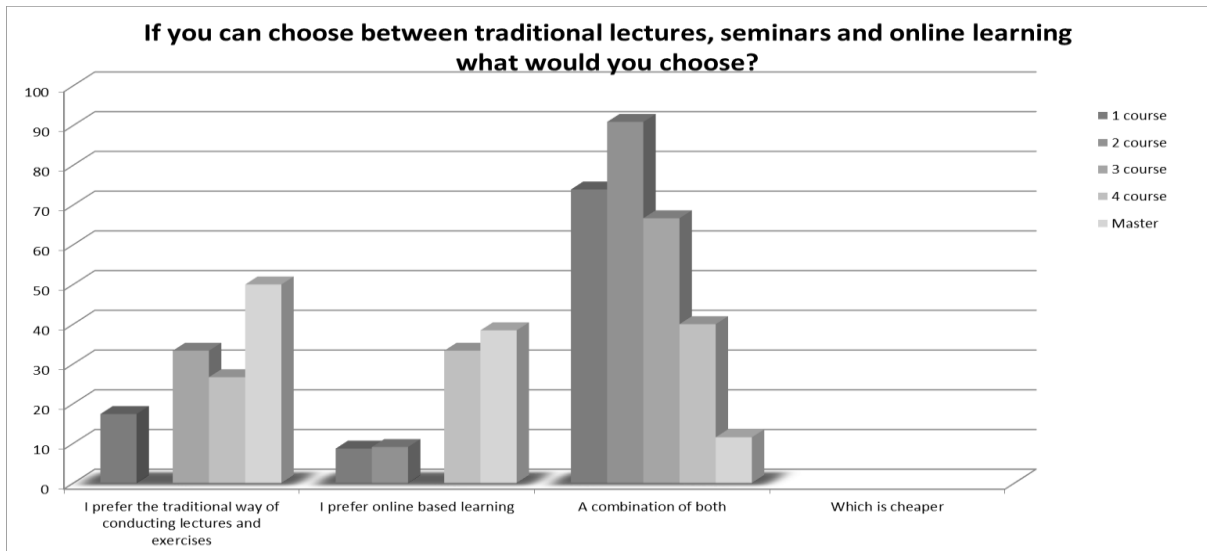


Figure 1.2.12: Results from the answers of the surveyed students to the question concerning the choice between traditional and online learning

Source: created by authors

57% of the surveyed students would choose a combined version between the two types of training - traditional and online. The cost of the education does not affect their choice in deciding on one or another type of training. The largest is the number of first year students who would like to have a choice and to choose both traditional and e-learning - 74%. The largest number of preference for e-learning has the Masters -38%.

The results in connection with the disadvantages of the traditional form of education are presented in Figure 1.2.13.

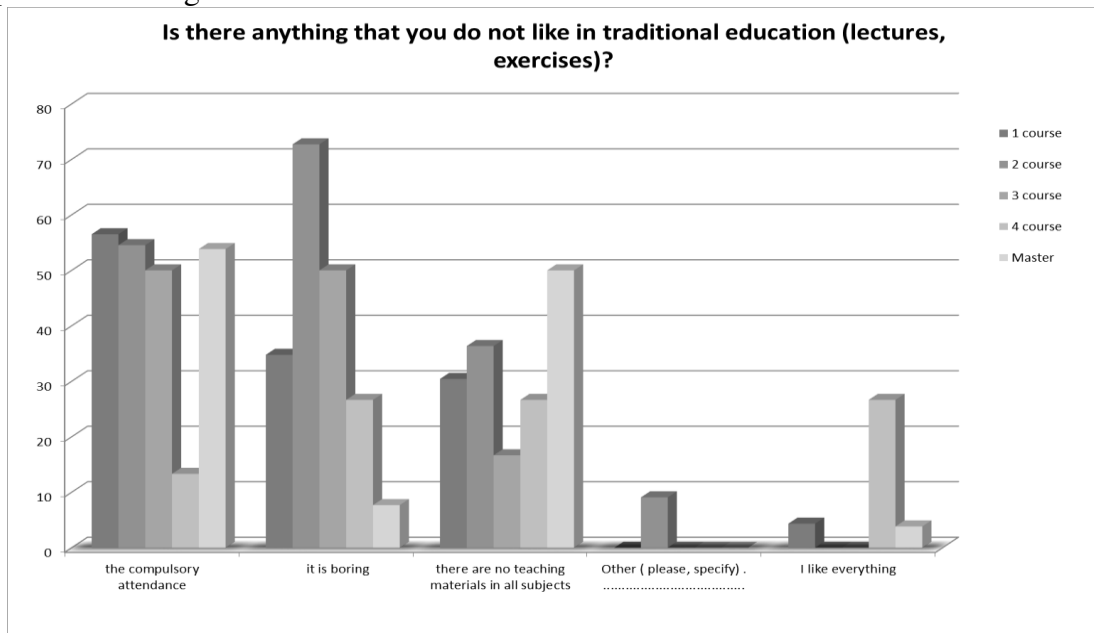


Figure 1.2.13: Results from the answers of the surveyed students to the question concerning what people don't like in traditional education

Source: created by authors

The mandatory attendance in the case of the traditional form of education worries 46% of the respondents. The highest is the percentage of students of first (57%), second (55%), third year (50%) of Bachelor's degree and masters (54%). 38% of the total number of the surveyed students indicates that the traditional form of education is boring. The largest number of students who indicate that answer is that of second year (73%) of bachelor's degree. The responses of teachers to this question are presented in Figure 1.2.14.

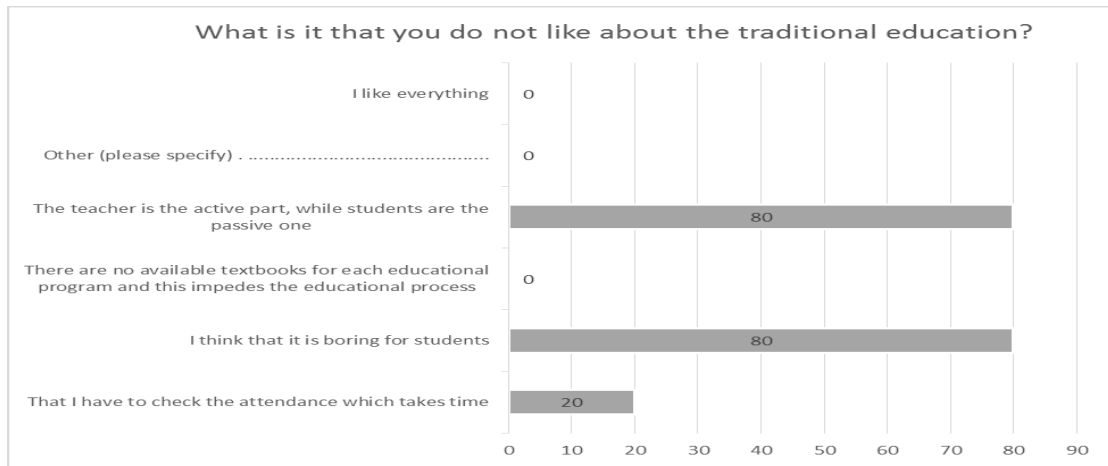


Figure 1.2.14: Results from the answers of the teachers to the question concerning the reason of disliking traditional education

Source: created by authors

80% of the teachers think that the students are bored. The same percentage of respondents noted a disadvantage of the traditional education the fact that the teachers are the active part in the process and the students are the passive one. The results concerning the attitude towards the e-learning are presented in Figure 1.2.15.

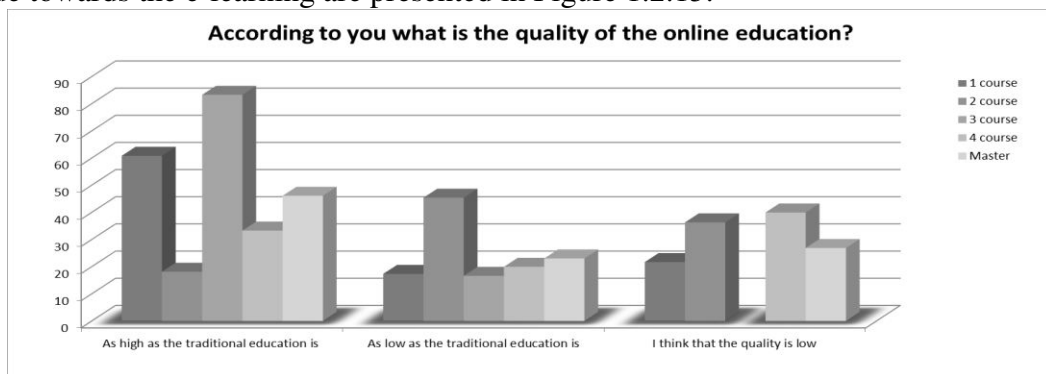


Figure 1.2.15: Results from the answers of the surveyed students to the question concerning the quality of online education

Source: created by authors

48% of the surveyed students believe that the quality of e-learning is as high as the traditional is. The responses of the teachers concerning the quality of e-learning are presented in Figure 1.2.16.

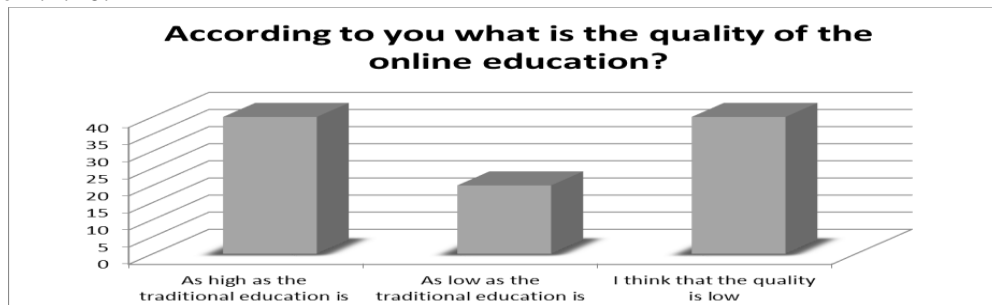


Figure 1.2.16: Results from the answers of the teachers to the question concerning the quality of online education

Source: created by authors

40% of the teachers believe that the quality is high, but the same percentage answer that the quality is low. The results in connection with the need for a change at present in the traditional education are presented in Figure 1.2.17.

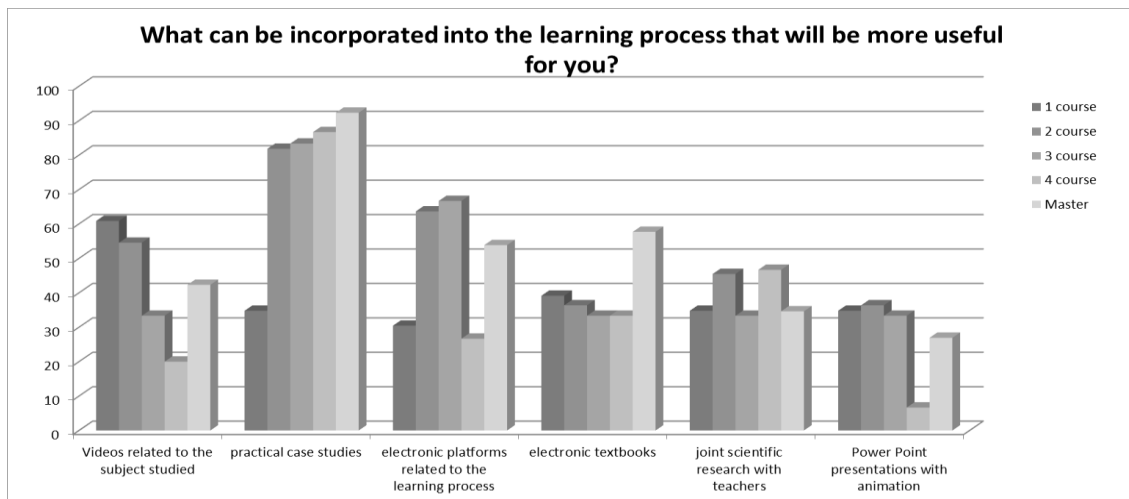


Figure 1.2.17: Results from the answers of the surveyed students to the question concerning implementing useful features to learning process

Source: created by authors

The biggest part (76%) of the surveyed students indicate that there should be more case studies, 48% indicate that there should be electronic platforms in relation to the educational process, 42% require videos in the educational process, 40% indicate that electronic textbooks should be offered.

Teachers were asked some additional questions related to the motivation of the teachers to develop electronic textbooks, the reasons for the preference for electronic textbooks, their weak points, the disadvantages of online training.

80% of the surveyed teachers respond that they would be motivated to develop electronic textbooks, if the intellectual product has reliable protection. 100% of the surveyed teachers indicate that electronic textbooks are updated more easily. 80% of the surveyed teachers indicate that what they dislike about the electronic textbooks is that their intellectual property is not protected. 100% of the surveyed teachers indicate that a major advantage of online learning is that students learn at a time convenient for them and that it is accessible to disadvantaged students. 80% of the surveyed teachers indicate that the major disadvantage of the online learning is that when one develop a course the intellectual property of the teacher is not protected, and every teacher can use their work. 100% of the surveyed teachers believe that offering online courses will attract more students. 100% of the surveyed teachers hold online consultations with the students and answer their questions.

Conclusions from the retrospective analysis of the term "innovation" in national and foreign scientific literature can be drawn as a result of the retrospective analysis of the term "innovation".

First conclusion: The fact is that innovations have always had and will have supporters as well as opponents. One of the reasons for this is that innovations often have bilateral manifestation, they help ones but are obstacle for others. For example, the growth of labor productivity as a result of a new method of work organisation will help the employer to achieve higher profits, but this may be at the expense of staff reduction. The wealth of the employer will grow but what will happen to the income of the dismissed worker. How will they survive? Or, there is a novel method for the treatment of severe disease in children. But this method is expensive. The child of the rich will be saved and what about the poor?

Second conclusion: The fact is that the only constant in today's world is the change. "Change or die". In this 21st century the slogan of the counselling guru Michael Potter "Innovation or death, the choice is yours" is relevant as never before [15, p. 251]. This means that the resistance to innovations and their denying is a suicide.

If we try to combine the two drawn conclusions we will find that they have something in common. It is that no one can and should not stop this "new" that saves lives, facilitates

workflows, and creates better living conditions. But! The guiding principle for the practical application of this "new" must be social fairness. For as Joseph Stiglitz says [12, p. 402] it "is important not only the growth, but also the nature of the growth. Growth, in which the situation of most people is deteriorating, where our environment is suffering, where people are subjected to anxiety and alienation, is not that growth to which we should strive".

Conclusions from the analysis of various national and foreign scientific research related to the needs of innovations in the educational process in higher education allow us to draw two main conclusions in support of the thesis of the ever-growing role of innovations in the educational process in higher education.

First conclusion: The younger generation has specific characteristics that universities should take into account when offering various forms of training. The current generation is characterized by the need to make choices among more available options. And the more choices, the more satisfied is this need. Also in this regard, unlike the older generation, the younger generation loves technologies and is not afraid of them. On the contrary, is looking for them because they are his supportive partner since childhood. A fact which should also find its place in the form of training offered in higher education.

Second conclusion: The problems faced by the universities already have a global character. Decrease in the number of students, rising costs of universities, respectively high fees that lead to non-competitiveness. These are facts that universities should also consider in the introduction of innovations in the process of education.

Conclusions from the survey conducted with students on innovative forms in the educational process could be drawn from the survey conducted with students in conjunction with the innovation forms in the educational process.

First conclusion: First year students and Masters have the greatest desire to maintain online contacts with teachers and make joint research with them.

Second conclusion: The price does not affect the choice of form of education: traditional or innovative (online training). What is important for the students is to have a choice. This is particularly important for the first and second year students of Bachelor's degree.

Third conclusion: Main advantages of online training according to the students is the opportunity to study at a convenient time and to have the possibility to work.

Conclusions of a survey conducted with teachers in conjunction with the innovative forms in the educational process can be drawn from the survey conducted with teachers in conjunction with the innovative forms in the educational process.

First conclusion: Teachers are not sufficiently convinced in the quality of online training.

Second conclusion: Teachers understand very well the disadvantages of the traditional teaching and why students prefer online training and the use of electronic textbooks.

Third conclusion: Teachers realize the usefulness of electronic textbooks, but are not motivated to develop them. The reason is the lack of security in terms of job retention and the lack of protection of their intellectual work.

Key findings from the cross analysis indicating discrepancies between needs and realities of innovative forms of learning in higher education are:

- **Understanding of innovative forms in the learning process.** Students identify joint scientific research between teachers and students as an innovative form in the process of training. Minimum number of the surveyed teachers indicate that answer.

- **Online courses in the subjects:** Students prefer to have a choice and are offered traditional forms of training as well as online courses in the subjects. At present in the organizations in which the study was conducted, students have not the possibility of such a choice.

- **Electronic textbooks:** Students prefer electronic textbooks in the learning process. The surveyed teachers indicate that they are not motivated to develop electronic textbooks.

- **Use of case studies:** Students believe that the use of case studies will enhance the usefulness of the training. The surveyed teachers say that they very rarely use case studies.

The survey results confirm the first hypothesis that there is a discrepancy between the desired and used innovative forms of learning in higher education. Of course, there are matches, but in future it is better to work on removing the inconsistencies because they could lead to risks of loss of interest in the educational process by the younger generation.

The survey results confirm partially the second hypothesis of the study that first year students of bachelor's degree will have greater requirements to the implementation of innovative forms of learning in higher education compared to the other students. The hypothesis is confirmed for some of the innovative forms, for example, the use of videos in the learning process, or maintaining online contact with teachers. But this group was joined also by the second year students and the masters. The presented results can be used in making decisions about:

- Development and improvement of different forms of learning in higher education;
- Development of motivational systems for teachers;
- Development and improvement of educational programs in various disciplines.
- Organization and planning of scientific research.
- Development of media plans to promote online learning among teachers.

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PART 2: DEFINITIONS, BASICS AND ELEMENTARIES

2.1 MARKET DEMAND PRINCIPLES

Participants of the Economic Processes

Economic processes have three main participants: households, enterprises and government. All are bound by the market. The first two are economic entities. Market buyers represented by the households, but the sellers - by enterprises (enterprises employees as individuals are also the consumers of households).

Enterprises producing goods and services make decisions independently, and through disposal of production factors (purchased, hired, belonged etc) can make the maximal profit.

Households that own these factors of production, return them for reward to enterprises or state, for to optimally satisfy its needs with these incomes.

The state at all different levels of government institutions, which have a political and legal as well as economic power to control the market and other economic process participants to achieve the objectives of the public primarily through economic rather than administrative levers.

In a market economy the households are considered consumers (Figure 2.1.1). German historian Barbara Seel (64) offers the following explanation of the household:

benefit source + benefit utilization = the unity that provides the needs

Figure 2.1.1: Explanation of the household

Source: Seel, B. (1964)

It shows that households do not produce benefits, they only consuming them. Households are divided into two broad categories:

- private households,
- public households.

Private households are both an individual and a group of people (family) that share a common housekeeping, that is, common consumption. Private households can belong to an enterprise.

Public households' representatives also do not produce anything, but only consume. Also, many public households may be enterprises that produce goods or provide services. Manufacturers are these enterprises, but not their owners, such as the state, which, as the household represent the government, including the various levels of local government. Households have different sources of income:

- private households (income for their production factors);
- non-governmental organizations (donations);
- government (taxes and department of state enterprises);
- parties (membership fees and donations);
- charitable funds (donations);
- churches (donations and gifts, in some countries the church tax);
- trade unions (membership fees);
- NGOs (donations, special funds financing, etc.);
- scientific institutions (the state budget, however, science research institutions can often to ensure themselves financially by performance of contract works for their customers).

Characteristic features of enterprises are:

- operating goal to make profit, to reduce production costs of goods and services;
- to offer goods and services;
- to require production factors.

Characteristic features of all kinds of households are:

- to require consumer goods and services;
- supply of production factors (more opportunities have private households (mainly with work), the public, for example, by offering temporarily free funds).

Households and enterprises are closely linked. Households need benefits to satisfy their needs. But to obtain these benefits they need the corresponding income. No one usually give it for free. In its turn, enterprises that produce goods and services for households need profit. Simplified households and enterprises correlation is shown in Figure 2.1.2.

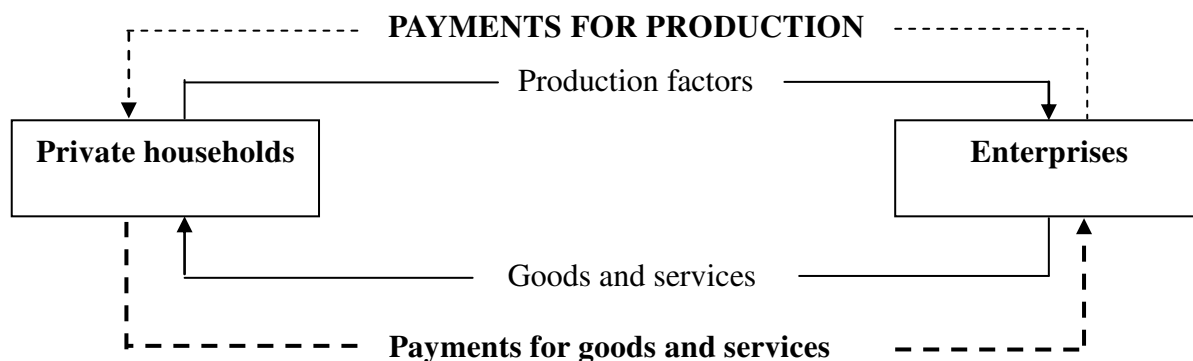


Figure 2.1.2: The simplified model of circulation of the national economy

Source: author's construction

Private household, in order to gain income, offers to enterprises its own and free production factors. Enterprises which produce for these households the required goods and make the required services use the suggested factors of production and make out the respective payments. Households can buy the necessary benefits (buy goods and receive services, making payments to enterprises). The two circles, as we can see on Figure 2.1.2, are completed, and both partners are satisfied. Of course, the flow of payments, which goes in opposite directions is not same, that is, payments for goods and services are for profit share larger than the payments for the factors of production.

In real life, this model is not so simple. All four flows pass through the respective markets, in the economic chain involved banks, the government, takes place an export and import operations. A single individual in a specific place at a specific time may have different roles. For example:

- Craftsman can have shoe repair shop, which can be craft business or individual producer enterprise (see Figure 2.1.1). When the craftsman, somewhere or even in his house, of course, in a separate room, execute the order, he produce and represent his producer-enterprise. When this craftsman in work clothes makes lunch in the kitchen, etc., he is a consumer, representing the household and do not produce anything. This craftsman never can represent the household (consumer) and enterprise (manufacturers) simultaneously.
- Manager or owner of a big business can relax at home enjoying family warmth and rest. At this time, he is a consumer and represents the household. However, he can receive a call from the company and resolve labor issues. In this situation he will be head of the enterprise and represent producers. This cup of coffee sipped at home on the phone by the manager or owner dealing with labor issues, will be included in household consumption, but if he have the same cup of coffee in his office, it will be included in the cost of production (for example as presentation expenses).

DEMAND

Demand formation

The man as an important representative of households is characterized by desire to consume. Of course, it is not stubborn satisfaction of whims (I want and that's it!), but to

consume in order to meet own needs. The needs satisfaction have the following stages: desire → needs → demand (Figure 2.1.3). Desires are located on the lowest step.

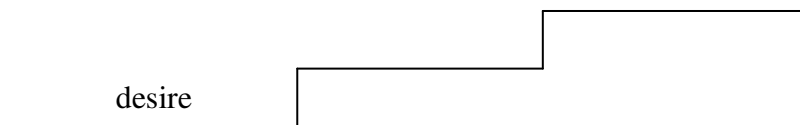


Figure 2.1.3: Demand origin

Source: author's construction

Desire of any goods may begin with the fact that a person likes it. Initially, this person even does not represent how this product will suit to her. Then she begins to imagine this product, for example the shoes, and how she dances with prince of her dreams, but the place and time are uncertain. For the colder time, she, maybe need not exactly these shoes, however some shoes are necessary. Consequently, we have come to needs. Desires of enough-to-do society may form associations (involuntary relationship between an individual's expectations and reality), with which it is possible to manipulate, such as clothing, interior items, entertainment items, etc., with a number of marketing tools, etc.

Needs are a natural, social or spiritual factors, which operation require the presence of the organism, personality, social group or society as a whole.

If needs accompanied by purchasing power, then we can talk about demand. Of course, the consumer buys enough qualitative and valuable goods.

Demand is a set of goods or services that consumers want to buy and can pay the market price for it in order to meet their needs.

Needs

In the core of human economic activity lies the endeavour to satisfy one's needs. Human needs may be described as subjective and objective. Needs of the lower order are more objective, but the higher is the order of needs the more subjective they become.

Private household needs can be divided according to several criteria. If we consider the needs of a household as an aggregate of needs based on basic needs, then to become demands (wants to be satisfied), the household needs may be divided into:

- **primary needs** (indirect) such as income (yield),
- **secondary needs** (direct) all the rest.

Private households obtain income through the available factors of production. They offer work for which they receive payment. The higher the payment, the more secondary needs (wants) can be satisfied. Such an approach to the theory of job payment was described already in the works of *F. W. Taylor* (1856-1915). In his opinion the more workers produced, the more they earned. Through satisfaction of primary needs (income generation) private households can satisfy their immediate needs, e.g. to buy clothes. Thus, nowadays wages are used:

- to satisfy physiological, self-preservation, social recognition and self-actualization needs (see Figure 2.1.1); the level of these needs satisfaction is affected by the standard of living, employment and other factors;
- to provide payment for labour corresponding to the state of labor market and economic situation in the country;
- to serve as monetary consideration for labour accepted in a particular company and generally corresponding to standards accepted in a particular sector of industry (according to criteria, categories, levels);
- to provide monetary consideration for labour according to the employee's contribution and the value system of a company.

If we focus our attention on the immediate needs and separate them from the aggregate

of needs, then all human needs can be divided according to their features. In the best way this is shown in Abraham H. Maslow's (1908-1970) hierarchy of needs (see Figure 2.1.1), who based his theory on the following three principles:

- the principle of the hierarchy of needs (needs arranged in order of importance) in 5 levels;
- the principle deficiency of needs (the process is unlimited);
- the principle of progression (human behavior is motivated by unsatisfied needs, as soon as one need is satisfied, another need may arise and ask for satisfaction, and so on indefinitely).

American psychologist A. Maslow's theory is one of many theories of needs. Graphically his hierarchy of needs (1943) is usually presented in the form of a pyramid (Figure 2.1.4). The bottom of the pyramid is formed by basic or "pressing needs", i.e. the needs that put a human being under great pressure so important they are to be satisfied, but the higher to the top of the pyramid the less pressure a human being feels in the pursuit of needs satisfaction.

1. **Physiological needs** among others include human needs in clothing and food, according to a minimum wage and tolerable working conditions (other physiological needs are beyond the scope of this course).

2. **Self-preservation needs** and the faith in the future are the needs for safety, protection and stability, which may be also understood as insurance, a good job with a higher than a minimal wage and better retirement prospects. Physiological needs and self-preservation needs fall in the category of basic needs.

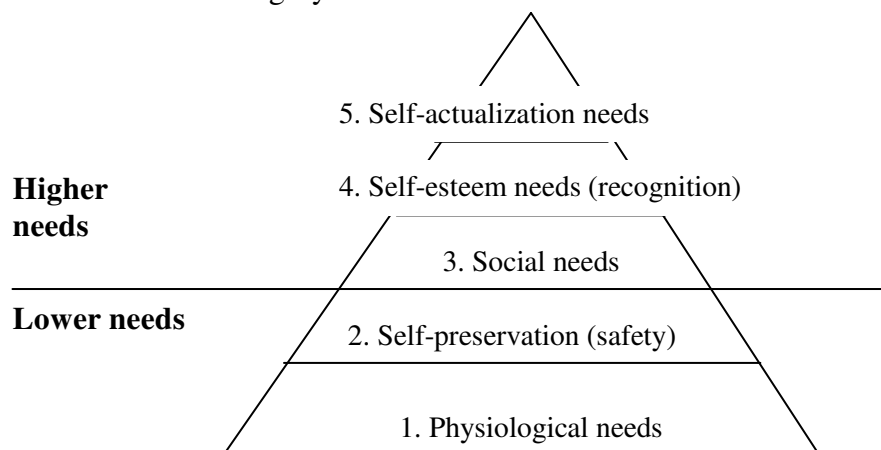


Figure 2.1.4: Abraham Maslow's hierarchy of needs

Source: Wahba and Bridgewell L.G. (1976)

3. **Social needs** are the needs to belong to social environment, to be socially accepted and have good cooperative relations with colleagues.

4. **Needs for recognition** are the needs to be respected and valued, to reach a certain status, etc.

5. **Self-actualization needs** are the needs for self-fulfilment and achieving one's full potential.

Divisions between the categories of needs in the graphic presentation of A.H. Maslow's hierarchical system of needs in Figure 2.1.4 are shown as straight lines. However, in real life, these divisions may be not as clearly expressed as the needs of an individual may embrace needs from various levels, especially if these needs are directed from the bottom to the top of the pyramid. In this case we can observe the phenomenon called "the principle of twined fingers", i.e. the individual's needs as a whole may be at the second level yet, but some of the needs are already from the higher levels. The opposite order is also possible (see Figure 2.1.5). For this reason, when a specific market situation analysis is carried out, these peculiarities should be taken into account.

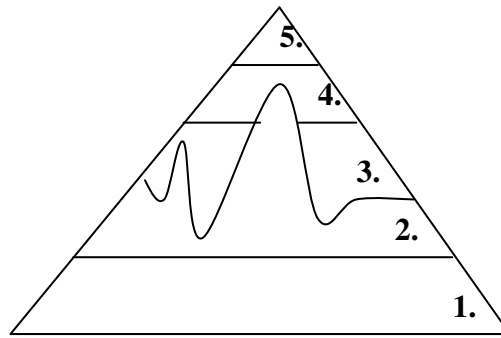


Figure 2.1.5: Principle of twined fingers in the context of Maslow's hierarchy of need

Source: created by author

However, A.H. Maslow's theory of needs was criticized for certain limitations by T.R. Mitchell, M.A. Wahba, and L.G. Bridgewell among others. Experiments have shown that it was not always the needs satisfaction at one level automatically excited the needs at another level. Consequently, a strong hierarchical structure was disrupted (Wahba and Bridgewell, 1976). A. Maslow was also criticized for not taking into account personal individual differences. Therefore it deemed necessary to develop his hierarchy of needs further by focusing on personal experience of separate individuals, and emphasizing people's individual features (Lawler, 1973). Different individuals like different things, have different needs and preferences in regard to remuneration systems (Mitchell, 1978). In order to avoid these limitations A. Maslow's theory of needs was complemented with other theories.

However, in the author's opinion, A.H. Maslow's theory does take into account the diversity of individual needs if only in a generalized sense. Higher needs belong to psychological (intangible) factors.

If we divide A.H. Maslow's pyramid into two parts (one subsuming the needs of the 1st and 2nd levels, and the second are the needs of the 3rd, 4th and 5th levels), then such classification of needs will be comparable to Frederick Herzberg's two factor theory, according to which needs are divided into:

- hygiene factors, which F. Herzberg understood not only as preventive needs to maintain health and prevent disease, i.e. to ensure physical health, but also as factors that help to maintain human capacity for work);
- motivational factors or motivators.

According to F. Herzberg (1959, 1968), hygiene needs are those that need to be satisfied in order to maintain the human capacity for work and so they are work-related, but the motivational needs are related to the nature of work and have a positive effect on the employee's job satisfaction. Motivational factors include the need for creative growth, for building a career, for success achievement, etc. The hygiene factors include wages, working conditions, etc. The ERG theory of Clayton Alderfer (1972) distinguishes the following three categories of human needs:

- the needs for existence → physiological needs,
- the needs for relatedness → contacts, security,
- the needs for growth → self-actualization, self-expression.

David K. McClelland (1970) identifies the following categories of needs:

- the need for achievement → praise, merit recognition,
- the need for affiliation → belonging to a social group, cooperation,
- the need for power → administrative authority and influence.

C. Alderfer's ERG and D.K. McClelland's theories share much of common ground. Many scientists were influenced by the views of Friedrich Benedikt Wilhelm von Hermann (1795-1868), a German economist, mathematician and statistician. Eugen Böhm Ritter von Bawerk (1851-1914), the Austrian school representative, also wrote on the hierarchy of needs.

He classified needs as:

- 1) needs for physical survival,
- 2) needs for maintaining health,
- 3) needs for improving health,
- 4) higher (luxury) needs,
- 5) communication needs.

According to Böhm Ritter von Bawerk physical survival was the primary need, which was also objective in nature. The other four were ranked subjectively, and one could arrange those secondary needs at one's own discretion.

Maslow's theory of needs was strictly hierarchical. Alderfer's theory was not strictly hierarchical, but may still be classified as hierarchical one. Unlike Maslow and Alderfer's theories, in McClelland's theory the needs were not arranged hierarchically, although they were interconnected and influenced each other, which influence should be taken into account in specific situations.

The latest generation of needs researchers includes Pirkko Anttila (1993), Andrzej Niezabitowski and Victor Papanek (1973) among others. P. Anttila analyzed a number of studies on the needs. As a result, he divided all human needs into four categories based on different criteria:

1. Needs according to the criterion of **importance** may be ranked in a certain order on the basis of biological and social factors (similar to F. Herzberg's theory). Human psychological and physiological primary needs are major biological dimensions, and it is believed that all other needs are based on socio-cultural phenomena. For example, living accommodation is necessary to meet the needs for physical warmth, safety, hygienic and sanitary conditions and light. When these basic needs are satisfied, a person seeks to satisfy socio-cultural needs, such as needs for aesthetical values, privacy, social contacts, etc.

2. Needs according to **human interaction and criteria of choice**. This approach is based on psychological thought focusing on needs, drives and choice (e.g. behaviorist theory developed by American psychologist John B. Watson in the early 20th century). Needs analysis is a foundation of any market research, and needs are related to the experience of excitement or dissatisfaction, delight and disgust. Since it is very difficult to explore the needs as so many different criteria have to be taken into account, this should be assisted by the study of consumer preferences and behavior.

3. The criterion of a **hierarchy of needs**. In this case, different needs have different meanings. A. Maslow's hierarchy of needs is the most popular in this regard.

4. Needs according to the criterion of **influence**. P. Anttila (Anttila, 1993) assumes, and A. Niezabitowski supports, that needs are drives that motivate people to become socially and culturally active.

A. Niezabitowski believes that an individual has needs that may be divided in 4 groups, and communication is not affected by time and culture in which one lives: there is the need for safety, the need for response at emotional level, the need for social acceptance, and the need for acquisition of new experience. Based on these 4 groups A. Niezabitowski has developed a non-hierarchical system of needs according to the following categories:

- The **need for safety** is aimed at avoidance of internal and external threats;
- The **need for comfort** is aimed at facilitation of other needs satisfaction, such as unencumbered acquisition of consumer goods (regarding living accommodation to have it sufficiently warm, light, soundproof, etc.);
- The need for **social acceptance** also covers the need for having a modern and well groomed environment, etc.;
- The need for **social contact** includes needs for social contacts with others and belonging to a social group, expressing this need, for instance, in a certain manner of dress, etc.
- The need for **action** is expressed not only in building a career, but also in engaging in sports and cultural activities, etc.;

- The need for **peace and quiet** is expressed in the need for privacy in one's private life and the need for integrity, which notion also includes a stable and invariable environment;
- The **need for beauty** is associated with sensitivity to aesthetic values. In this regard, forms and relationships, colours and materials, etc. are essential, for example, the semantic content of goods.

Victor Papanek classifies needs as (Papanek, 1973):

- **transient** (temporary) **needs**,
- **real** (permanent) **needs**.

Transient needs are those that are manageable and which can be manipulated e.g. fashion. These needs receive much public attention.

Real needs are economic, psychological, spiritual, technological and intellectual needs. According to V. Papanek our clothing is just a costume, with the help of which the consumer plays a role. Such needs are not in the focus of public attention.

In modern society, material and non-material needs are intertwined. All the time new needs emerge mainly due to marketing and its influential instrument - advertising. Consequently, in satisfaction of some non-material needs, such as self-actualization and self-esteem, material resources may be used. Yves Bernard and Jean Claude Colli classified needs as:

- **survival needs** (primary needs), such as food, housing, etc.;
- **other needs** (secondary needs) as comfort, leisure, etc. These needs emerge when private households wish to obtain a higher standard of living (Bernard and Colli, 1994).

The boundaries between these categories of needs mainly depend on the standard of living in a particular country. Rising living standards stimulate growing needs and this turns the differentiation of needs into important factor of economic activity revival. Needs may be classified according to the degrees of satisfaction:

- **minimal level**,
- **basic level**,
- **higher** (luxury needs satisfaction) **level**.

Of course, the boundaries between these levels are relative and the division is conditional. Over time, with the increase in living standards, these levels may regroup, for example, the car was once a luxury item, but today many classes of cars are within the normal level of needs; similarly with bicycles.

In the quantitative aspect needs are multifarious, but with regard to their intensity, the situation is reversed. Each individual has their own perception of the satisfaction of a need and this depends on the nature of a need. Thus, when the level of satisfaction increases, the intensity of a need decreases.

Needs may complement each other, and needs may also compete with each other. This raises the problem of intersubstitutability of needs and their hierarchy, which can be solved by economic development organization. The optimal hierarchy of needs forms in a market economy as a result of the individual's free choice related to the market driven individual income distribution. In the Third World countries, where the standard of living is lower, the satisfaction of primary needs is a priority.

Value

When *value* is understood as an economic category, it may be described in terms of usable or unusable. Values have many classifications. Erik Allardt (1995) classified values as:

- **learned values**,
- **general values**,
- **permanent values**,
- **goal-related values**,
- **choice based values**.

Understanding of the concept of value helps to make choice. Some values, learnt from

the environment, may be common (religion, etc.) or permanent (honesty, etc.). The individuals' choices are influenced by their set of values consciously and unconsciously. At the same time, the opposite relationship is also true when making choices creates values. An individual's choice is influenced by his set of values both in a conscious and unconscious way. However, there is also the opposite connection - situations that create choices, form values.

Charles W. Morris (Schumann, 1992) developed his system of values based on three dimensions related to different cultures:

- **Dionysian** dimension expressed in the desire to enjoy life and free oneself from the need to create pressure;
- **Promethean** dimension expressed in ambition to have influence on the world and change the established order;
- **Buddhistical** dimension manifested as a tendency to concentrate oneself on oneself and to repress one's desires.

Goods

In the context of this work good is understood as economic good. **Good** is everything used directly and indirectly to satisfy certain human wants.

For merchandise, services, events, fruits of labour (work products), rights, in short: things or effects to become goods, the following conditions should be met:

- there should be the need in them;
- they should have features that make them suitable for a specific want satisfaction;
- consumers should be aware of the link between the wants they wish to satisfy and the features of a thing they want to acquire;
- there should be opportunities that will allow managing and handling the acquired goods.

Things are not goods yet, or are no longer goods, if at least one of the above mentioned conditions is not met.

Goods can be classified according to several criteria. According to the criterion of origin, i.e. whether the thing or effect is a product of human activity or not, goods may be:

- **free goods,**
- **economic goods.**

Free goods are the so called nature's bounty, which are obtainable without any effort or return value in unlimited quantities (e.g. air, daylight, solar energy, etc.). In most cases, such goods are not in anybody's possession, so they are also known as universal goods. With the growth of population, many such earlier free goods turned into economic goods, for instance, land. Even in the late 19th century, anyone willing could get it for free in uninhabited or sparsely populated areas. In certain places, such good as water in the desert, which elsewhere is universally free, is an expensive good because it exists in very limited quantities. Due to environmental pollution water and air are no longer free goods, even in places where recently they were still free goods, e.g. in the industrial zones, especially where there are poor natural air exchange conditions, such as in hollows and closed depressions. Water in the water supply networks for residential environment is also economic good because its provision is maintained through economic activity.

Not all things in the world may become goods, as they may be useless materials for satisfaction of people's needs, such as barren rocks, desert sand and icebergs. With time, some of them may become goods.

For instance, through the development of certain technologies, it may become possible to transport icebergs to arid coasts and use them for provision of high-quality drinking water, of course, if in total such water extraction technology will become sufficiently commercially cheap and will correspond to the consumers' purchasing power.

Economic goods are goods produced by way of use of other goods or labour skills (labour is also a kind of goods). They exist in limited quantities as much as produced.

According to the criteria of utilizing, goods are divided into:

- **consumer goods,**
- **producer goods.**

Consumer goods are those that can directly satisfy customer needs, such as food products, clothing, etc. *Carl Menger* (1840-1921) called them the first or lowest order goods. They are also immediate goods.

Producer goods (intermediate goods) are various means of production, materials, semi-finished products, tools, technology, industrial buildings and structures, land, etc. They are used for manufacturing the consumer goods and for this reason they are intermediate goods. Producer goods can be divided according to different degrees: depending on how far they stand from transformation into consumer goods they are classified as goods of 1, 2, 3, etc. order.

The need in goods is satisfied in the production process. Depending on the period during which goods may be used they are divided into:

- **non-durable or soft goods,**
- **durable or hard goods,**
- **consumable goods,**
- **inconsumable goods.**

Durable and non-durable goods are consumable goods. Such consumer goods as food, clothes and other merchandise, and such producer goods as input materials, technology, fuel, etc. are **consumable goods**.

Land plots are **inconsumable goods**, their value can vary during the period of usage, but they never depreciate. According to the external form, goods may be divided into:

- **objects** (corporeal things),
- **personal services** (used for indirect satisfaction of wants),
- **legal relationships.**

Human working abilities, expertise and ideas are also considered to be goods. Legal and economic relations are also goods, e.g. customer base, goodwill of the company (image), patents, copyrights, inheritance rights, etc. Goods concerning legal relationship do not include corporeal goods or material goods, but may include, for example, one's word of honour, civil condition, etc. According to the nature of goods they may be divided into:

- articles, they have material, physical form;
- services, they have non-material, incorporeal form.

According to the fields of utilization goods may be divided into:

- material (tangible) goods,
- non-material (intangible) goods.

Material (tangible) goods are usable material things and things related to their management, application and benefit obtaining rights.

Non material (intangible) goods are those that affect the individual's abilities to develop. Intangible goods are divided into:

- internal goods,
- external goods.

Internal intangible goods are personal characteristics, human faculties (for example, business acumen, professional excellence, etc.).

External intangible goods are reputation, human social connections (friends, neighbours, relatives, enemies, etc.). Reputation is not necessarily dependent on the individual, but it is certainly dependent on the surrounding people beliefs about the person.

According to the criterion of divisibility goods may be:

- individual consumption goods, which may be divided into sufficiently small units and sold to individual consumers;
- public goods, which are indivisible and cannot be sold to individual consumers.

According to accessibility, goods can be divided into:

- further non-transferable goods such as human abilities, trust-based business communications, favourable climatic conditions, air, privileges; etc.
- further transferable goods, which are all other goods.

According to customer's attitude goods may be divided into:

- neutral goods, which are goods against which a consumer does not feel any particular dislike or liking.
- demerit goods, e.g. cigarettes for a non-smoker, or for the users of other tobacco products, such as chewing or snuffing tobacco.
- merit goods, which are goods liked and wanted by substantially all customers (these are the majority of goods).

According to ownership goods may be divided into:

- Private personal goods, which are goods for personal usage; they belong to and may be consumed by one individual only, they cannot be consumed by several individuals at one and the same time, e.g. food, clothing, toiletries, etc.
- Individual public goods are goods that can be used simultaneously by several individuals or even groups of individuals, although the number of users may be limited to some extent, e.g. passengers of various public transport vehicles, the audience of cultural events, etc.
- Collective public goods are goods used by the unlimited number of consumers, e.g. natural light and street lighting, public parks, roads, etc.). Such goods are quite often for free.

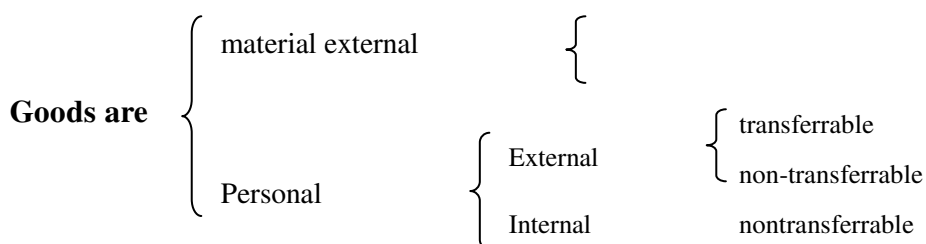


Figure 2.1.6: Classification of goods according to A. Marshall

Source: Marshall (1993)

Taking into account A. Marshall (1993) theory of wealth, goods can be represented in the diagram of Figure 2.1.6. The benchmark for goods evaluation is their value or utility.

Demand function

The demand we usually understand as household demand. Such a view has a logical justification - absolutely the greatest amount of demands consumed by households. However, part of the demands goes to households indirectly - only after the production process, when is produced the final product consumed by households.

The demand for the final product that can be consumed by households is called direct demand. Demand for goods and services, which are involved in the production process (raw materials, materials, capital goods, etc.) is an indirect demand.

Often, between direct and indirect demand for goods there is no dividing line. For example, sugar can be a household direct product demand, as well as material for manufacturers in the food industry.

However, the direct demand for goods usually cannot exist without an indirect demand for goods. There are exceptions, such as the nature gifts (rough mushrooms and berries, etc.). In this respect, estimating the demand, we can see that the benefit of indirect demand of goods is reflected to a direct demand. In that sense, there is the combined demand, which covers direct and indirect demand and reflected in immediate demand.

Any goods or a service request is influenced by many factors, and in analytical way it shows such a request function:

$$Q_n^d = \sum f(x_1, x_2, x_3, \dots, x_{n-1}, x_n), \quad (2.1.1)$$

where Q_n^d is demand and $f x_1 - f x_n$ are factors influencing demand.

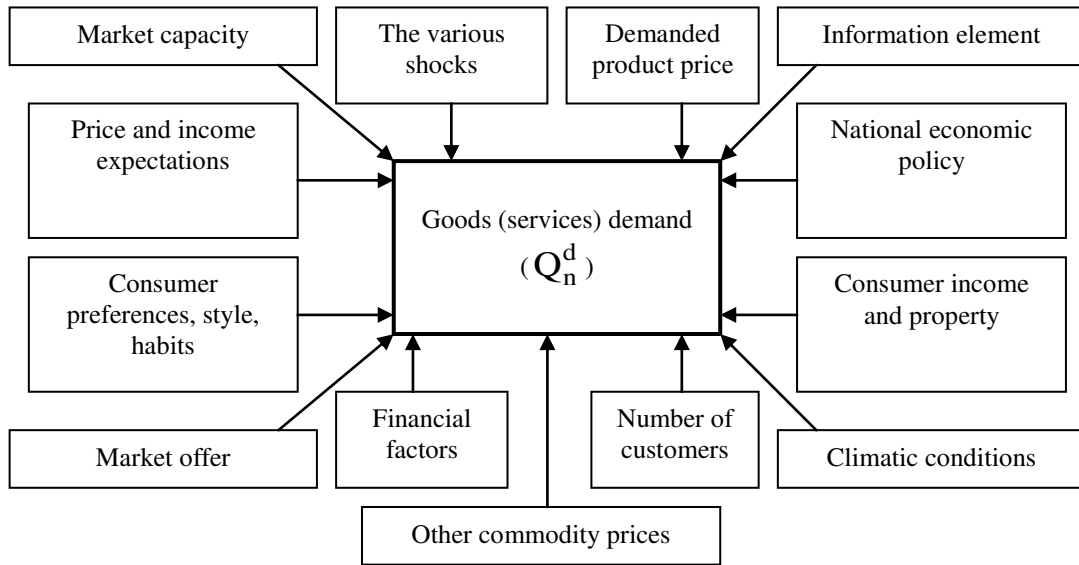


Figure 2.1.7: The factors influencing demand

Source: composed by the author

How the different factors and their groups impact on demand, shown in Figure 2.1.7. Direction of the factors that are drawn in this image shows the demand direction. This direction has been accepted conditionally. In practice the factors axis may also be the opposite, i.e. one that reduces the demand. One household demand for goods is an **individual demand**. Household group demand is the **market demand**. It consists of the individual (partial) demand amount.

The demand based on a particular factor can be shown in tabular form (see table 2.1), graphically (in graphic form) (see figure 2.1.8) and analytically (in the form of mathematical expressions) (see formula 2.1), with the ceteris paribus principle. *Ceteris paribus* is the assumption, according to which one influencing value is considered to be a variable, while the other values (conditions) are constant.

Table 2.1

Demand dependence on price

Price p	1	2	3	4	4,5
Volume Q _d	8	6	4	2	1

Economic processes in graphic form assume that monetary factors are represented on the vertical axis, while volume factors - on the horizontal axis.

In this example, as shown in Figure 2.1.8 and 2.1.3, demand function is linear. Demand function, as well as other relevant economic relationships may also be at any curve which is a sufficiently accurate and reliable capture the subjects of economic process. In this case, the demand functions type identifying the specific goods in a specific place (market) at a specific time. In case of hangers in the goods demand time, there will be already a different demand function.

As illustrative material, which could show a general request or some other economic process function, recently adopted a linear relationship, that is, direct. This assumption makes it easy to display this relationship and, if necessary, additional construction. So we will not be surprised if in some economic book would be written about the economic curve, but it would be displayed in a straight line.

The Y (vertical) axis shows the price of goods, but the X (horizontal) axis shows the volume of demand.

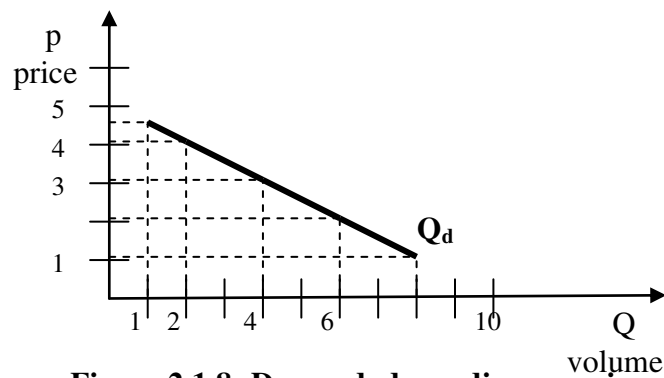


Figure 2.1.8: Demand, depending on price

Source: compiled by author

Household demand classification

Taking into account the various factors that affect private household demand, it can be subdivided (Figure 2.1.9).

Consumer choice depends not only on rational considerations, how it happens in absolute majority of cases, but also on irrational considerations, such as whims case.

American economist Harvey Leibenstein divided consumers (private households) demand into two broad categories:

- functional demand,
- non-functional demand.

Complementing these two large groups with additional information we obtain in Figure 2.1.9.

Functional demand is part of the demand, that is stipulated by benefits of consume properties.

Non-functional demand is part of the demand, which is not linked to the consumption of beneficial properties.

Speculative demand is formed when there are high inflation expectations.

Non-rational demand - is the unplanned demand, and usually it not has a rational consumer use.

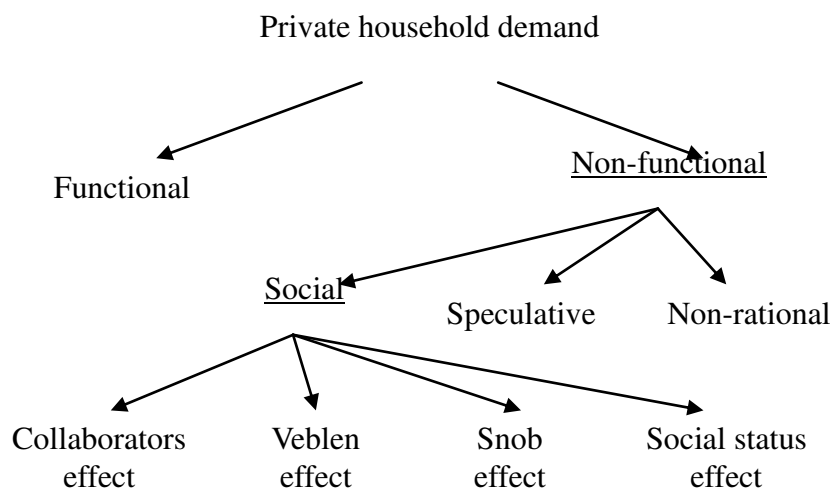


Figure 2.1.9: Private household demand classification

Source: created by author

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2.2 ESTIMATING CALCULATIVE RATE OF INTEREST BY SIMULATION

The possibility of using calculative interest rate is evaluated on several ways in the national and international technical literature. Many empirical researches are dealing with the implementation of this method to prepare their investment decisions. The method introduced through the practical examples of empirical researches can sometimes produce not relevant results and can divert decision-makers from the right direction. The purpose of this study is to set the value of calculative interest rate estimated by orthodox method against the one estimated by unorthodox method with the suitability of estimation by simulation. After contrasting methods and availabilities summarized in the Hungarian and English professional literature, it is presented through a practical example how more effective is estimating the value of calculative interest rate by simulation when decision-maker is establishing an investment decision. The results of examination were illustrated by Gauss curve and cumulated relative frequency curve. The main question is whether it is acceptable that instead of traditional methods the estimation by unorthodox method is more usable to evaluate the ability of yield production of investment decisions.

Investments are very frequent in the daily routine of business enterprises. About the meaning of the word "investment" it can be stated that investments generally mean the short or long term lockups of liquid assets with the purpose of yield production. On the whole the consequence is that investment can be everything which meets the requirement of return. Investments affect the profitability of business enterprises, the liquidity conditions and due to the change in wealth statement they also affect the efficiency of management (Watts, 1988; Fröhling, 1992).

The professional literature interprets the specialties of investment decisions and the possibilities of practical implementation of them on four levels. First of all, investments are connected to facilities or to the improvement of business opportunities, so they can be graded long term. Secondly, the long life cycle infers the factor of uncertainty and the possible lack of information. Next to these facts, specialty is also the limited mobility of fixed assets, so the assets used in the facilities can be passed on only with significant losses after the useful life cycle. The other specialty belongs to special costs like operating and managing costs. Finally it has to be added that the case of agricultural enterprises is particular because there the value of current assets are high.

The economic efficiency preparation of an investment can be implemented on three levels which are the followings: the preparation of project plan, the planning of turnover and costs, and the examination of sensibility. It is important to define the costs of the investment and the size of expected turnover and costs during the useful life (Godfrey-Espirrosa, 1996). If all the above-mentioned data is available, so the planned investment possibility of the business enterprise can be evaluated with the help of investment efficiency rates (net present value, period of return, internal interest rate). The purpose of this study is not to introduce these methods but to introduce without the aim of completeness -the possible relevance of each factor of investment efficiency calculations.

The operating costs of the design method is correct that the depreciation costs do not list the actual operating costs of the investments, so that the economic calculations are not borne version of the investment plan is a cost that will not actually be withdrawn from the company Nejad-Kabadi, 2016; Zhang-Zheng, 2015).

So much study concentrated on the calculative rate of interest (Pylypenko, 2015; Magni, 2014; Stretcher et al. 2015) and said this calculative rate of the time value of money expresses. The calculative rate when determining the most professional company always uses the calculation of the current bank loan interest rates, but to develop several possible answers can be given Craig-Raman, 2016; Magni, 2015; Makrominas, 2016; Merlo, 2016; Pyo-Robinson-Shin, 2016; Thompson-Barry-Myers, 2015):

- The calculative rate of interest should have be the same with the development loans;
- Actual earnings per total fixed commitment of the company could be the basics of the calculative rate of interest;
- The current answer to achieving maximum income to be the size used in the calculative rate of interest.

The calculative rate of interest used in the calculation of net present value and interest rate of return (Paquian et al. 2016). In the following three chapter deal with the method of how could choose the calculative rate of interest.

The determination of a calculative interest rate in business enterprises is the result of a careful process. Business managements use external interest rates widely in business decision preparations. Decision makers mainly use calculative interest rates as discount factors while evaluating investments. The external interest rate is often used to estimate cost of capital or it is considered while calculating amortization factor (Coenenberg, 1999). Calculative interest rates can naturally be used for determining normal profit or for mapping economic cut-off points of business enterprises. The extent of cost of capital of profit-oriented business enterprises can be determined in the knowledge of market conditions. Generally three main factors must be considered for calculative interest rate estimation.

The first factor is the risk-free return rate without market risk (r_0), which in developed market economies is equal to market reference return rates of long-term government bonds. The theoretical background of this is that the stock market from the aspect of microeconomics is considered an efficient, perfect and competitive market where the conditions of realizing Marxian extra profit or microeconomic profit are not given and as a result this return rate can be reached risk-free. In the stock market, as for the concept of government bonds, atomized demand and supply sides are opposed, the market is characterised by power symmetry, the market actors are perfectly informed and monopoly effects are eliminated as a result of the operation of the stock market. If the capital of business enterprises is invested in government bonds, on the one hand, it is not necessary to take economic risks and, on the other hand, the market reference return rate is guaranteed, which can be achieved risk-free on the long run because of a relative market balance. Of course, this reference return rate is low since it contains no risk offset.

The second factor influencing the extent of calculative interest rate is the average return rate to be realized on real markets (\bar{r}_{ROI}), that contains risk offset in addition to risk-free return rate. This return rate may be reached under normal market conditions but only if the given business enterprise is willing to take average market risks. Since average return on equity includes risk-free return, we call the difference of the average market return and risk-free return average risk charge (Illés, 2008).

$$\bar{r}_{ROI} - r_0 = \text{átlagos piaci kockázati prémium}$$

According to the above-mentioned derivations the risk of risk-free return is 0 ($\beta=0$), while the risk value of the average market return is 1 ($\beta=1$). The most obvious method to assess the risk of investment is to analyse the reaction of market portfolios on market movements. In this case we compare corporate returns with average market return and assign lineal to the points we get. Beta values are the steepness of these lineal. The greatest difficulty in real economic life is the fact that the product and service composition of corporate portfolios vary significantly which makes the estimation of average market return complicated (Witt-Witt, 1994; Mullian, 1989).

The third factor that determines the movement of external interest rate is the individual risk offset of business enterprises. The overall risk offset of a business enterprise can be determined using beta values. According to the conceptual model estimating calculative interest rate the expected risk charge is proportional to the beta movement. This means that all entrepreneurial investments are located along the return-risk lineal. As a consequence, if the beta of an investment is 0.5, the expected risk premium is exactly half of the expected risk

charge of the market. If the beta value is 2, the expected risk charge of investments is precisely the double of the market risk offset. In summary, and according to the described conceptual model, we can say that the overall market premium of a business enterprise consists of average market risk offsets and the individual risk premium of the given business enterprise:

- Overall risk offset of business enterprises: $(\bar{r}_{ROI} - r_0) * \beta$;
- Average market risk offset: $(\bar{r}_{ROI} - r_0)$;
- Unique risk premium of business enterprises: $(\bar{r}_{ROI} - r_0) * \beta - (\bar{r}_{ROI} - r_0)$.

Based on the conceptual model of calculative interest rates we may say that the external interest rate (r) has three elements: (a) risk-free return rate, (b) average market risk offset, (c) unique risk offset.

$$r = r_0 + (\bar{r}_{ROI} - r_0) * \beta$$

The following diagram is the conceptual figure of the above-introduced return-rate-risk model that can be used to estimate the calculative interest rate of business enterprises.

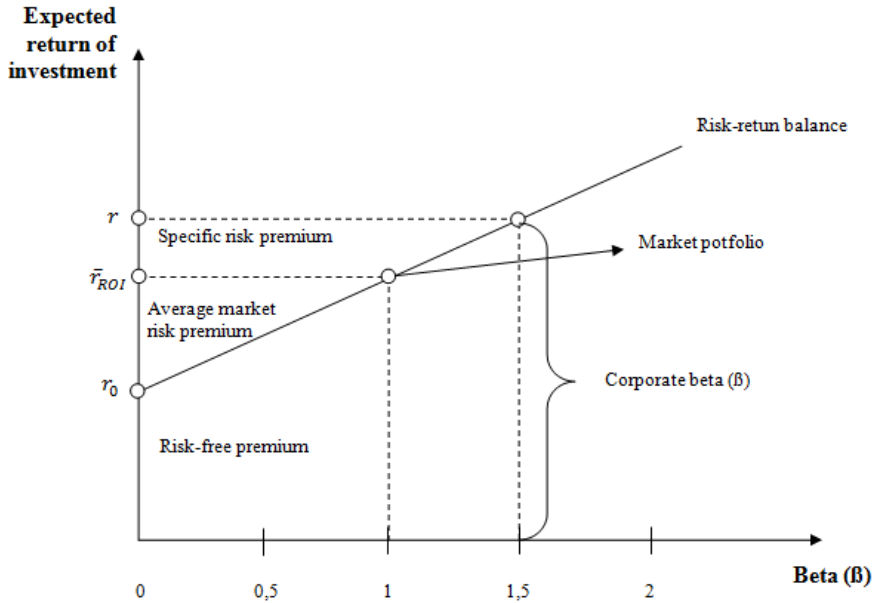


Figure 2.2.1: The conceptual diagram of return-rate-risk model

Source: own construction, used by Brealy-Myers, 2013

The horizontal axis shows risk values (β), while the vertical axis shows the expected return of investments. The axial section of risk-free return intersects axis Y and if we connect this point to market portfolio return, we get the return-risk lineal. If we project corporate beta values on this, it shows the estimated extent of calculative interest rate of a business enterprise on axis Y. Figure 1 shows that whatever the beta value of a business enterprise, it must be on the return-risk lineal, otherwise, for example, a greater risk would bring less return which cannot be the aim of a rational entrepreneur.

In summary we can say that the conceptual model provides guidance for calculative interest rate estimation since it shows the negative consequences of irrational decisions and corrects them.

Calculative interest rate estimation by Monte-Carlo simulation

Risk analysis is a process that determines the frequency function of output data by taking into account the probability distribution of insecure input data on the market. Risk analysis is carried out in several steps (Bitz, 2006):

- Selecting relevant input data on the real market;
- Estimating the probability values of uncertain input extents;

- Determining uncertain input data values by Monte-Carlo simulation that are needed for output value estimation;
- Calculating output data in the knowledge of the input data;
- Determining and depicting relative and cumulated relative frequency functions of output data.

The entrepreneur first must estimate those input factors that determine the extent of calculative interest rate and must rank them into class intervals. According to the conceptual model these input factors are the following:

Long-term government bond market reference return (r_0), the average return on equity market rate (\bar{r}_{ROI}) and the individual risk factor of the business enterprise (r_F). Of course, entrepreneurs will use empirical data for the estimation of possible values of input data.

In the second stage entrepreneurs assign probabilities to the values in class intervals which are determined empirically or by using statistical information. Table 2.2.1 shows the class intervals of input data and their probabilities.

Table 2.2.1

Class intervals of input data and their probabilities

Name	Class interval 1	Class interval 2	Class interval 3	Class interval 4	Class interval 5
Market reference return of long-term government bonds (r_0) (%)	1.1-1.5	1.6-2.0	2.1-2.5	2.6-3.0	-
Probability w (%)	0,2	0,2	0,4	0,2	-
Average return on equity rate (%)	6.0-7.4	7.5-8.9	9.0-10.4	10.5-11.9	12.0-13.5
w (%)	0,2	0,2	0,2	0,2	0,2
Individual risk factor	0.8-0.95	0.96-1.1	1.11-1.25	-	-
w (%)	0,2	0,4	0,4	-	-

Source: own construction

In the third stage entrepreneurs carry out necessary calculations while taking into account probabilities by random selection of input value combinations that is similar to processes on the real market and thus simulation imitates market processes by using the Monte-Carlo simulation model. Entrepreneurs need a generator supplying a random number which, in our case, may be a dice*.

Table 2.2.2

Average values of input data class intervals while taking into account probabilities

Random numbers	(r_0)	(\bar{r}_{ROI})	(r_F)
1	1,3	6,7	0,875
2	1,8	8,2	1,03
3	2,3	9,7	1,03
4	2,3	11,2	1,18
5	2,8	12,75	1,18

Source: own construction (* The table shows that we have 5 class intervals, so the random numbers can be 1-5. If an entrepreneur rolls a 6, he/she has to roll again.)

Before rolling the dice, he/she determines the average values of input class intervals and assigns them to the random numbers. Table 2.3.2 shows the data received. The target function needed for calculative interest rate estimation is the following (used during calculations).

$$r = r_0 + (\bar{r}_{ROI} - r_0) * r_F$$

Where:

- market reference return of long-term government bonds (%);

- average market return on equity rate (%);
- individual (entrepreneurial) risk factor;;
- average market risk premium (%)
- the overall risk offset of the business enterprise (%);
- individual risk premium of the business enterprise (%).

In order to determine the distribution of calculative interest rate, first we have to calculate the highest, lowest and average values of the external interest rate which is quite simple in the knowledge of the target function.

Highest value:

$$r_{MAX} = r_{0MAX} + (r_{ROI_{MAX}} - r_{0MIN}) * r_{F_{MAX}}$$

$$r_{MAX} = 3,0 + (13,5 - 1,1) * 1,25 = 18,5\%$$

Lowest value:

$$r_{MIN} = r_{0MIN} + (r_{ROI_{MIN}} - r_{0MAX}) * r_{F_{MIN}}$$

$$r_{MIN} = 1,1 + (6,0 - 3,0) * 1,8 = 3,5\%$$

Average value:

$$\bar{r} = \bar{r}_0 + (\bar{r}_{ROI} - \bar{r}_0) * \bar{r}_F$$

$$\bar{r} = 2,05 + (9,75 - 2,05) * 1,025 = 9,94\%$$

Table 2.2.3

Assigning random numbers to individual inputs (seventeen repetitions)

Random numbers	1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.	12.	13.	14.	15.	16.	17.
(r_0)	3	2	4	2	5	2	2	1	5	5	2	1	1	2	3	5	3
(\bar{r}_{ROI})	1	3	3	2	1	5	2	5	3	3	5	3	2	3	2	2	2
(r_F)	1	1	4	5	1	5	2	5	1	4	4	4	2	5	3	2	2

Source: own construction

Table 2.2.4

Calculative interest rate values determined by simulation

Number	Input data belonging to random numbers			Output
	(r_0)	(\bar{r}_{ROI})	(r_F)	r(%)
1.	2,3	6,7	0,875	6,2
2.	1,8	9,7	0,875	8,7
3.	2,3	9,7	1,18	11,0
4.	1,8	8,2	1,18	9,3
5.	2,8	6,7	0,875	6,2
6.	1,8	12,75	1,18	14,7
7.	1,8	8,2	1,03	8,4
8.	1,3	12,75	1,18	14,8
9.	2,8	9,7	0,875	8,8
10.	2,8	9,7	1,18	10,9
11.	1,8	12,75	1,18	14,7
12.	1,3	9,7	1,18	11,2
13.	1,3	8,2	1,03	8,4
14.	1,8	9,7	1,18	11,1
15.	2,3	8,2	1,03	8,4
16.	2,8	8,2	1,03	8,4
17.	2,3	8,2	1,03	8,4

Source: own construction

Besides highest, lowest and average external interest rate values, entrepreneurs must determine further calculative interest rate values by Monte-Carlo simulation. The random numbers needed for this are included in Table 2.2.3 and they are determined by entrepreneurs using a generator. Managers generate further seventeen values, besides the three starting values, so there are twenty values for the distribution function. This is considered to be a good starting point for editing, on the one hand, a Gauss curve and, on the other hand, a cumulative distribution curve. Using the random numbers in Table 2.2.3, and in the knowledge of the entrepreneurial target function, the further 17 calculative interest rates can relatively easily be determined (Table 2.2.4).

The next step is to sequence the highest, lowest, average and the estimated 17 values in an ascending order (Table 2.2.5) which enables us to edit a Gauss curve and a calculative interest rate distribution function.

Table 2.2.5

The rank of calculative interest rate values

Rank	The number of calculative interest rate	Value of calculative interest rate (%)	Frequency
1.	Lowest value	18,5	3 (4.9%)
2.	r ₈	14,8	
3.	r ₆	14,7	
4.	r ₁₁	14,7	9 (9.2%)
5.	r ₁₂	11,2	
6.	r ₁₄	11,1	
7.	r ₃	11,0	
8.	r ₁₀	10,9	
9.	Average value	9,9	
10.	r ₄	9,3	
11.	r ₉	8,8	
12.	r ₂	8,7	
13.	r ₁₃	8,4	4 (11%)
14.	r ₇	8,4	
15.	r ₁₅	8,4	
16.	r ₁₇	8,4	
17.	r ₁₈	8,4	3 (14.7%)
18.	r ₅	6,2	
19.	r ₁	6,2	
20.	Highest value	3,5	1 0.02%

Source: own construction

Managers edit the Gauss curve of calculative interest rates in a way that the interest rate values from Table 2.2.5 are depicted on the horizontal axis and the relevant frequency values on the vertical axis. The cornerstones of the calculative interest rate (highest, lowest, average values) and the Gauss curve (Figure 2.2.2) edited by using the 17 values determined by simulation provide a good opportunity to determine a reliable calculative interest rate. The Gauss curve demonstrates that it is advisable for entrepreneurs to choose a 9.2% calculative interest rate since about 50% of known interest rate values are located near this value. It is well-known from technical literature that cumulated relative frequency curves provide further relevant background information compared to Gauss curves for decision makers or for experts taking part in decision preparation (Schmalen, 1999). Entrepreneurs get calculative interest rate distribution curves by recording estimated calculative interest rate values on the horizontal axis and assigns cumulated relative frequencies to individual interest rate values on the vertical axis (Figure 2.2.3).

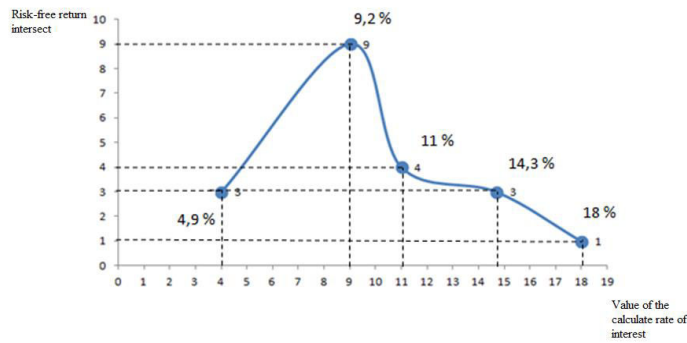


Figure 2.2.2: Gauss curve of the calculative interest rate

Source: own construction

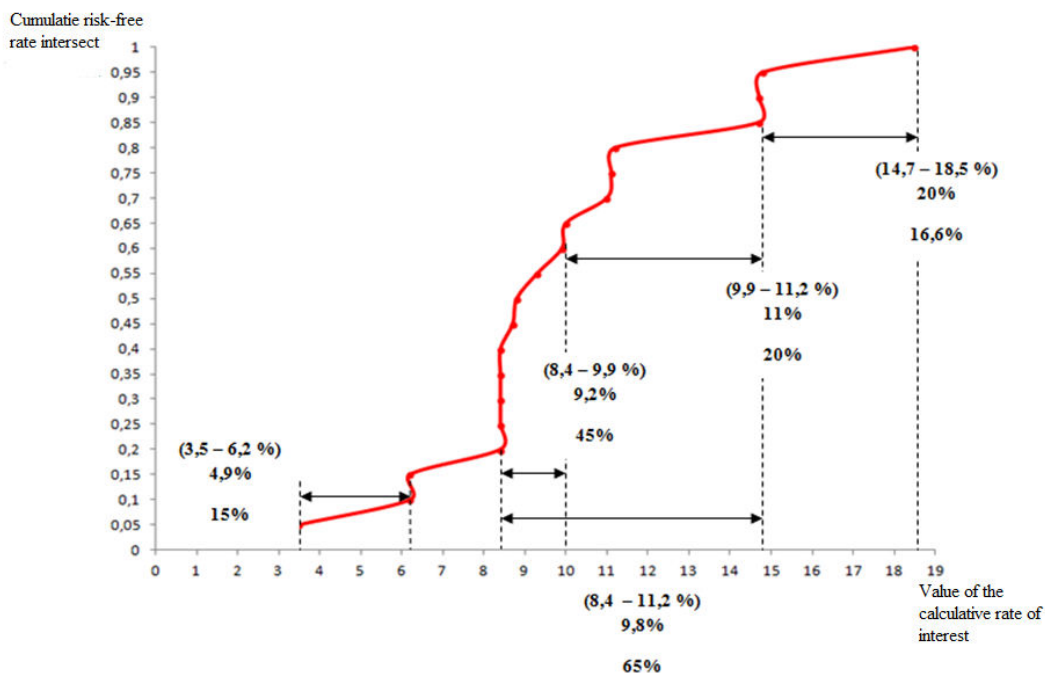


Figure 2.2.3: The cumulated relative frequency curve of calculative interest rates

Source: own construction

Figure 2.2.3 well demonstrates that the frequency curve of calculative interest rates can be divided into well-separated sections that show the average interest rate values belonging to different probability values.

1. There is a 20% probability that the external interest rate will be between 14.7 and 18.5% - 16.6% on average, which are unrealistically high values according to the model.

2. Very low calculative interest rates, 4.9% on average, can only be forecasted by a probability of 15% since the proper offset of the risk the entrepreneur is taking would not be produced.

3. Relatively high external interest rate values, 11% on average, have a probability of 20% according to model calculations, which is also very low.

4. The probability that calculative interest rate on the market is on average 9.2% (8.4 - 9.9%) is quite significant, 45%. In the knowledge of model calculations we can say that external interest rates usually belong to this range.

The cost of capital factor supported by Monte-Carlo simulation and derived from return requirements is between 8.4 and 11.2% with a probability of 65%. This means that the relatively most frequent values of enterprises belong to this range, with an average of 9.8%.

Based on the model calculations carried out in the study we suggest that decision makers should choose a calculative interest rate of 9.8%. According to trial calculations this return requirement can be considered as realistic on the market since the target function used for calculative interest rate estimation takes the probabilities of given input factors into account thoroughly. All in all we can state that the model including risk analysis can determine the level of return requirement which efficiently assists the work of decision makers.

Orthodox versus unorthodox model calculation

An inappropriately calculated return on capital requirement is not only disadvantageous but it can be economically harmful for the business enterprise.

Let us examine a machinery investment economy calculation in which we estimate calculative interest rate without risk analysis and with risk analysis support (Francis, 1983).

The basic data needed for calculations are the following:

1. Long-term government bond market reference return $r_0=2.5\%$
2. Average market return on capital rate $\bar{r}_{ROI}=10.5\%$
3. Individual risk factor $r_F=1.15$
4. Invested amount $I_0=600$ mPE
5. Sold product quantity $Q=380$ m pieces
6. Useful lifespan of machinery $n=5$ years
7. The changeable first cost of product $FP_v=0,575$ PE/piece
8. The price of product $p=1$ PE/piece

The results of calculations are the following:

Calculative interest rate without risk analysis (Pohl, 1989):

$$r = 2.5 + (10.5 - 2.5) * 1.15 = 11.7\%$$

Calculative interest rate with risk analysis (calculated earlier): $r = 9.8\%$

Net present value when calculative interest rate is 11.7%:

$$q = \frac{0,117 * (1 + 0,117)^5}{(1 + 0,117)^5 - 1} = \frac{0,20345}{0,73886} = 0,275$$

$$NPV_{ortodox} = -600 + \frac{380 * (1 - 0,575)}{0,275} = -600 + 587,3 = -12,7mPE$$

→ a beruházás nem gazdaságos

Net present value when calculative interest rate is 9.8%:

$$q = \frac{0,098 * (1 + 0,098)^5}{(1 + 0,098)^5 - 1} = \frac{0,15640}{0,59592} = 0,262$$

$$NPV_{unortodox} = -600 + \frac{380 * (1 - 0,575)}{0,262} = -600 + 616,4 = +16,4 mPE$$

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Internal rate of return of the business enterprise:

$$IRR = 9,8 + 1,9 * \frac{16,4}{|-12,7 + 16,4|} = 9,8 + 1,07 = 10,9\%$$

The economy calculation results of investment according to different calculative interest rates (Figure 2.2.4).

In the knowledge of the net present values calculated by calculative interest rates estimated by different principles and the investment curve (Figure 2.2.4) edited with the help of output data, we can say that interest rates determined by over-simplification (orthodox method) is not economical while the interest rate estimated by simulation (unorthodox method) used as a discount factor shows economical courses of business (Cooyne, 1984).

The inner return rate of the studied investment is 11% in the actual economic environment which is considered good based on known market return rates. As a

consequence, if we calculate an interest rate without considering the probabilities of input factor realizations, it will be disadvantageous for the company and economically harmful. In the present case the business enterprise will lose an excess return over 16 mPE which could be seen as a profit and means comparative advantage on the market since if an advantageous investment is not implemented it will result in significant loss of return. In the studied investment situation the business enterprise not only lost economic profit but cost of capital as return requirement - as well (Keating, 1986).

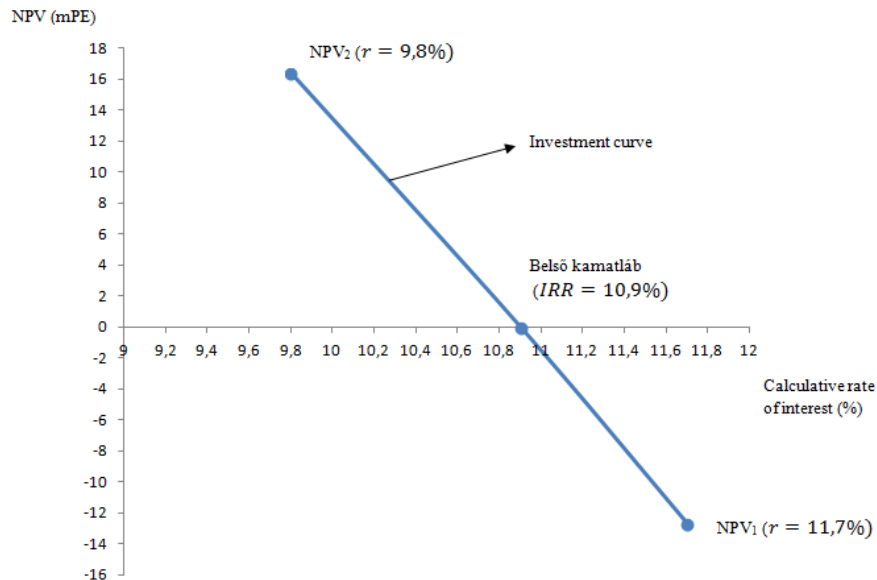


Figure 2.2.4: Net present values in the case of different discount factors
Source: own construction

The study first introduces reference works in the technical literature dealing with calculative interest rates and then introduces the conceptual model on external interest rate estimation in detail which is a good base to lay the foundation for demonstrating the necessity of further developing return requirement estimation methods used in the technical literature and in practice.

The improved method of careful calculative interest rate estimation results in the urge to follow dynamic principles instead of static, rigid principles. This principle takes into account the probabilities input extent realization which enables us to determine "real function relations" (Gauss curve, distribution function).

The model demonstrating the theoretical background of external interest rate determination draws our attention to the fact that decision makers should consider economic regularities (e.g. higher risk should only be undertaken if a proper market premium can be realized) instead of routinely-done or ill-considered interest rate estimation methods.

The simple knowledge of factors determining calculative interest rates does not guarantee relevant interest rate estimation. The simulation method introduced in the study draws our attention to the fact that mapping the probabilities of individual input values is essential on the market besides determining the real extent of input factors. This procedure can be used to "imitate" market processes from real market environments which probably enable more reliable calculative interest rate estimation. The reason for this is that the simulation model enables us to generate a great number of output values while taking into account random influences on the market. A great number of output values supply enough information for decision making.

Based on the conceptual models introduced in the study and the results of the economy calculations of investments, we can draw the conclusion that not carefully defined calculative interest rates used as capital costs and discount factors may cause significant losses for business enterprises. If discount factors are higher than justified, even economical

investments cannot be realized, this is, on the one hand, a return requirement, on the other hand, it can cause economic damages, a loss of market and a drop in turnover because of the loss of excess return.

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2.3 BRAND OF EDUCATION AS A POTENTIAL OF THE ECONOMIC DEVELOPMENT COUNTRY

Integrating low-developed countries in the international economic environment corresponds to the general principles of civilization that dominated at present functioning of the world economy. Globalization, as a systemic geo-economics and geopolitical phenomenon leads to an increase risk for these countries considering their a lack competitiveness, and therefore the search vector of their own destiny, effective format of management of the national economy is the guarantor of the success of their integration into the global economy. Based on the historical experience of economic development and the integration of the different levels of prosperity, each country must go through quality improvement of the national economic system that requires structural shifts in the economy and the corresponding changes in the governance of the national economy. In this regard, actual opinion is today Y.A. Schumpeter that economic development is a spontaneous and discrete changes in the ways the flow economic life, an imbalance that forever changing, replacing the previous equilibrium and begin in industry and commerce [72, p. 73]. The system modernization of the national economy as the dominant mechanism for the growth of its profitability is able to integrate the powerful potential of the country and implement it in the overall national wealth. Increasing of the economic potential to the level of developed countries will provide additional impetus from integration with other countries on a parity basis through attraction in the economy of additional external resources such as financial, innovative and intelligent. A special role in forming country's economic potential and structural economic changes belongs to the brand of education.

The purpose the given research is to determine the mechanism of influence brand education on forming the economic potential of the country, highlight the links between education brand and other economic factors affecting the development of the country. For the purpose were used: *systemic and national approaches* to the methodology of scientific knowledge brand of education that allowed to investigate his the integral properties and influence on the formation country's economic potential; *synergetic approach* to the integrated use of all components of brand education; *system-behavioral approach* to represent the brand of education through the prism of the problems associated with the volatile character of modern economy, adequate changing its characteristics; for justification of conditions of the transformation of the brand in the international education and global; *managerial approach* to process management brand in specific market conditions and consumer conditions; *international approach* for effective integration into the global economy.

The place of science and education in innovative economy

The efficiency of enterprises primarily depends on a high level of culture management, innovative technology, methods and mechanisms of its application, which requires preparation of intellectual capital as one of the priorities of innovative development. An innovative economy needs advanced technology and equipment, new educational system that will provide updates intellectual potential that V. Tsipurynda defines as a critical mass of highly skilled professionals who are able to find and implement new technologies and high moral character [71, p. 19].

The decisive role in training and establishing scientific, technical, cultural and educational connections that form the educational system belongs of higher education institution. Use and dissemination of new knowledge should be the basis of national competitiveness and the basic prerequisite of intensive growth of economic potential. Education plays a constructive role in the triad innovative economy that is shown in Figure 2.3.1. The interaction of individual components of the innovation economy in Figure 2.3.1 symbolically represented as wheels, each of which is starting to move, drives the other, i.e. the general development of innovative economy depends on adequate development of each

component. Stopping one wheel hurts the overall movement of elements i.e. system elements works like a clock, which symbolically emphasizes the need for agreed movement, whose support will contribute to its longevity.

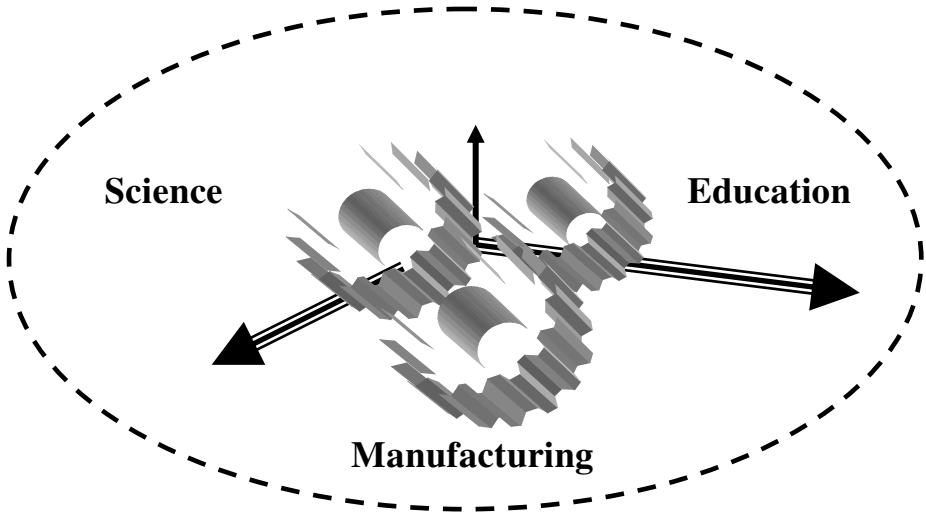


Figure 2.3.1: The scheme of the mechanism innovation economy

Source: compiled by author

Furthermore, the integrated development of all components will be the emergence of synergies effect, the absolute size of which is far exceeds the simple arithmetic sum of its individual elements.

Manufacturing that is on seen in Figure 2.3.1 as one of the three elements of the innovation economy, on the one hand is the intellectual, material and financial source of science and education, and on the other, is a consumer of the intellectual production as well as intellectual strength i.e. human resources.

Science and education, thus determining the level of production, and therefore are influential factors forming the country's economic potential. The educational brand in the context of this study is seen as aspirations of the state; private business and community improve relations, financial and governance component in education. Combining efforts of the government, the private business and community in the issue creation of the educational brands in the country is a condition for successful operation through the integration efforts in forming material base of educational brands, optimizing connections between its components, providing needs of national economy in qualified specialists and innovation. It is important that the brand provides educational needs of the national economy in the technological, industrial and managerial innovations, forming its potential.

It is generally known that the knowledge-intensive global average is 1.9% of GDP, and in countries with innovative strategies spending on science should be from 2.5% of GDP, while in developed countries the figure is 5% of GDP [70]. So, analysis of the total government spending, private business, and charitable contributions to educational activities, scientific, research and technical work in the country establishes the accordance of the actual situation to strategic objectives and level of knowledge-intensive of the national economy. The obligatory part of this analysis should be the absolute and relative indicators that characterized the dynamics of budgetary and private funding of scientific activities and their effectiveness. The level of knowledge-intensive and innovative national economy coincides exclusively under the condition of the maximum efficiency of investment in science and education. The innovation of the national economy as a result of the effective and timely implementation of scientific achievements in production, education, management reflects the level of social welfare of the population of country. Availability of scientific and educational potential is not 100% guaranteed of the innovative development of national economy, such

potential needs of the demand and implement within their own countries, that innovative preference is monetized in the country, which actually occurred. In particular, brand education as its model of innovation, provides national economy by qualified specialists, the absence of demand leads to emigration, and therefore to the loss of investments of the state and private funding for education.

Availability of national education brands advocates as indicator that positively characterizes the country in the global space provides the growth of its economic potential and competitiveness among similar institutions.

Sources innovative potential of the national economy

The fall in the growth rate of the volume of scientific and of technical works in production leads to physical and moral aging of equipment, falling productivity, enterprise profitability, lower productivity, reduced requirements for the professional skill of workers, that deepening the negative trends up in the manufacturing sector. This chain-dependence indicates the presence of feedback between education and production and can lead to the degradation of not only the production industry whole, but and intellectual degradation of the country, whole society and civilization, therefore the responsibility of Education and Science covers all aspects of life.

The sources of innovation potential, as production capacity, education and basic-applied science to provide the implementation of the innovation in the production process and update products, shown in Figure 2.3.2:

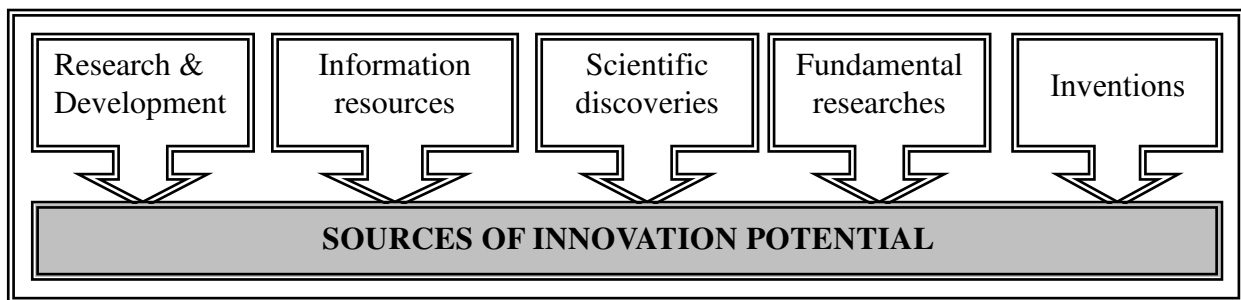


Figure 2.3.2: The sources of innovation potential of the country

Source: compiled by the author [63]

The fundamental scientific researches open to person new knowledge that transformed into products and technologies high-tech industry, stimulate productivity growth, reducing material and energy intensity, increasing the competitiveness of social production, accelerating the pace of accumulation of public income, changing motivations employment, improving the general welfare of citizens in the country.

The scientific potential as a component of innovative potential, determined by a combination of resources and organizational, managerial forms of effective implementation opportunities not only in science, but also education, any production system (enterprise, territory, industry, country).

The link between science, education and production creates preconditions for development scientific potential, which is forming influenced by the following elements:

1. Amount of financing scientific and of technical works;
2. The degree of diversification of sources of innovation financing;
3. The state share of funding for scientific research;
4. The volume and rate of growth of scientific and of technical works;
5. Dynamics network of scientific and research institutions;
6. The number and quality of the staff of research institutions;
7. The share of innovative products in the volume of industrial production.

The trends of stagnation or reducing of the organizations engaged in scientific and

technological activities, indicate the existence of serious problems in the country. The expenses on science in advanced countries for the past 10 years, growing annually by 1.5-2 times faster than global growth. According to expert calculations in today's world, more than 3/4 of economic growth is achieved through the use of new knowledge and implementation of scientific and technological progress. Today, developed countries inherent such traits as dominance of GDP knowledge-intensive economic activities, growth in export share of high technology and know-how (US 32%, UK 31%, Finland 24%), a significant increase in investment in infrastructure knowledge (education, science, telecommunications, Internet) and the share capital of leading companies and business structures that are related to expenditure on science. The initial limit innovation model of the world economy is defined at 40% innovatively and knowledge-intensive in terms of GDP is not less than 2.5%, and to reach this limit without structural changes in the national economy is almost impossible.

Education that considered as an element of the innovation economy plays a fundamental role in preparing the intellectual resources of the country not only for production but also for social, i.e. the role of education extends beyond the triad considered.

The economy bases on productive use of new knowledge, the quality of which depends on science and education. The state innovation policy of educational, scientific and technical, innovative and related industries provides practical of reformation activities which should ensure accelerated pace of the qualitative growth of production and the modernization of public relations.

Practical ways of implementing the concept of innovation development of national economy distinguishes elements of a modern knowledge economy:

- Affordable, quality and continuous education of the population on the basis of new scientific knowledge;
- Economic incentive and institutional regime that encourages efficient use of national and global knowledge in all sectors of the economy;
- Effective innovation system that integrates into a single set of economic, scientific, academic and research centres;
- Infrastructure, which connects elements of the innovation system among themselves and with the environment;
- The state as the initiator and coordinator of the process of building the economy based on new knowledge.

The strategic objectives of the knowledge economy include:

1. Consolidation of methodological and information systems, educational, professional, educational and scientific, educational and industrial infrastructure and communications within a single national innovation space;
2. Strengthening the international integration of countries in the humanitarian sphere and the combination of the national innovation system with technological platform of global post-industrial society;
3. Providing of vertical mobility that corresponds to national task and available potential society in matters of including the global system of division of labor, determine the dynamics and directions of the global economy, the distribution of income and benefits from the results of modern scientific and technological revolution [62].

The first two tasks directly related to the research topic and have influence on the formation educational brands. The integration of all elements of scientific, educational and manufacturing complex of the country should form their own national innovation system, which shall consist of the following elements:

- Scientific and educational institutions sector, which will create new knowledge;
- Innovative and techno-industrial infrastructure able to introduce innovations and transform them into goods;
- Extensive information network that provides access to global knowledge and innovative communications;

- Conditions (legal, financial and economic, credit, etc.) that promote attracting investments and dissemination of the innovation.

Algorithmic as a way to simplify branding of the educational institution

Society has the benefits from the availability of highly educated citizens. The state must act as the main investor of the education system, because such costs are socially useful. The main, but not single investor, hence economic success of higher education institutions (HEI) depends on the competitiveness of universities in the education market (not only national, but also international), the chosen strategy, the diversification of commercial efforts - all activities that are inherent in HEI- brand.

Conditionally HEI- brands can be divided in time (historical and newly-created) and space (international, national, regional), temporal and spatial parameters can be the same. However, this applies primarily to internationally renowned universities, which for a long time (even centuries) prepare highly qualified specialists in various fields, and have created the fundamental scientific schools, which are famous by worldwide discoveries and outstanding scientists. The process of creating and promoting brands in universities meets modern market conditions of development of society which are inherent characteristics such as globalization and randomness. In such circumstances, the brand provides certain advantages that allow the university to remain competitive and achieve commercial success.

Algorithm of the branding simplifies the process of the representation, understanding and practical application of theoretical and methodological approaches to research and build a brand. Difficult process of constructing brand in universities after structuring it into separate components is seen as a technical and creative plan, as reflected in Figure 2.3.3 "Technical" because the work is carried out consistently and incrementally (step-by-step), and "creative" because like a lot of creative work aimed at the creation of a new, previously unknown spiritual or material assets (art, engineering technological, managerial or other innovations, etc.), which are components of fantasy, imagination, psychological component which contains the image to create the final product (creative result).

Building a brand starts with the creation of a university that will be its embodiment. If the university exists, step "creation" is skipped.

We define branding of a university, as the actual process of creation, development and brand management, the main way to identify a university, instruments of its implementation to the market and create long-term relationships with consumers. From an organizational point, branding is a complex of consistent measures aimed at creating a holistic and demand by consumer image of the university, algorithm which allows visualizing the process and simplifying the construction of the brand. In the process of building a brand it is important to consider that the main consumers of educational services is higher education applicants, those who study or wish to study at universities in order to obtain the relevant degree and qualification, but we must remember that to another consumer group include parents of future students participating in making decisions about choosing universities, and companies that are interested in getting higher education of their employees. This will help determine communication channels with all groups of consumers and improve the efficiency of the dialogue.

Block diagram characterizes branding of a university in one plane but in reality branding develops in a spiral, otherwise further expansion, branding would be blocked, life - very short. The idea of the spiral shape of history arose in the framework of dialectics. In the light of the law "denial denial" development history splits into separate, relatively independent stages, with each next stage related to the previous by denial as a necessary and essential element of development.

All processes of branding algorithm must be consistent with the philosophy of the university, which, in fact, encourages others to act in accordance with its goals and is considered as a system of guiding principles are the basis of carried out actions by staff in

relation to each other and to consumers (graduate students, etc.). Philosophy educational institution makes potential customers interested in its benefits and values. For example, the philosophy of Keiser University (USA): "The interests of student are important other" [68].

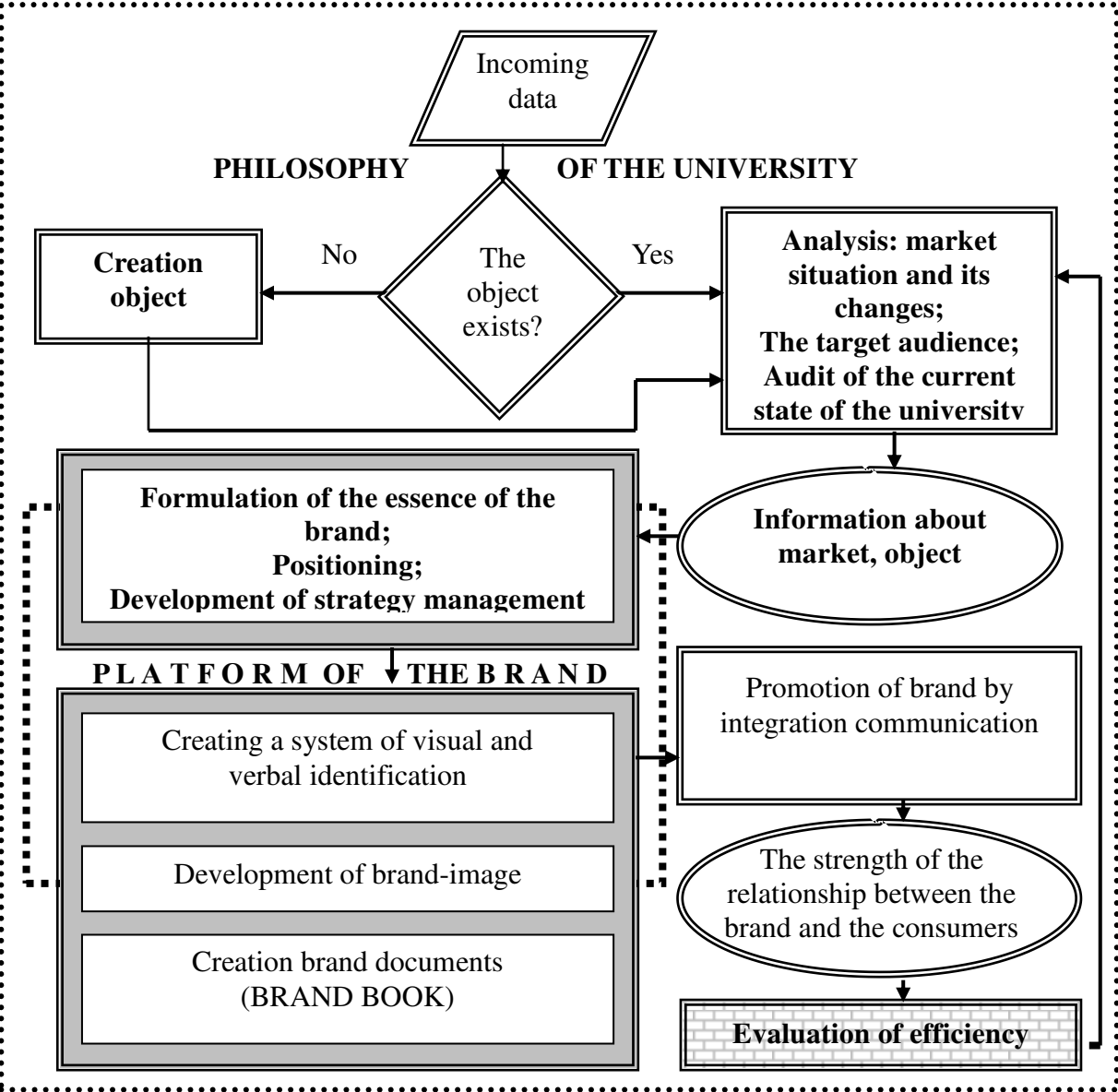


Figure 2.3.3: Algorithm of create of the brand Universities

Source: proposed by author

Education Brand (HEI) as a unique collection of all forms of brand

The uniqueness of the brand university is that it is a combination of all existing forms of brand that shown in Figure 2.3.4. At the beginning of the last century academician V. Vernadsky formulated the role of human intelligence as the productive forces on a global scale and further development of mankind connected with science, intelligence and humanism, i.e. the "noosferization" because is not accidental our brand university scheme symbolizes the solar system that naturally keeps in orbit of brand of goods and services, brands persons, events brands, brands territory, brands organization. Each "planet" rotating on its own orbit that has strategy development and promotion, has specific objectives aggregate of are consistent with the overall strategy of the university and focused on the general consumer. Consider more detail each component of the university brand.

The brand product within the brand university may be books that are written by the academic staff, scientific films, periodical scientific collections, methodical and lectures, the

content, the quality of preparation which will depend on its total amount and frequency of publication, the geography of (brand such product claims to move beyond the university). Brand services in universities, which is trying to create a brand should be lectures and seminars, personal consulting teachers, and students should have the right to choose on their own lecture of a teacher that will influence its rating, which should be a motivational element in pay the further development of the teaching staff.

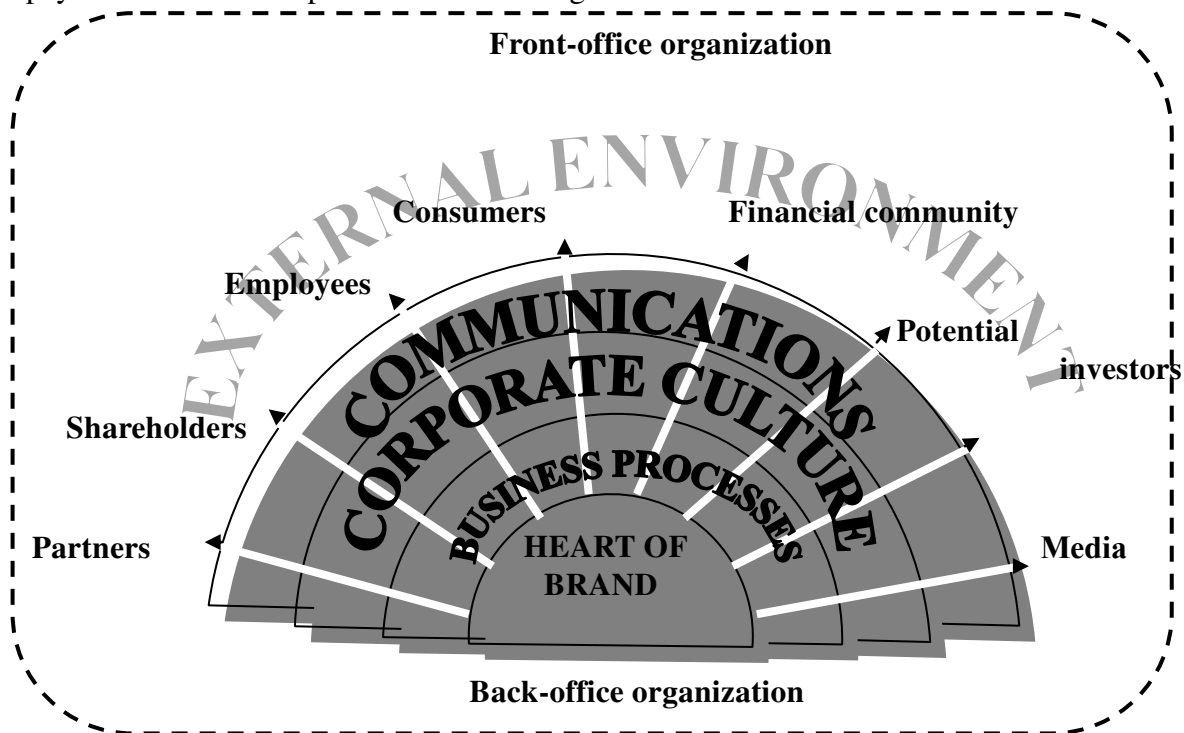


Figure 2.3.4: System of brand "university"

Source: compiled by author

To Brand Events Universities should be referred the conferences, including for students, especially international, because of such a measure allows to promote the universities into international space; holiday "Consecration to students" and the awarding diplomas; mass cultural and educational activities that have meaning propaganda on the potential consumer market (schools, colleges, businesses), competition between faculties of amateur performances, students and teachers, student theatre miniatures, etc; sponsorship work and charitable activities that contribute to the general public opinion and associative perception of potential consumers. Brand Events of universities attract attention to it, promote it to customers and improve the image of the institution.

A brand person is a tool to implement its own strategy for achieving his goals. As a tool, the brand persona is used in various spheres of life: in private life, training, business for building rapid career. Thus, the desire to come to a certain social circle or create your own family promotes using of brand person in part of creating a positive image. While studying the image, which managed to create the first years (quality academic records) and reputation increase "cost" of student and you get "bonuses" in the last years of education namely; to pass easily tests and exams, receive an invitation to further study and best place to practice. Special urgency brand person plays during employment, career advancement and business.

Brand persons in the context of our research envisages the involvement of a famous professors and scientists at the university that, through their own research and teaching accomplishments have famous name and can provide the interest the potential customers to join at this university; attract the best students and create conditions for the development and promotion of talent also will improve the image of the university. The educational institution, which is trying to become a brand, is interested in creating their own brand of teachers and

students, promotes development initiatives, to encourage better results. There is an increased scholarship for students who received the highest marks in most universities but, unfortunately, their substantial motivation cannot be considered if a difference with conventional scholarship is minor.

The set of educational buildings, laboratories, ancillary farm buildings, hostels, clubs, their parks, and recreation areas and sports fields forms an integral territorial brand Universities, which requires the overall management and support development. Universities, which has such a territorial brand has a strong competitive advantage over other educational establishments because consumers have interest to receive education in the comfort of living in the "student city". Infrastructure development brand Universities depends on many factors, especially the availability of funding and geographic expansion opportunities. Support of the link between the brand university and the brand persona will help in solving these issues, because each university has famous, influential, wealthy graduates who can contribute to the further development of their alma mater. Of great importance in the development of brand territory of Universities play and links with industrial enterprises, which, on the one hand, can be a source of funding for education own employees, support charitable university, and, on the other hand, can become the basis of production practice for students to degree, diploma, laboratory research and more. Thus create back connection and the interest in cooperation that is beneficial to both parties.

Back-office, front-office HEI as components of its brand

A special place in the brand university occupies brand-organization that consists of two parts: the back-office and front-office. Noting any special characteristics of the object or subject, we automatically fall under its influence, entering a communicative relationship with her. This external manifestation of each brand by V. Balashov proposed to call "front-office" brand. But the way to the hearts of consumers requires from company or organization primarily internal culture medium as "back-office" brand [58, p. 11-12]. The combination of the internal part and external forms the complete image of the brand universities, a kind of interface between educational institution and the consumer.

Inside the company's image begins with the concept of employer brand that is well positioned in the labor market. Each brand is created for its target audience; consumers of the brand back-office are its own university staff (teaching and technical staff). Brand back-office has a direct benefit during attracting qualified teachers, especially brand-teachers. We know that a strong brand product has a strong impact on the image of the employer: "Any wrong decisions in personnel management immediately becomes known to all. If the product has a bad reputation on the labor market, it is impossible to create a positive image of the company" [69]. The negative image of the employer can be provoked by violations of promises regarding wages, changes in motivational schemes, working conditions, workload, which may explain the absence of corporate culture educational institution his weak back-office. Organizational or corporate culture university as a mirror of his image in the eyes of employees and job seekers, which plays an important role in creating brand employer and affects the mission and vision, values and general rules of internal regulations, corporate communication network and hierarchy, allowing it to become a powerful means for forming both back- and front-office. In post-Soviet countries of payment for the teaching staff is low, not only does not correspond high qualification of employees, but sometimes does not provide a minimum subsistence level of teachers, that is one reason for the low quality of teaching and of corruption in the education system.

The brand exists wherever there is contact between the university and its own staff who are involved in the preparation of delivering trainings, development and manufacture of educational products (programs books, etc.), providing technical service educational institutions. The first man who university "sells" its product is its own employee. From his belief and convictions in what he does depends the quality of the final product, installed

communications and final financial result, that allows stating brand is "a market perception of the quality of internal management and production processes and standards, unique value-added" [58, p. 69-70].

Brand an employer helps to attract and to keep qualified teaching staff in educational institution thus combining marketing and human resource management. Presence in university the highly motivated employees directly influences its success. Given the changing realities of the job market, every educational institution is trying to put itself in a unique position on the career ladder. There is a demand for qualified teachers that continually exacerbated on the labour market and on the contrary, there is a decline in proposals through continuing demographic changes due to decline among young researchers, the reduction of public funding of science. In such circumstances, the creation brand employer is the basic tool to attract qualified applicants. Otherwise, many scientists emigrate.

The process of creating back-office of the university envisages the involvement of practically all staff of establishment from the technical staff, faculty to the head (Rector, Director) during the entire process from analysis to promote it in the environment. Forming back office should be the concept of the university, because the system messages and promises educational institution of their execution improves image of university in the market that helps to attract the best employees and ahead of the competition in development. Each audience perceives the environment through the prism of brand communications, culture and business processes, as shown in Figure 2.3.5:

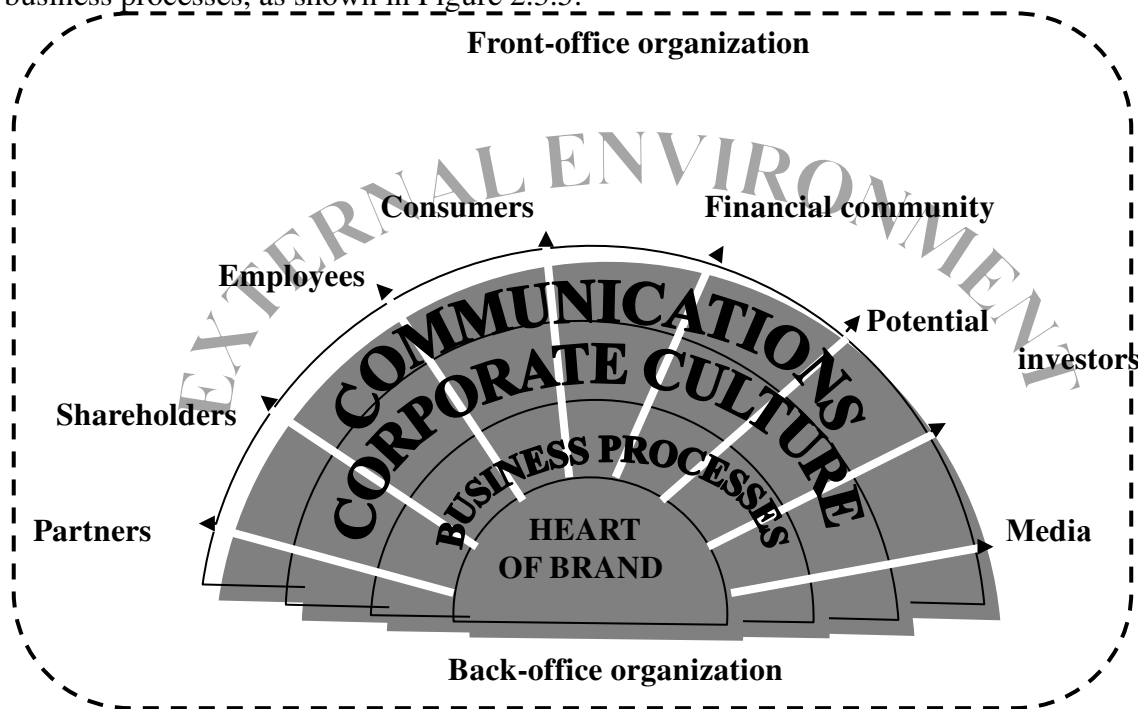


Figure 2.3.5: Scheme of interaction back-office and front-office

Source: compiled by author from [60]

This prism must be indivisible and equal for the perception of the both audience, internal and external. Well-established business processes declared and active corporate policy and Culture University, communication with its own staff and the environment denote and support the heart brand, allowing purposefully, consistently manage the perception of audiences, both internal and external.

Determination of brand positioning through creating its platform

Returning to algorithm of create brand university, that is in Figure 2.3.3 we note that after careful analysis of the internal and external environment and determine the benefits of the university, its weaknesses, opportunities need to start a forming the brand platform that

will determine format its future positioning, the ideology and character of the strategy, be used as a simple and effective tool for coordinated management at all levels of decision making. Universities brand platform creating and structuring on the basis of deep diagnosis conducted at different levels of decision making. Place the platform in the general scheme of the university brand its detailed structure is presented in Figure 2.3.6:

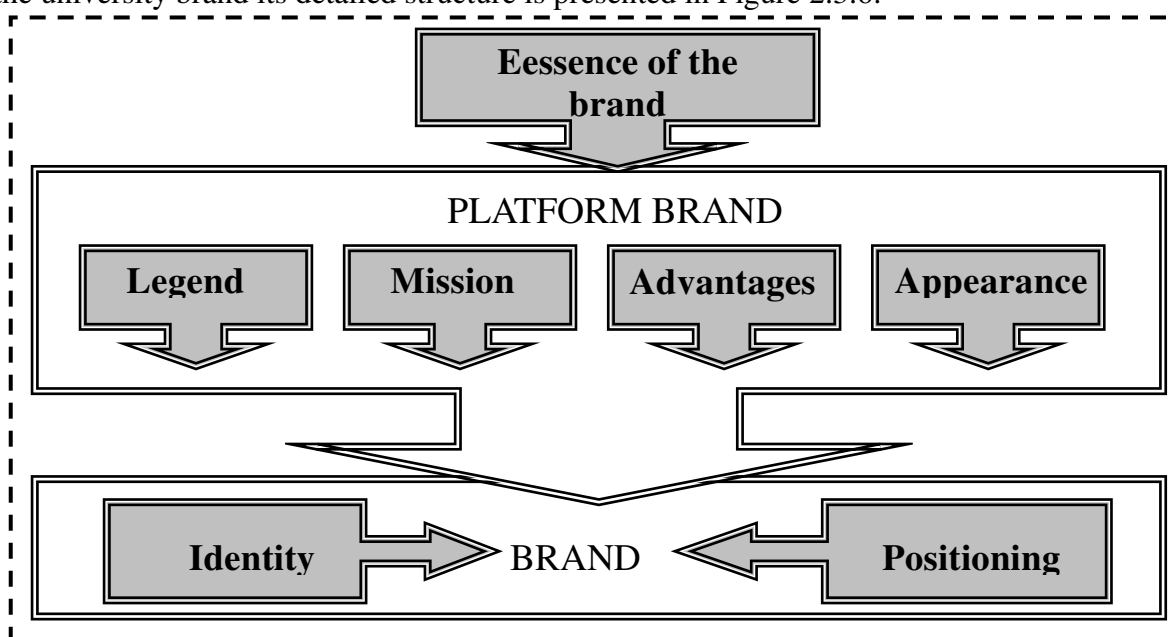


Figure 2.3.6: Positioning platform in the branding of University

Source: compiled by author

The values that carry the brand to the consumer form a fundamental part of the university brand platforms as consumers difficult to understand, accept ideology than personal usefulness. Functional benefits that have been identified during at a stage creation of object (individual educational programs, courses, using modern technology, special skill composition universities) are the primary internal identifier, which determines consumer brand values match their own settings. As for the secondary advantages, they arise at consumers during direct contact with the university but to understand them and recognize the need before install it of the contact because this understanding will be pivot creating external universities identification.

For secondary benefits belonging social, mental and spiritual benefits of understanding which helps to create its own brand-code, DNA (Deoxyribonucleic acid) university that provides unique brand Universities in the world today.

Social benefits provide the ability of consumers to identify themselves with a certain social group (identification) to express his personal stance.

Mental benefits of supporting in person confidence, inspiration, good mood, pleasure, mental relaxation, increased perception of authenticity. This measure is really penetrates deep into the personality. Here brand touches what that most of us would call a soul. Mental benefits influence the personal transformation i.e. can change or help to develop new ideas about himself as T. Gad sure that some of the best brands of tomorrow will play the role of a personal instructor that promotes mental development [61, p. 10].

Spiritual benefits are the perception of global or local responsibility, a sense of belonging to solving global problems, the implementation of further cultural development, and innovation.

Thus, the platform of the brand is a tool for the formulation of unique set of branding-part that will differentiate it in difficult market conditions. **Legend brand** Universities are a story of its origin described as an interesting history and is based on historical facts. Legend defines "age" of the brand says his fate and largely determines further development.

Mission brand Universities (goal of the brand) is presented in the most general summary form and often represent the main reason for its existence, it is a fundamental policy statement that defines the major principles of the functioning and development, gives the message to the environment about its aspiration and contributes to the formation certain the image of the object and creation of corporate spirit.

The last element of the brand platform is **Appearance University**, including the elements that make it possible to create a visual identity of the brand, make different from competitive. External elements of brand identification Universities are the following: name, logo, graphic, slogan, shape, colour or colours, sounds (hymn) movements - all components forming the final image of the university, which includes work on the formation of the elements of corporate culture and corporate style, finding effective strategies of their own identity and preferences in their work that in the future will turn into values that will provide long-term sustainable associative perception of the target audience.

Brand Universities give him a list of benefits:

1. Thanks to the popularity of the brand and audience loyalty reduced marketing costs;
2. Getting additional preferences (brand is seen as an indicator of quality, attracting the attention of potential customers and involve more number of students);
3. High consumer confidence will simplify the implementation of the expansion strategy (specialties, new faculties, university affiliates);
4. Some protection in a competitive market;
5. Strengthening corporate image, simplify promotion of new ideas.

The visual concept of the brand Universities assumes presence of three elements: slogan, background, symbolic sign or figure, each of which has specific requirements and recommendations. Universities brand slogan (mantra) should be short, rhythmic, harmonious; it must clearly and unambiguously perceived avoid ambiguous; finding the perfect slogan is figurativeness and associability which over time, influencing the minds of consumers, will cause persistent association brand perception universities, for example, the slogan of Nijinsky State University M.V. Gogol (Ukraine) sounds convincing: "We taught Gogol - and teach you!"

Logo is responsible for creating "pictures" in memory of the consumer, visualizes the brand. Often logo looks like a picture, the name of the university or even its first letter. The logo should harmoniously combined with the name of the brand, to be executed with it in the same style, do not interrupt him. Graphics and text are obliged work by single connection.

The use of corporate colours also plays a certain role in creating the image of the university. Background (cover-brand) is a colour basis, on which will be located slogan and other elements, colour range carries symbolic of loading understanding of brand and improves the efficiency of the associative perception. Symbolic identification marks as external symbols (visual-brand) complete the visual image of the brand, enhancing its perception. Every element of the first stage of promotion of brand complement each other and used together in the future deployment, development of brand university, each element of the visual concept can be used separately, based on existing associative perception of consumers.

The presence of the visual concept of brand (front office) is mandatory, it supports popular universities, recalls the essence of the brand, which can be considered as the interaction and is mutual complementing following hierarchical levels:

1. Attributes that describe the brand as physical education facility, appearance, size, key components;
2. The benefits i.e. the unique properties of Universities brand that aimed at the specific needs of customers;
3. The values characteristic i.e. consumer attitudes to brand university;
4. Individuality, which allows us to represent the brand in the form of human characteristics and provides emotional connection with consumers and promotes a high level of popularity;
5. The basic idea of a brand (slogan or mantra).

The presence of the working platform of the brand, its clear positioning in the market and creates conditions for the development of brand management Strategies University. The essence of the brand Universities, the strategy of its construction, development, promotion of the educational market, its advantages which is the main lever for creating its sustainable associative perception constitute its contents, and external identifiers Brand universities which enable to distinguish a brand from its competition, consists its form. The harmony between form and content, of the brand gives it maximum efficiency. That is why the purpose of branding universities, on the one hand, is the search and selection of precise verbal and visual of the brand identifiers, and the other, is a serious development of brand elements which make it a single image. In the context of unity of form and content a successful brand is a demand concept universities understand essence, attractive for the target audience conscious differentiation and sustainable set of attributes and qualities, agreed among themselves, exact niche positioning, good name that reflects and supports the essence of the of the brand, visual aesthetic that is unique and adequate to content brand. So fair is the formula:

The unity of form and content = successful brand

Violation of the unity of form and content of the brand Universities lead to serious risks and errors, reduce life cycle brand. The imbalance between form and content of the brand are different. A common imbalance is the creation only form. In case there will be no spontaneous formation of content, which is rare; the brand is not competitive and short. The disproportion as the lack of consistency between form and content, there is often plagiarized brands that use strategies to adapt to the market. Amorphous, not a clear form of the brand could lead to the disappearance and those brands that have a long history of development, if the market there will be a brand with a bright, recognizable form. To avoid these distortions of form and content it is necessary to maintain a balance between them, never forget the sequence: a study of the competitive environment, the concept of education proposals, the essence of the brand, quality and characteristics, differentiation, positioning, creative concept, identification, and audit. The process of creating of a brand of the university is very important in achieving the main goal of its functioning in the market conditions and commercial success. Chaotic movements on promotion in this way that were studied, analyzed, been structured many well-known by scientists and practitioners, turned in a specific sequence, methodological scheme step by step instructions.

Education marketing as a tool for brand Universities

Promotion of Brand University involves the use of traditional marketing tools complex of which directed to creating its favourable image in order to develop the competitiveness of universities. The system of marketing tools in this context is regarded as educational marketing. Scope of educational marketing is extremely broad. In general it can be defined as the educational market in which there is production, demand and offerings product of a special type of educational programs, courses, books and more. There is a difference between the marketing tools of economic and educational environment, but generally channels of promotion are traditional. So, if we review this question through the prism of B2B and B2C markets, promotion Brand University in the educational environment provides deliver speech before school community and personal negotiations with corporate customers and sponsors. Traditional Advertising channels are television, radio, outdoor media, the media and others. Among the methods for promotion a Brand University: traditional PR, action public speaking, Internet technology, use of which now is very topical and effective. The optimal ratio of integrated marketing tools will provide additional effect of the perception of consumers of educational services. "Integrated marketing communications is a multi-tool system information and communication impact on the target audience, intended for synergistically effect of simultaneous use advertising, PR, sales promotion, customer loyalty programs" [60, p. 24].

Single message in within integrated marketing communications allow for more effectively achieve their goals by delivering accurate and clear information to the target audience.

Using a systematic approach in the choice of channel promotion of brand education services or Brand University as a resource in the competition for the consumer, exactly brand will strengthen the authority and credibility of the university. In the aspect of promotion of educational brand by advertising means, brand acts as an agent of influence on consumers. It is the carrier of psychological, cultural and ideological characteristics that can be considered of educational brand equity as a source of innovation in the sphere of education. Development of the system of integrated marketing communications is one of the final stages of creating a brand that includes:

1. Media planning that ensures contact the advertising message with target audience that occurs through the purchase of advertising spaces in the media and the placement of advertising;

2. Production of promotional products;

3. Placement of promotional products in the channels of communication;

4. Complex loyalty programs.

It should be noted that consumer loyalty to the brand Universities have certain features are connected with duration of repeated treatment to brand, which should not be involved only during entrance campaign but should be permanent. The principle of Loyalty consumer is to create the impression of contact with the brand that causes a credibility and which must be supported throughout the lifetime of the brand that stimulates potential consumers of educational services is the choice of a university and the recommendations of his friends ("word of mouth" is the most effective way to spreading information). Loyalty to educational brand maintained by a support holistic concept of Brand University.

Brand is an intangible asset of the university. Creating and promotion of brand University are innovation that helps create and save margin premium brand through the use of integrated marketing communications, increasing the effectiveness of its promotion. According to research by Interbrand brands Harvard University and Stanford University estimated more than Pepsi and Sony respectively [73].

Today in the world there are about two dozen approaches to valuation of commercial brand, but the basis of various methods are a number of similar indicators: the history of the brand; stability of the market; share of coverage of national markets; the cost of advertising support; legal protection. Therefore, creating a powerful of educational brand is not a simple mechanical combination of a number of technologies and promotion system in the educational market and permanent impact on potential customers.

The positive reputation of the staff combined with the brand Universities creates a unique image, which contributes to its strengthening and effective promotion of the market, there is a direct correlation between brand Universities, commercial and academic success, which is why its establishment has strategic importance.

It is important to distinguish the category of «brand identity» and «brand image» that "brand image" as brand perceived and "brand identity" as the way it should be perceived. Associative perception is decisive for both notions; it is the basis of the communication process, connection between brand and consumer. The difference is in the degree of match between expected and obtained a perception, the task of brand management make this difference minimal that can be achieved through constant monitoring of the market environment, customer surveys, audit and correction brand. Thus, the concept of brand identity linked to it subjective perception of consumers.

Positioning the university envisages the geographic location of the target segment (find and take a free a market niche of educational services, or compete in the existing), the availability of competitive advantage. In modern conditions to take a free niche is only possible if the university has special characteristics that will be a competitive advantage. The task positioning a university comes down competitive advantage over similar institutions.

Geographical segmentation of the market is characterized by emotional closeness consumer groups, that gives general psychographic and become the hallmark features of this process. Economic, political, demographic, cultural and ethnic criteria also contribute to the transformation of modern market segmentation.

Formation of educational brand image through its images

Image of university is a complex formation, which through the system of visions, projected onto a target audience, as shown in Figure 2.3.7:

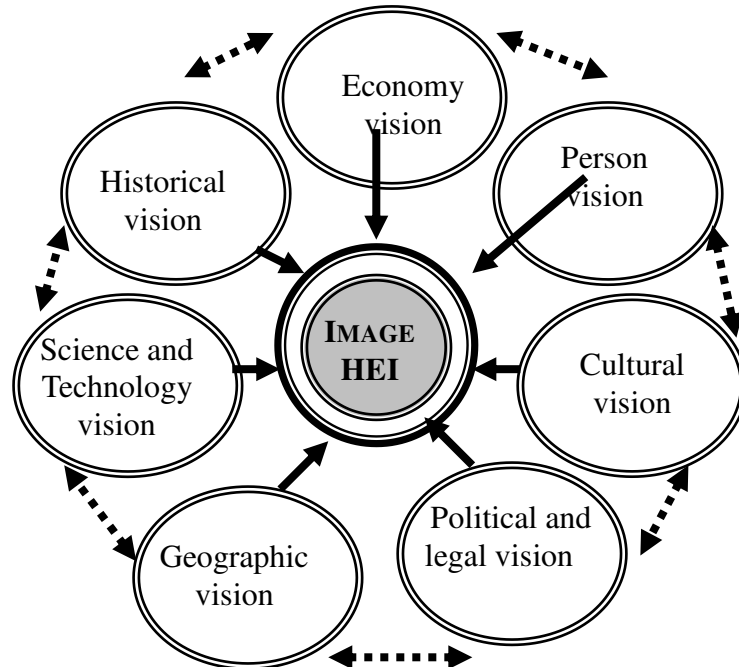


Figure 2.3.7: System visions of university through which perceived its image

Source: compiled by author

Each of the defined elements is dominant in different cases. To bold separate element is rather arbitrary because of the tight links between elements but analysis and management optimizes individual elements forming the required vision through which the future will be perceived image of the university. For example, economic vision will carry the information about attractive conditions of investment in education, the possibility of free continuing education in the case of personal success. Scientific and technical vision will open intellectual potential of the university and the limitless possibilities of science within the educational institution, which remains outside of a demand.

Geographical vision combining of the representation about territorial brand of university, structural characteristics, location coordinates, which can be crucial in implementing consumer choice. Of great importance in forming the image of university has its brand of person brands such as faculty members, favourite students, scientists, athletes, historical figures. Scientific and technological vision of university supported by its scientific and technical potential, which is determined by a combination of material, labor and financial resources that channelled in scientific and technological activities and are able to make better use of social labor.

Its integral parts are innovative and scientific potential. The dominance of the scientific and technical university vision occurs in the evaluation by potential consumers the general vector of the university, its scientific, creative, intellectual potential and investment attractiveness.

Australian researcher A. Yates says that there are only two mechanisms for technology development: marketing breakthrough and technological push that are interconnected [74]. Measures to create a positive image of university belong to the first mechanism and the

creation of its scientific and technical basis reflecting the reality corresponds to modern global trends of innovation development of the university.

Impact the education brand on the economic potential of the country

Post industrialization of the country involves the use of highly qualified specialists in all production sectors, so support and development of the educational sector provides, on the one hand, and the need, on the other hand, adequate industrial development, all sectors, including agriculture, in order to integrate "products" scientific vector with the industry in the future. Post industrial economy to provide a harmonious combination of the triad: science, education, manufacturing and harmonious development of each element. Systemic efforts of the government, private business and the public help overcome institutional, financial and political problems of the educational establishment. The low level of scientific and technical base poor financing of research, resistance to scientific and technological innovation, inhibit the improvement of education. Formulation and solving these problems requires modern tools of strategic management of development of the educational sector as an open system that preparing the intellectual capital of the state, effective format which is certainly Brand University.

Qualitative changes in the development of education in the country are congruent task of innovative development of national economy, the result of which is closely correlated with the provision of economic security of the country and its economic development potential that shown in Figure 2.3.8:

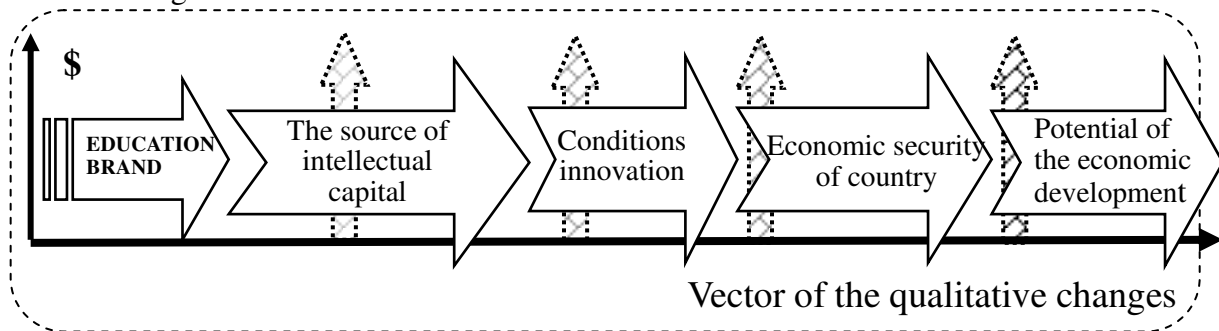


Figure 2.3.8: The impact of brand education on country's economic potential

Source: compiled by author

Thus, in the context of a market economy the brand university is subject of the educational market, which offers and promotes its "product" in the form of educational services and product, persons brand, brand events, territorial brand by setting communication with customers by using optimal system of integrated marketing tools. Creation, development and promotion of brand university envisages of focus in several ways is formation of internal brand, employer brand or back-office and external development of the brand, its front-office; create (attracting) person brand, brand events, territorial brand. Strong, powerful, long-term brand university can be created only if its back-office is integrated with its front-office, their combination with other elements of the brand university. Only such brand can become famous, popular, competitive and economically prosperous. The integration of brands universities, science and industry will provide an innovative vector of development of the national economy.

Brand education as a guarantee of competitiveness of University

Education Brand for consumer means, first of all, that graduates of these universities are the most competitive in the world labor market. In particular, the rating of universities evaluated by the British magazine Times Higher Education accordance with the employment rates of graduates in the top ten places taken seven US universities, Britain is represented by 2 universities, Canada by one that can be seen in Table 2.3.1.

British education today considered unsurpassed global brand, and London called

educational capital of the world [59]. British education today considered unsurpassed global brand, and London called educational capital of the world [59].

Table 2.3.1

The top 10 university in the world index of employment in 2015

	Name of University	Country
1	Harvard University	USA
2	University of Cambridge	United Kingdom
3	University of Oxford	United Kingdom
4	California Institute of Technology, Caltech	USA
5	Yale University	USA
6	Massachusetts Institute of Technology, MIT	USA
7	Stanford University	USA
8	Columbia University	USA
9	Princeton University	USA
10	University of Toronto	Canada

Source: compiled by author [67]

Our research global education brands showed that University of Cambridge and Oxford University of United Kingdom occupy 2nd and 3rd place at the ranking British magazine Times Higher Education top 100 world university based on an assessment of their reputation, and the total number of English schools in the rating have only 12%, while first place ranking is Harvard University (Harvard University), USA, and the proportion of university of the country is 43%, as shown in Figure 2.3.9:

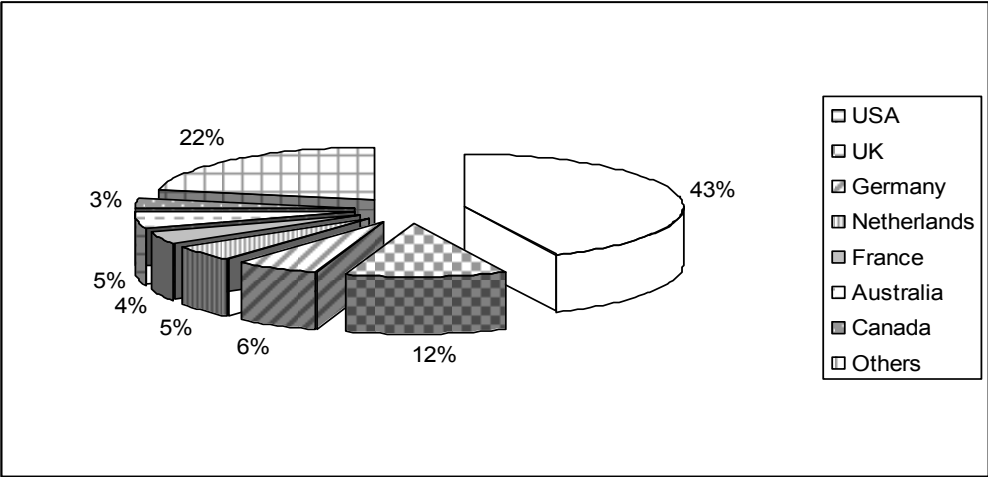


Figure 2.3.9: The structure of the top 100 world university in 2015

Source: calculated by author [65]

In the TOP-200, according to BBC News, also dominates United States with index 49, universities of UK occupied 30 positions in the rating, Netherlands are represented by 12 universities, Germany by 11, Canada, Australia and Japan each by 8, China by 7, France, Sweden and Hong Kong by 5 universities [67] Brand University provides to educational institution an attractive reputation that allows university to retain consistently high price of education that can be seen on Table 2.3.2.

At the same time Brand University offers opportunities to invite the famous scholars and scientists, creating scientific schools and traditions educational institutions carried out research and discovery for those receiving awards, and this, in their turn, attracts consumers of educational services, increasing competition among universities and increasing the quality of educational services. Graduates of the top ten university in the world as assessed by their reputation Presidents were 13 and 325 Nobel Laureates (more than 50% of the total number of laureates in physics, chemistry, literature, medicine, economics and Peace), which evidence in

favour of the creation of brand university. Among the famous graduates of the top ten universities in the world are politicians, scientists, filmmakers, artists that are shown in Table 2.3.2.

Table 2.3.2

Influence of Brand University (TOP-10) on the price of education

No.	Name of university	Country and foundation year	Famous graduates	Price per year of study (thousand \$ US)
1	Harvard University	USA, 1636	8 Presidents 69 Nobel Laureates, Theodore Roosevelt, John F. Kennedy, George W. Bush, Barack Obama, Mark Zuckerberg (Facebook), Bill Gates, Natalie Portman and others	40
2	University of Cambridge	Great Britain, 1209	64 Nobel laureates, Isaac Newton, Charles Darwin, George Byron, Vladimir Nabokov, Francis Bacon and others	14-35
3	Oxford University	Great Britain, 1096	27 Nobel laureates, King Edward VII and VIII, Stephen Hawking, Andrew Uaylz, Margaret Thatcher, David Cameron	14-32
4	Massachusetts Institute of Technology	USA, 1861	32 Nobel laureates, David Baltimore, Robert Solow, Jerome Friedman and others.	36-40
5	Stanford University	USA, 1885	10 Nobel laureates, including Economics: Oliver Uilyams, Alvin Elliott; Condoleezza Rice, Sergey Brin (Google), Larry Page and others.	40-43
6	University of California Berkeley	USA, 1868	66 Nobel laureates, 9 winners Wolf,7 owns of mathematical Fields Medal and other	35-40
7	Princeton University	USA, 1896	15 Nobel laureates, Woodrow Wilson, Johnny Cache F. Scott Fitzgerald	37-40
8	Yale University	USA, 1701	5 Presidents 20 Nobel Laureates George W. Bush, Gerald Ford, Bill Clinton, William Clinton, Edward Norton, Jodie Foster, Healers Clinton, Meryl Streep	40-43
9	California Institute of Technology	USA, 1891	35 Nobel laureates, Martin Luther King, William Campbell, Paul and other Modric	40
10	Columbia University	USA, 1754	39 Nobel laureates, Joseph Stiglitz, Milton Friedman, Leonid Cooper	45

Source: compiled by author [66, 67]

Achieving graduates of the famous education brands is significant. Thus, graduates of Stanford University became the founders of the world famous companies as: Google,

Hewlett-Packard, Electronic Arts, Yahoo!, Cisco Systems, Silicon Graphics, Sun Microsystems. A graduate of Harvard University, Mark Zuckerberg created a social network Facebook and considered the young billionaire in the world.

The competition between educational establishments of all levels for students has gone beyond national borders; universities create attractive conditions of for foreign students, strengthening the scientific and industrial potential of their own countries.

The undisputed leader in this respect is the USA where annually removed nearly 1 million students Figure 2.3.10:

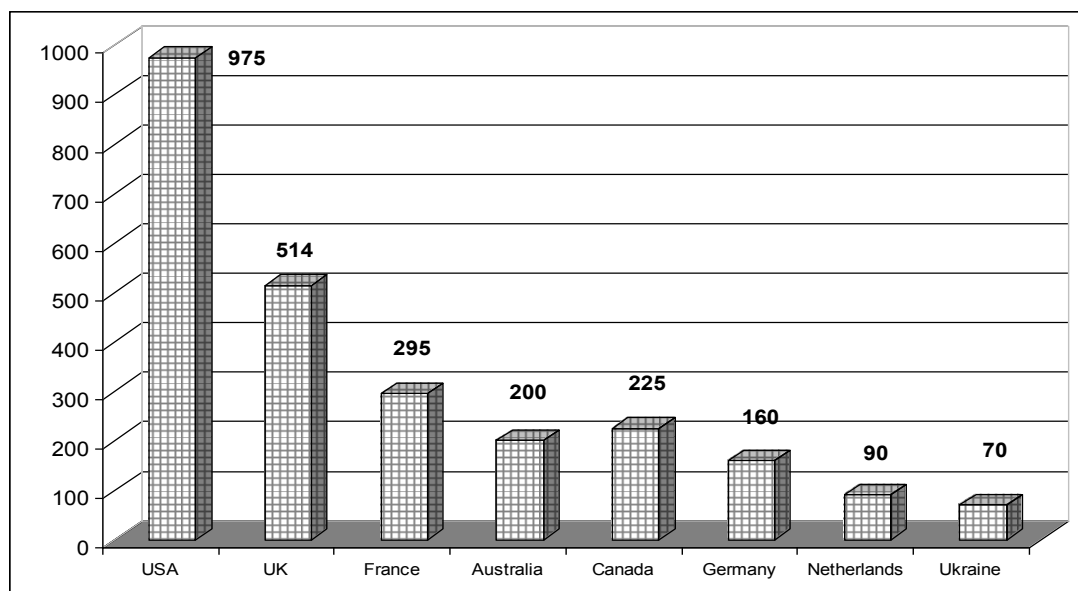


Figure 2.3.10: The number of foreign students (thousand people)

Source: compiled by author according to [64, 66, 67]

To summarize, the following points are to conclude and to discuss:

1. Science and education play a strategic role in the development of innovative economy;
2. Science and education are the main sources of innovation potential of the national economy;
3. To create of establish educational brand simplified by algorithmic process;
4. Brand HEI is a unique set of all forms of brand that has integrated capacity development;
5. The development of educational brand depends on the harmony between its back-office and front-office;
6. Positioning university in the educational market provided by platform its brand;
7. Efficiency university brand depends on its promotion by means of educational marketing;
8. The positive perception of image Brand University provided broadcasting system of its visions to target audience;
9. Education Brand directly influences the formation of economic potential of the country;
10. Brand University (HEI) is the guarantor of its competitiveness in the educational market.

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2.4 CRITERIA AND PARAMETERS OF LABOR EFFICIENCY

At first the concept "efficiency" has appeared in the works of one of the founders of classical polite economy, William Petty and the member of school physiocrats Francois Quesnay. However they used this term in value of productivity, using it for an estimation of those or other governmental or private measures depending on that they whether or not promoted revival of an economic life. Later in David Ricardo works again there is a concept "efficiency" which already gets the specific value being important from the point of view of the economy and is considered as the attitude of result to the certain kind of expenses. Since this moment efficiency has got the status of an economic category and which consider the given concept from the various sides.

So, Makkonnell K.R. and Bryu S.L. determine efficiency, as the general basis, the central part of economy. The economic science, in their opinion, "...is a science about efficiency" [74, p. 944].

V.V. Novozhilov is entered the following understanding of efficiency: "Efficiency in general is the attitude of useful effect (result) to expenses for its reception. Parameters of efficiency are frequently expressed in the return form, i.e., as the attitude of expenses to effect" [75]. Novozhilov considered, that «... the most effective variant of manufacture of any product is not that variant which demands the least expenses of manufacture of this product, and such variant which corresponds to the general minimum of expenses" [75].

In work L.M. Chistov, from our point of view, the concept "efficiency" as Novozhilov is specified, namely: efficiency is meant "concentration of useful properties as made production counting upon unit of used resources in unit of time" [76, p. 375]. Thus the author describes some parameters of efficiency reflecting same: asset turnover; intensity of functioning of social and economic system, quality of set of used resources; density of a stream of production made in social and economic systems counting upon unit of used resources. Under asset turnover in the work the parameter, "estimated is meant by division of value ... used capacity of set of used resources on value ... mid-annual cost of used resources in their set" [76].

Modern western authors D.L. Gibson, D. Ivantsevich and D.H. Donneli consider concept "efficiency" of three aspects: 1) efficiency as a degree of achievement of the purposes of the organization; 2) efficiency as a degree of the coordination of interests; 3) efficiency as a degree of flexibility, survival rate, adaptation to an environment [77, p. 662]. The American economists enter some terms, designating efficiency: 1) efficiency means profitability, he enters D. Sink for definition of a ratio of necessary and actual charges of resources; 2) effectiveness - means a degree of achievement of the purposes of system concerning quality of production and performance of the plan (D. Sink); 3) productivity (a ratio of volume of a product with corresponding expenses of resources); 4) profitability; 5) innovation; 6) quality of work life [78, p. 3]. Collins Dictionary determines efficiency as the attitude between expenses of rare factors and release of the goods and services. In the same place allocate technological efficiency (where the attitude between rare factors and release of the goods and services is expressed in physical expression) and economic (the attitude is expressed in cost expression). The dictionary also enters concept X-inefficiency as "break between actual and maximum achievable results of manufacture" [78, p. 4].

The concept "efficiency" with reference to manufacture and labor activity is frequently defined as a ratio between expenses and results. It elucidates us that the given definition reflects a private case of efficiency, which is one of its possible expressions. Optimization of a ratio between expenses and results acts as a criterion of economic efficiency of manufacture. If we mean production efficiency as a whole in combination with its economic and social sides, in our opinion, definition of efficiency is more preferable as degrees of achievement of the purpose and set of the purposes. Such approach is applied at an estimation of technical and economic development of a society, as reflected in corresponding with methodical

development. However, it possesses certain limitation, if there is a necessity to measure in a more common language in regard with social and economic value of processes. First of all, it is represented that comparison of results and expenses should precede the understanding the importance of the fact about achieving certain results answering to the purposes of public progress. It is also important to take into account the time necessary to achieve the purpose.

Thus, criteria of efficiency of labor, manufacture, management, scientific and technical progress should be counted as a degree of achievement of the certain economic and social purposes. Accordingly, efficiency should be examined from two sides, economic and social. In addition to the aforementioned, we should consider noting that it is impossible to reduce economic efficiency to a ratio between expenses and results. On the other hand, the decision of the certain social tasks requires an estimation of expenses necessary for it. Therefore, efficiency is defined as a common and a whole: 1) a degree of the solutions to the certain economic and social tasks, achievements of the certain economic and social purposes; 2) a ratio between expenses for achievement of the set purposes and the received results.

The second reflects a "price" of achievement of those or other purposes, economic and social. The estimation of efficiency from a position "expenses - results" represents the greatest complexity and cannot always be accepted.

As a general parameter of efficiency of labor appears, first of all, parameter of productivity of labor. The given parameter is treated differently. So, for example, L.A. Kostin distinguishes concepts "efficiency of labor" and "efficiency of production", thus he marks that economic efficiency of labor characterizes the relation of the received result to the expenses of labor and economic efficiency of production to all kinds of expenses, including material and financial [79, p. 15]. As the major parameter of efficiency of labor, the given author considers productivity of labor, thus connecting it only with expenses of live labor.

Other authors, for example, Yu.G. Odegov [80, p. 924], distinguish productivity of an individual with public labor. The first is connected with expenses of live labor and the second with expenses live and realification of labor. More definite approach is stated in the book of K.H. Abdurahmanov "Economy of labor" [81, p. 373]. K.H. Abdurahmanov connects distinctions between individual and public productivity of labor with a level of public division of labor. He considers individual productivity of labor corresponding with individual resolving labor and public productivity of labor to the area of the common and private division of labor. The author suggests dividing individual and the public productivity into two kinds: productivity of live and cumulative (alive and realification) labor.

In practice individual and public productivity of labor are connected mainly with expenses of live labor and estimated in relation to numerosity occupied (at the enterprise or in a national economy as a whole). From the point of view of accounting social factors, such approach estimating productivity of labor is, probably, more preferable.

The analysis of productivity of labor or other reflecting parameters does not exhaust the problem about researching social factors for efficiency of labor. The concept of "efficiency of labor" is wider in comparison with the concept of "productivity of labor". First, the concept "efficiency of labor" reflects efficiency of labor in all spheres and branches of manufacture, whereas productivity of labor characterizes productivity of labor in sphere of production of goods. Besides, efficiency of labor is estimated by much wider system of the essentially different parameters depending on a level of economy (workplace, the enterprise, branch, national economy as a whole), among which productivity of labor though concern to number of the most significant, but it is not the only thing. So, for example, at a level of workplace besides the level of performance norm of manufacture as parameters of efficiency of labor can appear: quality of work, observance of terms of execution, ensuring trouble free operation, observing the normative technological operating modes of the equipment and others.

The role of a parameter productivity of labor in researching social factors is twofold. First, the parameter productivity of labor represents itself as one of the parameters of efficiency of labor, with the help of the estimated measure of influence of this or that factor is.

Second, the parameter productivity of labor is a basis for calculation of economic efficiency of enclosure in social factors from the position of "expenses - results" [82, p. 104]. Its complexity is caused by the absence of enough proven techniques, allowing with necessary accuracy to estimate a measure of influence of this or that factor on growth productivity of labor.

The system of criteria and parameters of efficiency of labor should differ depending on a level of research, as for each level is peculiar to the special system of the purposes. So, the criteria purposes of efficiency of labor can be submitted in the following kind: 1) growth of manufacture of material benefits and services, improvement of their quality and assortment at reduction of expense labor unit manufacture; 2) improvement of hygienic labor conditions; 3) rational use and development of labor potential of a society; 4) overcoming social heterogeneity of labor.

The first of these criteria reflects economic efficiency of labor, the other three it is social efficiency. Division of efficiency of labor into economic and social is derived from the circumstance that the result of labor is both creation of a product and reproduction of the worker, the subject of labor. The last also makes a sense of social efficiency of labor. As our task is to show the role of a person in the development of manufacture and value of social reserves of economic growth, the social effect is also considered by us not in itself and in its return influence on economic effect. Thus a link between social and economic effect is the labor potential, as the reproduction and development process of labor activity of the worker (that is social effect of his labor) further becomes the factor of economic efficiency of his labor.

Thus, both kinds of efficiency possess internal unity, have the common character. Economically and socially effective is, in the final account, labor activity, which provides full usage, development and reproduction of potential labor of workers and their groups. Distinction between two kinds of efficiency will be, that in one case development of labor potential acts as the factor, and in the other case - as a result of labor, its effect.

As the task of the present research is to consider various factors working on increase of efficiency of labor so for example social, technological, economic and organizational factors, it is more to consider social factors.

Passing to consideration of the factors promoting increase of efficiency of labor, it is necessary to enter precise differentiation concept "factor".

The factor in a broad sense is the reason, the driving force of any process determining its character or its separate features. In productive and economic practice changes as factors it is necessary to understand the objective causal phenomena and processes under which influence the degree of efficiency production. Distinctive feature of factors is the continuity of their action in space and in time. They are always actually and for any investigated subject irrespective of a level: economic, branch, a level of the enterprise, a workplace.

It is necessary to distinguish reserves of growth of efficiency of labor, which also can cause increase of feedback from labor from factors. Reserves create an opportunity of more full use of factors [83, p. 156]. As against factors reserves are not constant and can be exhausted (for example, are eliminated losses working hours) and the further growth of efficiency of labor for the given reason will be not possible. As the conditions promoting growth of efficiency of labor, reserves can be found not on any subject. For example, to one enterprises and branches superfluous employment can be peculiar; on others number of the personnel can be optimized.

The researchers approach to the social factors from different point of view. So, for example, L.A. Kostin marks such factors, as an increase of an educational, cultural - technical and professional level of the staff, perfection of forms material and moral incentive, an attitude in collective, a labor discipline, development of socialist competition [79, p. 255].

However if transfer of all probable social factors, in our opinion, not the best way of their classification for always there is a clearness to miss any important factor, to concentrate

attention on the minor moments. Precise definition of essence of social factors which would become a basis for their classification is necessary. Thus it is important to emphasize, that rigid differentiation between social and other factors of efficiency of labor is not always justified, for any factor can act to some extent as social.

For example, the technology factor influences efficiency of labor as directly through a technological level of means, subjects of labor and the technologies of manufactures, and mediated through the contents and working conditions. In the second case it indirectly represents itself as a social factor. Distinctions in the contents of labor generate distinctions in qualification of workers, concerning them to labor, in a level of labor activity. Perfection of the contents of labor, improvement of conditions of its course facilitates labor of the person, creates for it emotional and intellectual stimulus, increases thus its industrial feedback and satisfaction labor, promotes development of its person.

The organizational as administrative factor (forms of division and labor co-operation, the organization of workplaces, rhythm of manufacture) influences efficiency of labor directly through use working hours and a labor. On the other hand, the level of the organization of labor and manufacture appears also the important social factor as it determines conditions and a mode of labor and its intensity during the different periods of time, uniformity of labor loading, actual duration of the working day and week (in view of overtime works), that is reflected in serviceability of the person, a degree of its exhaustion, on its attitude to labor, observance of labor and technological discipline.

Such economic factor as the system of material stimulation, acts as a social factor. The fair payment which is taking into account the real contribution of the worker, allowing providing satisfaction of his needs at a level of developed social norms, serves as effective stimulus to labor, generates a habit to work honestly and with full feedback.

Thus, there is a necessity of precise definition of essence of social factors of efficiency of labor which, on the one hand, would not carry out sharp borders between social and other factors of efficiency of labor, and on the other hand, would allow to reflect distinctive features and to capture the basic properties of research.

The name social factors speaks that the subject of consideration is the person and his functioning on manufacture. Therefore as factors of efficiency of labor it is necessary to consider, first of all, characteristics of the subject of labor, his labor potential.

The concept "labor potential" is rather new in relation to such categories, as "manpower", "labor resource". In the economic literature the labor potential is considered in a narrow and wide spectrum of opinions. In a narrow spectrum "potential of the worker" [84, p. 64], "...ability of the worker to perform physical and intellectual work" [85], in a wide spectrum is considered by Abdurahmanov K.H. "...the generalizing characteristic of a measure and quality of cumulative abilities to labor of able-bodied population, to participation in public useful activity" [86, p. 228]. We believe that the given concept can be used and in a more comprehensive sense for reflection of all set of properties of the worker influencing his manufacturing feedback. It is represented, that in the concept "labor potential" of the worker is expedient to include three interconnected components:

- psycho physiological potential: abilities and propensities, health, serviceability, endurance, type of nervous system, etc.;
- qualifying potential: volume of the general and special knowledge, labor skills, causing ability to labor of certain quality;
- personal potential: a level of civil consciousness, the attitude to labor, valuable orientations, needs and inquiries in sphere of labor, the position of citizenship, reasonably to accept correct and necessary decision-making, organizational, the creative approach.

Between components of labor potential there is an interrelation and interdependence. So, for example, high qualification of the worker influences his personal potential, the attitude to labor, the responsibility and conscientiousness in labor. On the other hand, the positive attitude to labor renders return influence on qualifying potential, stimulates aspiration of the

worker to growth of the qualification, mastering by secrets of skill, the advanced methods of labor as well.

The labor potential of the worker is in constant change, development. The size, a degree of development of labor potential of the worker represents itself as the major social factor of efficiency of his labor. However the labor potential of the worker even rather advanced, is not still a guarantee of effective labor.

Much depends on that, as well as in what measure it is used on manufacture. The above the degree of use of knowledge, skills, abilities and propensities of the person, probably, is more and its industrial feedback. Presence of conditions for realization of personal potential of the worker, satisfaction of his social needs also is positively reflected in efficiency of labor. The degree, uses of health and endurance of the worker has the physiological limits which excess has an adverse effect on efficiency of labor. Thus, efficiency is determined not only labor potential of the worker, but also conditions of his use, that is the above technological, organizational-administrative and other external, objective factors which in this case represent itself as social. And, at last, the necessary moment of effective functioning of labor potential of workers is his constant reproduction.

So, social factors of efficiency of labor are the factors determining labor potential of workers and their groups, conditions of its formation, use and reproduction. Thus the main role belongs to objective circumstances of industrial activity of people for size of labor potential, conditions of its formation and use are caused, first of all, needs of a social production for a labor of the certain quantity and quality.

Formation, use, development and reproduction of labor potential is carried out in different spheres, during activity of various social institutes. One of the major is the institute of production of goods. Use and development of labor potential during labor activity of people acts simultaneously and as its reproduction. Other important social institutions are: family, an education system and professional trainings. Reproduction of labor potential the social institutions created for satisfaction material and spiritual needs of people provide also establishments of trade, consumer services, public health services, sports and culture.

Thus, all process of functioning of social institutes of a society represents itself as a social factor of efficiency of labor. Efficiency of activity of social institutes is determined, first, by properties of the given public system as a whole, second, a qualitative level and a coordination of development of separate social institutes of a society and their subsystems.

As the general factors here act, the state system of an education and professional trainings in working, the organization of management by manpower, presence or absence of unemployment. The important factor of determining the size is qualified potential of the population on the level of economic development of the country.

Psychophysical potential of manpower, his reproduction depends on the general level of economic development of the country, determining a way of life of the population, a condition of consumer services, public health services, education, duration of the working day, etc.

Specific factors of efficiency of labor represent forms of display of the general factors in concrete conditions, in different subsystems and cells of a society. Rather a challenge is classification of specific social factors.

As represented to us, that last classification of attribute should be considered as primary, initial at grouping social factors. According to it we count expedient allocation on this basis of the factors working at a level of a national economy as a whole, at a level of a territorial generality, branch, the enterprise or its division, and the factors working at a level of a workplace.

Such approach allows separating, first, from each other factors of efficiency of public, collective and individual labor. Secondly, allocation of levels of action of social factors allows determining the basic types of research works in the given area, having the special purposes, tasks, special methodological and methodical principles of the analysis, the system of

parameters of efficiency of labor, the sources of the information, and methods of gathering and the analysis of the data.

As the second classification of attribute we believe that lawful use of concept «labor potential» is in the structure of three components. According to this it is possible to allocate: psycho physiological potential, qualifying potential and personal potential.

Thus, we offer a bi-dimensional principle of classification of social factors of efficiency of labor. We shall consider the basic groups of social factors of efficiency of labor depending on a level of action (Table 2.4.1).

Table 2.4.1

Grouping of social factors of efficiency of labor

Level of factors action	Names of factors
National economy	- The labor legislation - Normative legal acts regulating labor attitudes
Territorial	- Coverage a manpower; - A level of development of a social infrastructure; - The organization of preparation and improvement of professional skill of the staff
Branch	- Introduction of modern technologies
The enterprise	- Participation of workers in production management - Development of the organization of labor - Social - psychological climate - System of material stimulation of labor - Improvement of working conditions - Improvement of professional skill, promotion, selection and placement of personnel - Strengthening of a labor discipline - Level of the organization of labor, rhythm of manufacture - Control system and qualities - Partner attitudes between administration and workers - Development of a social infrastructure (conditions of life of labor, a condition of health services, etc.)
Workplace	- Personal labor potential of the worker - The organization of a workplace

Source: created by author

The system of the social factors working at a national economy level covers first of all laws and other statutory acts regulating labor activity and labor attitudes in a society.

Normative legal acts are the rule due always contains norm of participants of joint labor. This norm is designed for numerous applications and on an uncertain circle of persons which appear subjects of adjustable social - labor attitudes. Normative legal acts are regulating labor attitudes of the Republic of Uzbekistan "The Constitution Republic of Uzbekistan" [87], "Labor Code" of the Republic of Uzbekistan [88], Laws "About employment of the population" [89], "About a labor safety" [90], "About health protection of citizens" [91], "About sanitary and epidemiologic well-being of the population" [92], The Decision of Cabinet minister of the Republic of Uzbekistan "About the further perfection of measures on a labor safety of workers" [93] and others are the decision and orders [94] are applied.

Studying of the social factors of working at a level of a territorial generality (region) assumes research of problems of maintenance labor to resources of a national economy of given territorial unit, their rational use in scale of region.

The account of social factors at a branch level will consist, as it is represented, in an

estimation of social efficiency of new techniques and technology (techniques or technological progress). Techniques or technological progress in all forms of its display rendered the strongest complex factor on influence on growth of efficiency of labor. First, this decrease confirms in dependence of human activity from conditions of the nature. It is expressed, in particular, that the possession of region, the states sufficient natural resources is not a pledge of economic prosperity that confirms an example of economic rise of the countries which are not having minerals, for example: South Korea, Singapore, Japan.

Techniques or technological progress operates through other relationships of cause and effect between conditions and results of a social production. Influence of techniques - technological progress on efficiency of labor develops doubly: 1) through means of perfection and subjects of labor, technology, as way of connection of means of labor and manpower; 2) through change of character of labor.

From all components of techniques or technological progress energy is one of the major components. Replacement of the limited to physiological opportunities motive force of the person or practically unlimited natural stocks of energy has allowed the person to receive animals at the equal charge of efforts in ten times more a product. In it the economic sense of mechanization will consist. Therefore Academician S.G. Strumilin has named power (energy) an important factor "in competition for the highest labor productivity level" [95, p. 52].

But new technologies are capable of to bring the greatest effect only when they cover not any part of technological process, and all process of manufacture of a product with all auxiliary and serving operations. The increase in cumulative effect is impossible only due to growth of technical efficiency without qualitative changes in labor at other stages of reproduction. Therefore at planning the technological innovations directed on increase of efficiency of labor, it is necessary to take into account principle priority organizational factors before scientific and technical.

The system of the social factors working at a level of the enterprise, its division, includes those elements of economic and social management which influence use, development and reproduction of labor potential of workers of the enterprise. So, for example, use psycho physiological potential of workers depends on such factors, as "improvement of working conditions", "level of the organization of labor, rhythm of manufacture", "development of a social infrastructure". Development of qualifying potential of a labor is determined by the factor "improvement of professional skill, promotion, selection and placement of personnel". Such factors as "participation of workers in production management", "strengthening of a labor discipline", "partner attitudes between administration and workers", "development of the organization of labor", "social-psychological climate", "system of material stimulation of labor" influence mainly the attitude of workers to labor, personal potential, labor activity, satisfaction of labor. The factor "control system and qualities" influences completeness and character of use of all set of factors of efficiency of labor, both social, and technical-technological, organizational-economic.

We determine a workplace as a position in the system of a national economy in which there is a connection of manpower by means of manufacture, inclusion of the worker in production.

At a level of a workplace directly show the action of the characteristic of the subject of labor, his labor potential is realized, therefore at definition of factors of efficiency of individual labor it is necessary to allocate, first, set of characteristics of the subject of the labor, determining size of labor potential of the worker in a cut of three components (psycho physiological, qualifying and personal), second, to allocate set of circumstances of labor activity (on a workplace) which influence use and development of labor potential.

Influence on psycho physiological properties of workers (ability, propensities, type of nervous system, etc.) is considered in works on psychophysiology of labor [96, p. 239]. Value of working conditions as a factor of efficiency of labor usually is connected that they determine a degree of consumption, with expenditures in labor of nervous and physical

energy of the worker. Adverse working conditions are physiological restrictive efficiency of labor-reduce-rate and quality of work, result in over fatigue, and infringements of a labor discipline.

The qualifying potential is volume of qualifying characteristics of the worker (specialization, education, improvement of professional skill, a level of preparation, experience, knowledge), determining a degree of his professional readiness to qualitative performance of labor operation. Efficient ability of labor to improve quality of work, first of all are connected skills, training and additional opportunities of the worker. Nevertheless, these opportunities are more limited, because it is required more additional time and money resources (the investment on "the human capital" [97, p. 690]).

Table 2.4.2

Grouping of social factors of efficiency of labor

Labor potential of the worker	Parameters of social efficiency of labor
Psycho physiological potential	- Working conditions (sanitary-hygienic positions); - Intensity of labor; - The organization of a workplace.
Qualified potential	- A level of complexity of labor; - Education; - The experience of labor; - Special preparation (qualification).
Personal potential	- Satisfaction of labor; - Creative opportunities; - The attitude(relation) to labor - valuable orientations.

Source: created by author

Among the factors influencing use and development of personal potential, special value is given to the contents and character of labor. Usual influence of the contents of labor is treated from the point of view of that what opportunities labor gives for creativity. Substantial, creative activity is considered as psychological stimulus of the positive attitude to labor and high industrial feedback.

Thus, practically all social factors of efficiency of the labor, working at a level of a workplace, to some extent influences change of efficiency of labor. Statement of a problem of the importance of factors has the features for different levels of research. At a level of a workplace the subordination of factors of efficiency of labor has the objective independent character of consciousness and activity of people. There are deep, steady and natural connections between concrete factors and results of labor which can be estimated unequivocally enough and to choose on their basis the limited set of the most significant factors.

As against it, the social factors working at a level of the enterprise, labor collective, represent elements of conscious activity of people. By virtue of it factors of the given group can be both significant, and little significant depending on as far as, effective activity of people on use of this or that factor in concrete industrial conditions. Definition of the importance for considered group of factors will consist, apparently, not in selection of them is the most significant, and in definition of conditions at which the given factor becomes significant, that is can bring appreciable economic benefit. Speech can go, for example, participations of workers in production management, definition of rational ways of management by a social-psychological climate, etc. Represented, that an important moment of productivity of research of social factors of the given level is the all-round analysis of the factors working at a level of a workplace.

Considerations of efficiency of labor on a workplace, it is expedient to us to use such parameters of economic efficiency which open a degree of achievement of the purposes or results of labor of the separate worker: manufacture in natural expression or a level of performance standards (or production targets), quality of production or work, economy of materials, a degree of the savings of techniques, etc.

For the account of social efficiency of labor of workers, we believe that it is expedient to use the parameters reflecting a measure of use and development of potential labor of the worker in all three components (Figure 2.4.1).

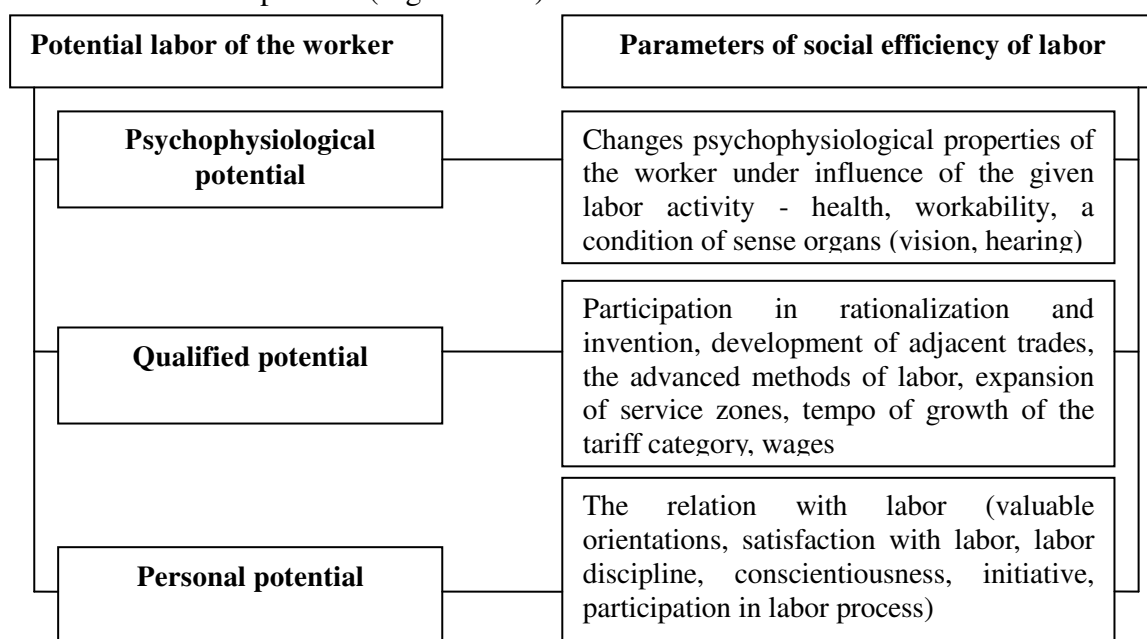


Figure 2.4.1: Parameters of social labor efficiency on a workplace level

Source: created by author

In the parameters on figure 2.4.1, development of qualified potential and personal potential possess the certain unity reflect a degree of activity of the worker in labor. We connect the necessity of their differentiation that parameters of development of qualified potential have rather rigid connections with a qualification level of workers, which reflects labor activity of their most qualified part. At the same time parameters of development of personal potential reflect on activity of the workers possessing different qualification.

The question about parameters of personal potential development demand special consideration. It is known that studying social factors of efficiency of labor was, for a long time, carried out within the framework of research with relation to labor, which was their compound part, therefore, in the sociological literature of these concepts practically are not divided and opened at an empirical level with the help of the same parameters - performance of norms, quality of labor, participation in rationalization and invention [98, p. 172]. However these concepts are not identical to each other. First of all, they cannot be considered as parameters in relation to labor parameters of economic efficiency of labor. We believe that parameters in relation to labor coincide with parameters of social efficiency of labor in that part which concerns development of personal potential.

From our point of view of parameters of the relation to labor, those real displays of people which reflect social effect of labor in its part which are connected with personal potential. Thus, it is possible to relate labor discipline, conscientiousness, responsibility, initiative, participation in socialist competition, in labor process. Parameters of participation in rationalization and invention, expansions of zones of service cannot, in our opinion, unequivocally be treated as parameters of the relation to labor, as determinative factors in this case represent development of qualified potential of workers.

Use of this or that system of parameters in relation to labor depends on from what point of view relation to labor is considered as a social factor of efficiency of labor or as its social effect. If we study influence in relation to labor on efficiency of labor, that is, to consider the relation at labor as the factor of efficiency of labor, it is expedient, apparently, to be limited parameters of valuable orientations and satisfactions with labor.

Valuable orientations of the worker represent a basis, on which its relation to labor is

formed in general and in the given concrete manufacturing situation. Research of valuable orientations assumes studying a ratio between various components in relation to labor, that is definitions of the importance of separate groups of workers of those or other motives of labor activity. As the main making motives follows, in our opinion, to consider: 1) the relation to labor as to sphere of the appendix of abilities as interest in the contents of labor, opportunities of creativity, initiatives; 2) interest as a result of labor; 3) the relation to labor as to means of a life; 4) the relation to labor as to sphere of ability to live - social and economic needs (material interest), norms in the field of hygienic conditions, regime and the organization of labor.

All listed relations to labor are significant, therefore, to estimate character of labor motivation the matters are not of absolute importance to this or that motive, a ratio between separate elements of labor motivation, its structure.

Material interest of the worker in the labor in modern conditions gets special value. Increase of a material interest in labor collectives and separate workers - the important lever of growth of efficiency of labor and efficiency of production.

The recognition of a role of a material interest contains in the works of K.H. Abdurahmanov, G.E. Slezinger. Labor should satisfy human needs not only by the creation of consumer cost, but also for the founder - to compensate labor, which should provide reproduction of the spent worker force. In this the fundamental importance of the material compensation is an absolute connection, acting more often in the form payment wage, as the factor for coefficient labor [99, p. 237], [100, p. 336].

The above considered elements of the relation to labor reflect a system of basic needs of the person in sphere of labor. The degree of satisfaction of these needs for a concrete manufacturing situation causes a level of satisfaction labor. The common satisfaction labor and separate satisfaction with elements of a manufacturing situation are distinguished by the contents of labor, material stimulation, regime and conditions to labor. The analysis of satisfaction labor covers, as a rule, two groups of problems. The first group will consist of the definition of communication between satisfaction and efficiency of labor. The second group is directed to study factors for satisfaction with labor.

As a task of the present article - allocation of the most significant social factors for labor efficiency, it is necessary to define a place and a role, on the one hand, the factors reflecting qualified potential of working, on the other hand, the above mentioned elements of the relation to labor and their influence on efficiency of labor.

The result of the theoretical analysis of the research consists of the assumption of higher importance of qualifying factors and labor conditions in comparison with other factors at a level of a workplace. Qualifying factors can be divided into three parts:

1. qualifying labor is the important factor of labor efficiency of workers, in relation to the value of labor conditions;
2. qualifying labor is the factor, more significant in comparison with the contents of labor, its creative opportunities;
3. the factors, reflecting qualified potential of workers, are more significant from the point of view of labor efficiency, rather than valuable orientations and satisfaction of workers with the labor.

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2.5 EMPLOYMENT SECURITY OF YOUTH

The globalized world of the third millennium brings new demands on the national economy according to modern innovative changes. The experience of countries with the highest level of national competitiveness argues that the determining factor of economic development, the key to the progress of modern civilized society and guarantee the success of the transition process in an active participation in the young generation.

Towards Ukraine's accession to the European Economic Area more important is the process of training highly qualified specialists. The obvious fact that the modernization of Ukraine's economy is impossible without the training of young personnel with the appropriate skill level, as they are able to respond flexibly to innovation, generate innovative ideas, introduce new technologies to serve the technologically updated equipment, adapted to modern demands of innovative society.

Therefore, for Ukraine is strategically important to efficiently overcome youth unemployment and effectively integrate young people into the labor market.

The purpose and objectives of the study is to identify problems and summarize how to enhance youth employment in the labor market in Ukraine by studying the EU experience and develop practical recommendations to overcome the imbalance in the youth labor market. To achieve this goal the study dealt such scientific and practical tasks:

- Conducting a SWOT-analysis of youth labor market and the quality of education in Ukraine;
- Formalizing and systematizing impact factors on employment and unemployment of young people in the labor market;
- Assessing the state of youth labor market by quantitative and qualitative criteria;
- Conducting comparative analysis of the youth labor market in Ukraine and the EU;
- Developing methodological approaches to building a social and economic model to overcome the imbalance in the youth labor market in Ukraine;
- Determining the direction of overcoming the imbalance in the labor market of young people in the modern world.

The object of research is the processes of increasing youth employment in the labor market.

The subject of the research is theoretical, methodological and practical aspects of formation of the ways to increase youth employment in Ukraine.

Analysis of recent research and publications is an important contribution to employment of young people in Ukraine done by such scholars as: S. Bandura, A. Vyshnyak, M. Dolishniy, Y. Krasnov, E.M. Libanova, L.A. Semenova, A. Khomra, O. Yaremenko et al.

The formation of the labor market of young people, especially professionals with higher education, are covered by such Ukrainian scientists as A.S. Lavruk, A.A. Yaremenko, O.A. Grishnova, M.I. Nizhniy, S.M. Zlupko and others.

Overall, the scientific literature provides many mechanisms to address the problem of youth unemployment, but we suggest a more integrated approach, it identified all subjects related to the process of youth employment. Each entity has its own goals and interests. Based on researches, we took into account all the factors and mechanisms to address the situation, the results are presented in Table 2.5.1.

Undoubtedly, editing needs and current legislation should emphasise on young people and focus on the following areas:

- setting incentives that will be beneficial to the employer, not the state, where can be used a certain experience of the European Union;
- necessary to significantly reduce the number of governing regulations of the employment of young people with the need to focus on quality, not quantity;
- formation of joint educational programs, internship programs, practical trainings of offsetting the workbook, but the legislation necessary to prescribe exactly protection of

young professionals who participate in such events clearly highlight the duties and rights of employers and young workers to do these mutually beneficial relationship;

- prescribe in law real and effective mechanism for concessional lending or partial compensation for housing for youth from the State Fund for Youth Housing;
- require in legal acts to legalize certain types of flexible forms and innovative types of employment such as freelance.

Table 2.5.1

Mechanisms for improving youth employment based target groups

Indi-viduals	Objectives	Execution
Government	<ul style="list-style-type: none"> • benefit from investment in education • prepare taxpayers for the future • prepare the necessary specialists 	<ul style="list-style-type: none"> • creating incentives for employers when arranging specialist first job • increasing the number of public order for unpopular professions and instead cut funding for popular specialties • refusing direct State funding training, and providing targeted subsidies for training specialists for enterprises that undertake to employ students after graduation • increasing conversion specialist centres • creating a job search portal for students and graduates
Youth	<ul style="list-style-type: none"> • getting higher education • acquiring certain skills and abilities • becoming competitive in the labor market • finding a good paid job • developing the career step 	<ul style="list-style-type: none"> • undergoing training workshops to obtain certificates • participating in training programs • attending job fairs • posting resumes on job search portals • constantly monitoring labor market
Employers	<ul style="list-style-type: none"> • finding good specialists 	<ul style="list-style-type: none"> • offering internship programs, practices for young professionals • holding open day • developing youth projects (start-ups) to attract additional investments in this area • creating a summer student employment program that allows gaining experience before graduation
Educational Institutions	<ul style="list-style-type: none"> • getting more state order • filling all space contract 	<ul style="list-style-type: none"> • improving practice programs for graduate students, namely, to provide base and control practices for its passage • conducting mandatory conferences for students on problems in the labor market; • revising curricula of universities, focusing on workshops and lecture practitioners • improving and developing job fairs

Source: compiled by author

THEORETICAL CHAPTER

Article 43 of the Constitution of Ukraine says: Everyone has the right to labour, including the possibility to earn ones living by labour that he or she freely chooses or to which he or she freely agrees. Paragraph 2 of Article 43 of the Constitution of Ukraine says that the state guarantees equal opportunities in the choice of profession and activity, creating conditions for the full enjoyment of their right to work and implements programs of vocational education, training and retraining of personnel according to the needs of society.

The Constitution of Ukraine forbids any discrimination in employment, including violation of the principle of equality of rights and opportunities. Certainly, these constitutional guarantees apply to young professionals. Young people as a separate category of the population are the most vulnerable in the current market environment. This is due to the lack of professional experience, legal and professional knowledge, and often, moral unpreparedness to compete in the labor market. Accordingly, in the present conditions young professionals are extremely difficult to exercise their right to work and compete in the labor market with other subjects.

Legislative acts establishing guarantees of the right to work of young people are: "The Labour Code" (Art. 196, 197), the Law of Ukraine "On Employment of Population" (Art. 14, 28, 29), Act No. 2998 of 5 February 1993 on promotion of social formation and development of the youth in Ukraine, as amended to January 1, 2015, the Law of Ukraine "On Education", the Law "On Vocational Education", "On the Procedure of employment of university graduates, whose preparation was carried out by state order": Resolution of the Cabinet of Ministers of Ukraine of August 22, 1996 № 992.

January 1, 2013 came into force new law of Ukraine "On Employment of Population" №5067-VI of July 5, 2012. Since its adoption it has been about three years, it is quite a short time, but now we are able to analyze the dynamics of change.

According to the new Law of Ukraine "On Employment of Population", orphans, children deprived of parental care, and persons aged 15 years and that the consent of a parent or person in loco parentis, may, as an exception be made to work belong to people who have additional safeguards to promote employment. Also people with additional safeguards in promoting employment, owned youth who graduated or stopped teaching in secondary, vocational and higher education, retired from regular military or alternative (non-military) service (within six months after the expiration or termination of education and services) and for the first time accepted the work. For their employment enterprises, institutions and organizations with the number of staff more than 20 people set a quota of 5% of the average number of staff during the previous calendar year.

Today during youth employment, state guarantees a series of benefits and guarantees. Law of Ukraine "On Employment of Population" clearly defined mechanisms to encourage employers to create jobs (monthly, for one year, compensation costs for payment of the single social contribution for employed person who has finished or stopped teaching in secondary, vocational and higher education, freed from regular or alternative service), additional privileges of youth as "initial payment" and training with admission to general employment.

In particular, young workers who agree to work in rural areas, receive housing and a lifetime "starting pay" in tenfold minimum wage (up to December 1, 2013 by 11,470 UAH). Additional encouragement could be home ownership for young employee who works in rural areas for at least ten years.

University students are entitled to probation for up to 6 months of entering the record of the passage of such training in the workbook. The law also provides vocational training of the unemployed to order the employer for a specific job. According to Article 29 of this Law, colleges and students of vocational schools that have received a profession (qualification) for the qualifications of "skilled worker", "junior specialist", "bachelor", "specialist" and continue to study at the next educational qualification level, have the right to undergo training in a profession (specialty), which acquire education, enterprises, institutions and organizations regardless of ownership, type of activity and management, under the conditions of a specified contract for an internship in their free time.

Although it is a new law that would have to be more reasonable and modernized, still, there is more range of issues in the implementation of the labor rights of young people. After all, these rules do not apply to persons who have received education and qualification level "master" and those who received a lower education level, but ceased further training, which is confusing and creates the position of not prevailing opinions legislator. This gap in the

development of the law does not create a legal dispute between the theoretical and the practical application of it.

A significant, at first glance positive innovation is the right to have their internship for the profession for which acquired education and record of completion of the training into the workbook. However, the law does not stipulate how the internship will contribute to employment as a young person, because under the guise of training can create temporary unpaid jobs. However, according to the experience of Kazakhstan, the lack of clear mechanisms to protect trainees opens the way for abuse by employers. Quite a frequent occurrence when graduates as interns working within the statutory period without pay, and then find themselves behind the company, institution or organization due to lack of communication between employment and internships. It seems that consolidating seemingly positive update legislator seeks to hide the bitter truth under a layer of sweet promises. So, like it happened with another norm of the new Law of Ukraine "On Employment of Population".

Before acting Law of Ukraine "On Ensuring young people who got higher and vocational education, first job of providing subsidies to the employer" that established an effective form of support for youth employment, namely the employment of young unemployed by granting the employer subsidies by the Fund compulsory state social insurance of Ukraine against unemployment. This was to encourage employers to take a young man who will eventually gain a foothold in the production and become truly qualified. After the entry into force of the new Law of Ukraine "On Employment of Population", above mentioned legal act invalid. Instead of subsidies, was seemingly positive institute compensation that encourages employers to create new jobs and employment for these young people? However, the feasibility of such replacement seems questionable from the point of view of efficiency incentives employers. Today, the cost of creating new jobs far exceeds those benefits and tax credits, which the government is trying to maintain the initiative of the employer and thus even carefully drawn subsidy mechanism worked inefficiently. A compensation of actual costs in the amount of single fee for obligatory state social insurance are significantly less than the subsidized and are only 100% compensation to pay single social contribution. In addition, compensation will be provided only through the establishment of a new job, and the grant was provided directly in connection with the employment of young specialists, without requiring the creation of new jobs. Consequently, there is no reason to believe that compensation will be better than incentive grants. In fact, the rejection of subsidies has become a way of saving the state budget and the Social Insurance Fund for Unemployment.

In the context of legislative changes driving, April 15, 2015 adopted a resolution at number 216 of August 22, 1996 № 992. Resolution of that has changed, three coming years determined the fate of young professionals, not particularly in view of their desire, entitled "On the procedure of employment of university graduates, whose preparation was carried out by state order": Resolution of the Cabinet of Ministers of Ukraine of August 22, 1996 № 992. Previously, according to the resolution of graduates who studied under the state order, was required to work for three years after graduation. From now on assignment for three years will receive only graduates of medical schools. In addition, for their fate meets Ministry of Health.

Youth market segment is the most problematic share of the national labor market. Finding a first job, the discrepancy between the level and quality of education professional duties, lack of experience, youth discrepancy requests and suggestions employers exacerbate tensions in the labor market.

It is important to analyze the factors affecting the choice of place of youth employment. Many of them characterizes the current generation and different from older workers.

The most important factors that influence the choice of workplace can include the stability of the company and the payment of wages and interesting composition of and prospects for

personal development. That young people are interested in not only money, they have seen the need for self-realization.

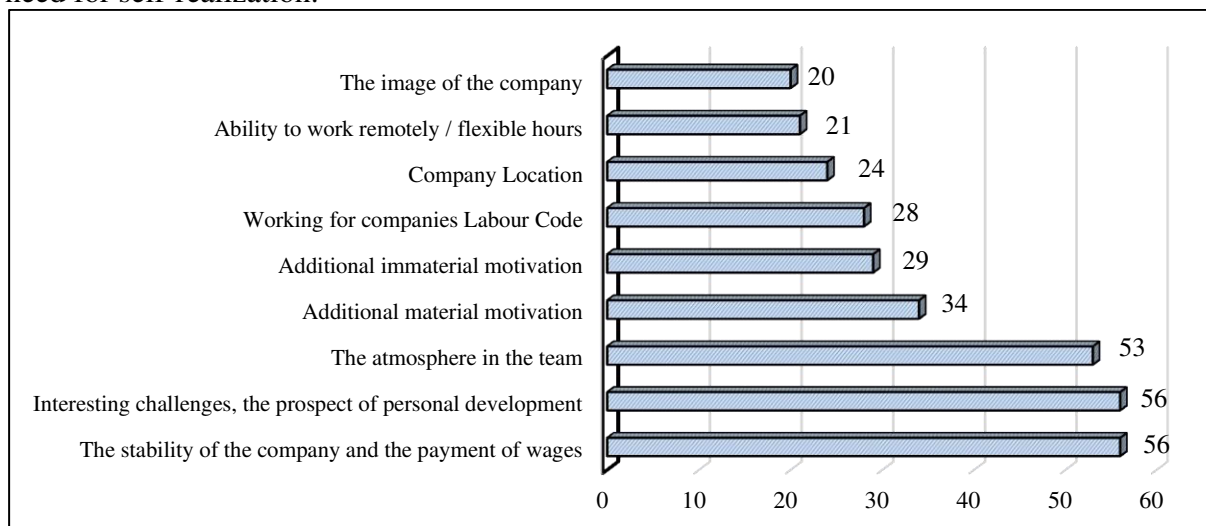


Figure 2.5.1: An important factor when choosing a workplace for young professionals

Source: compiled by author

Not much affects the location of the company, indicating that the adaptability of young people and their mobility. Unlike the older generation, modern youth hurry to stick to own apartments and a city. Not very important for young people is the image of the company.

Do not discard the psychological moment; the atmosphere in the team is very important for young people (for 53%, this factor was important). Therefore, of course, employers need to pay special attention.

If the estimated range solution to the problem of youth employment in other countries such as Austria, Czech Republic, Poland, Lithuania, Germany, the conclusion is that Ukraine, in terms of youth employment, compared with a number of European countries is an economically neglected country. In Germany, youth surprisingly rarely have problems with employment due to lack of experience and seniority. In Germany, there is a wide range of state-subsidized employment programs and courses designed to improve the schooling and vocational training. Employers are interested in forming young reserves in the country, as evidenced by the actions of employers to pay for training and skills of special learners with the condition of their employment with the company that sponsors.

In Austria, for example, employer's outlook is relatively bigger than in our country, because the Austrian employers need to implement new labor exclusively through attracting young professionals. This is because such people quickly learn new skills, have more endurance labor compared to other categories of persons, have the ability to implement their new working ideas and increasingly perform their duties due to lack of their family obligations and not have high demands for payment or position occupied. In the Netherlands, masters in the factories receive a fee for the preparation of a change in the factories.

According to the current situation in Ukraine, the country needs to develop something new. For example, Ukraine has long been ready to invest in IT-education. Experience shows that a country can "give birth" to decent professionals. Nevertheless, just to give birth, because almost all the promising young people most of all seeks to realize them abroad. As Kum, the founder of messenger "WatsAPP" was born in Kiev, but was educated in the US and became a billionaire by implementing the "American dream". Another example is Max Levchin, the founder of the electronic payment system PayPal, he was born in Kiev too and was educated in the US and is a dollar billionaire. Investments in education and information technology should make it to our country, but there are too many risks and too big payback for foreign investors.

The media and youth organizations should psychologically prepare young people to realize the role that they can and will play in the development of their country.

ANALYTICAL CHAPTER

For activities at the international or regional level, UNESCO uses a universal definition developed by the UN, according to which the youth are people aged 15 to 24 years, but Ukraine considers young persons aged 15-34 years. Therefore, the purpose of consistency feasible concepts comparative analysis of key indicators of the labor market for young people aged 15-34 in Ukraine, and for years the EU youth aged 15-24.

One of the most important factors that affect the reproduction of labor youth in Ukraine and the EU is the demographic situation and the level of economic activity. According to the State Statistics Service of Ukraine, the level of economic activity generally fluctuates. Since 2010, we observed a positive trend and steady growth, but in 2015 compared with 2014, this figure did not change. From 2010 to 2015 the levels of economic activity fell by 1.3%. The analysis shows that there are negative dynamics of economic activity among young women from 2010 to 2015 in the age group 15-24 which decreased by 3.4% and in the group 30-34 by 6.3%. However, the percentage of economically active women aged 25-29 years in 2015 reached a record value in the amount of 70.7%, compared to 2010 it grew by 0.7% (Table 2.5.2).

Table 2.5.2

Economic activity rate in Ukraine for 2010-2015 by age and gender, in %

Indexes	Years					
	2010	2011	2012	2013	2014	2015
All economically active population 15-70 years	63,7	64,3	64,6	65,0	62,4	62,4
including young people aged						
15-24, including	40,5	41,7	40,7	39,3	38,4	36,3
female	35,2	36,6	35,0	34,0	32,5	31,8
male	45,6	46,5	46,3	44,4	44,0	40,6
25-29, including:	79,9	79,7	81,5	80,8	80,5	80,8
Female	70,0	69,0	71,0	70,2	69,4	70,7
male	88,6	90,1	91,7	91,0	91,3	90,5
30-34, including:	83,4	83,6	83,4	83,3	82,6	82,3
Female	79,6	77,8	77,3	76,9	73,3	73,3
male	87,8	89,4	89,7	89,8	91,7	91,2

Source: compiled by author based on [108, 109]

The average rate of the economically active population in the EU is much higher than in Ukraine. In 2015 the average level in the EU was 72.6, in Ukraine 62.4, more than 10.2%. Despite the general upward trend of the economically active population, an interesting situation is observed in the age group 15-24, where we see a negative trend, as a whole, and for each gender. In 2015, the indicator of economic activity in the age group 15-24 years was 41.5% and in 2010 - 42.8%, it decreased by 1.3%. However, in the category of women from 25 to 34 years, which does not apply to young people in the EU, we see a steady increase in economic activity (Table 2.5.3).

For example, in some EU countries, such as Belgium, Lithuania, Portugal, quite clearly traced delay the transition from education to employment. Economic activity in the age group 25-39 years is much higher than 15-24 people per annum, as many of them continue their education and become economically active at the age of 25 years and older. In many countries, including Denmark and the Netherlands, the level of economic activity is higher than the average level in all three age groups. In these countries, most young people combine education and work and work as interns and students at double system, or students working during their studies in higher education.

Table 2.5.3

Economic activity rate for the EU 2010-2015 by age and gender, in %

Indexes	Years					
	2010	2011	2012	2013	2014	2015
All economically active population 15-70 years	70,9	71,1	71,6	71,9	72,3	72,6
including young people aged						
15-24, including	42,8	42,4	42,3	42,0	41,7	41,5
female	39,6	39,4	39,3	39,1	38,8	38,8
male	45,6	45,4	45,1	44,7	44,4	44,0
25-34, including:	84,4	84,3	84,5	84,4	84,4	85,1
Female	77,3	77,5	77,8	77,9	78,1	78,4
male	91,4	91,0	91,1	90,8	90,7	88,9

Source: compiled by author based on [108, 109]

The economic activity of women in Ukraine at present does not have large distortions and gender remains high and close to the unique countries with the highest levels of gender development.

To monitor the overall level of employment and youth unemployment was elected Ukraine, EU (28), Germany, as one of the most developed countries, Lithuania, as the prototype of Ukraine, which was part of the USSR and became the European way back in 2004, and Italy, which is a member of the EU, but is in crisis and unemployment hits record including youth. That is, considering the three countries being very different to each other.

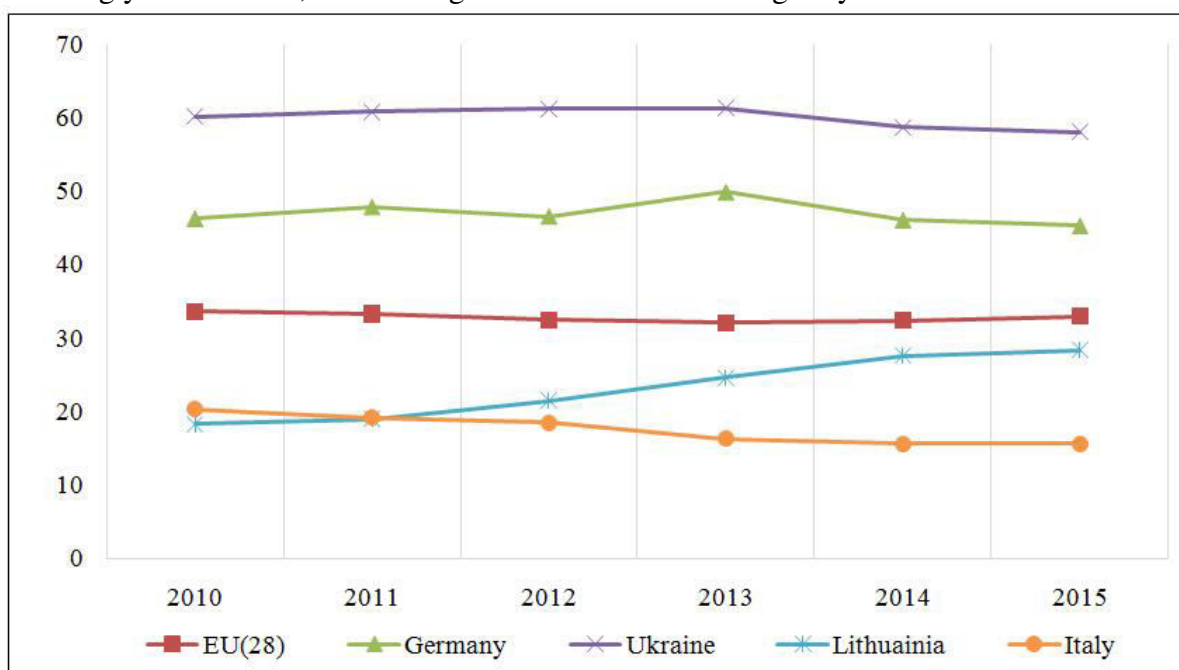


Figure 2.5.2: The employment rate of young people in Ukraine, the EU (28), Germany, Lithuania and Italy, in %

Source: compiled by author based on [108, 109]

During the years 2010-2015 Ukrainian youth employment rate exceeds the average value of this indicator and the level of employment of youth in Germany, Italy and Lithuania. However, it is clear that increasing the average age group of 25 to 34, as a European, we do not consider them. In 2015 in Ukraine youth employment rate was 58.1% at the same time as in the EU, on average, it amounted to 33.0%, 45.3% in Germany, 28.4% in Lithuania and 15.6% in Italy (Figure 2.5.2). European average is pulled down by countries such as Greece, Spain, Portugal and Italy, where virtually every second young person is unemployed. As we

see in Italy there is a steady decline in youth employment, in 2010 the employment rate of young Italian was 20.3% and in 2015 only 15.6%. On the one hand, we think that in Italy everything is fine and many Ukrainian wants to go somewhere like Naples, Milan or Turin, but there are very serious problems with employment. Almost 50% of Italians want to change the country and work abroad, and 46% of students graduating from universities do not have local specialty.

A very interesting example is Lithuania, which actually also was part of the Soviet Union as Ukraine as a prototype. In 2004 they started their path to the EU and now we see the rise in this country. Clear and transparent reforms of Lithuania have highly developed. For example, today the average salary for Lithuanians is in average 700 Euros, which is about 20,400 UAH. Undoubtedly, a factor directly influences on youth employment. So in 2010 the Lithuanian youth employment was 18.3%, it was even less than in Italy. In 2015 this figure was already 28.4%, which is 0.2% more than in Ukraine in the age group 15-24 years. In Lithuania is seen a steady upward trend in youth employment. Perhaps this country is an example to follow.

Let's look at youth employment in the context of gender. Overall, we see quite stable employment rates among younger men. In Ukraine in 2015 this figure compared with 2010 decreased by only 0.9%, in Germany it decreased by 0.2%, the average value decreased by 1.4% and Italy by 5.4% (Figure 2.5.3). Again Lithuania surprise in terms of male employment. When in 2010 Lithuania was a record low youth employment of men with only 19.1%, which was almost 2 times less than the average European rate. So in 2015 the level rose to the level of 30.9%, or 1.6 times higher compared to 2010.

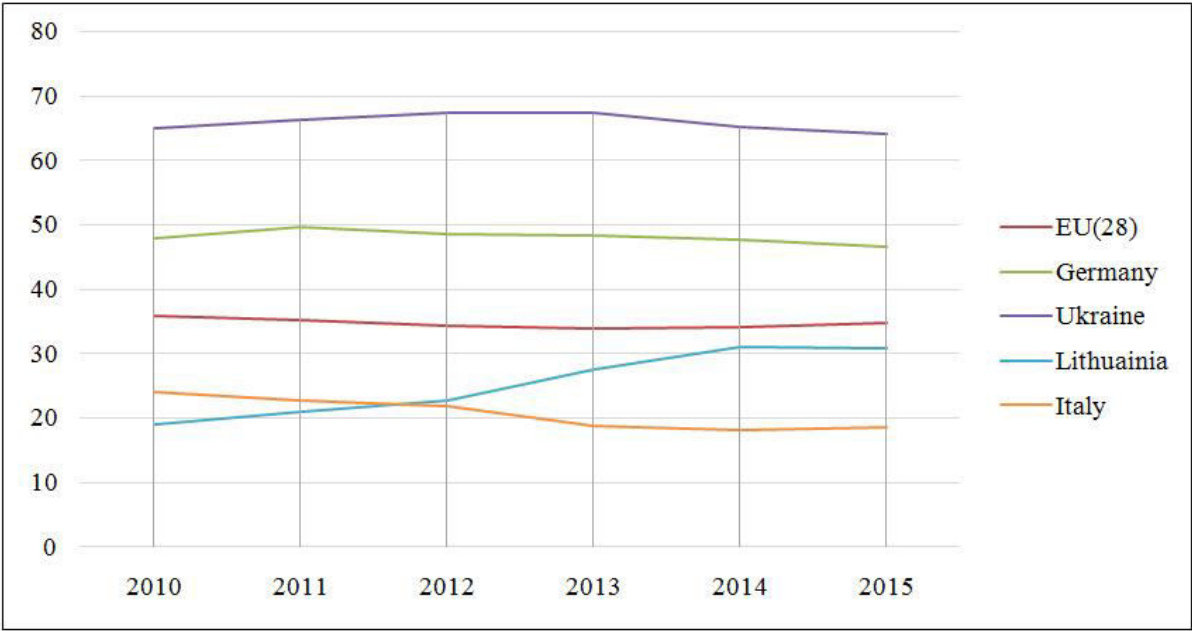


Figure 2.5.3: Employment rate of young males in Ukraine and the EU (28), Germany, Lithuania and Italy, in %

Source: compiled by author based on [108, 109]

The employment rate among women reflects certain tendencies in the countries. First of all, it is much less than the level of youth employment among men. Second, in Ukraine is a rapid decline of female employment. In 2015 compared with 2010 this figure fell by 3.9%, in Germany during this period the level decreased by only 0.5%, the average in the EU countries increased by 0.4%, in Italy it fell by 3.8% and in Lithuania it increased by 8.3% (Figure 2.5.3). If we compare female employment in 2015 only in the age group 15-24, in Ukraine it is extremely small and made only 25.2%, which is below the European average and almost 1.8 times less than in Germany.

Overall, the level of female employment shows very clearly the state of the economy. For example, in Germany there is a certain stability, a decrease of 0.5% is very small, and the same in middle-Europe. However, the situation in Italy and Ukraine clearly demonstrate the instability of the economy and the labor market. Here at the example of Lithuania shows, firstly, the economic growth of the country and, secondly, a very pragmatic gender policy in the country. In this context it is very interesting that the President of Lithuania Dalia Grybauskaitė is a woman.

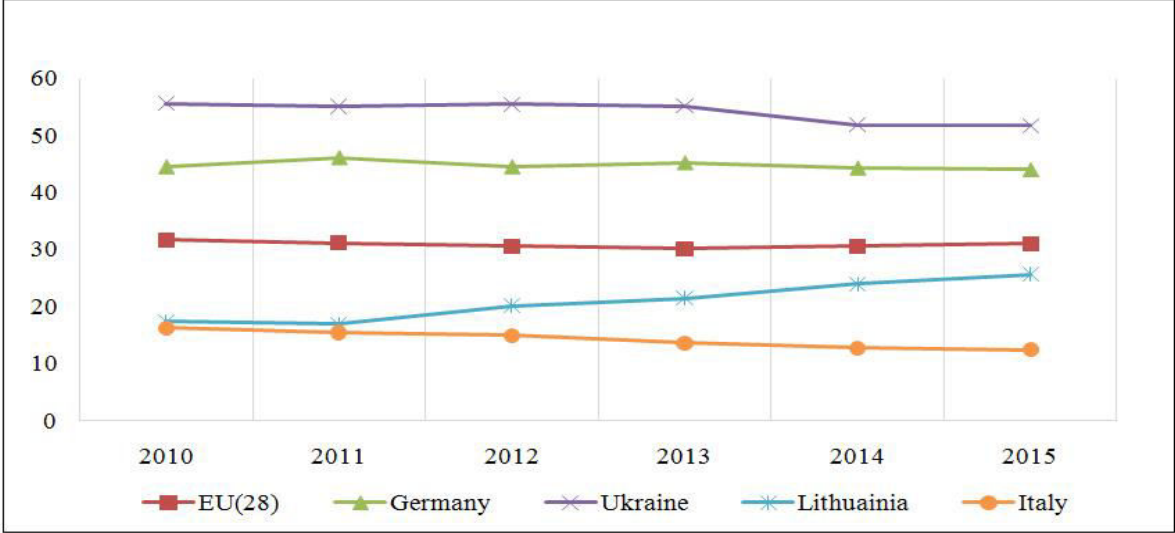


Figure 2.5.4: Employment rate of young women in Ukraine, the EU (28), Germany, Lithuania and Italy, in %

Source: compiled by author based on [108, 109]

Youth unemployment remains a serious problem for most countries, since some of them in this figure reached a historic high. In the world the youth unemployment rate in 2012 increased to 12.6% and forecast to 2017 it will increase to 12.9%. This is an extremely serious problem. Incidentally average unemployment rate in the EU will not reflect objective reality, as is the case by internal labor migration. For example, the young Italian aims to build a career in the more developed countries, such as Germany. Let's analyze this figure in the context not only of the EU average, but in the context of Ukraine and the three analyzed countries.

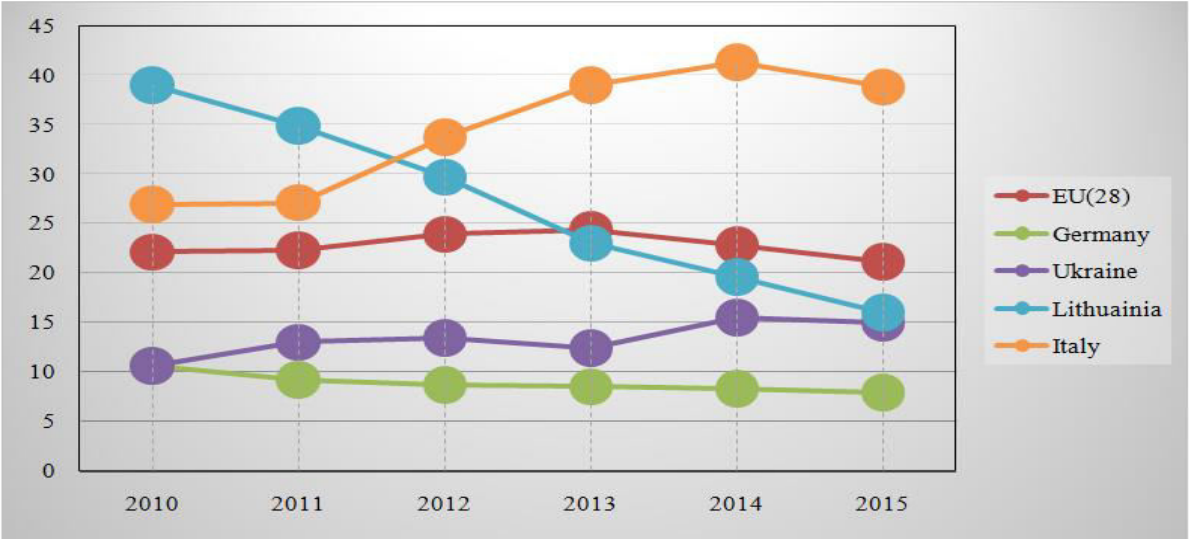


Figure 2.5.5: Youth Unemployment 2010-2015 in Ukraine, the EU (28), Lithuania, Italy and Germany, in %

Source: compiled by author based on [108, 109]

The unemployment rate in the EU among young people in 2010-2015 is still more than 10% in all but six countries (Germany, Austria, Switzerland, Norway, the Netherlands and Luxembourg). With that in Germany there is a tendency to reduce youth unemployment, in 2010 this figure was 9.7%, and in 2015 - 7.3%, or decreased by 2.4%. In modern terms this incredible performance, especially when the value in Ukraine is growing rapidly? In 2010, the youth unemployment rate in Ukraine amounted to 11.7%, in 2015 - 14.4%, increased by 2.7%. The EU average unemployment worthy through Germany, Austria, Switzerland, Norway, actively and effectively fighting youth unemployment, but countries such as Greece, Spain, Portugal, Italy contrary increase it. In Italy, the level of youth unemployment reaches record labels, if in 2010 the unemployment rate was 27.9% and in 2015 it was 40.3%, which is a growth by 12.4%. European average youth unemployment rate in 2015 was 20.6%, at the same time in Italy 40.3%. In Lithuania in 2010 was almost the highest rate of youth unemployment with 35.8%, however the country made a number of reforms, the Lithuanian government managed to reduce this figure by 2.1 times to 16.3% in 2015.

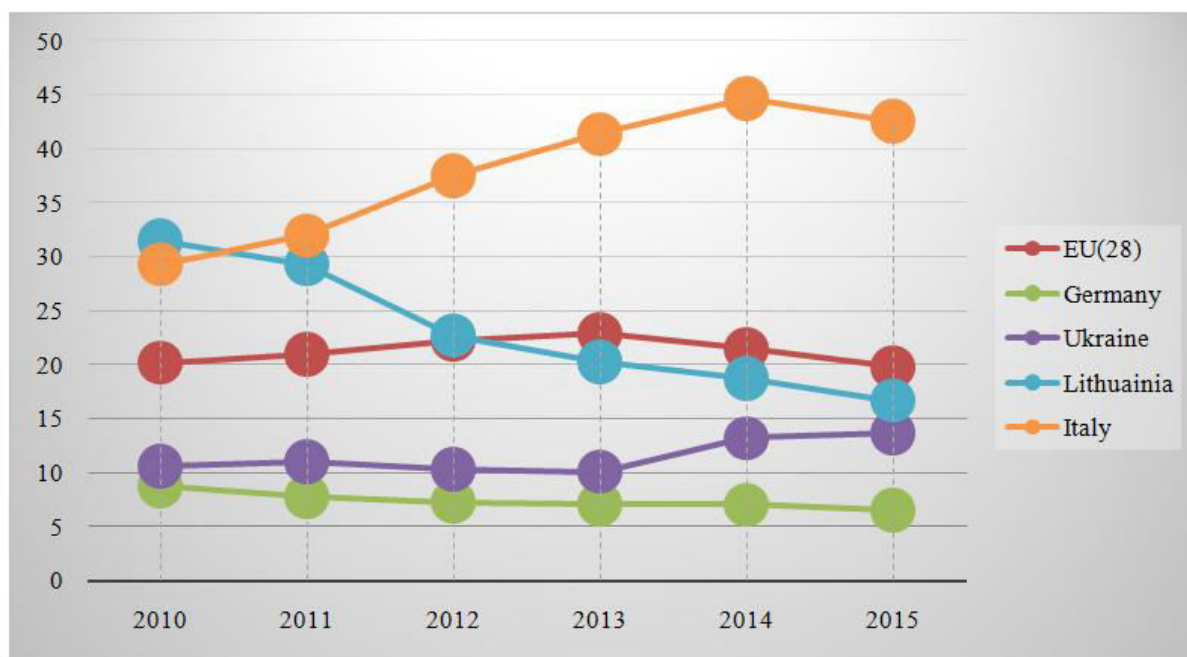


Figure 2.5.6: The unemployment rate in young males 2010-2015 in Ukraine, the EU (28), Lithuania, Italy and Germany, in %

Source: compiled by author based on [108, 109]

Germany holds a very effective policy to reduce unemployment among young males. If in 2010 this indicator between Ukraine and Germany was only a difference of 1.8% in 2015. This difference increased by 2 times. Youth unemployment among men in Ukraine exceeded the mark of 15%, and in Germany, by contrast, was less than 7.0%. In the EU, significant fluctuations was not seen (Figure 2.5.6).

Beating all records of male unemployment in Italy, unemployment highest value observed in 2014 was 41.3%. In 2015 it fell by 2.5%. However, compared with 2010, the unemployment rate increased by 12%. In Lithuania, on the contrary, in 2010 the rate of youth unemployment among men was 39.2% and in 2015 only 15.9%, or decreased almost 2.5 times.

The picture on the youth labor market status of women resembles a man's job market. Germany also very effectively solved the problem of female unemployment in 2015 compared with 2010, this level decreased by 2.3%. In Ukraine in 2015 compared to 2010 the unemployment rate increased by 3.1%. On the European stage this value ranged within 4 years from 19% to 23%, and in 2015 stopped at around 19.8%.

In Italy, the rate of female unemployment rose from 29.3% in 2010 to 42.6% in 2015. In Lithuania in 2010, 2011, 2012 the female unemployment rate was considerably higher than the average value, but in 2013 it began to plummet and in 2015 was lower than in the EU by 3.1%.

Table 2.5.3

SWOT-analysis of higher education in Ukraine

Internal environment	
1	2
<i>Strengths (S)</i>	<i>Weaknesses (W)</i>
<i>Resource potential</i>	
1. Increasing the number of students in universities III-IV accreditation. 2. Increasing the number of students accepted in universities III-IV accreditation. 3. Increasing the number of issued experts universities III-IV accreditation. 4. Increasing the value of fixed assets of educational institutions.	1. Reducing the number of students in the universities I-II levels of accreditation. 2. Reducing the number of accepted students in the universities I-II levels of accreditation. 3. Reducing the number of issued experts universities I-II levels of accreditation.
<i>Human resources</i>	
5. Increasing the number of graduate students. 6. Increasing the number of PhD students.	4. Reducing the number of scientists.
<i>Financial aspects</i>	
7. Ability to provide paid services.	5. Dependence public universities from state budget funding. 6. A small number of investments in fixed assets.
<i>Organizational aspects</i>	
8. Increase the number of universities III-IV accreditation. 9. Relief move citizens to further education or employment in the European zone of higher education. 10. Ukraine agreements on legal assistance, abolishing the requirement of legalization of official documents on education.	7. Reducing the number of universities I-II levels of accreditation. 8. Problems with employment of graduates.
External environment	
<i>Opportunities</i>	<i>Threats</i>
<i>The operating environment</i>	
1. Increasing of average wages. 2. State concessional long-term loans for education. 3. Provision of loans for construction (purchase) of housing for scientific, pedagogical and teaching staff. 4. The scientists state awards, scholarships and grants.	1. The consumer price index (inflation index) for housing, water, electricity, gas and other fuels. 2. The decline of living standards.
<i>The legal environment</i>	
5. Improvement of legislation.	
<i>The social environment</i>	
	3. Negative demographic changes.
<i>The competitive environment</i>	
6. Education foreigners	4. Increased competition from European universities.

Source: compiled by author on fundamentals of [108, 110, 112, 113]

Indicators of unemployment in Ukraine labor market have not high gender differentiation and the unemployment rate of men over the years 2010-2015 exceeded the "female" unemployment. The only categories of the population, where age-specific

employment rates show significant gender asymmetry in favour of men, are people aged 25-35. Women ages 20-24 and 25-29 years have the highest birth rates (in 2015 the proportion of children born by women in these age groups was 29% and 63%), which explains the low employment rate of younger women because of their reproductive activity. Breaks in professional activities related to the birth and upbringing of children, affecting not only the level of income of these women age, as well as the deterioration of the quality of their professional knowledge and skills in today's dynamic conditions of the labor market.

From the results of the comparative analysis determined that Ukraine has the lowest value of the share of youth in total population by age cohorts, the level of economic activity of young people is below the European average in all ages (15-24 and 25-34) cohorts of young people. It is also worth noting that the level of economic activity and employment rate of young people aged 15-34 years in Ukraine is the lowest in the last six years. Therefore, improvement of youth in the labor market can only be achieved through a deep understanding of employment problems both in general and in specific countries. However, effective solution to the problems of youth employment is impossible without constant monitoring of employment, unemployment of young people, in order to ensure effective regulation of youth labor market at all levels and the adoption of a package of special measures to counteract the negative effects of socio-economic crisis and the crisis of the labor market and employment, including measures of a social nature, aimed at easing the crisis particularly for young people.

Education is a priority of the state and society, an indicator of its culture and the foundation of progress. During the period of economic reforms Ukraine lost the high level of training, respect for knowledge. Finishing high school, young professional change to the share of economically active population and are one of the subjects of the labor market. Undoubtedly, there is a very close link between quality education and the labor situation in the roar of both general and youth.

Consequently, conduct SWOT-analysis of higher education in Ukraine on the basis of statistics [108] and others [112, 113] data. The matrix would look like Table 2.5.3. Its factors internal and external environment are grouped in separate sections. To strengthen higher education in Ukraine we include following measures obtained:

- Increasing the number of students in universities III-IV accreditation. In the years of independence the number of students in Ukraine has changed more than 1.5 times; from 881.3 thousand at the beginning of 1990/91 to 1438.0 thousand at the beginning of 2014/15 due to the opportunity to acquire training on a fee basis and popularity of higher education among the population. However, the largest number of students in universities III-IV accreditation (2372.5 thousand) was observed in the year 2007/08;
- The number of students accepted in universities III-IV accreditation increased more than 1.6 times from 174.5 thousand in the years 1990/91 to 291.6 thousand in 2014/15. The maximum value of this index (507.7 thousand.) was observed in 2006/07;
- The number of issued experts of universities III-IV accreditation rose 3 times from 136.9 thousand in 1990/91 to 405.4 thousand in 2014/15;
- Increasing the value of fixed assets of educational institutions by more than 1.5 times;
- Positive dynamics in the training of professionals in a constant independent Ukraine, starting with the academic year 1991/92, increasing the number of highly qualified personnel. Thus, in the academic year 2014/15, the number of graduate students compared to the year 1991/92 increased 2 times;
- The number of doctoral students is increasing every year, so in 2014/15, their number was 1,759 people in whole Ukraine, which is 3.5 times more than in 1991/92;
- The ability to provide paid services according to the CMU the number was 796 of August 27, 2010. Schools can charge fees for services in the areas of education; scientific and technical activities; international cooperation; health, recreation, dozvil- field, health, tourism, physical culture and sports; services; transport services; housing services; other services;
- Increasing the number of universities III-IV accreditation by more than 1.9 times

from 149 in 1990/91 to 277 in 2014/15. The maximum value of this index (353) was observed in the educational year 2008/09;

- Facilitate to move citizens to further education or employment in the zone of the European higher education; this contributes to the accession of Ukraine May 19, 2005 at a conference in Bergen to the "Bologna Process";

- Ukrainian agreements on legal assistance, abolishing the requirement of legalization of official documents on education concluded with Belarus, Bulgaria, Bosnia and Herzegovina, Armenia, Estonia, Kazakhstan, Latvia, Lithuania, Poland, Russia, Romania, Serbia, Hungary and the Czech Republic.

Following events happened in the past to weaken higher education:

- Reducing the number of students in the universities I-II levels of accreditation by more than 3 times from 757 thousand in 1990/91 (maximum) to 251.3 thousand in 2014/15;

- Reducing number of accepted students in the universities I-II levels of accreditation by more than 3.5 times from 241 thousand in 1990/91 (maximum) to 69.5 thousand in 2014/15;

- Reducing number of issued experts at universities I-II levels of accreditation by more than 2.9 times from 228.7 thousand in 1990/91 (maximum) to 79.1 thousand in 2014/15;

- Reducing the number of scientists annually since the years of independence (except in 2004);

- The dependence of state universities from state budget funding, the State Budget of Ukraine for 2014 general fund expenditures for MES provides 18,448,197.1 thousand USD, accounting for more than 68% of total expenditures (26,946,132.7 thousand USD);

- A small number of investments in fixed assets in 2014 in the education sector, Ukraine has invested 719.1 million USD, accounting for a very small percentage of the total investment in fixed assets;

- Reducing the number of universities I-II levels of accreditation by more than 1.9 times from 742 in 1990/91 to 387 in 2014/15;

- Problems with the employment of graduates during 2010-2014. Among the unemployed aged 15-70 were 14.1-18.3% not employed after schools and universities I-IV accreditation levels.

In opportunities of higher education parallel the following events had happened:

- Increasing of average monthly salary in education in the years 1995-2015. There was a positive trend in this indicator, from 71 USD per one full-time employee in 1995 to 108 USD in 2015. Therefore, there is every reason to hope that this trend is confirmed and in will continue in the future;

- State preferential long-term loans for education in the State Budget of Ukraine for 2014 to the Ministry of Education, Youth and Sports provides loans of \$ 5 million USD from the General Fund;

- Training of foreigners was regulated Resolution of the Cabinet of Ministers of Ukraine "On Education of Foreign Citizens in Ukraine" dated February 26, 1993 and the Regulation on the admission of foreigners and stateless persons to study at university, approved by the Cabinet of Ministers of August 05, 1998. Today there are about 50 thousand foreign students. The following facts threading higher education:

- Consumer price index (inflation index) for housing, water, electricity, gas and other fuels was 143.3% higher in December 2015 than December 2014;

- Increasing number of Ukrainian treated with lower total income per month than the living wage lead to a reduction of living standards as a result;

- Since 1994 Ukraine's population decreased annually because of negative demographic development;

- Ukrainian students get higher education abroad because of increasing competition from European universities.

Table 2.5.4

SWOT-analysis of the youth labor market in Ukraine

1	2
<i>Strengths (S)</i>	<i>Weaknesses (W)</i>
1. The introduction of foreign universities grants programs for Ukrainian students with the condition of returning to Ukraine after graduation. 2. High mobility, potential and ambitions of youth as a social category. 3. Openness young new technological and management solution.	1. The imbalance of supply and demand for labor. 2. High quality requirements and competitive workforce youth. 3. The inability of young people to put into practice the theoretical knowledge lack practical skills management and planning of their time, ignorance of the basics of labor discipline and business ethics. 4. Lack of skills in youth work team leader submission skills and business communication. 5. Imperfect legislation. 6. The unstable military and political situation in the country. 7. The reluctance of employers to participate in the learning process. 8. Fierce competition in the labor market. 9. Low wages youth.
<i>Opp</i>	<i>Threats (T)</i>
1. Improvement of legislation. 2. Improving the quality of education in the country. 3. Encouraging young professionals to work with student years. 4. Introduction of international experience youth employment. 5. A deeply differentiate youth and senior professionals in the labor market.	1. Increased migration among young people. 2. "brain drain" abroad. 3. Further increase in youth unemployment

Source: compiled by author based on [112, 114, 115, 116, 118]

It is advisable to make a prediction about 2020 youth unemployment. To do this, use the method of extrapolation of the trend using a trend line in the program Microsoft Excel. Output table is the following:

Table 2.5.5

Initial data for the prediction of the number of unemployed youth by 2020

Year	2010	2011	2012	2013	2014	2015
Number of unemployed, thousand	975,10	972,30	914,10	849,90	864,40	892,80

Source: compiled by author based on data [108]

Table 2.5.6

A forecast of the number of unemployed youth by 2020

Year	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
Unemployed, thsd.	975,10	972,30	914,10	849,90	864,40	892,80	831,49	808,65	785,81	762,97	740,13

Source: compiled by author based on [108]

Based on the forecast we plot the data in Microsoft Excel. The regression equation will look like: $y = -22,84x + 991,37$. Coefficient of regression equation shows how unit's results change when changing factor 1 units. The coefficient $b = -22,84$ shows the average effective rate change (in units of) to increase or decrease the value x factor per unit of its measurement. That is an increase of 1 Data y decreases by an average of 22.84 thousand. The coefficient of determination is 92% that is accurate selection of the high regression equation.

With forecasting, we determined that in 2020 the number of unemployed young people will be approximately 740.13 thousand people at a stable situation.

SUGGESTIONS

Special attention should be paid to issues such as start-ups and innovative projects. The experience of foreign developed countries indicates that countries that have chosen the journey of innovation development today have a leading economic position in the world market. The proof of this fact is the USA, which brings innovative products to market by 85%, Japan 75%, and Germany 55%. Ukraine produces only 1% of innovations. According to the Global Innovation Index 2014 Ukraine occupied the 63rd place in the ranking of 143 countries by the level of development of innovation [119]. This position is saved for the last 5 years (from 2010 to 2015).

The new generation Z is the ideal ground for start-ups. Gen Z really differs from Gen X. The new generation of Z characteristic desire to have everything immediately, to live for own pleasure, and contempt for authority. Unlike their parents they can work for an idea, and be able to take risks.

Start-ups and innovative technologies, firstly, will stimulate the economic development of the country; secondly, will motivate young people of new generation to create new interesting projects in this area. Thirdly, this will help to avoid brain drain from Ukraine, who knows, if in Ukraine were favourable conditions, if may Jan Koum and Max Levchin founded their start-ups in Ukraine, paying taxes, and filled the state budget.

At the moment in Europe and in the world there has been a trend of strategic transition from commodity economies, bearing elements of instability to the intellectual. Governments around the world have long realized the importance of IT-industry to the economy, so use a number of tax tools and incentives. However, in many countries receives special tax treatment not only IT industry, but also companies from sectors where there is a high technology component.

According to the Deloitte report, in 2015 Global Survey of R&D Incentives in the world using a combination of five types of tax incentives:

- tax deduction (reduction of the tax base by the amount of spending on R&D);
- tax credit (reduction of tax payable on the value of investment in R&D);
- preferential rates (income tax, VAT or as exemption from customs duties);
- accelerated depreciation (fixed assets involved in R&D);
- various grants.

With all these benefits in Ukraine is only exempt from VAT for the supply of software. However, the discussion draft Code of even this privilege is not available, and most likely it will not.

Certainly if Ukraine wants to develop in this direction, we must create the conditions for IT-business. For example, interest in this regard is Lithuania. Vilnius is the most active start-up platform. It hosts hundreds of themed events that bring together a vibrant start-up community. The city has several co working for business start-ups such as: StartupHighway X (SHX) located in Rupert, the centre of the arts, education and business integration. Also Vilnius Hub is the first co working space in Lithuania. Another important initiative is the stage start at Vilnius Tech Park. This place will be the main hub for technology start-ups and other business initiatives in Lithuania. This technology park will bring together local and international talents of the fastest growing sectors: heyminh, big data, cyber security, and graphics. Prosperity start-ups in Lithuania promote a policy of low taxes compared to other European countries. The same is needed in Ukraine.

Experts predict that by 2020, IT industry in Ukraine could grow from \$ 2.4 billion to \$ 7.7 billion, and the share of IT in GDP in Ukraine could reach nearly 5.8%. In this case in the next 6 years could be created over 100,000 new jobs, and it stimulates the creation of 400,000 jobs in other industries. However, IT market requires a comprehensive state program of support, not only financial. All this is possible in the performance of several conditions, first of all Ukraine need to create a special fund, which will deal with investment and venture capital investments in promising start-ups. Each year, the fund requires the state to deduct 1.5-

2% of the state budget. In 2016 the state budget of Ukraine totalled 83 billion 694 million UAH. Let's calculate the approximate amount that will come to the annual trust fund:

Total deductions from sb = 83 billion 694 million * 0,02 = 1 billion 674 million;

It turns out a very attractive sum. For clarity, it is appropriate to cite a few examples. Venture investor Mike Marcoule invested at the time 250 thousand US dollars in Apple, after he sold his share for 154 million dollars, and earned 61.6%. Thomas Alberh invested 100 thousand US dollars at bookstore Amazon. Overall, the revenue from this amounted to 26 million US dollars.

The process of creating a start-up from an economic point of view and the cost of it is shown by an example of the limited liability company "Complex IT", which is in the software market since June 13, 2015. The main activity of the company is aimed to create enterprise information management systems using modern application development tools and databases.

Today the company focuses on three areas:

- Web-Site development, promotion of search engines and social networks;
- Development, sale and implementation of software for complex automation of internal business processes;
- IT-outsourcing, servicing PCs and servers, setting up networks and software, remote PC maintenance.

In Table 2.5.7 are analyzed the main indicators of "Complex IT" on the basis of statements:

Table 2.5.7

The main indicators of "Complex IT"

	Aug.15	Oct.15	Dec.16	Feb.16
Cost (thousand UAH)	5908	6164	6754	6967
Profit (thousand UAH)	1396	1748	1809	2597
Profitability, in %	23,6	28,4	26,9	37,3

The profitability was calculated by the formula:

$$P = \frac{P * 100}{PCS}, \quad (2.5.1)$$

де P – profit, PCS – production cost of sales.

P (Aug.15) = 1396 * 100/ 5908 = 23,6%;

P (Oct.15) = 1748 * 100/ 6164 = 28,4%;

P (Dec.16) = 1809 * 100/ 6754 = 26,9%;

P (Feb.16) = 2597 * 100/ 6967 = 37,3%.

We propose to include in this model the ROI (Return on Investment), such as cost of goods or services, and all production costs:

- Purchase of materials, logistics costs, wages to workers of company;
- Total income without deducting the cost;
- Income, which presents the final profit after implementation of specific goods or services;
- The amount of investment, something composed of all expenditure allocated to a particular business.

Calculate the ROI (2.5.2):

$$ROI = ((TR - C) / TAI) * 100\%, \quad (2.5.2)$$

TR - total revenue, C - cost, TAI - the total amount of investment.

Suppose that the government has allocated from the trust fund investment amounting to 100 thousand UAH. Thus, the original data to calculate the rate of return on investment (last reported month):

Total revenue = 9670 thousand UAH;

Cost = 7200 thousand UAH;

The total amount of investment = 1000 thousand UAH;

$$ROI = ((9670 - 7200)/1000) * 100 = 247\%.$$

Thus, the rate of return on investment is 247% > 100%, which means that the business brings considerable profit. And this is without taking into account that the company would pay taxes to the state budget of Ukraine and create jobs especially for young people, because they are most utilized in the field of IT-technologies and start-ups.

Recently, Mark Zuckerberg, founder of Facebook, said that the creation of Facebook took about 500 thousand dollars investments and 9 months. To create a clone such as Twitter by Henrik Vardenlina it is estimated that he needed 50 to 250 thousand dollars.

Effective and efficient selection of start-ups funding should consider three main types of cost indices to be used:

- Average index value of launching a start-up;
- Index of cost of launching start-ups, depending on the segment (ICT, Biotechnology / life science, energy efficiency, other industrial technologies, services, related technologies and other innovative technologies);
- Index of cost of launching start-ups that participate in specific programs / projects.

The calculation of the average index value to launch start-ups is conducted on the basis of weighing its main components (index of start-ups run depending on the segment) in the industrial structure start-ups received during questioning. The average value of the index start is the arithmetic mean value of start-ups in all segments.

$$I_{ST} = \sum_{i=1}^n p_i, \quad (2.5.3)$$

Where n - number of start-ups assigned to segments, p - the cost of launching a project.

The index of start-ups run depending on the segment, calculated by formula (3.4):

$$I_{SEGM} = \frac{\sum_{i=1}^n p_{SEGM}}{n}, \quad (2.5.4)$$

Where n - number of start-ups assigned to a particular segment, p_{segm} - the cost of launching a project in this segment.

Similarly, the index of the cost of launching start-ups that participate in specific programs / projects. For example, the index value of the start-ups launch RVC calculated using the formula (3.5):

$$I_{RVC} = \frac{\sum_{i=1}^n p_{RVC}}{n}, \quad (2.5.5)$$

Where n - number of start-ups participating in programs / projects RVC, p_{rvc} - the cost of launching a project that is involved in the programs / projects RVC.

By the same principle calculated index value of launching start-ups "Skolkovo" and the index of start-ups launching projects OIU.ru and Competition of Russian innovations.

We thoroughly dismantled the microeconomic level, i.e. payments made at the enterprise level. At the macroeconomic level, as appropriate, in our view, is to pay attention to the tax system.

Given the US experience, an effective method of taxation in the IT-industry is characterized by higher salaries more than 20,000 UAH per month. It is advisable not to tax all wages, but only 12,000 UAH. Such a measure, firstly, help companies formally pay real wages, and secondly, to reduce the pressure on companies in this field and thirdly effectively fill the state treasury. In Ukraine, the tax system is not at all adapted to start-ups as the example of Lithuania. In Lithuania created special economic zones in which start-ups do not pay income tax, i.e. the rate of 0%, as the country is famous for its experienced technical team, a commitment to innovation and highly developed Internet infrastructure.

To prove ineffective tax policies companies offer to calculate tax burden in Ukraine. Focus cohort of start-ups companies do not make sense, since the country currently does not work for them preferential tax system and they pay to the state treasury as much as other businesses. According to the "Methodological recommendations on a plan-schedule of documentaries scheduled inspections of the entity "calculation of the tax burden" is based on the definition of two kinds of tax: income tax and value added tax.

The tax burden on income tax is determined by the following formula (2.5.6):

$$TB_{IT} = \frac{IT}{CR} 100\%, \text{ where:} \quad (2.5.6)$$

TBIT – the tax burden on income tax, %;

IT – income tax, thousand UAH;

CR – company revenues from all activities.

The tax burden of the VAT is defined as follows (2.5.7):

$$TB_{VAT} = \frac{VAT}{S} 100\%, \text{ where:} \quad (2.5.7)$$

TBVAT – the tax burden of value added tax, %;

VAT – value added tax, thousand UAH;

S – the supply (excluding VAT), thousand UAH.

However, the calculation of these indicators does not take into account the tax burden generally overlooked because of only two types of taxes. Other tax payments occupy a large share in the total aggregate tax payments. In particular, must be considered a single social contribution, which is included in the costs of the company and varies from 36.3 to 49.7% of charges on the payroll. To determine this parameter can be used the following formula (2.5.8):

$$TB = \frac{TP}{VA} 100\%, \text{ where:} \quad (2.5.8)$$

TP – the amount of tax payments, thousand UAH;

VA – value added, thousand UAH.

This figure shows how much of a firm's value added accounted for by taxes and is used to calculate the tax burden on specific company or industry. In the macroeconomic scale tax burden reflects the effectiveness of tax policy measures that quantify the cumulative effect of tax payments to the source of their payment. The results of calculations of the tax burden for 2014, 2015 in Ukraine are given in Table 2.5.8:

Table 2.5.8

The results of calculation of tax burden in Ukraine during 2014-2015 years

Indexes	2014	2015
Tax revenues to the consolidated budget of Ukraine, in billion UAH	387,731	376,578
Income tax of individuals	68,092	72,151
Corporate income tax	55,793	54,994
VAT	138,827	128,269
GDP, in billion UAH	1408,9	1454,9
The level of budget tax burden, in %	27,52	25,88
In particular, the tax on personal income, in %	4,83	4,96
With CIT, in %	3,96	3,78
With VAT, in %	9,85	8,82
Own revenues of the pension fund, in billion UAH	158,00	166,86
The tax burden on labor, in %	11,21	11,47
The level of the overall tax burden, in %	38,73	37,35

Source: calculated by author

According to Pricewaterhouse Coopers, Ukraine is among the ten countries with the most complex tax systems. The tax burden on the economy in Ukraine remained at 44%, while in Central and Eastern Europe (CEE), which are outside the EU is only 30%. Shadow economy, according to official estimates of the Ministry of Economic Development and Trade

of Ukraine reaches 35%, according to expert it is estimates to 45%. According to estimates of consulting company Boston Consulting Group, Ukrainian enterprises annually underpaid to the budget 25 billion US dollars which is almost 20% of the profits hidden taxes. At the same time the number of taxes Ukraine ranks on 91st place in the ranking among 185 countries surveyed annually by the World Bank, the tax load 154th, and the time spent on administration of taxes on 171st place.

Reducing the tax burden on start-ups especially in the field of IT-technologies can be profitable, using the example of Lithuania. It is advisable to create free economic zones, which in the early years of liberating business from income tax. In this case it is possible trying to create an analogue to Silicon Valley in California, USA. Their specific activity is the creation of free economic zones and release companies are registered there from income tax for a period of 2 years.

The basic "raw material" field of IT start-ups and, of course, is the intelligence, knowledge, so the raw materials are valued very highly. Not surprisingly, wages in these sectors can reach considerable amounts. For example, the average IT-company offers software developers a salary of at least \$ 2000 per month. Such companies in Ukraine are enough, but why the State Statistics Service salaries resulting in information and telecommunications are about 9500 UAH? Thus we can conclude that these firms make the manipulation of salary and pay it in an envelope, creating an additional strain on the company that has the potential to move, for example, to Lithuania, where everything is transparent and without undue pressure. But the state also loses deductions from salary, the difference is getting interest from fictitious salary or receive a smaller percentage, but with real wages.

Let's look at an example, the average wage in Ukraine ensuring software developer is about \$ 2000. Translate that amount at the rate of 1 \$ = 25,5 UAH.

$$2000\$ * 25,5 = 51000 \text{ UAH};$$

The level of tax on personal income = 18%; Military tax = 1.5%.

Let us count the amount received by the developer "on hand":

$$51000 - (51000 * 0,18) - (51000 * 0,015) = 41055,0 \text{ UAH};$$

The amount received the state budget from taxes on personal income = $51000 * 0,18 = 9180 \text{ UAH};$

Yet, another measure that must be eradicated, are salaries in envelopes. Of course, when the IT-companies pay salaries up to \$ 2000, there is a great temptation to circumvent the tax side, because we have calculated that if such a wage company has to deduct tax on the amount of 10000 UAH. According to the State Statistics Service, the average salary now in the information and telecommunications is only 9455 UAH. We offer the following benefits set. Complete posting companies registered in the free economic zones, subject to monthly fee of 15,000 UAH or less. For example, with the same salary of software developer, this for example is 51,000 UAH.

We realizes a profit of 15,000 UAH, so the amount of tax on personal income will be: $15000 * 0,18 = 2700 \text{ UAH};$

The military tax amount is: $15000 * 0,015 = 225 \text{ UAH}.$

The rest of the salary in the amount of 36,000 UAH is not subject to any taxation. Thus, the owner simply does not fraud and pays two minimum wages to a person who receives, for example 30,000 UAH. Firstly, now there is no need to hide the full amount of wages, and secondly, it will help to get out of the shadow economy and stop paying money in envelopes. And for businesses that would make fraud, there must apply very strict sanctions.

Currently the situation in the field of information and telecommunications the average salary is 9455 UAH and is occupied by about 294.5 thousand people. Let's calculate the amount of tax revenue:

$$9455 * 0,18 = 1701,9 \text{ UAH}; 9455 * 0,015 = 141,8 \text{ UAH};$$

That is an average of 294,500 people and paid taxes of 1843.7.

$$\text{The total amount of tax deductions} = 294,500 * 1843,7 = 542,969.650 \text{ UAH}.$$

The implementation of this action firstly increases the number of employees in this sector, and secondly, the average salary increase of at least 2 times. It is important that the average salary will be, whether it is at least 70,000 UAH subject to posting 15,000 UAH. Suppose the event after the introduction of the average salary in industry increased from 9455 UAH to 27,345 UAH, and the number of workers employed in industry increased from 294,500 people to 351,200 people. Calculate the amount of tax revenue: $15000 * 0.18 = 2700$; $15000 * 0.015 = 225$; thus, on average predicted 351,200 people will pay each 2925 UAH taxes. The total amount of the potential tax deductions = $351200 * 2925 = 1027260000$ UAH. In our opinion, this is one of the most effective measures that can certainly minimize taxes regardless of the amount of wages, and increase the amount of employees sufficiently by at the same time reducing the shadow economy and will help to fight against huge youth unemployment and create new business start-ups and innovative technologies.

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2.6 "BUSINESS STRESS" AS A RESULT OF EVOLUTION OF SOCIAL AND ECONOMIC SYSTEMS AND STRENGTHENING INNOVATIVE MANAGEMENT

Civilization is transferred intensively to the post-industrial stage of development. In the pre-industrial stage, the main direction for competitiveness was aimed at effective use of natural (mainly land) and labor (mainly physical force) resources. At the industrial stage, the increase of competitiveness has been achieved, first of all, through the effective use of the equity capital and, above its active part (machinery and equipment). In today's post-industrial stage, the main factor in the competitiveness ensuring is informational and innovative resources. Such scientists as D. Bell, J. Galbraith, J. Martin, J. Massoud, F. Polak, O. Toffler, J. Fourastié, P. Drucker, G. Soros, F. Fukuyama, J. Thurow, M. Castells, T. Veblen, R. Dahrendorf, V. Menger, M. Polanyi et al. have developed the theory of post-industrial society and made invaluable contribution.

Long periods of sustained development (original periods of "economic peace") are characteristics of pre-industrial and industrial stages of development of society. Qualitative leaps in the economy or so-called "economic stresses" appeared occasionally and rarely. Such economic situations occur in a significant number of cases after a certain period of time.

The qualitative leap is the level of development, when the same problem can be solved in a shorter period of time and much more effectively in comparison with the previous stage of development. Moreover, qualitative leaps pervade almost all spheres of human activity. Their essence and significance are clearly visible in a few examples.

Period of substitution innovations by technique was as follows: up to the XX century it was up to 50 years and over; in the first half of the XX century it was 15-30 years; in the second half of XX century it was 5-10 years. Now it is measured by years; in some areas it is measured by months. Thus, 6 years of constructive development was invested in a car in 1990 and only 2 years was invested in a modern car. Now the key area of economic development – microelectronics – annually doubles the complexity and volume of integrated circuits production at lower cost and price of 30%. VLSI specifications are improved up to 4 times each two years. Modern computer, which costs 2000 US dollars many times more powerful than the computer, which has worth 10 million US dollars twenty years ago [121, p. 7; 118, p. 95; 123, p. 43; 124, p. 195]. I.e. a significant qualitative leap in the technique production has been done through the use of modern technologies (and, first of all, in software production). Moreover, it can be assumed that the use of expert systems and artificial intelligence systems, along with advanced software in the future will lead to a new qualitative leap, and, possibly, to a series of leaps.

Second example: Japan took 95 years to give the first million patents. And to give second million patents, it took only 15 years [125, p. 35].

There is also an example of a quantum leap which is over the closest scientists. If earlier to compile a bibliography for the dissertation it was required half a year minimum, but now this problem will be solved during hours or days with the help of modern software.

In today's global environment, qualitative leaps (economic bifurcation) have a permanent character; they are an integral part of economic life. Such increase in the bifurcation development is the result of the socio-economic systems' evolution. It follows from the dialectics of social progress; it has an objective nature and it is the result of combined effect of three factors: 1) acceleration the pace of public life and the economy, in particular; 2) emergence and inclusion of new productive factors and their combinations into the economic circulation; 3) significant increase in mutual influence and interdependence of the world.

1. The pace of social life and the economy in particular, is accelerated under the influence of accelerating scientific and technological progress and innovative development opportunities (as its result). If humanity needed 112 years to organize the extensive use of photography, 56 years to use telephony, then appropriate time for the use of radar, television, transistor and integrated circuit were respectively 15, 12, 5 and 3 years [120, p. 6].

At the same time, strengthening the innovative process with globalization accelerate the pace of social and economic life much more. It is accompanied by the fact that new technologies are much more economical than traditional.

Previously, a letter from Australia went by regular postal service approximately 1.5 months in the Ukraine. Now e-mail from any place in the world to another place will come for a maximum of two hours. For example, the cost of document transmission by 40 pages from Chile to Kenya by means of e-mail is less than 40 cents, by means of faxing about 10 US dollars and by means of courier 50 US dollars [126, p. 30]. Thus, the efficiency of new technologies increases significantly. The efficiency of traditional technologies increases significantly in conjunction with the new technologies. The cost of a 3-minute telephone conversation New York – London was as follows: 245 US dollars in 1920, 9 US dollars in 1950 and 0.78 US dollars in 1999 [124, p. 195]. Thus, the speed of information dissemination and their accessibility are increased revolutionary. Ultimately, this is one of the main reasons for increasing the economic systems speed development in a common.

2. The rapid acceleration of the innovative process led to the emergence and integration into the economy a significant number of new production factors (labor objects, technologies and new labor forces) and their combinations. Oil is not considered an economic resource before the advent of the internal combustion engine. Penicillin fungus was only one species of fungi before the antibiotics discovery. A few decades ago stem cells, which now cost over thousands dollars (or even hundreds of thousands dollars) were subject to disposal.

The process of new productive factors involving in the economic circulation grew significantly in the last decades of the XX century and continues nowadays. The revolutionary discoveries in biology have generated a number of new professions: genetic engineering, cellular medicine et al. Recent discoveries related to the decoding of the human genome, expanded horizons even more, allowing to produce goods or to do certain medical operations taking into account genetic characteristics of individuals.

3. Interaction of factors and processes regardless of their territorial action scope is significantly enhanced in the context of globalization. Factors that could not previously affect certain processes in terms of increasing interdependence have this capability nowadays. As a result, the number of influencing factors significantly increases and therefore the number of development options significantly increase as well. In fact, virtual-intellectual environment is formed, where space and time factors are largely lose their limiting value [127].

Now the situation is possible, which was impossible a few decades ago. For example, a leading surgeon can watch the operations process on Skype occurring at the other continent and can give invaluable advice online that could save the patient's life.

As a result of complex influence of the three abovementioned processes, qualitative leaps in the economy (a kind of "economic stresses" or bifurcations) acquire a permanent nature and cause of the bifurcation development.

Strengthening of the bifurcation leads to the emergence of adequate system of patterns, which are specific to the current stage of development. These patterns may occur with unequal force in different regions and in different periods. But in general, such system of patterns characterizes current stage of development.

Pattern 1: Further gradual acceleration of public life pace, including the economy. As a result of the bifurcation strengthening, further acceleration increases the number of options in different sectors of the economy; the best of them are selected for practical use. Accordingly, they increase the productivity of tools. Using those individuals can affect quickly the labor subjects and can achieve the desired results. It creates a fundamental condition for the further acceleration of social life and, first of all, economic processes. That is, we can state that the "economic stress" creates a new "economic stress".

Pattern 2: Significant increasing of business entities competition especially for the right of use of the informational and intellectual resources. As the pace of economic life in the future will rise, finding the quickest and the most effective options to solve current problems

of economic development will be actual more and more. It will raise competition for the right to use all kinds of resources, especially informational and innovation resources, since they will become the main tool for survival in conditions of "economic stress", as it will be shown later.

Pattern 3: Acceleration of knowledge generations changes. As the number of qualitative leaps will increase, it will lead to a more rapid aging of the accumulated knowledge. The period of time for the relevant knowledge inevitably reduces and the new knowledge change old ones. The consequence of this situation is to reduce the "life cycle" of knowledge, i.e. the period from its inception to practical use.

Pattern 4: Acceleration of changing equipment generation and reducing its "life cycle" is a significant acceleration of knowledge transfer from one generation to another leads to an acceleration of equipment generation change and reduction of cycle "research – developing and constructive works – testing of new equipment – implementation of new technologies".

Pattern 5: Increasing the labor productivity and capital goods. Given the fact that the new productive means will be established on the basis of new, more advanced generation of knowledge that can significantly deeper and more fully take into account the use of laws, forces and objects of the nature, then they (means) will be much more productive than the previous ones. At the same time the productivity of the productive means will increase from generation to generation. It will determine the progressive increase in labor productivity.

Pattern 6: Increase the role of health as a competitive resource. With the increasing of bifurcation in development, demands on the competitiveness of the individuality are significantly increased and especially to two of its most important components: 1) level of intellectual health (level of intellectual development) and 2) level of physical fitness. In the industrial epoch it was enough once to get higher education and every 10-15 years only a bit correct and supplement their knowledge. In the post-industrial era, knowledge is updated so rapidly that every 10-15 years it is necessary to replace them completely (or largely). To survive and compete effectively under conditions of "economic stress", withstanding great physical and mental stress, it is necessary to be healthy. Health level (mental and physical) is turned into the most important competitive resource of personality. Accordingly, the average level of the nation's health (mental and physical) becomes an important competitive resource of the state.

Pattern 7: Accelerating development, implementation of macro- and micro-technologies, as well as the acceleration of their synthesis and mutations. The second half of XX - beginning of XXI century presented outstanding discoveries, which became the foundation for the new macro-technologies (i.e. technology-based innovations), in particular: 1) development of computer technologies; 2) development of nano-processes; 3) decoding of the human genome et al. However, the interaction of different scientific fields will occur under the influence of "economic stress", as well as the synthesis of technology and mutation.

We suggest considering the synthesis of technologies as the integration of different technologies into a single system, resulting in a fundamentally new integrated macro-technology. Integral macro-technologies may arise as a result of synthesis of two or more macro-technologies. There is another option, when the integral macro-technology is the result of a synthesis of macro-technologies and micro-technologies as from both own and other areas of science. Micro-technology is a technology that is based on improving innovation.

Mutation of macro-technologies we understand as their change as a result of interaction with other macro and micro-technologies. What gives the reason to believe that the synthesis and mutation of technologies will increase under the influence of "economic stress"? Firstly, "at the intersection" of the two technologies (in particular of different scientific spheres) it is possible to find non-traditional solutions of the problem and to obtain significantly better results than when they have used alone. Secondly, "at the intersection" of the two technologies it is possible to develop integral technology that will solve the problems, which is impossible to solve by means of "maternal" technologies. Thirdly, using integrated technologies it is possible accelerate significantly problem solving. Fourthly, integrated technologies may be much more efficient than their "maternal" technologies.

Pattern 8: The increase of the "price" of conflict in "stress economy". Always economy was a system that was composed of heterogeneous elements (business organizations; institutions of market infrastructure; state, whose interests represented by regional and central governmental authorities; non-governmental institutions, etc.), which operate at different levels (micro-level, regional, sectoral and inter-sectoral levels, macro-level and international level). Except of national interests, each of these elements has its inherent system of interests, which is generated by its nature and specific place in the common economic system. Systems of interests of different elements can be the same, but it is possible and quite often there are situations when these systems (or individual interests) completely or partially in conflict with each other. This situation is an objective basis for the emergence of conflicts in the economy. Anti-conflict function has always been one of the main functions of the state. But in many cases it was enough to eliminate the conflict consequences in the non-globalized world before bifurcation stage, as "price" of a certain part of them was accepted by society.

Ceteris paribus "price conflict" (a set of socio-economic consequences of the conflict) in terms of "stress economy" increases. It means that the socio-economic consequences of similar conflicts in the conditions of the "stress economy", as a rule, are growing in comparison with relative economic calm.

This situation is caused by a number of laws: 1) lag for making anti-conflict decisions under conditions of "stress economy" reduces; 2) the number of options for anti-conflict solutions significantly increases; 3) lag for implementation of anti-conflict solutions reduces; at the same time it means that, ceteris paribus, implementing cost increases; 4) the number of possible options for the conflict consequences increases due to the number of variants of development a particular process. It greatly complicates the ability to predict the conflict consequences; 5) probability of a "conflict chain reaction" is increasing, when one conflict creates next ones and so on. This circumstance is due to the fact that when there is a conflict in a limited number of options, then the number of options of conflict development is limited. When conflict arises in a large and constantly increasing number of variants, then the number of options for the conflict development accordingly increases proportionally with increasing the total number of development options.

Pattern 9: Increasing role of the creative potential in modern production. At the present stage, when "economic stresses" have a permanent character, the most important task of economic science and practice is the development of effective mechanisms for generating, accumulation and use of new knowledge. Moreover, this knowledge should use after its transformation technical, technological, organizational, social, environmental and other wide-range innovations. Any new knowledge is a derivative of individual intelligence (intelligence an individuality) or collective intelligence, i.e. the total intelligence of structured in a certain way group of individuals. Therefore, it is extremely important to stimulate individual and collective intellectual activity of the company's employees.

To solve this problem, first of all, it is necessary to involve and to use maximally the creative potential of employees. Creative potential always has been the engine of progress. All intellectual ups of civilization were connected with the creative potential of an individual or group of individuals somehow. Where there was no such enormous acceleration of economic life, which takes place in recent decades, when "economic stresses" were rare for the sustainable competitive advantages of business entities, it was enough to use the creative potential of their leaders or group of leading experts. In current conditions of rapid development of the economic environment it is not enough. Nowadays, to get long-term competitive advantages, it is necessary to use creative potential all of employees, and ideally all employees.

Pattern 10: Strengthening the systems of economic life and growing role of the individual information of employees. Two principles are important: the principle of the spoken word by enterprise employees (hereinafter – the principle of the spoken word) and the principle of unspeakable word by enterprise employees (hereinafter – the principle of unspeakable word)

for increasing "stress economy". *The principle of the spoken word* means that any information (any knowledge), provided by the company top-management from the side of any employee can be invaluable and bring huge profits to the enterprise. It is very difficult to determine which information can be the basis of effective development in the context of "economic stresses". Therefore, it is advisable to save, analyze and use the information provided by any employee of the company. *The principle of unspeakable word* means that any information (any knowledge), not provided by the company top-management or provided, but ignored, could harm the company both in short-term and long-term. This circumstance is due to the fact that modern production (especially high-tech) presented by hundreds, thousands or sometimes millions of system-forming connections. Moreover, systems of production enhances with the increasing of "economic stresses", i.e. the number of system-forming connections in the production increases.

Underestimation at least one or more of system-forming connections can cause significant impact on the enterprise competitiveness. The company's top-management sees the system as a whole; they cannot count all systemically important communication at all levels, because they do not know and do not see them. Only employee of the company sees and knows a particular communication. Therefore, it is important to accumulate, analyze and save any new knowledge. Said word by employee (especially said at the time) can bring significant profits. Unspeakable word by employee (or said, but ignored) can cause damage.

Pattern 11: Strengthening the role of the innovator and the formation of informational and innovative vector for competitiveness. Vanguard civilization went through pre-industrial and industrial stages, and now it moves mostly in the post-industrial stage of development, where the main factor is the competitiveness maintenance of the intellectual and innovative resources. As it was shown earlier, the value of these resources increased in "stress economy". However, intellectual and innovative resources do not arise by themselves. They are the derivative of intelligence of separate or associated individuals. Separate individual is a human being. Associate individual is a system of individuals, which functioning is explained by the same goal and which acts under certain conditions, like an individual acts. Moreover, we can speak about both a separate intelligence (individual intelligence) and an associated intelligence, i.e. a certain intelligences system of individuals who are part of the associated individual.

In post-industrial society, when "economic stress" acquires a permanent character, come to the fore, individuals and their structured aggregate. But it is not just individuals, but individuals and their combination, which are appropriate creative ability to generate new knowledge and on the basis of their innovation, in other words, individuals who can actively participate in the innovation process and become "engines". The whole innovation process is a very complex, multi-pronged and multi-stage phenomenon. It is associated with the creation, deployment and diffusion of innovation [128, p. 5]. But his primary link is the process of innovation, which was attended by a large number of different actors: individual innovators and inventors; research teams; individual scientists; enterprises, organizations and their employees; autonomous units of enterprises and organizations that are on commercial considerations; various cooperative structures (industrial parks, techno, business incubators, and science and technology centres).

In post-industrial society, when "economic stresses" acquire a permanent character, individuals and their structured sets come beforehand, for example those individuals and their sets, which have a certain creative abilities to generate a new knowledge and innovations. In other words, there are individuals who can actively participate in the innovative process and become "engines". Thus, innovative process is a complicated, multi-pronged and multi-stage phenomenon. It is associated with the creation, deployment and diffusion of innovations [128, p. 5]. Its primary link is the creating process of innovations, which was attended by a large number of different participants, i.e.: individual innovators and inventors; research teams; individual scientists; enterprises, organizations and their employees; autonomous units of enterprises and organizations that act on commercial base; various cooperative structures (industrial parks, technopolises, business incubators, scientific and technological centres).

All abovementioned participants have a different economic character, which is determined by their immanent interests, scale and position in the economic system because of being part of, as well as genesis and development of the areas. But in spite of all diversity of their economic specifics they have a common function associated with the development of innovations. Therefore there is a particular need to develop a concept that would describe the totality of subjects that create innovations. "Innovator" fulfils this function most adequately.

The term "innovator" became in the scientific literature recently [129, p. 17]. Recently, it has appeared in the major encyclopaedias and reference books. Economic Encyclopaedia (Chairman of Editorial Board is G. Havrylyshyn) determines the innovator as the author of innovations [130, p. 656]. Handbook "Innovative Management" defines the innovator as the author of innovations (discoveries, inventions, utility models, project solution, technological innovation, "know-how", industrial property or other innovation) [131, p. 14]. Moreover, innovation is usually mediated through the creation of intellectual property.

The abovementioned definitions, in our view, are correct, since they adequately reflect the essence of the studied concepts. But is it very important to classify the subjects that are included in the set of innovators. All innovators can be divided into two main groups: individual and collective. Individual innovators are individuals-innovators, i.e. individuals who create innovations. Moreover, this group includes both employees who are hired by the company and create innovations because of their contract conditions (hired innovators) and individuals who are self-employed and create innovations at their own cost and in their free time (free innovators). Collective innovators consist of legal entities-innovators and independent innovators. Legal entities-innovators are legal entities that by own (or at the cooperative basis) create innovations. They primarily include companies and organizations, research institutions, which create innovation by own or in team. Independent innovators are divisions of enterprises and organizations, which have no legal status, but can act quite independent; they have a commercial nature and create innovations.

In essence, innovator is the main protagonist in a "stress economy", as he/she generates a new knowledge and innovation, which are the main competitive resource. A structured set of innovators at the enterprise becomes its main competitive resource. At the same time, a structured set of innovators of certain country is transformed into one of the main competitive resource of its economy and it creates an intellectual potential. It is possible to trace the role of the innovator under condition of in a permanent "economic stress", if to build a causal vector of influence its activity to ensure the competitiveness of both national economy and individual economic entities. This vector can be termed as informational and innovative vector to ensure competitiveness in a globally-post-industrial environment and it generally comes to:

1. Innovator generates a new knowledge using their creative skills and appropriate social and economic institutions.

2. Innovator transforms own creative results into a closed information (available to a certain users) and open information (available to all society) with the help of certain socio-economic institutions.

3. Innovator creates innovations based on the information.

4. Innovations make possible to improve and to create new post-industrial and industrial technologies. Post-industrial technologies are technologies related to the creation and transformation of post-industrial resources, i.e. production, processing, transformation and transfer of new knowledge and information, as well as activation of the innovative potential. Industrial technologies are technologies based on the use, creation and transformation of traditional material resources used in the production of goods.

5. Improvement of technologies leads to effective use of post-industrial and material resources.

6. The progressive increase in the competitiveness level is an integral result of causal abovementioned vector.

Thus, an individual's intelligence and its creativity are the basis of the informational

and innovative vectors to enhance the competitiveness of the economy and economic entities, i.e., in essence, the ability to create and to generate a new knowledge. Ability and motivation of individuals to the creativity are some of the main factors in ensuring the competitiveness of business entities.

Given all above-mentioned, it can be stated that in the previous stages fundamentally new economic situation were quite rare. In such circumstances, a manager at any level should provide a sustainable competitive advantage, in addition to the required knowledge, first of all, a great experience in dealing with typical situations. The need for innovative management (search for new ways to solve the non-standard situations) has been reduced to a minimum.

Opposite situation has been under constant "economic stress" (permanent bifurcations). Non-standard management situations arise constantly, as a result of the bifurcation, whereas the typical management situations become a rarity. In such circumstances, a manager, except for in-depth knowledge, should have innovativeness of management, i.e. constant ability to find new ways and methods of solution of non-standard management, economic and technical situations. Moreover, the management of innovativeness is needed at all levels, from the micro- up to the macro- level. It means that it is becoming one of the major factors for competitiveness at all levels of management. In the future, the need to improve the level of innovative management as a lever to ensure the competitive advantages will increase. It is due to the fact that "economic stress" is now increasingly become an inherent part of economic life. The number of "stress-inducing" factors and the level of "stress" under the influence of the innovative acceleration will continue to grow.

Innovations have double and dialectical role relatively economic bifurcations. On the one hand, innovations are one of the factors contributing to the bifurcation and even creating them, i.e. one of the "stress-inducing" elements. On the other hand, innovations are the best and the most effective "medicine" by "economic stress", because they allow to find a new and non-standard solutions of a new situations that arise under the influence of qualitative leaps. Only those countries and economic entities will be able to provide the high competitiveness, who will reach the highest innovative management.

However, innovative management should be increased at both micro- and macro-levels. To ensure high competitiveness of business entities and the general economy under condition of increasing bifurcation, both central and local public authorities have to implement the following measures:

1. Progressively improve innovative governance at the national and local level to work mainly "ahead of the curve". It means that public authorities and control bodies should implement methods for rapid analysis and reaction to the different socio-economic events that occur in society, given that these events will continue. However, such a formulation of the problem it's just the minimum program. The maximum program is to predict the possible socio-economic bifurcation and to strengthen positions (if they are positive) or to liquidate negative situation (mitigate it) their destructive influence (if they have a negative potential).

2. To strengthen the consolidative (anti-conflict) function of the state. As we discussed earlier, under "stress economy" the price of most conflicts increase in hundreds of times. Therefore anti-conflict policy should aim, first of all, not to eliminate the consequences of conflicts but to their prediction, prevention and elimination of the causes that rise conflicts; in case that they occur to eliminate them with minimal impact.

Also, the main goal of economic policy should be consistent harmonization of interests of elements of the economic system with national interests, i.e. harmonization of divergent interests of economic entities with state interests. Moreover, it is necessary to remember that the system of national interests and the system of interests of individual economic entities both are not only static; they are characterized by a certain dynamics.

3. To expand extensive work among the top-management of companies to explain the ways of survival in a globally-bifurcation environment. Using special informational recourses and mass-media, specialized local authorities should establish regular giving the information

to the top-management of companies about the features of globally-bifurcation stage of development and how to survive it.

4. Constantly to implement measures aimed at medical prevention and improving health. Public authorities should develop, first of all, a broad outreach to different segments of the population about the necessity of personal prevention each individual's health, as well as a systematically to improve health care measures, the progressive increase of budget allocations for prevention and health protection. Moreover, one of the main priorities of the state should be the development of medical science and the innovative process in the medical field.

In summary of this work we can conclude, that the three most important process are characteristics of modern development: 1) accelerating the pace of social life and economy; 2) emergence and integration into the economy a significant number of new productive factors and their combinations; 3) significant increase in mutual influence and interdependence of the world. As a result of combined effect of these processes, qualitative leaps in the economy are enhanced (a kind of "economic stress" or bifurcation), which are permanent and inalienable, permeate the economic space and cause the bifurcation development. Strengthening the bifurcation is the basis for the emergence of a number of fundamentally important laws, e.g.: accelerating the change of knowledge generations; accelerating the change of equipment generations and reducing its "life cycle"; improving productivity and production means; increasing the role of health as a competitive resource. To survive and to ensure high competitive in a constant gain of bifurcation development is only possible due to the high innovativeness of economic activity.

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2.7 GLOBAL INNOVATION ECONOMY: FACTORS OF ITS PRESENT DAY DEVELOPMENT

The article studies the factors of innovative economy development in the present day globalization conditions. The nature of state support to the innovation processes in the sphere of economy has been defined. The growing role of transnational corporations in the international innovation economic process is substantiated. The technology transfer importance for the global innovation economy is explained. The basic problems of the current innovation economy are determined, and suggestions are put forward for their solution. Particular attention is paid to forming innovation mentality in the today's professionals to educate them as innovative employees.

The present day world economy is developing in the conditions of rapid scientific and technical progress. As a result, the period of the technological cluster replacement is rapidly declining: up to the twentieth century it lasted 50 years or more; in the first half of the twentieth century. Its duration was 15-30 years; in the second half of the twentieth century this period reduced to 5-10 years. It is now measured in years, but in some branches of industry it lasts just a few months. At present, in the key sphere of economic development, i.e. microelectronics, the complexity and volume of integrated circuits annually doubles at 30% lower costs and prices. Technical characteristics of very large scale integrated circuits are improved by 4 times every two years [132, p. 15]. Under the described circumstances, it is only innovation economy that can be competitive. In this regard, the issue of innovation economy development acquires topicality, and studying the world's experience of its development, is of great scientific and practical importance.

Various aspects of the innovation economy were investigated by L.I. Fedulova, S.G. Mikaelian, G.B. Titarenko, I.A. Halytsia, L.L. Lytvynenko, V.V. Tokar, I.A. Pyenska, T.V. Kryvoruchko and other scholars. However, the issue of the innovation economy development, with account of the main factors, influencing it in the today's globalization circumstances, remains understudied in the scientific literature.

The study is aimed at analyzing information on the global innovation economy functioning, using historical and logical methods, and exploring the impact of the major factors affecting its development in the current globalization environment.

A characteristic feature of today's global economy is its innovative orientation. The most innovative is the economy of the developed countries. World markets of high technology products are controlled by the US companies by 39%, Japan by 30%, Germany by 16% [133, p. 51]. The United States, which exports more than by 90% are high-tech products, is the absolute leader of the global innovation economy [134, p. 32].

Strategically important in the innovative economy formation is development and implementation of national programs for science and technology, for example: A strategy for American Innovation: Driving Towards Sustainable Growth and Quality American Recovery and Reinvestment Act (USA), High-tech Strategy 2020 (Germany), Science and Innovation Investment Framework (UK), Medium- and Long-term National Plan for Science and Technology Development (China) and others [135, p. 22].

Taking into account the high cost of research, particularly fundamental, the government's support of their funding becomes assumes a great, sometimes decisive, importance. Thus, the share of public expenses on fundamental research is: Germany 27-28%, UK 30%, France 40%, China 25%, Brazil 53%, India 66% [135, p. 21]. The result of scientific research is the creation of innovative technologies. The key advanced technologies include:

- new materials manufacturing and products processing technologies (super alloys and polymers, semiconductor materials, meta-materials (nanostructures with special properties));
- next-generation industrial technologies (industrial automation and robotics, micro- and nanofabrication and measuring equipment);

- equipment for the composite materials fabrication (aviation, nuclear and missile applications);
- information technologies (computer hardware and software; computer simulation and processes modelling);
- telecommunication equipment (digital telecommunication systems, satellite communications and satellite telecommunication systems, wireless communication equipment);
- electronic devices and equipment designed for military applications (the electronic provision of hostilities, radar systems, military robotics);
- biotechnology (research and production equipment, medical diagnostics, production of genetic engineering tools) and others [136, p. 21; 137, pp. 6-7].

Introduction of new technologies into the manufacturing processes contributes to the innovative products creation. Only in the EU developed economies 85-90% of GDP accounts for the high-tech products manufacturing [138, p. 116].

At the same time, it should be noted that only 5% of the total expenses on research and development lead to emergence of new products that are successfully sold in the market; only 10% of new products and technologies are based on the latest results of fundamental research. In the US, the average annual rate of return from private investments in R & D activities is 20-30%. Therefore, investment into research and development is a rather risky business [137, p. 6].

Therefore, as a result of the international practical activities, a wide range of mechanisms for the governmental support of innovations and innovative production was developed, including preferential taxation and crediting research performing firms; privileged depreciation regime; subsidies for research to develop new products or technologies; grants for refresher training of companies' research staff; subsidies to small and medium-sized enterprises (SME) engaged in risky research projects, etc. These mechanisms are targeted at different entities of the innovation activity: educational institutions, science research institutes and laboratories, large national corporations, small and medium businesses [139, pp. 124-125].

One of the spheres of the governmental support to innovation activity and its results commercialization is the so-called techno polis. Techno polis is a research-and-production complex designed for innovative products manufacture or for developing new high technologies in close cooperation with universities and research engineering centres. According to the international classification, technopolises are distinguished as: innovation centres (promotion of new high technology organizations' development, e.g. Berlin Innovation Centre, Germany); scientific and research parks (servicing not only new, but also long before established organizations, ties to universities or research institutes, e.g. Cambridge Science Park, UK); technology parks (network of high-tech companies and industries); technology centres (development of new high-tech firms, e.g. Advanced Technology Centre in the state of Georgia, USA); conglomerates (belts) of techno-complexes and research parks (conversion of regions into high-tech area, e.g. Silicon Valley, USA). As has been demonstrated globally, one of the most efficient ways of governmental support to high-tech, knowledge-intensive industries is technology parks (parks) creating. Today, in the world there are over 700 existing techno-parks, including over 160 in the US, nearly 50 in Japan, over 50 in China, 46 in UK, over 50 in France, 16 in Sweden, and 17 parks in Finland. Over 100 technology parks are operating in Central and Eastern Europe, and over 50 in Russia. The total number of innovative companies within the territory of technology parks in the world is about 11 thousand units; the number of their employees is over 430 thousand people, which make about 40 professionals per one company [140, p. 16].

Another important factor in the development of the global innovation economy is the activity of transnational corporations (TNC), which are operating in many countries through the network of their branches. Most of them come from economically developed countries. According to UNCTAD, the companies, included into the group of 100 largest TNCs, originate from: the USA about 30%; Japan 20%; Germany and France by 10%; UK 7%; and

Switzerland 5%. The total amount of 82 out of 100 TNCs are located in these six countries. Notably, the USA and Japan count 70% out of 100 TNCs' assets [141, p. 117].

Competitiveness of TNCs is conditioned not only by the traditional factors (economies of scale, transfer mechanism of pricing, monopolistic market position, foreign expansion, etc.), but also by new factors (formation of strategic alliances, particularly in the science and technology sphere, formation of global information networks, availability and skilful use of companies' intellectual potential, internal corporate information exchange). Modern TNCs are increasingly penetrating into the high-tech and knowledge-intensive industries, whose rapid development requires enormous investments [142, p. 64]. This is evidenced by the branch structure of the top 100 TNCs: chemicals and pharmaceuticals (21 TNCs); electronic and electronic engineering industry (18 TNCs); automobile construction (14 TNCs); oil refining (13 TNCs); food industry (9 TNC) and others. In this context, TNC is a key part of the innovation process. They possess over 80% of patents and licenses for new equipment, technology and know-how. About 75-80% of the total global research and developments is carried out under the TNC. Against a backdrop of global market formation, TNC is one of the most important structural elements of the economy, the international regulator of products manufacture and distribution, the driving force of improving the country's competitiveness: 500 world largest TNCs realize 80% of the electronics and chemicals products; 95% of pharmaceuticals; 76% of machine engineering products; TNCs control to one half of industrial production, 2/3 of international trade, about 4/5 of patents and licenses for new equipment and technologies; their enterprises employ up to 50 million people [141, pp. 116-117].

TNC's innovative potential is use in the state interests of their countries of origin. TNCs are executing state orders for the innovative products manufacturing. For example, in 2011, the US government signed a contract with the corporation Lockheed Martin Corp. (US) valued at the sum of 789, 8 million USD to create a defence system for the US Missile Defence Agency. At the beginning of 2012, Lockheed Martin Corp. and Space System (USA) companies received from the US Department of Defence a contract worth 238 million USD for production of spacecraft up to 2016 [143].

Assessing the impact of TNCs on the global innovation process, it should be noted, that due to their production and financial capacities, TNCs have concentrated the most high-tech industries in their hands.

Characteristic of the global innovation economy is the process of large TNCs' absorption of less powerful companies, which are preparing to enter the market with an innovative product or technology. In this case, funding of all expenditures on research and development is provided by the company absorbed, and TNC only uses its resources for the final stage of the innovation commercializing, i.e. mass production. Such a method of acquiring new technologies and products is the most common in the sphere of software production, electronic communications and information processing. Takeover, performed by Intel (US), of a smaller company Nvidia (USA), held in 2010, is an example. As a result, Intel has abandoned its own graphic chip developments, using the experience of the company absorbed. The incorporated company's development strategy has become the transition from the production of computers and laptops to hand-held electronic notebooks and smart phones [144].

Another way of global innovation economy's development (also related to the activities of TNCs) is creation of strategic alliances. According to UNCTAD, back in 2009 there were almost 30 thousand strategic alliances in various fields [141]. More than a quarter of them are intended for the joint implementation of projects in the field of microelectronics, computer technology, industrial automation, IT and telecommunications. Thus wise, the aim of creating a strategic alliance between Hitachi Company (Japan) and Texas Instruments (USA) was the expansion of experience in the core memory development. The benefits of the both companies lie in obtaining the knowledge needed to develop new products. While developing a fast processor in the field of electronics several alliances were created: Toshiba (Japan), IBM (USA), Fujitsu (Japan), ADM (USA), Sharp (Japan), Intel (USA) [146, p. 17].

One of the most important factors of the global innovation economy is the innovative technologies transfer. Technology transfer means: 1) the process of spreading scientific and technological knowledge; 2) practical application of scientific knowledge (discoveries) of another organization; 3) transition from the fundamental knowledge to its technical and technological application; 4) adaptation of the existing technology to the new technology terms [136, p. 19].

Only the United States, Germany and some of the most technologically advanced countries (OECD-members) act as exporters of innovations, including transfer of patents, licenses, know-how, a variety of scientific research and developments results, technological equipment to other countries' entities. However, the overwhelming number of the world countries (including even such countries with high economic indicators as Japan, Taiwan, South Korea and other so-called "Asian tigers") are acting as importers of innovations. Their fundamental difference from many countries, exporting innovations, is that in most cases they only buy abroad the results of research and development work, having their own, even more efficient, compared to exporters, mechanisms of innovations regulatory support in accordance with their national habits and traditions [147, p. 67].

Foreign affiliates of TNCs are taking absolute priority in the technological innovations application, particularly, over 67% of the licenses and patents export in the US account for their transfer by parent companies to their foreign branches, and only 33% account for the commercial export of technologies to independent companies [137, p. 6-7].

The real technology transfer is based on the transfer of knowledge, since it is knowledge (technical, expert solutions, experience, skills worked out in practice and modes of operation with a particular technology) is a key factor that controls the technologies in general.

The decisive factor in the innovative economy development is training of relevant personnel, for they are people, scientists, researchers, engineers, highly skilled workers, who performs research, develops innovative technologies and implements them in the production. Therefore, countries developing the innovative economy are paying great attention to education. For example, the leader of the world economy, the USA, spends on education 5% of GDP; higher education covers almost 4.5 thousand universities and colleges. In addition, there are about 250 so-called research universities, combining a high level of science research with the first-class training of students. In the US, the share of workers with higher education makes 30% [148, p. 9].

However, it is not enough just to get education and knowledge. One should understand the necessity for its continual updating and creative application in practical work. The employee's creative approach to the production activity considerably improves its results, if compared to simply careful performance of duties. Creative activity should involve the entire production team (from the Chief engineer to a worker) in every company. For this purpose, it is advisable to create not only research laboratories, but just as well innovators groups. Thus, every employee can participate in the company's innovation activities according to his capabilities and potentialities.

But organizing the employees' participation in very difficult innovation activities of an enterprise is only possible upon the condition of their innovative mentality formation. Raising this awareness in the employees should start in one's youth at school, continued during the future professionals training at universities, constantly supported during their field experience.

For this purpose, it seems reasonable that educational institutions should develop the concept of innovative mentality to train experts-innovators in various fields, including economics. According to the above concept, all employees should be aware of the following: under the circumstances of rapid science and technology development, competitiveness, both their personal and that of an enterprise, depends entirely on the level of their innovation knowledge and the ability to implement it into production.

Despite the positive dynamics of the innovation economy development, there exist certain problems in this sphere, including:

- inventors copyright violation;
- fundamental research requires too much money, therefore governments usually have to finance them from the state budget;
- small and medium-sized firms, trying to deal with innovative businesses on their own, often cannot compete with large companies and are absorbed by them;
- The purpose of business is maximum profit gained from exploiting innovations. In this case, the owner of the invention is interested to remain a monopolist of the invented technology and to prevent its spreading as long as possible. In connection with it, transfer of the key, i.e. the most important for business, companies or technologies, most profitable for the national economy, is sometimes limited;
- In some countries, conditions for scientists' activity are not favourable enough. As a result, the researchers sector has been clearly defined in the global labor market in recent years, including scientists, actively migrating round the world, seeking favourable conditions for their ideas realization.

Solution of many problems of innovative economy lies in the legal plane. Business entities must keep within the law on copyright protection of inventors. The countries' authorities have to develop and implement the antitrust law that will allow SMEs to be engaged in their own innovative business along with large companies. Besides, different organizational forms of innovative business, government's funding of fundamental research, mechanisms of financial support to small and medium-sized innovative entrepreneurship, etc., are approved by the law. Thus, the formation of the innovation activity legal framework and control over its execution is the key to successful development of innovative economy.

Thus, the world practice proves that the global innovation economy is a rather complicated sphere of activity affected by many different factors. The main factors contributing to its development are: state support of innovative processes, innovative activities of transnational corporations, international technology transfer, training and efficient innovative activities of the innovative business personnel (researchers, engineers, and high-skilled workers).

Taking into account the specificity of each factor mentioned above, it seems reasonable to suggest measures to provide their most efficient influence on the development of the global innovation economy.

1. The world countries should implement the policy of active innovation support. For this purpose, they should:

- Forming the legal framework to support and protect innovation in the country (copyright, competition law, etc.);
- Developing and implementing innovative strategies in the country's life;
- Promoting the development of innovative priority spheres of the economy;
- Carrying out financial support of fundamental science research from the state budget;
- Organizing close cooperation of universities and manufacturers to help commercialize inventions;
- Developing different forms of innovative businesses (technology towns, venture companies, etc.);
- Developing and implementing mechanisms of financial support for small and medium sized companies that are trying to implement their own innovative business.

2. Transnational corporations using its powerful financial base, infrastructure of their worldwide extensive network of branches, access to labor resources (including scientists, researchers, innovators) of other countries, should:

- Carrying out state orders on high-tech products manufacture on their own scientific and industrial base;
- Creating laboratories both in their countries of origin and in host countries (where their branches are located), invite scientists, fund their science research;

- Promoting successful commercialization of the inventions, made due to research studies performed at their own plants;
 - Implementing innovative technologies that promote innovation economy of each host country at plants located in their foreign affiliates;
 - Promoting international technology transfer as a result of research laboratories establishment and innovative production worldwide.
3. Technology transfer significantly promotes development of global innovation economy under the following conditions:
- Active innovation policy performed by the world countries (i.e., promoting science research and exporting the obtained innovative technologies to other countries, or, if necessary, importing technologies from abroad to implement them in the national production);
 - Creation of international organizations that would perform control over the international technology transfer, prevent attempts of their piracy and protect inventors' copyright (on the basis of relevant international law).
4. Training and efficient work of personnel necessary for the innovative economy development requires:
- Employees receiving academic education, mastery of knowledge and skills of innovation activities, systematic refreshing training;
 - Upgrading all the personnel as professional innovators. For this purpose, it is advisable to develop and implement into the teaching process, and later into the production activities, the concept of innovation mentality that motivates employees to actively participate in the innovative production.

Integrated application of these measures should make the impact of the factors, contributing to the development of the global innovation economy, more efficient. It will greatly intensify the economic development of both the individual countries and regions and the world as a whole.

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PART 3: PRACTICAL IMPLEMENTATION AND EXAMPLES

3.1 THE TENDENCIES OF IMPLEMENTING MANAGING SYSTEMS OF BUSINESS RELATIONSHIPS IN LITHUANIA

Retaining business relations has become a common phenomenon in the world of business as companies reinforce their strategic positions. As intensive competition dominates in contemporary market, the problems of attracting and maintaining a customer arise. The occurrence of concept of customer relationship was influenced by a growth of consumption and competition. The organisations realised how important it is to keep an existing customer and fulfil all its expectations. With the help of the customer relationship management, the quality of customer service improves, marketing and sales become more effective and competitiveness is promoted. The research in this field is carried out in Lithuania and other countries and most of them are on a theory level, whereas the practical evidence on the importance of business relations and relations with customers is insufficient. In order to analyse the customer relationship management and determine the aspects that define it, deeper and more specific insights are necessary. This article also includes the Lithuanian statistical data that help to identify the spread of use of business relationship management programmes in the Lithuanian and EU companies.

Customer relationship management is extremely topical in contemporary literature. There are many different opinions about systems that help to manage the customer relationships. It is natural that different sources provide different information that often contradicts one another. Therefore, it is very difficult to select proper business tools, especially those used to manage such sensitive information as business relationship with a customer.

With the use of informational technologies today, a buyer can find competitive offers online, without even leaving their home. Besides, it provides the customers with a higher negotiation power, reduces the value of a trade mark and other earlier benefits of companies-suppliers. Some scientists argue that the main non-material property of a company is not a trademark but company buyers. Thanks to data transmission technologies, the importance of a trade mark is diminished and finding a new customer is much more expensive than keeping an old customer. Both the supplier and the buyer realise that the potential benefit received when the supplier and the buyer cooperate exceeds the value that may be achieved while fighting each other. Therefore, relationship with the buyers becomes much more important than earlier.

It is noted that some aspects of business relationship management in Lithuanian companies are analysed by L. Kvietkauskaitė (2006), Ž. Karazijienė (2014), Ž. Karazijienė and A. Sabonienė (2013), V. Tamulienė and M. Urbas (2012). In the context of process optimisation of business relationship management the analysis is carried out by D.M. Lambert (2010). The business relationship management directed towards the programs is analysed by F. Buttle and S. Maklan (2009), L. Dumitrescu and M. Fuciu (2009), A. Jenkinson and M. Jacobs (2002), C. Nitu, C. Tileaga and A. Ionescu (2014), E. Taki, H.A. Mirghafoori and A.M. Sharifabadi (2015), and others. The most attention in the works of foreign authors is dedicated to the business management by informational systems. A lot of attention to this problem is dedicated by J.A. O'Brien and M.G. Marakas (2009), Ph. Kotler (2003), P. Greenberg (2009), M. Godson (2009), K. Jaceiwcz and June-Suh Cho (2015), M. Lorcan (2015), E. Peelen (2005), S. Singh and D. Jain (2013), and others.

Aim of the article is to reveal the features of CRM systems and to evaluate the tendencies of implementing CRM systems.

Methodology: systemic and comparative analysis and generalisation of academic

literature, logical deduction method, comparative analysis of statistical indicators, and conclusion generation method.

From the very beginning of this concept's development, the management of business relationship has been considered as one of the most important features of modern marketing. In the narrow understanding, the customer relationship management is understood as the software-based collection and management of information about customers. It is important to mention that often CRM is incorrectly understood only as a technology, in other words, the software. A much better is the definition provided by Kotler Ph., et al (2003): customer relationship management is the establishment of high customer's value and satisfaction, in pursuance of customer relationship development and retention. This includes all aspects of customer's acquirement, retention and the increase of their number. In this case, the software becomes a suitable but the not the most important tool in the implementation of business relationship management. Greenberg P. (2009) states that the customer relationship management is a philosophy and a business strategy based on information technologies, business rules, sequences of actions, processes and social characteristics, designed to attract the customer for a collaboration dialogue in order to ensure mutual benefits in a safe and clear business environment.

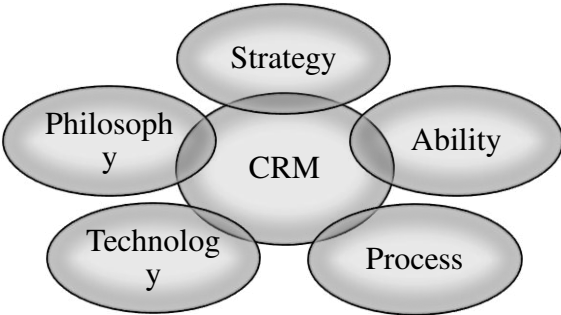


Figure 3.1.1: Elements of business relationship management

Source: compiled by author

After generalising the opinion of various authors, the main elements of management of business relationships with customers may be extracted (see Figure 3.1.1). As it is shown in Figure 3.1.1, the management of business relationships is much more than having a customer database (technology).

The possibilities offered by business relationship management programmes are as follows: full use of company orientation towards a customer, directing the organisational system towards the customer and possibilities provided by CRM technologies, improvement of such company indicators as company market share, profitability, customer satisfaction, and sales. In other words, CRM possibilities may be related to CRM benefits.

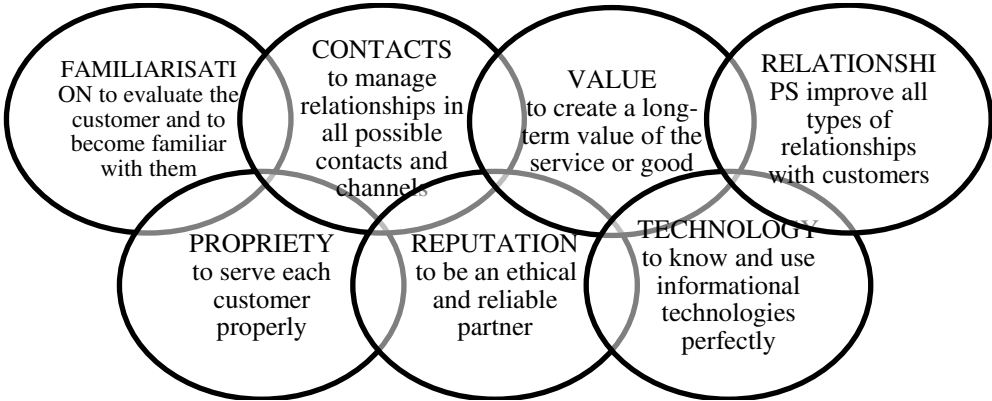


Figure 3.1.2: The stages of the business relationship management strategy

Source: compiled according to Jenkinson A. and Jacobs M., 2002

Companies have a more successful cooperation with customers if they implement a relationship management strategy of their choice. The realisation of the strategy may involve the following stages (see Figure 3.1.2).

In general, it could be said that the management of business relationships is the business strategy of modern marketing that is used by the companies to create, maintain and strengthen the positive relationships between the company and its customers. The definition of CRM includes not only the technological part (software), but also the following: a certain customer-oriented philosophy, action strategy, ability to take actions necessary for this strategy, and management of a relationship between the customer and the company.

Informational Technologies in the Management of Business Relationships with Customers

Nowadays, the management of relationships with customers by applying IT data accumulation is not understood as a narrow field. The segmentation of clients and promotion of loyalty are emphasised. The management of relationships with the customers is an integral part of controlled systematic data. IT development and customer management are moving forward in parallel, hence, productive possibilities of implementing relationships with customers are possible with the help of technological processes, by applying the strategy and employee motivation. To sum up, the employees that use the management systems of relationships with customers must have not only the theoretical knowledge but, also, be motivated, search for solutions that would satisfy the user needs what would eventually result in added value to the company (Tamulienė and Urbas, 2012).

Customer relationship management (hereinafter – CRM) is a business management system that helps to manage and develop business relationships with existing and potential clients that way guaranteeing a maximum and long-term profit from every customer. In a narrow sense, the technology of CRM software can effectively organise, automate, integrate, and synchronise business processes. Companies that use CRM seek to keep existing customers and to attract new customers and gain their loyalty. The managing programme of business relationships with customers causing the increase in profit and decrease in business costs involves entire company's business strategy. Data on all customers are accumulated and analysed and the possibility to offer the best option for each user is created. Besides, application of CMR in companies helps to find and save contacts more easily. Taking segmentation into consideration, it is possible to offer a best offer to every user, determine a loyal customer and apply loyalty programmes, as well as gather data about partners (Karazijienė and Sabonienė, 2013).

Based on the type of activities, CRM is distinguished as *analytical* and *operational*. According to this, a strategy is selected that the organisation will follow while implementing the system of relationships with customers. *The operational* CRM system includes the activities directly related to the customer, i.e. management of customer contacts (calls, letters). Upon the implementation of an operational CRM system, a more productive communication with the customer is expected. *The analytical system*, which is also called a strategic CRM system, is created for the accumulation, processing and segmentation of customer details. Reliance on IT that way allows understanding the customer actions and creating a strategic CRM production (Godson, 2009).

According to Karazijienė (2014), the CRM system consists of three parts (see Figure 3.1.3). To the mentioned operational and analytical parts a cooperation part is added that applies the method of communication with customers.

According to Anot Buttle, Maklan (2009), the theory of management of relationships with customers as a basis of an organisation emphasises the user's role and not the processes and products because the development of relationships with customers, knowledge of needs and their satisfaction and the financial benefit received from it is one of the main aims of the strategy and determines the advantage against the competitors and leads towards a long-term

business of the company. Hence, a system that would guarantee an effective and productive management of relationships with customers is needed.

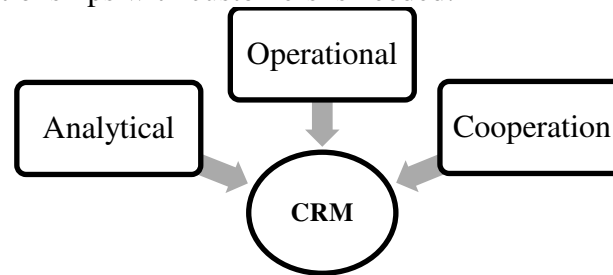


Figure 3.1.3: Management parts of a CRM system

Source: according to Godson, 2009; Karazijienė, 2014

According to S. Singh and D. Jain (2013), such elements as customer service, the principle of pricing, disposition of sales in CMR are connected into one. Therefore, a proper use of the system may be an additional and very strong tool that would create an added value both to the organisation and to the buyer.

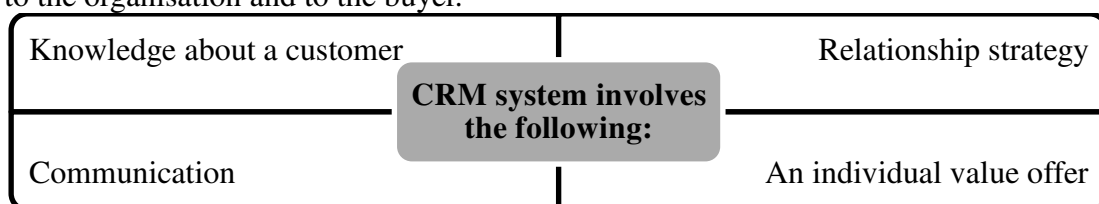


Figure 3.1.4: Main aspects in the CRM system

Source: according to Peelen, 2005

Individual knowledge about every customer is important when placing an order, developing long-term relationships and applying specific offers (see Figure 3.1.4), therefore, when creating a strategy of relationships with customers, it is important to consider a possibility to install the system. As Karazijienė (2014) states, the CRM system may ease and carry out the functions that affect the improvement of profit:

- ease the course of sales and marketing;
- promote the effectiveness of sales;
- improve customer service;
- determine loyal customers and guarantee their retention;
- increase the market share taken up;
- improve the competitive advantage of an organisation.

Most organisations have at least software that is used for the management of company's running processes, e.g. bookkeeping. When analysing the reasons why companies have not got the CRM system, it is seen that it is done to avoid financial costs because the data need to be systematised and transmitted to a new software and that consumes a lot of time, and there may also problems occur regarding the implementation of a new systematic programme, or similar systems are already in use (Dumitrescu, Fuciu, 2009).

For the analysis of CRM market, Lorcan Malone (2015) bases his findings on ROI indicators that are strongly affected by the employees' work with a CRM tool. Therefore, the author states that, upon the evaluation of the satisfaction in the system, it is important to take into consideration the people's ability to absorb a new system, understand and control it and only then define their satisfaction in the CRM tool. In most cases, a constant data input reduces the users' enthusiasm to use the CRM tool. Hence, one of the most important factors determining the choice is the comfort in use and compatibility with software already in use.

Modern informational technologies enable many actions that without them would be physically impossible or would consume too much time. There are many CMR programmes that aim at helping companies to manage relationships with customers more effectively. O'Brien

J.A. and Marakas G.M. (2009) provide three fields where CRM systems help to maintain relationships between a business and its customers: first, attraction of new customers by using wide possibilities of customer contact management; second, "strengthening" customer service when customers are offered better quality customer service after analysing and using the data accumulated in CRM (customer behaviour, type of goods bought, time and place of shopping, etc.); and third, customer retention, CRM systems enable the business to identify loyal customers by developing strategic marketing and apply a respective loyalty program to every segment.

In attempt to achieve an effective integration of informational technologies in relationships, the main success factors of the structure of transferring the customer information to databases may be excluded:

- 1) support, leadership, management;
- 2) data quality and accessibility;
- 3) requirements in determining expectations;
- 4) strategy and structure;
- 5) model of organisational data (Griffin and Johnson, 1999).

According to Lambert D.M. (2010) customer relationship management process is divided into two parts: the strategic process, where the management establishes and strategically manages the process, and the operational process, where the realization occurs.

There can be distinguished customer relationship management (CRM), supplier relationship management (SRM), supply chain management (SCM), product lifecycle management (PLM) and enterprise resource planning (ERP) programs. Targeted and effective business relationship management process can determine the competitive advantage of the organization.

According to C. Nitu, C. Tileaga and A. Ionescu (2014), the traditional CRM model consists of the functions of sales, marketing and customer service, the main aim of which is ensuring customer satisfaction and loyalty. Such CRM tool is based on the data and information accumulated that segments the customers and excludes customer target groups. However, today the CRM tools become Social Customer Relationship Management that is described by the authors as more part of a company strategy and not a tool of additional technologies dedicated to improve customer loyalty and maintain strong relationships. Public relations have a great impact on CRM models, thus, they change and transform. The SCR model created by the authors differs from the traditional CRM in the customer expertise and their satisfaction in the quality of service. SCR involves processing of these additional components together with the information accumulated in CRM.

When analysing flaws and contradictions related to the concept of the Social CRM, K. Jaceiwcz and June-Suh Cho (2015) excluded its main features (see Figure 3.1.5).

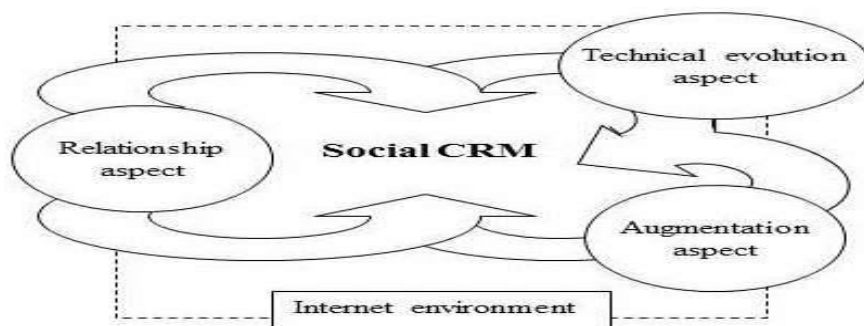


Figure 3.1.5: Social CRM model

Source: K. Jaceiwcz and June-Suh Cho (2015)

Based on the main aspects reflected in Figure 3.1.5, four main aspects compiling the social CRM may be named:

1. Internet environment means speed in communication;

2. Technical evolution aspect is a constantly changing technological environment that influences communication and basic communication sources;

3. Relationship aspect relies on the tendency that more and more information may be found on the Internet and communication based on it pushes towards cooperation or relationship of a different type;

4. Augmentation aspect represents the actions of the companies providing a service that are taken in order to adjust and use the changes.

The biggest source of influence nowadays is the customer experience that is shared with the people in the environment. Social environment has eliminated the borders that hindered communication between the people, hence, the person that is close may be a complete stranger reading a review or commenting online. K. Jaceiwcz and June-Suh Cho (2015) excluded its main advantages:

- a higher consumer pro-activity sharing experiences and information in a real time;
- increases employees' activity indicators by ability to express oneself in a social environment;
- improves customers' health and satisfaction when being involved in social networks.

Based on the aspects and advantages provided, Social CRM may be evaluated as one of the necessary and useful types of CRM tools the uptake and use of which in the marketing strategy may determine the growing customer satisfaction.

According to E. Taki, H.A. Mirghafoori and A.M. Sharifabadi (2015), customer satisfaction is determined by the relationship between the existing product or service quality and the customer quality of expectations. It could be stated that the supply of current CRM tools is formed based on the customer wishes and expectations. Hence, customer satisfaction takes a very important part in analysing CRM tools in the market and classifying them. It is one of the main factors determining customer choice. Satisfaction ratio is generated by gathering customer feedback, supplier's size, size of market share, and social impact. Compliance with these points determines a general result, after which the software categories are as follows:

- Leader
- High Performer
- Contender
- Niche

During the G2 GridSM (2015) research was based on the evaluation of customer feedback. Based on this, every of the earlier categories are formed and explained with the examples. The categories are illustrated in Figure 3.1.6.

Leader may offer CRM products that are well-evaluated by users and take up a lot of market share, they, also, have high external investments and high service resources. The following systems are categorised as Leader: Salesforce CRM and Zoho CRM.

High Performer may supply the products that are highly evaluated by their users but have not yet reached a respective market share or complied with other requirements that are applicable in the leader category. The following systems are classified accordingly: PipelineDeals, Workbooks.com, Salesnet, Avidian CRM, Base CRM, Contactually, Pipeliner CRM, Nutshell, InfoFlo Software, WORK[etc], Membrain, Pipedrive, Relenta CRM, GreenRope, Really Simple Systems, Aptivo, and CiviCRM.

Contenders have a relatively high market share and resources to retain it but their products have received below average customer satisfaction indicators or they have not yet received enough opinions confirming their product quality. The following systems are classified accordingly: "Microsoft Dynamics CRM, Oracle CRM on Demand", "Oracle Siebel CRM Netsuite, SAP CRM, Sage CRM, Oracle Sales Cloud, and INFOR CRM (former Saleslogix)".

Niche products have no leader positions in the market but they may be positively evaluated by the customers. Because of unsteady market positions, feedback evaluating their success and quality is not efficient. Niche products are as follows: Maximizer CRM, Sugar

CRM, Insightly, Vtiger ACT!, Goldmine, and Highrise. Based on the market player's size, CRM tools are segmented as follows:

- Small companies (50 employees or less);
- Average companies (51-1000 employees);
- Big companies (over 1001 employees).

Table 3.1.1

Classification of CRM tools based on features

Name of segment	Number of employees	Company size	Level of customer satisfaction	Market share
Niche player	Not defined	Not defined	Positive but insufficient	Low
Contender	50 or less	Small companies	Below average	Low
High-level player	51-1000	Average companies	Average	Average
Market leader	Over 1001	Big companies	High	Big

Source: based on the G2 Crowd GridSM research results, 2015

Comparing the data gathered, they may be compared in Table 3.1.1. Even though niche players have a positive customer satisfaction, they cannot be eligible to have a higher market share because of an insufficient amount of feedback. Contenders that fall in the segment of small companies have an efficient amount of feedback but their evaluation rate is lower, hence a small market share is taken up. The remaining two segments are divided in average and big companies, out of which High-level players, even if with a smaller number of employees, are evaluated relatively better than the average; therefore, they fall in a relatively intensive market share with a higher competition than elsewhere (see Figure 3.1.6). Market leaders stay because of their size and extent that influences a respective amount of feedback that guarantees a sufficient retention of the market share. Comparing the results of G2 Crowd Grid research and Gartner study, conformity is seen in evaluation of market arrangement. Figure 3.1.6 shows the main market players according to the latest data announced by "Forbes" that were prepared and presented by Gartner, Inc. (Market Share Analysis: Customer Relationship Management Software, Worldwide, 2014).

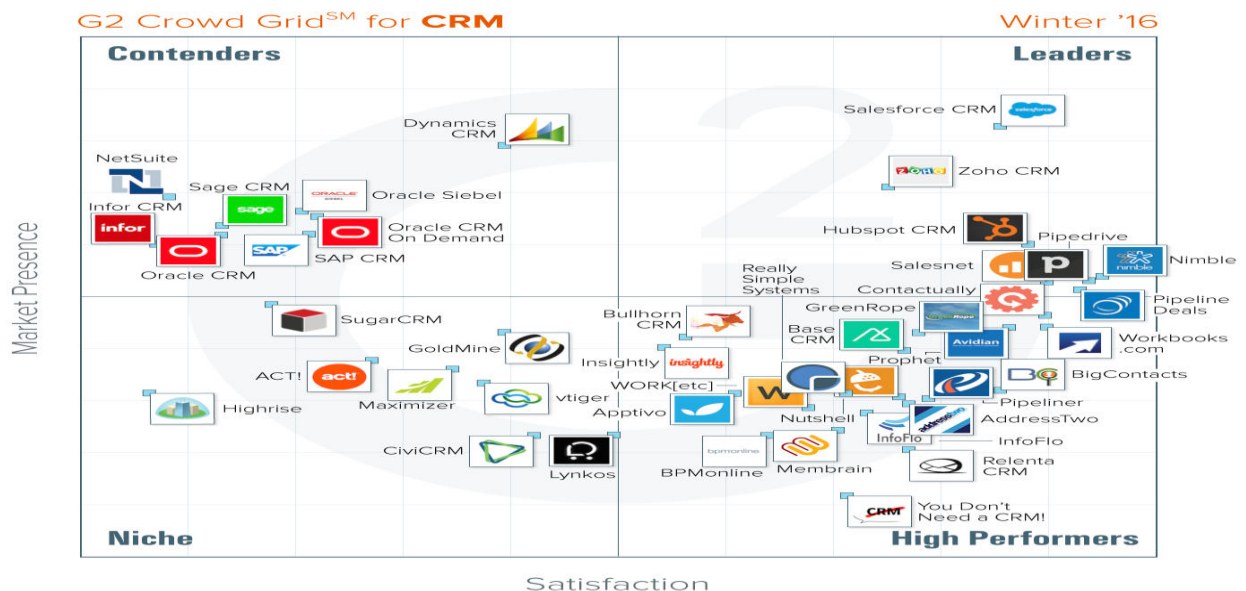


Figure 3.1.6: Market arrangement according to the level of customer satisfaction and market share

Source: G2 Crowd Grid research results, 2015

Based on data in Table 3.1.2, it could be observed that the main market leaders share almost half of the market. Comparing their growth in profit from 2013 to 2014, a growth is

seen. The highest growth in the market is retained and owned by Salesforce. Meanwhile, SAP, even with 12.1% of market, grew more slowly than the competitors Microsoft and IBM. Microsoft, the company that is number 4 in the rank of companies with highest income, is ahead of its competitors and is the second company according to the growth (compared to top five companies).

According to Joanne Correia, research vice president in Gartner Corporation, the main factors of CRM growth in 2013 were consumer investments in digital marketing and customer experience. According to him, CRM market will continue to grow and be marketable because it belongs to the market of digital technologies, the products of which are values and vital to keep competitiveness.

Table 3.1.2

Distribution of CRM suppliers based on income

CRM supplier's name	Income in 2014	Income in 2013
Salesforce	4,268.5	3,330.2
SAP	2,809.4	2,621.3
Oracle	2,115.2	2,060.8
Microsoft	1,438.6	1,181.8
IBM	873.1	792.1
Kitos	11,681.9	10,474.7
TOTAL	23,186.7	20,460.9

Source: Gartner research (May 2015)

In general, it could be said that the management of business relationships is the business strategy of modern marketing that is used by the companies to create, maintain and strengthen the positive relationships between the company and its customers. The definition of CRM includes not only the technological part (software), but also the following: a certain customer-oriented philosophy, action strategy, ability to take actions necessary for this strategy, and course of a relationship between the customer and the company.

Because of limited resources, small and average companies often cannot compete in price or provide a wide range of high-quality production to the market. Hence, it is much more favourable to specialise in one field. CRM makes the specialisation much easier: an effect customer management ensures a feedback between the company and the customer (Kvietkauskaitė L., 2006).

After analysing the data of Statistic Lithuania (2012-2015), it is clear that the entrepreneurs of Lithuania are familiar with CRM and other business management systems and recently the popularity of these programmes has been increasing gradually (see Table 3.1.3).

Table 3.1.3

Lithuanian enterprises with ICT systems for e-business, 2008-2015, percent

	2008	2009	2010	2011	2012	2013	2014	2015
Electronic exchange of information on supply chain management (SCM)	27.7	26.7	33.3	27.8	37.3	36.0	25.3	23.7
Sending (receiving) e-invoices	-	40.1	51.8	71.2	49.4	87.4	82.3	84.4
Enterprise resource planning (ERP)	5.0	5.8	11.5	12.6	23.1	39.6	34.1	40.1
Customer relationship management (CRM)	9.9	12.6	15.3	16.8	17.7	20.1	27.2	34.4
Qualified digital signature	24.7	23.9	68.9	72.4	72.0	85.8	87.1	86.4

Source: created by author

After a deeper analysis of e-invoices, it was found that in 2015 only 55.5% of companies issued e-invoices, and 83.4% of companies received e-invoices, but even 74.8% out of those companies indicated that these e-invoices were not suitable for an automatic processing, i.e. it is impossible to integrate them directly into the IT programmes that companies already have. After analysing the purposes of an electronic signature, it was established that in 2015 it was mostly used to receive electronic services, even 82.5%: for sent electronic messages 46.7%, and only 14% for signing internal electronic documents.

The comparison of the use of ERP and CRM systems in business shows that the implementation of CRM systems in enterprises is slightly growing every year, meanwhile the popularity of the ERP systems is growing rapidly (see Figure 3.1.7).

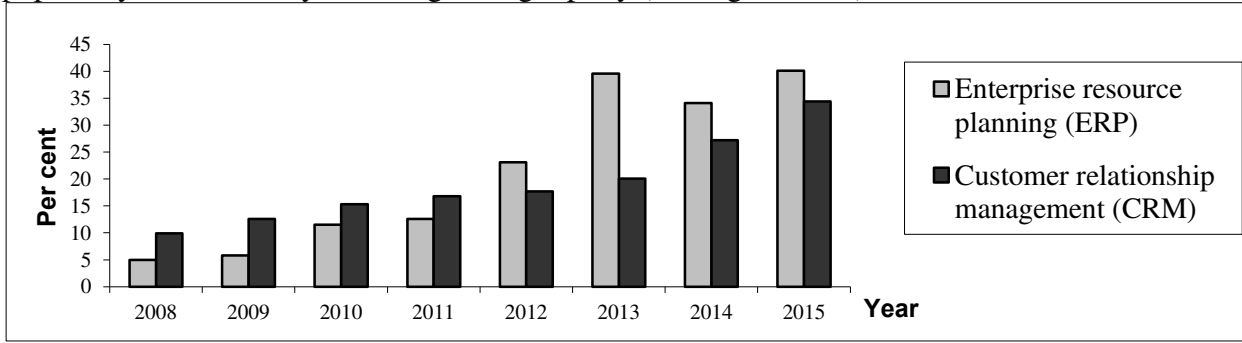


Figure 3.1.7: ERP and CRM systems used for Business Trend Analysis, in %

Source: compiled by author

The most common problem is that today it is hard to evaluate how the company will benefit after implementing a respective system. This problem arises out of natural causes: the systems costs money, funds for the implementation and service of the system need to be dedicated and the personnel need training. Finally, during the several first years the data about customers is only accumulated that later, after systematising and applying for the management of relationships with the customer or the forming of loyalty programs, etc., the company will gain actual benefit.

Another important aspect is system functionality. A vast number of various business processes happen in big companies. After transmitting them to CRM, of course, the management of business processes would be easier but there is a risk that every additional function will make the system more complicated. Unfortunately, the more complicated the system, the harder it is to carry out simple activities, the risk is higher, and the personnel will reject the system and will not want to work with it. The system that is not used will never bring benefit and pay off (Kvietkauskaitė L., 2006). It is illustrated by the data in Figure 3.1.8.

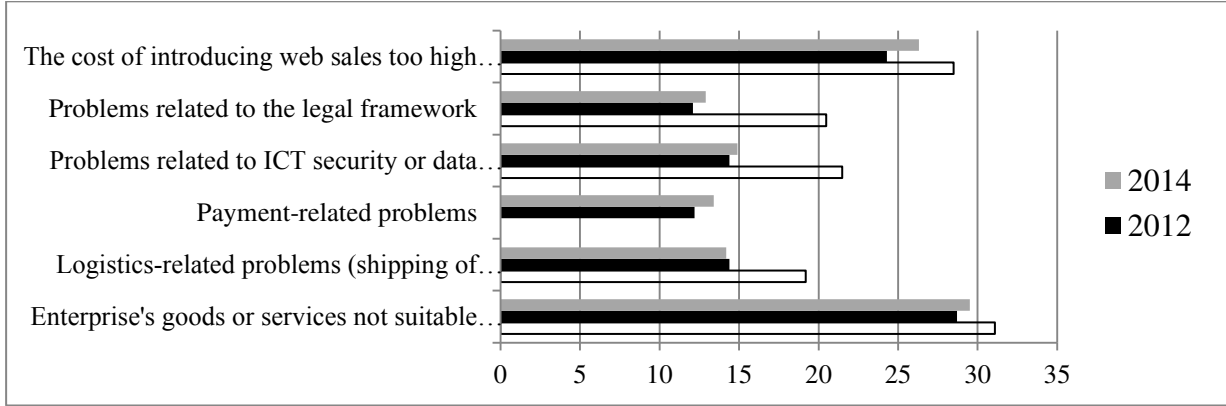


Figure 3.1.8: E-commerce problems and obstacles in enterprises, in %

Source: created by author

Most organisations have at least software that is used for the management of company's running processes, e.g. bookkeeping. (Dumitrescu, Fuciu, 2009). It is understood that IT systems need to be serviced, i.e. monitoring, development, expansion, etc. For this purpose the execution of IT functions in Lithuanian companies in 2014 was analysed (see Figure 3.1.9). The data are not very pleasing: even 57.3 of companies did not carry out the support and development of the Business Management software/systems (ERP, CRM) (52.9 percent respectively).

Seeing such situation, it is important to understand the situation not only in Lithuania but also in other EU countries. For this purpose, the data of Lithuania and EU are compared (Table 3.1.4).

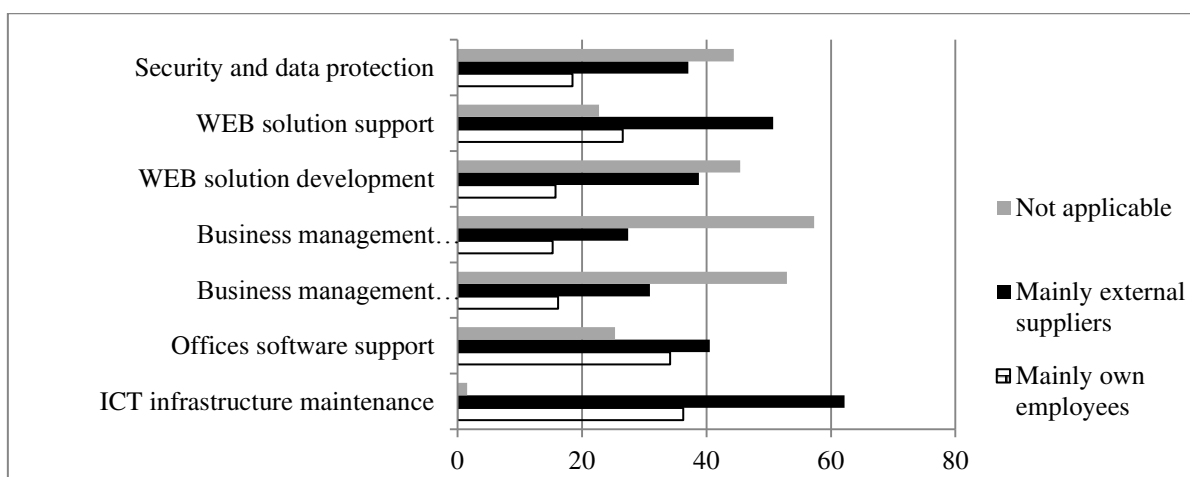


Figure 3.1.9: Performance of ICT functions in enterprises, 2014, in %

Source: created by author

Table 3.1.4

Comparison of the functionality of IT systems used for e-business in Lithuania

	Lithuania			EU 28	Rank
	2012	2013	2014	2014	2014
Integration of internal processes (with an ERP) (% of all enterprises)	23	40	30	31	17
Integration of internal processes - large enterprises (with an ERP) (% of all enterprises)	58	76	84	76	8
Integration of internal processes - SMEs (with an ERP) (% of all enterprises)	22	39	28	30	16
USE of analytical CRM software (% of all enterprises)	14	12	19	20	14
Electronic supply chain management - large enterprises (% of all enterprises)	50		49	43	7
Electronic supply chain management - SMEs (% of all enterprises)	37		25	16	3

Source: calculated by author

After analysing the data provided according to the place of Lithuania among 28 European Union countries, it is obvious, that there is little attention dedicated for business management with the use of informational technologies in Lithuania, i.e. Lithuania is only no. 17 according to the number of companies that use a business management system for the Integration of internal processes (with an ERP). In comparison with the use of software of customer relationship management in Lithuania (CRM), it is seen that among other 28 EU countries Lithuania is only number 14. However, if we evaluate the change tendencies, according to this parameter, in 2012 Lithuania was only number 20, and this shows that during two years, compared to other EU entrepreneurs, a positive attitude towards CRM programs is formed.

After analysing academic literature, it could be said that the management of business relationships is the business strategy of modern marketing that is used by the companies to create, maintain and strengthen the positive relationships between the company and its customers. The conception of CRM includes not only the technological part (software), but also the following: a customer-oriented philosophy, action strategy, ability to make changes necessary for this strategy, and course of a relationship between the customer and the company.

Measures ensuring business success are differentiated and valued differently. However, after a thorough analysis of positive and negative aspects of an environment,

consideration of company goals, detailed analysis of the situation in the market and a proper distribution of existing company resources, business relationships may be effectively used to ensure that the use of CRM systems helps to gain strategic advantage. With the help of the analysis about the information about the customer, the business may answer to itself why it is or is not successful; therefore, such data about customers becomes the biggest company property. Building relationships with customers, their development, and knowledge of consumer needs are closely related to the part of received income, increase in competitive advantage and company success. Therefore, it could be concluded that a proper choice of a CRM tool is a key to the business success. Business management system programmes join all data of an organisation and its management processes into the whole. Business management system includes all main activity functions of an organisation and are created to optimise company operational processes and information flows and integrate them in order create a united informational base of work with company resources (people, materials, finances, and equipment).

In an academic literature and articles the authors agree that the use of a CRM tool is very important to the success of a company. However, potentially less than a half of organisations have not implemented similar systems. CRM tools help in the sale process when it ensures a smooth communication both outside with a customer and inside with a team; it also helps in the management of marketing processes that influence the creation of marketing structures and choice of measures. Some main benefits arise from it that strongly affect the success of the business relationships strategy. One of them is the assurance of a life cycle of relationships with customers; the other is assurance of customer loyalty. When creating new products or providing new services, businesses often do not estimate these indicators and do not understand the added values created by their parameters. Exactly, customer retention is a more beneficial and strategic step in business than a constant search of one-time customers.

After carrying out the analysis of statistical data, it was found that during the recent years (2012-2015), Lithuanian companies gave less attention to the Customer Relationship Management systems (CRM), meanwhile, more funds and attention were given to the systems of company resource planning (ERP), i.e. their implementation grew rapidly in 2012-2015 and their demand was higher than that of CRM programs. Such difference may be explained by the fact that the use of the program of Customer relationships pay off and provide the benefit far later than the Companies with resource planning systems. After analysing the situation of Lithuania among 28 European Union countries, it is obvious, that there is little attention dedicated for business management with the use of informational technologies in Lithuania, i.e. Lithuania is only no. 17 according to the number of companies that use a business management system for the Integration of internal processes (with an ERP). However, after analysing the tendencies of implementing CRM systems, it was found that from 2012 to 2014 Lithuania among EU countries has risen from number 20 to number 14 what is evaluated as a positive aspect.

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3.2 STRATEGIC DEVELOPMENT OF INNOVATIVE TYPES OF TOURISM IN UKRAINE

This paper shows the priority of tourism industry development in Ukraine in general, as well as innovative types of tourism, such as: geotourism, in particular. The data clarifies basic approaches to the definition of "geotourism". It indicates the necessity of strengthening government role in the field of tourism, primarily through forming of development strategy of some types of tourism. Development strategies project of geotourism in Ukraine is proposed, which provides three strategic ways of development: geotourism, geoeducation and geoconservation. Each of them includes a list of priorities through the implementation of specific measures.

Today tourism industry serves an important part of the global economy. According to the International Tourism Organization tourism share of global GDP is around 9%, about 30% of world exports and 6% of world trade. In the field of tourism is every 11th employee. In 2013, the services of the tourism industry benefited around 1.089 billion international tourists in 2014 their number exceeded 1.1 billion people. The total turnover of world tourism in 2014 reached US \$1.5 trillion (in 2011 – US \$1.03 trillion) [186].

According to the World Travel and Tourism Council [186] direct contribution of travel and tourism to GDP in 2014 was US \$2.4 trillion (3.1% of GDP). Primarily, this figure reflects the economic activity sectors such as hotels, travel agencies, airlines and other passenger transportation services (excluding commuter passenger traffic). But it also includes, for example, the activities of restaurants and entertainment. The total contribution of travel and tourism to GDP (including those of the wider effects of investment, supply chain and induced income impacts) was US \$7.6 trillion in 2014 (9.8% of GDP). Revenues from international tourism in 2014 exceeded revenues from the automotive industry. The number of employees in the industry exceeded 277 million people. Over the past 24 years in the world tourist flow increased by almost 2.6 times from 435 million people in 1990 to 674 million people in 2000 and 1.13 billion people in 2014. In 2014, according to UNWTO [186] world travelled more than a trillion people. All these factors made the tourism sector one of the key areas that affect the overall status and trends of the global economy. That's why tourism increased attention from international organizations.

Ukraine occupies a leading position in Europe concerning a level of availability of valuable natural, historical and cultural resources, causing a great interest for native and foreign tourists.

However, according to the World Economic Forum 2013 in the field of travel and tourism, Ukraine among 140 countries ranked only 76th (Czech Republic 31, Hungary 39, Poland 42, Slovakia 54, Russia 63, and Romania 68). The above indicates that in international tourism market, Ukrainian national tourism product and natural resources are estimated to be less attractive and competitive than in other countries, where there is a global trend towards strengthening the role of the state in supporting tourism development. Although in 2010, Ukraine held 85th position, which shows a positive tendency in the world ranking of tourist most attractive countries. In the ranking of economic development of the tourism industry from the World Tourism and Travel Council Ukraine in all positions in 2015 is below the global average [188] and according to forecasts in the long term to 2026 will be a slight increase its position in the global tourism market, as evidenced by the low evaluation of the Ukraine in the World Economic Forum [182]. According to the World Tourism Organization UNWTO Ukraine's share in tourist flows in Europe is about 2.2% and about 0.3% in European revenues from tourism [186].

This significant difference in the structure of natural and cash flows may indicate low efficiency of Ukrainian tourist areas and low use of existing tourism resources.

Central and Eastern Europe (-5%) was the only subregion in Europe and the world to suffer a decline in arrivals in 2014, following three consecutive years of strong growth. This

was mostly the result of weaker Russian outbound demand as well as a sharp drop in arrivals to Ukraine (-48%) due to the ongoing conflict [186].

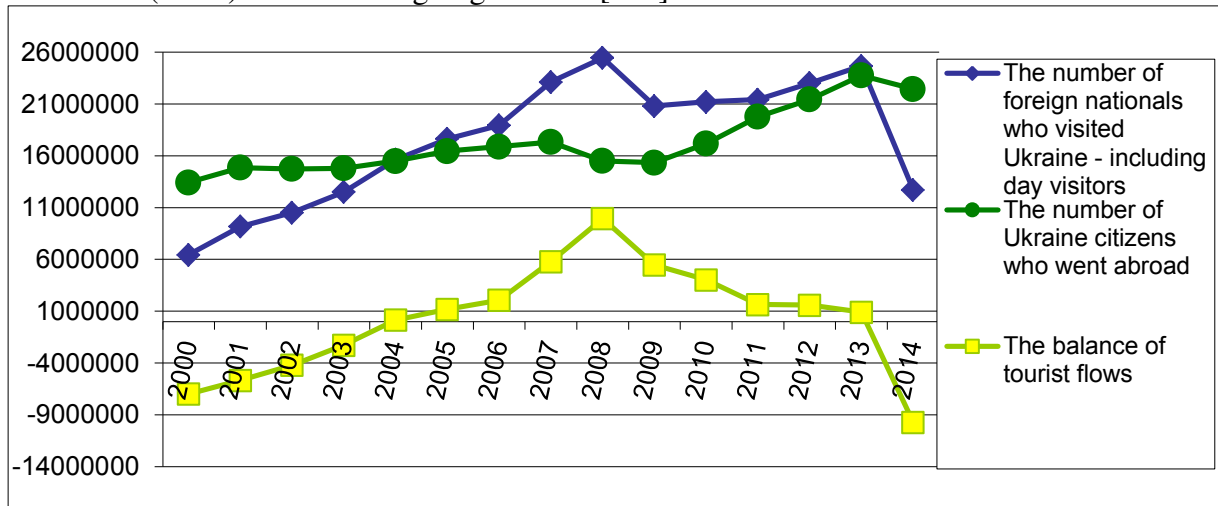


Figure 3.2.1: Calculation of the dynamics of tourist flow balance in Ukraine, 2000-2014
Source: [190]

Thus, analyzing the data the State Border Service of Ukraine (Figure 3.2.1) for the period 2000-2014 years, see disappointing picture, where after a long gradual increase in net tourism balance, in 2009 witnessing a gradual decline, and in 2014 general collapse rate to a negative value. The main reason is the reduction of inbound tourist flow through military conflict. If we analyze the dynamics and structure of tourist flows, which were served by tourist firms, the picture changes. A significant increase in exit flow while reduction of entry as well as domestic tourists. However, in 2014 the overall negative trend observed for all three trends. The total amount of tourists serviced by tourist firms decreased by 30% compared to 2013 [190].

In order to avoid losing positive tendency, the development of innovative types of tourism in Ukraine, geotourism particularly, should be encouraged.

The concept of "geotourism" is fairly new to the community that is also a reason why tourists use it so rarely; nevertheless in professional circles it is quite common. So what is geotourism?

History of the concept of "geotourism" (full title "geological tourism") is not complex. Many books, research papers, reports have been written on the subject of geology. The main idea of geology is that it examines the features of relief on the earth surface, which were formed as a result of various processes. The word "geology" (geology) comes from the Greek "geo" - land and "logia" - knowledge/teachings. Thus "geology" means - "the doctrine of the earth". While the concept of geology was being detailed researched by scientists, other researchers focused on the concept of "tourism", but only few combined these two concepts together.

One of the first scientists to combine geology and tourism became Myurey Grey in 2004. In her book "Geovariety: evaluation and conservation of a biotic nature" Grey proved that the two are clearly intertwined with each other. The author draws a parallel between geology and tourism from the point of view that the development of different areas is an important economic component, but it can cause damage to biodiversity and geovariety. During the development of the theme of the book, author concludes that the location of the relief features must be preserved, and moreover, they must be protected, thus the topic of how tourism can affect the conservation of nature attractions was considered. The book also examines positive combination of geology and tourism [181].

Other researchers such as Ross Dovling and David Newsam perceive geotourism as the one that can provide a better knowledge and understanding of Earth, its unusual places, its unique territories and cultures. Geological characteristics of certain areas always inspired and

amazed people, which is why these areas are under protection as a world heritage site. Whether the Grand Canyon in the United States, or Machu Picchu in Chile, such a unique place has always attracted visitors from all over the world, according to David Ross Dovlinh Nyuvsam [184]. The term "geotourism" is often equated with the term "ecotourism", "sustainable tourism", "alternative tourism". It is often combined with types of traveling with informative, educational purposes, but the real meaning is much deeper.

Publicly, the term "geotourism" was introduced in 2002 and was approved by the National Geographical Union. The determination was brought by the chief of National Geographic Traveller magazine, which is also the first manager of the National Geographical Union of environmental decision-making by Jonathan Tortelot.

Geotourism is a type of tourism that proves uniqueness of geographical location, such as environment, heritage, aesthetics, culture, relief features of the area, and the uniqueness of the local population. Geotourism is a kind of travel with an aim of nature conservation as well as protection of cultural heritage and traditions, history and geography exploration, promotion of the area uniqueness, investment attracting, developing of patriotism. Thus, this type of tourism lets travellers explore different places of interest on the specific territory, its cultural or historical heritage.

The object of geotourism is the uniqueness of the area: unusual landscapes, rock formations, unique flora and fauna, coastlines, river valleys, waterfalls, caves, etc. Along with the natural features of the location, geotourism is aimed at familiarizing with the cultural characteristics of the territory: the unique folklore, crafts, clothing, customs, cuisine, etc.

The subject of geotourism is the geotourist, whose main purpose of travelling is to visit areas with unique natural and cultural resources. At the same time, the geotourist does not harm the environment, but benefits the local people.

Geotourism is a special kind of tourism which combines the most popular modern types of travel. Each of these types brings something unique, something that creates the uniqueness of geotourism itself. Therefore, various directions exist in geotourism, based on the preferences of tourists and formed due to the specific natural, cultural, human and other resources involved (Figure 3.2.2).

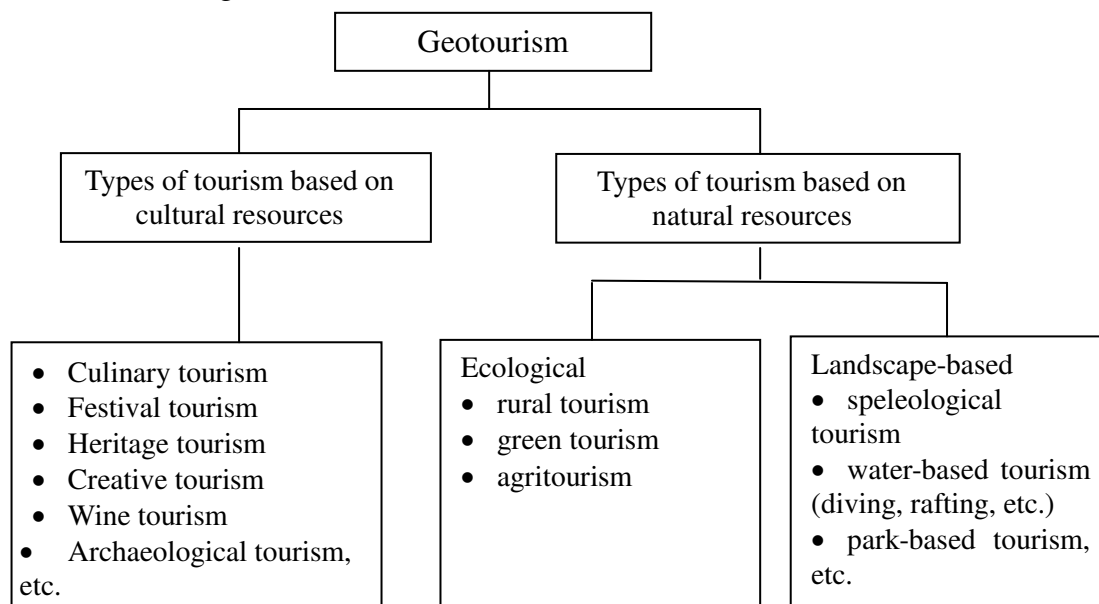


Figure 3.2.2: The main types of tourism that form geotourism

Source: created by author

It is suggested to single out two main tourism type sets that form the basis of geotourism. The first set includes those directions which are based on cultural resources. Undoubtedly, any kind of tourism involves cultural factor to some extent. The concept of

cultural tourism was officially used internationally for the first time in the proceedings of the World Conference on Cultural Policy (Mexico City, 1982).

The second set of tourism types is based on natural resources. Primarily, this group includes ecological tourism, which can be represented by green tourism, rural tourism, agrotourism, and other types. Ecotourism is a form of travel, favourable to the environment. Ecotourism is aimed at protecting the natural and cultural environment of regions that are visited by tourists. It provides that participants of these trips are people with high environmental awareness.

Geotourism is a tourism based on "relationship building" with the place of visit, with local culture, with natural environment, with people that live in that area. It is a kind of tourism that by itself is already unique, it offers tourists a special unique place of the country, and it offers authentic culture, but culture of the people who live in the area. Abroad, one of the most common forms of geotourism are geoparks.

Geopark is a protected area of national importance, on which are located socially important, rare (or unique), aesthetically attractive geological and geomorphological objects, that carry scientific, educational and recreational value [183]. These objects are a part of general preservation, education and sustainable development concept; most of them have exceptional geological, mineralogical, paleontological and geographical value. In addition to the objects that represent geological inheritance, geoparks also cover archaeological, ecological, historical and cultural. Geoparks are managed according to the national legislation of a country where it is located [183], however following the policy of preservation and sustainable development; each geopark has its own management plan.

Geoparks create perspectives for regional geological heritage values protection in conjunction with the landscape and promoting of their meaning. They also provide better opportunities for geotourism and geoharitage development, more then other environmental agencies. Parks can be as centres that play an essential role in promoting knowledge and education in the field of Earth sciences for society in general and centres of activities and projects aimed at the needs of both geopreservation in particular, and of nature in general; they are also required to maintain historical and cultural values and sustainable development of protected areas [185].

The issue of geoparks in Ukraine has been actively discussed in the scientific circles and environmental organizations. Actually there are some emerging scientific publications with the goal to establish national geoparks in the Carpathian region, Podilya, Pobuzh and Crimea [180, pp. 9-11]. At the same time Ukrainian scientists, leaders of environmental organizations and institutions are not well informed about the possibilities and problems of environmental institutions.

As already mentioned, functioning of the tourism industry in the modern business environment is characterized by specific activation, but there are a number of significant restraining factors. The most important among them is inadequate legal framework, the contradictions and inconsistencies of its individual policies, the lack of effective state programs regulating tourism as a promising direction of the development, there is no clear methodology and mechanisms for its implementation [179].

Unfortunately, the tourism sector at the national level does not play a significant role in the full implementation of economic, social and humanitarian functions, in preserving natural environment and cultural heritage, filling budgets on every level, creating new jobs, increasing the share of services in the gross domestic product.

Thus, Ukraine has developed many programs for tourism development. However, in practice, little progress can only be seen among small businesses involved in green tourism. To take full advantage of the rich tourism potential of Ukraine, effective mechanism had to be ensured, comprehensive program to improve tourism attraction of the region at the state level has to be implemented. For this purpose it is necessary to improve the management system of tourism industry at the state level [182].

To improve the competitiveness of the tourism industry and in particular geotourism, the role of the state needs to be strengthened and at the same time effective model of cooperation between the state, business and society has to be formed.

Overcoming the current negative tendencies, creating systematic and comprehensive geotourism preconditions for the development, improvement of functional and technical quality components of the national and regional tourism products, have to become priorities for sustainable tourism development in general.

Because the actual problem of modern tourism industry development in Ukraine is the lack of government regulation and control, there can be offered following:

1. Create at the national level legislated long-term development strategy of geotourism in Ukraine, with its following implementation and control of the regulatory structures;
2. Delegate workers into separate units of the executive committee of the regions of the state, for the monitoring and implementation of the national strategy;
3. Making the sector of tourism services more transparent;
4. Simplification of leading business in the sphere tourism;
5. Decreasing of tax pressure from the side of Ukrainian governments in order to involve more international investments;
6. Creating a single informational base on the state level with an educational portal segment to highlight the latest news, innovations and perspectives in the sphere of tourism in general and geotourism services provided by the country in particular;
7. Define and adopt national standards in the field of tourism services on European level.

The project of geotourism development strategy in Ukraine is proposed. The aim of the geotourism development strategy in Ukraine is to improve social, economical and intellectual life standard by creating competitive national geotourism product based on rational use of geoheritage in the local and world market (Table 3.2.1).

The strategy of geotourism development will be implemented according to the following principles:

- planning (this principle provides annual planning of needed budget on different level, which promotes transparency, stability and synchronization in geotourism development policy);
- concentration (due to limited state and local funds during the implementation of tasks set out in this strategy, resources are concentrated in certain areas, a hierarchy of priorities is established according to defined objectives, defined requirements for cost-effectiveness of their use);
- actions synchronization (provides synchronized number of reforms affecting the socio-economic development of territories, coordination of priorities and actions of national and regional authorities, community members and businesses concerning national and regional geotourism development);
- polarized development (expected to form a "reference areas" (geoparks), which concentrate financial, administrative, managerial, human and other resources, with further strengthening of innovative geotouristic activities in other regions);
- balanced development (leads to a differentiation of state support in different areas according to their potential conditions, criteria and deadlines established by legislation);
- partnership (promotes close cooperation between central and local executive bodies, local authorities, NGOs, business entities in implementing strategies, monitoring and evaluation of assigned tasks);
- subsidiary (division of authority, which shows that the place of administrative (management) services as close to its direct consumer considering the completeness of adequate service quality by concentrating material and financial resources at the appropriate territorial level of government).

Table 3.2.1

Strategic objectives, priorities and key measures for implementation of the Strategy
Objective № 1 – Geotourism

Priorities	Key measures
Define legislative and other regulatory legal frameworks regulating geotourism	Improving effectiveness of public policy in geotourism, development and implementation of effective models of governance to harmonize and protect the interests of all participants in this field; Establishing national and local geotourism development programs according to the EU directives and standards; Creating schemes and a general development plan of the tourist areas; Forming favourable tax conditions for tourism development; Developing regulations to strengthen responsibility for spreading false advertising about geotourism
Development and implementation of competitive national geotourism product based on rational use of geoharitage on the local and world market	Developing tourism infrastructure, particularly the reconstruction of existing and construction of new places for accommodation, dining and other tourist infrastructure facilities; Creating environmentally oriented businesses (mainly in the sphere of tourists service such as accommodation, food, recreation and leisure); Developing geotouristic tracks, create a network of tourist itineraries; Creating geoparks as objects of geotourism which would be included into European and international network in the future; Creating a unified system of marketing support for national geotourism product on local and external markets; Determining legislation and coordinating mechanism for distance selling of geotourism products (including the Internet); Ensuring the safety of tourists and people who travel.
Definition of socio-economic framework of geotourism development	Creating new jobs (reducing unemployment), expansion of rural employment in tourism activities; Decreasing the emigration level of the local population; Supporting the development of small and medium enterprises in tourism, efficient use of financial and material resources in geotourism activities, filling all budgets due to sources from the results of this activity and increased revenues of currency; Preventing unfair competition and monopoly in tourism activities; Supporting and renewing local crafts and traditions.
Definition of organizational and administrative principles of geotourism	Creating favourable conditions for providing tourists and people who travel needed tourism, recreation, sightseeing and cognitive services; Forming informational geotourism platform for rational and efficient use of tourism, natural and recreational resources through establishing and operation of geotourism development zones, Strengthening the role of NGOs in establishing the principles of geotourism, improve existing and introduce new mechanisms of interaction between central and local governments, local governments, NGOs, businesses, academic institutions and schools; Monitoring environmental impact during construction of tourism infrastructure at the site belonging to the natural reserve fund; Promoting transportation, municipal, border and customs infrastructure.

Objective № 2 – Geoeducation

Priorities	Key measures
Popularization of geoharitage preservation ideas, educational direction	Developing educational programs for the local population about the value of geoharitage; Conducting educational events to explain the significance of various components of the nature and form in the mentality of people the need for geoharitage protection; Holding school trips and excursions in order to help educate children and young people about patriotism, insert love to Ukraine, respect for national traditions, cultural values of Ukrainian nation, for the nature; Promoting sustainable development of protected areas.
Development of HR potential in the field of geotourism	Holding seminars, conferences; Improving the system of training, retraining and skills development in the tourism sector; Introducing to university students who study Tourism a new subject "Geotourism".
Formation of information environment for geotourism	Developing internet web-site about Ukrainian Geoharitage; Establishing Informational centres; publishing popular literature, maps, educational materials and presentations, booklets, posters, calendars, leaflets in several languages; Creating a positive tourist image of the state; Creating museums.
Foster the development of international cooperation in geotourism	Arranging meetings and field trips with representatives of the European and World geopark networks; Exchanging information, experience and methods of geobjects and landscapes preservation.

Source: created by author

Objective№ 3 – Geoconservation

Priorities	Key measures
Geoharitage research	Inventory (certification) of geoobjects; Introduction of the state monitoring system for geoharitage; Holding scientific researches; Holding some activities for the study of public opinion on issues of science.
Conservation and sustainable use of geoharitage	Include especially valuable objects in the List of UNESCO in order to preserve national cultural heritage, Developing programs for the protection and sustainable use of valuable objects of geoharitage; Developing draft laws and other normative legal acts concerning the legal status of geoobjects; Improving the legal, institutional and socio-economic conditions for the implementation of national policy on the sphere of geoplaces protection; Establishing Ukrainian geoparks network; Improving and expanding methods of geoobjects protection, improvement and promotion.

Source: authorial research

Solving problems related to the conservation and promotion of geoharitage, providing further social, economic and intellectual development of society and gradually bringing existing standards up to European.

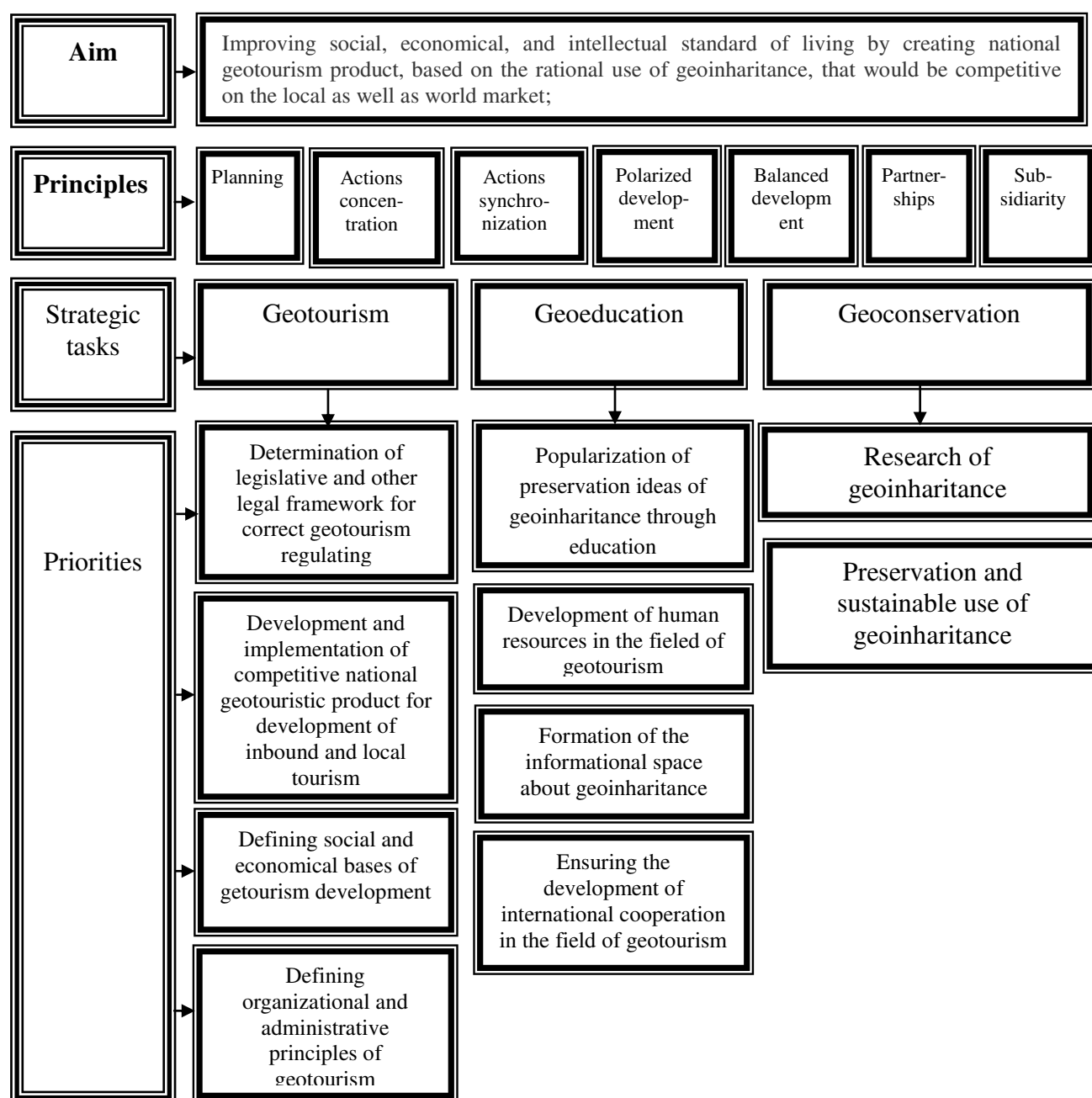


Figure 3.2.3: Schematic structure of Geotourism development strategy

Source: created by author

At the first stage of strategy implementation it is needed to provide:

- a legal framework harmonized with the European Union on the development of geotourism;
- Formation of competitive national geotourism product;
- strengthening entrepreneurship activities and business entities in geotourism;
- IT support in the sphere of tourism;
- monitoring geotourism resources;
- improving management effectiveness in field of geotourism;
- development of inbound and internal tourism;
- involving investments for development of material and technical base in tourism;
- improving the quality of excursions and similar services;
- safety of tourists and people who travel.

On the second phase there will be provided:

- development of tourism considering quality of life, traditions and culture of the population;
- development of human resources and staff potential in the field of geotourism;
- preservation of resource potential in mentioned field;
- controlling the use of geotourism resources;
- Creating marketing support of national geotourism product;
- improving international cooperation.

The third phase is expected to provide:

- sustainable use and conservation of geotourism resources;
- coordination of interests of businesses and individuals in the tourism sector;
- balance of all components of geotourism development, as socially responsible, environmentally and economically efficient activities;
- providing high quality services to meet the needs of tourists and people who travel;
- functioning according to constitutional rights of citizens in the tourism sector.

At all stages there should be held continuous monitoring and control of the implementation of these measures.

Implementation of this strategy will promote:

- quality of life of population;
- increasing the influence of tourism in the formation of gross domestic product;
- creation of conditions for development of certain areas, timely and complex problems solving concerning environmental protection;
- recovery of national culture and handicrafts, formation of national identity and education of young people on the basis of patriotism;
- preservation and restoration of unique natural, historical and cultural resources;
- significant improvement of the environment on the territory of tourist infrastructure objects;
- reduce unnecessary budget, rational use of financial and material resources, filling the budgets of all levels, the flow of foreign currency into the country;
- creation of new and preserve existing jobs, development small and medium enterprises in the tourism sector, expansion of temporary employment in rural areas;
- sustainable development of areas in order to improve quality of life, reduce poverty and unemployment, the middle class;
- improve the safety of tourists and people who travel, protection of their rights and interests that respect law, their property preservation;
- creation of equal conditions for participants of tourism activities, conditions for development of effective and transparent tourism market;

- creation of modern tourist infrastructure facilities within areas with a high concentration geoheritage;
- improving the system of information supporting the field tourism, creating favourable conditions for equal access to information;
- significant improvement of public policy in the field of tourism, implementation of functions of coordination, planning, management, promotion, the formation of the national tourist product, standardization and certification, etc., done by the government;
- improvement of existing and the introduction of new effective mechanisms of interaction between central and local executive authorities, local self-government, non-profit community organizations in the field of tourism related enterprises, scientific and educational institutions in promoting geotourism development;
- creating national and local geotourism development programs, economically reasonable plans for their implementation, at the same time considering the framework of socio-economic development programs of the regions;
- development of international cooperation and eurointegrational processes in the sphere of tourism, improvement of the tourist image of the state;
- increasing the amount of investment in tourism.

Ukraine is a promising area for the geotourism development, mainly because of existing geoheritage that is the basis for such statement. First step in the development of this field should be establishment of legislative basis for the formation of this innovative type of tourism, particularly the development strategy of geotourism on the national level. Promoting it in the media and the global Internet network, publication of printed materials and videos, holding advertising actions as well as festivals will only raise a public interest of community in geotourism, which will lead it not only on the national level but also international.

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3.3 ORGANIZATIONAL MECHANISM PUBLIC-PRIVATE PARTNERSHIP IN WASTE MANAGEMENT BUSINESS

Economic advantage of the European Union (EU) is directly connected to scarcity of resources. Waste management business plays a crucial role in providing advanced manufacturing companies in EU with cheap resources. Recycling community in the Union is a really important business factor in maintaining the environment and living area in a modernity of the 21st century and in addition, it provides waste management business with separately waste collection systems. In the EU there are a lot of waste management companies from excellent developed companies to low developed ones that need innovative business mechanism.

However, crowd funding business strategy was introduced in a wide business area, where a lot of people are involved directly in project development process. Presence of the crowd funding strategy in our economy gives an opportunity to be developed waste management by means of business model public-private partnership (PPP) and community to be the core business element.

In the current inquiring paper is created organizational mechanism public-private partnership in waste management business, it includes principle community-to-community.

The main purpose of the monograph is to be resolved the problem about low effective waste treatment on a households' level, annual waste fees inter alia and creation of high competitiveness level for Bulgarian and EU small and medium sized enterprises (SMEs) as well as waste management companies.

The subject of the monograph is organizational mechanism PPP in waste management business and the object is "Bulecopack" JSC.

Economic growth in the EU depends on the creation of innovative business approaches embraces the effectiveness from inclusion of the recycled resources in manufacturing business. Waste management business can effectively underpin profitability of the SMEs. We know that separately collected wastes possess value and it could be back again into economy. In sum this is well known circular economy [192]. Business model PPP is an instrument for providing the highest quality public services. The waste treatment processes are well known in energy projects, by incineration process inter alia are practically applicable is composting, recycling and reuse.

Waste management strategic policy in EU origins from Lansink Ledger [189]. Waste management strategy includes waste management hierarchy in accordance to Directive 2008/98/EC as follows: *prevention or reduce* by means lowering the amount of waste produced, using less material in design and manufacture, designing products for a longer life, *preparing for reuse* by means using materials repeatedly, cleaning, repairing, refurbishing whole items or spare parts, *recycling* by means using materials to make new products, *recovery* by means energy from waste, anaerobic digestion, incineration with energy recovery, gasification and pyrolysis which produce energy/fuels, some backfilling and *landfill* by means safe disposal waste to landfill and incineration without energy recovery.

In accordance to Environment Directorate General in EC, the economy of the EU should be transformed in sustainable one to 2050 with a high competitive manufacturing level based on green economy. Another important document is "the Roadmap to a Resource efficient Europe" [195] it notes the requirements for modern and innovative waste recycling equipment in every one member states (MS) and to be prevent landfills. As an end effect is predicted to be opened 580,000 work places, increase of the competitiveness and to be confined expensive resources in manufacturing business. In accordance to the author of the monograph the organizational mechanism PPP as well as the principal community-to-community will contribute for reaching EU purposes and to be established EU added value in waste management. By 2030 the recycling level is forecasted to be 70% from households waste and 80% from packaging waste.

In accordance to Environment Directorate-General, EC [196], in 2010 the non-treated wastes in EU amount to 600 m. tones from all generated 2.5 billion tones or 24% of wastes are ready for innovative and productive waste treatment. In household's conditions each person is a manufacturer of wastes at about half of tone. Only 40% of it is reused and recycled. The turning of wastes into resources is possibility for development of the manufacturing business based on a circular economy in the EU. In accordance to the author of the monograph organizational mechanism PPP gives a real chance for development of the competitive manufacturing in EU based on a recycling community and circular economy.

The waste recycling process is based on Directive 2006/12/EC. So, in accordance with European environment agency [197] increasing consumption and economy development continue to generate great volume of wastes. The "Zero Waste" strategy gives importance across the MS in the EU for reaching 70% recycling level of all generated wastes. The scientific viewpoint of the author endorses the above mentioned numbers waste recycling levels. Moreover, in this way the principle community-to-community would be a leading part in the creation of innovation in productivity of the circular economy and recycling community.

Waste recycling community is established firstly in France as well as in a lot of MS in the Union [198]. Recycling community in the EU is based on a three levels of developed MS in accordance to "Thematic strategy on prevention of wastes and increasing of recycling". Firstly, the community is connected to *highly developed MS* like Germany, Belgium, Nederland, Austria, Sweden and Denmark. Secondly, the MS in *transmission to recycling community* are Ireland, Czech Republic, UK, France, Slovenia, Luxembourg, Estonia, Finland, Italy, and Lithuania. Thirdly, *the lowest developed MS* are Bulgaria, Romania, Poland, Spain, Malta, Slovak, Hungary, Portugal, and Latvia. In accordance to the authors' viewpoint the organizational mechanism PPP is appropriate for developing of the lowest developed and the MS in transmission in the EU to the top waste management level. Innovation in waste business is created to a lot of leading companies in the Union.

In the Netherlands, the company AEB Amsterdam is one of the most productive and innovative one with its 99% level of waste treatment. Since 2014 the company is property of the municipality of Amsterdam [199]. Again in the Netherlands, the company Orgaworld is a private property and plays a crucial role in energy power business [200]. The company uses the strategic model DFBM (design-finance-build-management) and the treatment level is 96% from the whole generated organic wastes. The company maintains a business connection with supermarkets Albert Heijn, based on composting of the comestibles with expired dates. In comparison to the above mentioned companies, in 2015, in the capital of Bulgaria in Sofia, was opened a new waste management factory funded by Operational program Environment 2007-2013 [201]. The capacity of the waste factory is manufacturing of Refuse derived Fuel (RDF), composting and recycling inter alia the non-treated wastes filling in landfills are 27.80%. Consequently, the competitiveness level is not competitive. In Sofia, the separate waste collection practice is not populated. Waste recycling process is very important for the SMEs in Bulgaria. In connection to the issued Order by the Ministry of Environment and Water [202] is prepared mathematical analyses, including 4 Bulgarian JSC. The companies treat packages of wastes from plastic, paper and cardboard, glass, metal, wood, and compost.

Table 3.3.1

Waste management companies in Bulgaria

Company	Packages placed on a market	Recycled waste packages	Recycle level
Bulekopack	44 841,88 (13%)	29 257,70 (14%)	65,25%
Ecocollect	52 835,85 (16%)	32 513,18 (15%)	61,54%
Ecobulpack	93 312,41 (28%)	62 822,35 (30%)	67,32%
Ecopack	142 680,01 (43%)	87 144,07 (41%)	61,08%
Sum	333 670.15	211 737.30	

Source: Ministry of environment and water, Bulgaria

From the tabulated information we can see that "Bulecopack" JSC holds the lowest packages recycling level, hence this leads to the lowest competitive level and market share. The solving the problem is connected to inclusion of great volume of treated and simultaneously and different kinds of wastes such as: out of order equipment, clothes, shoes, rubber, and the like. In all MS in the EU, waste recycling business should be expanded on a maximum possible level. That would happen by creation of the organizational mechanism PPP. The idea encompasses the manufacturing SMEs, community and waste management business in the establishment of the circular economy on wide spread EU level.

In accordance to the National Statistical Institute of Bulgaria the common waste treatment level is about 30%, hence 70% of them fall into landfills. There are great omission between waste recycling strategy in Bulgaria and the leading MS one. What does the organizational mechanism PPP need to resolve? The recycling community provides added value to the community, by environmentally maintained living areas, low price level of recycled products and increase the competitiveness of the manufacturing and waste management companies.

In Bulgaria, in 2003 was issued Waste management Act, in 2012 was issued Public-private partnership Act as well as in 2013 was enacted the Waste management National plan 2014-2020. In the Plan are noted the possibilities for inclusion of the PPP in waste management business. Consequently, this is a great opportunity for the development of "Bulecopack" JSC by means of business model PPP.

Creation of the organizational mechanism PPP

For the establishment of the sustainable organizational mechanism PPP is considered, as follows:

1. Acceptance of the principles for management of the PPP [203].

The principles are issued by the Organization of economic cooperation and development (OECD). The principles are as follows:

- Policy leadership by proliferation of the PPP idea, community benefits and expenditures. The information should be provided for private sector and community;
- Defining of the clear, predictable and sustainable legislation framework;
- Ensuring of qualified and skilled institutional role and administrative capacity provided by the public sector;
- Investment decisions of the private partner should be based on fully government perspective inter alia and the funding method;
- Eligible project and transparency budget process;
- Research and acceptance of the most appropriate income-investment methods will contribute for more value for money;
- Risk transferring to the best able partner in the business partnership;
- Inclusion of the customers in the project designing and monitoring process of the PPP project, that will increase the value for money;
- Maintaining the value for money level by operating, renegotiation and evasion of possible project fail;
- Ensuring of the competition and integration of the public procurement process.

2. Motivation and terms for successful realization of the PPP [204].

• Business model PPP, like an instrument and betterment of the effectiveness, includes: inclusive development and accessibility, cooperation and credibility, stability and predictability, accounting and risk management, financial optimization of the project infrastructure, effective management, stakeholders in PPP;

• Building up of government PPP units provides the business model with base of knowledge, professional guidelines, standardization, approval of eligible bargain and experience. In Germany is created PPP Task Force [205]. In Czech Republic and France the PPP units are situated in Ministry of finance, in Hungary it is in ministry of economy and

transport, in Italy it is in Ministry of Economy and Finance, and in Lithuania the PPP unit is situated in development and investment agency in Ministry of Economy. In Bulgaria does not exist PPP unit, but in Ministry of Finance in State aid and real sector directorate the unit "Public investments, participations and concessions" carries out tasks including PPP.

3. Prerequisites for development and impediments in front of PPP in Bulgaria.

In 2006 is entered into force the Concession Law, as well as National concession register [206]. In 2000 Sofia Municipality concluded a concession contract for water supply and solid water with the "Veolia water Bulgaria". The contract duration is 25 years and the investment amounts of 150 million US dollars. Other achievements are both contracts concluded for concession of the airports in Burgas and Varna city. The contract duration is 35 years amounting of 1.5 billion Euros. In waste management business are no PPP projects, but the laws needed for the business are available. In 2013 was enacted PPP law, in 2003 Waste management Law as well as National waste management plan 2015-2020. In Bulgaria are available a lot of PPP plans on a municipal level. According to monograph’s author, the great problem is the missing central PPP strategy and the connection between central government, regional administrations and municipal authorities and the business branches from different sectors. The author is proposed possible national strategic plan for PPP development.

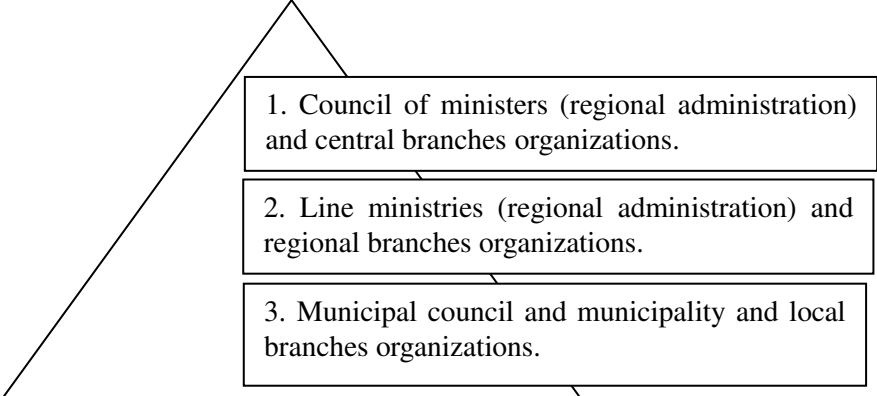


Figure 3.3.1: National strategic development PPP plan

Source: created by author

Connections between central, regional and local administrations by means of inclusion of branches organizations respectively from central, regional and local level, is a main factor for sustainable development of the business model PPP.

Development of the “Bulecopack” JSC

The author researches the possibility for acquiring "Bulecopack" JSC through the manufacturing SMEs by means of building up of the author's PPP model. The model includes private prosperity, creation of Special Purpose Vehicle (SPV), and invention of the principal *community-to-community*.

Theoretic scientifically realization of the organizational mechanism PPP

Step 1: Creation of the author's business model BLoOOM (Build-operational Leasing-Own-Operation-Management) based on PPP. For the establishment of the model many literature sources have been analyzed. [207, 208, 209, 210].

The wording new PPP model aims to create a greater market share for "Bulecopack" JSC, following the next steps:

Build: construction of the new build for treatment of a greater volume wastes, not only packages wastes. The process is being fulfilled by Special Purpose Vehicle, which is created in stage 3.

Operational leasing: this is an opportunity for buying new equipment for waste treatment process, in every ten years. **Operation:** treating of the separate waste collection from the households and its processing for the manufacturing purpose and third parties.

Own: the SPV is 100% owner of the waste management business and is not possible to be transferred to the public partner at the end of the contract duration.

Management: supplying of the manufacturing SMEs with recycled resources, as well as the processes of incineration, composting, reuse and business with third parties.

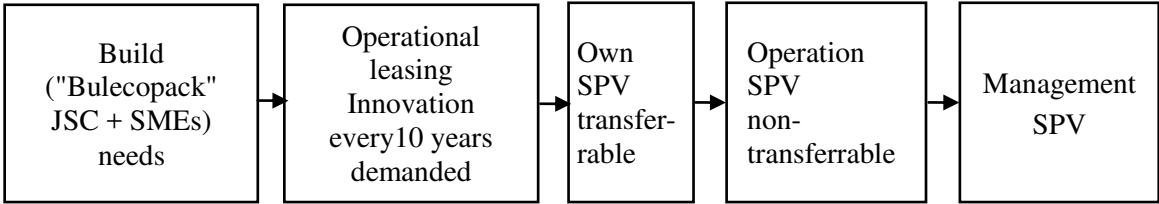


Figure 3.3.2: New PPP business model BLoOOM

Source: created by author

Step 2: Test for applicability of the SPV

- High prosperity of the SPV is settled on the partnership between manufacturing SMEs and "Bulecopack" JSC;
- Long contract duration with the public party, 30 years;
- Assuming of risks by construction, exploitation, management of the waste treatment, demand of services, risk availability, market risk with third parties;
- Long perspectives, expenditures assessment, analyses of the trade and ecological forecasts.

Step 3: Creation of the SPV

For the phenomena realization is assumed that "Bulecopack" JSC is acquired by the manufacturing SMEs, consequently it is a financial strategy between two private partners. In the SPV every one SMEs is a shareholder. The public sector is introduced by the municipal unit, which is the owner of the land for disposal of the separate waste collection systems. In the SPV are included associated partners: innovation centre and technical university. In this way the value chain is changed by the inclusion of the recycled resources at lower prices in comparison to the supplier's prices and resources extracted from the nature. In addition, the business synergy (shown in step 4) comes from the trade activities with third parties and the accessorial profit could be realized from lower prime costs of the resources which come from the manufacturing business of the SMEs.

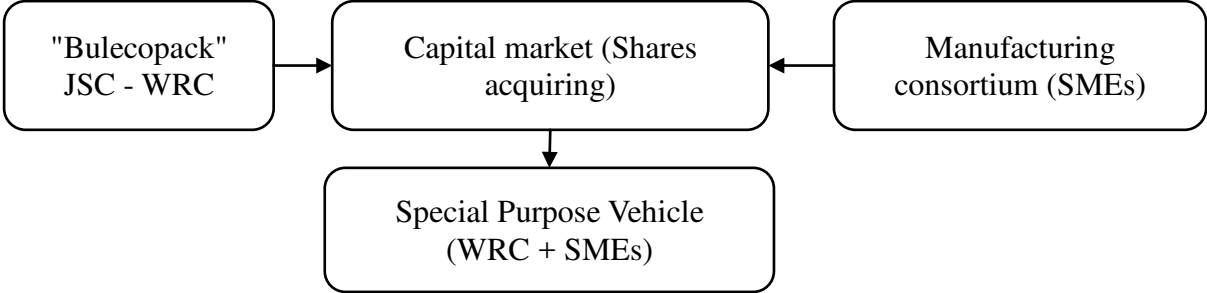


Figure 3.3.3: Share acquiring process by the manufacturing companies

Sources: created by author

Analyzing the provisions concerning competitiveness between undertakings:

In the research is assessed the new PPP business model BLoOOM on a legislative level by applying the Treaty on the Functioning of the EU (TFEU). As it is noted by the European commission, EU markets should work better ensuring that all companies compete equally and fairly on their merits. Hence, the benefits are for the consumers (tax payer), businesses and the European economy as a whole. In sum, the new PPP business model in the waste management business could be compatible with the internal market [211] because of the fact that prevention, distortion and restriction would not be impaired. In details, regarding to the Treaty of functioning on EU, article 101 will not be infringed because the

SMEs included in new PPP business model origin from different manufacturing sectors and the creation of cartel will not be possible. The case is the same with article 102; hence it will not be infringed because SMEs in the waste management factory do not have a dominant market share. In fact the SPV will gain an additional profit by selling the recycled products on third parties. But the main business activity will be use of the recycled products in the manufacturing process at lower prices in comparison with the supplier prices. This is a backward integration in the sense of Igor Ansoff's matrix. The cooperation between SMEs would not limit the production and innovation process, because of the inclusion of the innovation centre and a university in the effectiveness improvement of the recycling equipment and facilities. Likewise, the responsibility to SMEs could be enhanced by applying Think Small First Act.

The process of concentration between SMEs is analyzed in accordance to the specification of the new PPP business model BLoOOM. In the current article is researched the Council Regulation (EC) No 139/2004 on the control of concentrations between undertakings (the EC Merger Regulation). The principle of an open market economy with a free competition must be maintained on a MS level. In accordance to the new PPP business model BLoOOM, the competitiveness of European industry will be increased, the conditions of growth will be improved and standard of living in the community will be raised by supporting the level of the recycling society. New PPP model could not be an impediment for an effective competition because SMEs in SPV do not have a dominant position on the Internal European Market.

In the research it is accepted that SMEs included in new PPP business model fall in article 1 titled *Scope*, from the Regulation (EC) No 139/2004. In article 2 titled *Appraisal of concentration*, of the Regulation, new PPP business model does not create an impediment for competitors to enter in the recycling business. And dominant position of the PPP model is not applicable. SMEs are independent in doing the business on a manufacturing level. Regarding article 3 titled *Definition of concentration*, the new PPP business model BLoOOM is created by the concentration of the SMEs. SMEs are independent in their manufacturing business, but the process of waste recycling is a common business activity. In accordance with article 5 titled *Calculation of turnover*, concentrated SMEs included in new PPP business model do not sell the recycled products between them or provision of services, because the recycled products will be used in line to the different specification of the SMEs.



Figure 3.3.4: SPV management body

Source: created by author

The new PPP model provides a chance to SMEs to fulfil environmental changes by applying the waste management business strategy. In detail, they will create more European added value by increasing the capacity for new "green" markets and energy efficiency. This is supposed to be a new environment management system in SMEs business.

By applying the new business modes SMEs will enhance the competitive advantages in comparison with the large enterprises. In the manufacturing process SMEs will use recycled resources at lower prices which is a great opportunity for increasing the competitiveness. The new business could enable to use the environment management by Eco-

Management and Audit Scheme (EMAS). In this way the SPV will improve the environmental and financial situation. By using new PPP business model in the waste management business, SPV will also disseminate its environmental added value to stakeholders and to the recycling society.

Step 4: Creation of the SPVs management board

The SPV is predicted to have innovative managerial board including four functional units charged with recycling, incineration, composting and reuse activities. The Functional units' activities are connected to the business with the third parties.

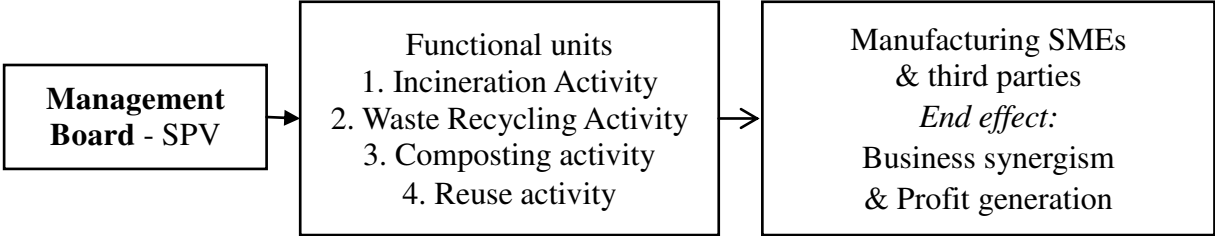


Figure 3.3.5: Managerial process of the SPV - management Board

Source: Project Governance: a guidance note for public sector projects, November 2007. HM Treasury (the figure contains changes made by the author)

The main purpose of the management board is the creation of resource balance between waste management activity and the needs of the manufacturing SMEs' as well as the business with third parties.

Step 5: Creation of the principal community-to-community

In the scholar inquiry is created the principle *community-to-community*. *First*, the principle encompasses connections between separate waste collection volume, the SPVs' profit and expenditure level, as well as households' annual waste fee. *Second*, the figure depicts the possibility of the development of Bulecopack JSC with interaction of the crowd funding strategy.

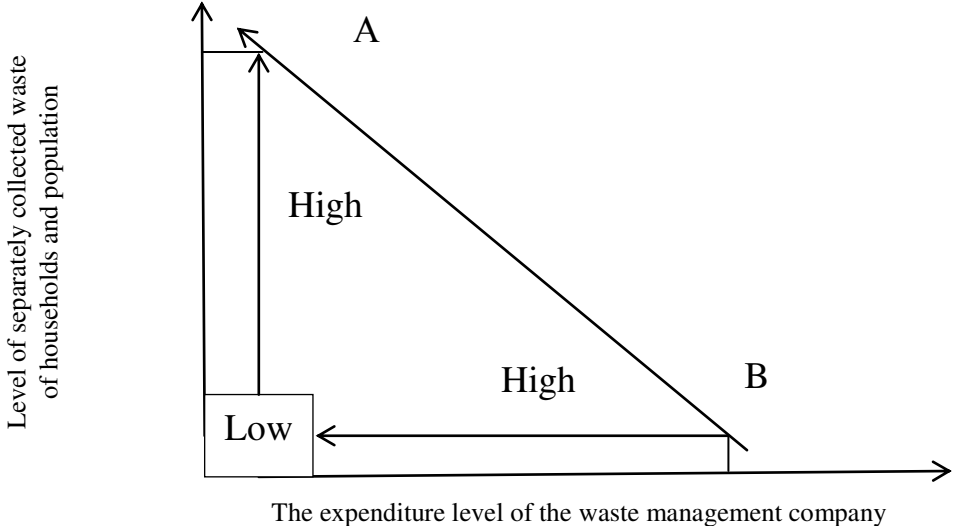


Figure 3.3.6: The effectiveness levels in the separate waste collection process

Source: created by author

First, the separate waste collection system supports the private sector to receive sorted wastes for the management process, consequently the SPV expenditures will go down. That is explained by the movement from the curve from B to A.

On the next figure is continued the connection from the first one. The higher volume of separately waste collection leads to a lower household annual waste fee. This is a positive effect of the SPV management activity. The strategic masterpiece of the outcome is based on a prime cost of the waste recycling and placement of the manufacturing SMEs with the recycled

resources (Part of the SPV).

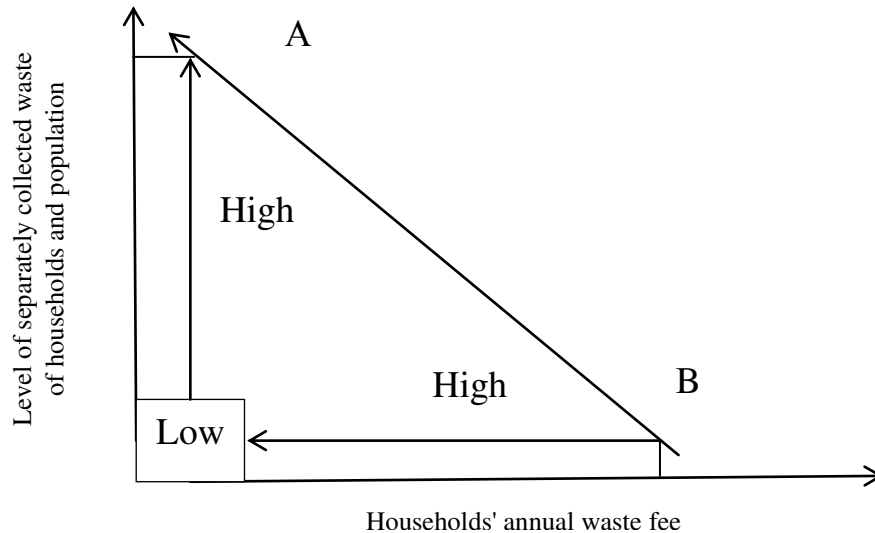


Figure 3.3.7: Incentive household level for separate waste collection

Source: created by author

Bearing in mind the logic of the scientific analyses is established *the Incentivize ratio (Ir)*. **Incentive ratio** = "SWC" in tons / "HF" (money)

The separate wastes collected by the households and the population (SWC) as the whole scale of separately generated waste on an annual base.

Households' annual waste fee (HF) as the whole household numbers in the metropolitan.

Second, on the next figure is depicted the establishment of the SPV, it is provoked by the funding shortages of the Bulecopack JSC.

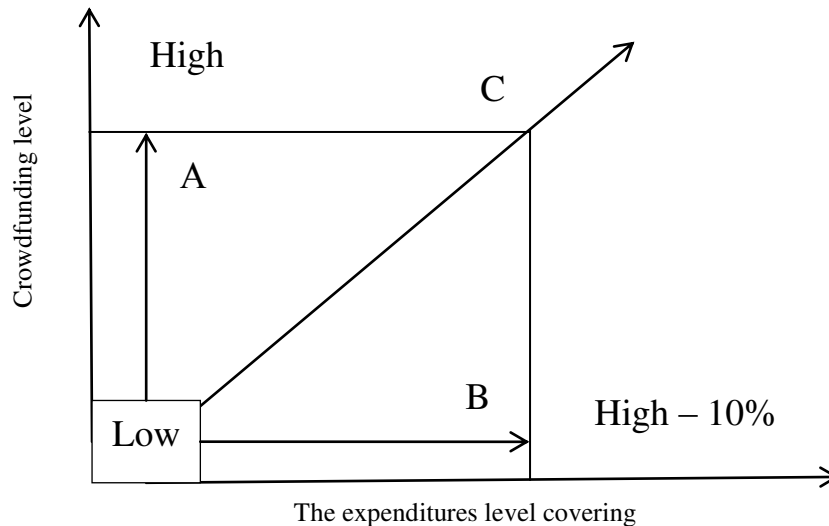


Figure 3.3.8: Connection between crowd funding strategy and the SPV

Source: created by author

In point C is the optimal outcome. It is assumed that 10% of the expenditures would be covered by crowd funding strategy. The crowd funding strategy [212] in waste management business creates the following end results:

- Purchasing of additional land, equipment and construction of the additional waste management build;
- Creation of the new monitoring level provided by the households;
- High social democracy level for private sector and society;

- Part of the crowd will be awarded with watches made by the recycled wood.

The strategy is possible to be realized by crowd funding platform only for the amount of 10% of all additional funding, intended for the SPV creation, while the SMEs share is 90%. On the next part of the report is established the scientific research.

The scientific research is based on expertise assessment compound by two researching methodology. First was structured interview with six managers. The aim of the interview is to be extracted clarifications in elaboration of the questionnaire. Second, by application of the questionnaire survey aims is being purpose to be acknowledgement of the organizational mechanism PPP in waste management business. The questionnaire survey is conducted across 24 experts from public and private sector. In both scholars researching the respondents possesses knowledge and experience in waste management, PPP and manufacturing business.

In accordance to the popular researcher in management science Uma Sekaran [208] are suggested ten main steps in inquiry research as follows: Observation, Identification of problem area, Theoretical framework or Network of associations, hypotheses, Constructs-Concepts-Operational definitions, research design, data collection, analysis of data, interpretation of data and last refinement of theory (pure research) or implementation (applied research). Uma Sekaran defined induction as a process by which common assumptions based on viewed facts has been settled, and deduction as a process of preparation of conclusion based on interpretation of meaningful results of the data analyses.

In accordance to Karl Popper deduction finds its scientific application after fulfilling logical analyses [217]. He explained that induction is possible to create problems in accordance to validity or trust in defining of the scientific statement. This is possible to be overcome by "knowledge of experience". The English philosopher, writer and policy person Francis Bacon has analyzed the scientific research as a moment of induction in the process of knowledge. Bacon' introduction has been developed across scientific papers of the John Mil [214]. He defined the induction as "summarizing based on experience".

The scientific research in accordance to the author is based on the inductive approach. The author has chosen the most appropriate algorithm for conduction of the appropriate scholar researching. The inquiry research is build up in the seven main steps, as follows:

1. The wording of the scientific research;
2. Definition of the scientific hypothesis;
3. Framework of the variables in the research;
4. Choosing the research instrumentation;
5. Conduction of the scientific research;
6. Conduction of the analyses;
7. Interpretation of the results.

Stage one: Wording of the scientific research

The scientific approach is directly connected to conducting of the structured interview and questionnaire survey. The purpose of the interview is to be extracted answers from the experts and to be acknowledged key moments in creation of the author's questionnaire. In the researching is used grading assessment in calculating the end results. The expertise assessment is not statistical method and there are no statistical means.

Stage two: Defining of the hypotheses

In the scientific research are defined null and alternative hypotheses. Null hypothesis, there is no connection between variables. Alternative hypothesis, there is a statement for existing the connection between two variables [213, 216].

1) *H0*: The principles for management of the PPP issued by OECD do not give a positive effectiveness in sustainable realization of the organizational mechanism PPP.

1) *H1*: Acceptance of the principles for management of the PPP issued by OECD gives a great added value for sustainable realization of the organizational mechanism PPP.

2) *H0*: Impossible interaction between models PPP with manufacturing business by acceptance of the good practice in European Union.

2) *H1*: Creation of the business model PPP in the sphere of waste management business in accordance to the manufacturing SMEs and applicable good practice in European Union.

3) *H0*: Useless inclusion of all treated volume of non-hazardous wastes in manufacturing process of SMEs because it will decrease the competitiveness level and market share.

3) *H1*: Inclusion of all possible non-hazardous treated wastes from "Bulecopack" JSC will provide the manufacturing SMEs with increased competitiveness level and market share.

4) *H0*: Impossible creation of the incentives for the community by inclusion of the separate waste collection system aiming to decrease an annual waste fee, because of the fact that SPV will raise profit and the innovative principal "community-to-community" will be created.

4) *H1*: Building up the new principal "community-to-community" through creation of the incentives for the community in separate waste collection process by decreasing the annual waste fee and enlargement of the profit of the SPV.

5) *H0*: Impossible creation of the business synergy and high competitive level for the SPV.

5) *H1*: Creation of the SPV provides business synergy and high competitive level.

6) *H0*: Negative effect and managerial added value by creation of the SPV with one managerial board with four functional units.

6) *H1*: Positive effect and managerial added value by the creation of SPV with one managerial board with four functional units, concerning recycling, incineration and composting process, as well as reuse of wastes.

Stage three: Framework of the variables in the research

In the current paper are included dependent, independent, modelling and intervening variables.

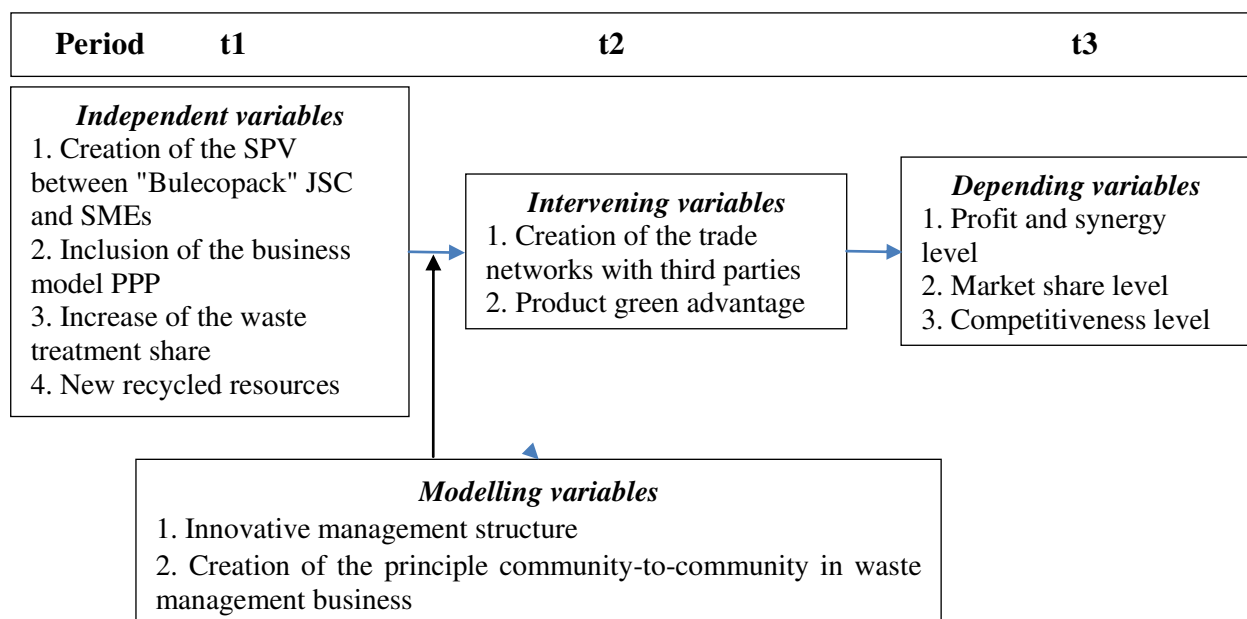


Figure 3.3.9: Variables in the scholar inquiry

Source: created by author

Stage four: Choosing of the research instrumentation

Research instrumentation includes interview and questionnaire survey along with experts from the public and private sector. The experts are predicted to take part in the scholar research, to possess professional experience more than five years, to have bachelor degree and knowledge in PPP, and waste management in Bulgaria and in EU.

Stage five: Conducting of the research

The scientific research is being conducted in January 2016. First, with five experts by

conducting interviews, and second, by a questionnaire survey with 12 experts from public sector and 12 from private sector. The questionnaire survey is carried out by means of www.linkedin.bg as a professional platform and by emails. The purpose of the interview is to be set up clear and professional questionnaire and inter alia to be tested the creation of the organizational mechanism PPP in waste management business. The questionnaire survey aims rejection or confirmation of the hypotheses.

Conduction of the interview; the respondents were asked five key dichotomous questions, as follows:

1. Does the business model PPP create added value in the waste management process? Marked Yes;

2. Is the private sector engaged enough in the process of waste management business? Marked No;

3. Is it possible an implication of the business model PPP in Bulgaria? Marked Yes;

4. Could waste management business underpin the increase of the competitiveness of the SMEs? Marked Yes;

5. Is it possible a creation of the social effect for the households in relation to annual waste tax fee? Marked Yes;

As a result from the received responds is found fully acceptance of the posted key moments in the creation of the linkages between business model PPP and waste management business. Thus, the questionnaire is elaborated with five detailed questions intended for public and private experts.

Conducting of the questionnaire survey:

The respondents included in the survey were asked to answer six detailed questions, which were the same for the public and private experts. The questionnaire survey is settled on a grading assessment from 1 to 5, one is the lowest level of significant and five presents the highest level of significant.

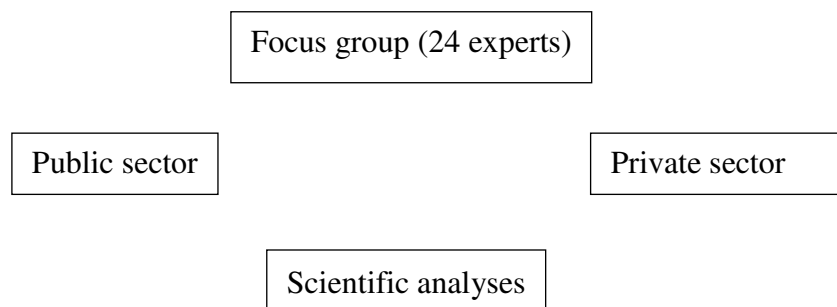


Figure 3.3.10: Conduction of the questionnaire survey

Source: created by author

Results from the conducted questionnaire survey:

1. Will acceptance of the principles for management of the PPP issued by OECD ensures a great added value for sustainable realization of the organizational mechanism PPP? Public sector: 4.83; Private sector: 4.92.

2. Is it possible a creation of the business model PPP, which is applicable in waste management business and simultaneously in the manufacturing SMEs by inclusion of the good European practise? Public experts: 4.83; Private experts: 5.

3. Will the inclusion of all non-hazardous wastes in "Bulecopack" JSC business provides the manufacturing SMEs with grater competitiveness level and market share? Public experts: 5; Private experts: 5.

4. Is it possible the connection between separate waste collection systems, annual waste fee and crowd funding strategy to be set as a new "community-to-community" principal? Public experts: 4.92; Private experts: 4.92.

5. Does the establishment of the SPV provide a synergy and high competitive level? Public experts: 5; Private experts: 5.

6. Is it effective, on a managerial view point, the SPV to be managed by a managerial board with three functional units? Public experts: 4.83; Private experts: 4.83.

Conducting of the analyses

In the current stage are included results from the questionnaire survey as well as the hypothesis analyses. The extracted results from the private experts are in amount to 4.94 and the results from the public experts are in amount to 4.90, hence the hypotheses confirmation give fully positive outcomes. Every one question confirms the postulated hypothesis in chronological terms.

Consequently the final balance assessment is in amount of 4.92, namely the highest level of significant. Hence the creation of the organizational mechanism PPP in waste management business is accepted.

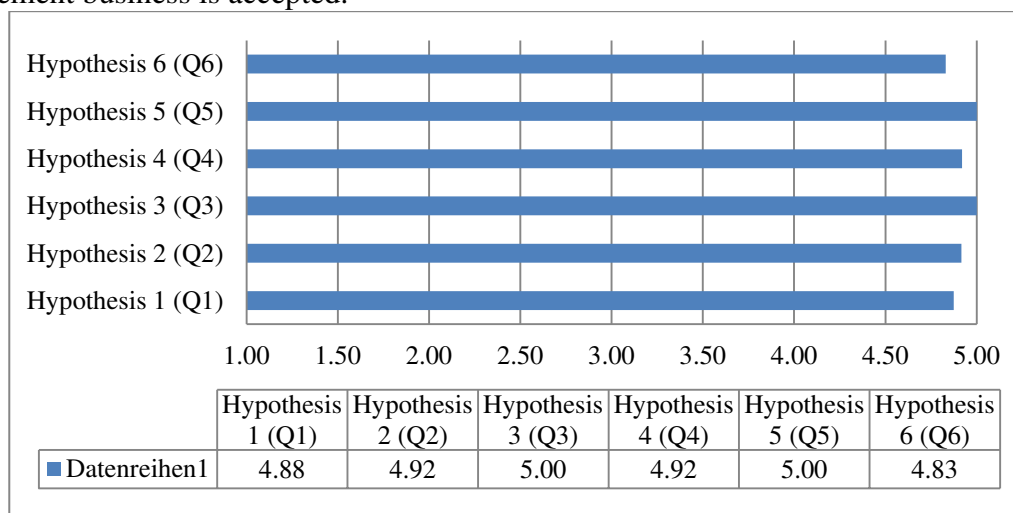


Figure 3.3.11: Common results from public and private sector

Source: created by author

Interpretation of the results

The conducted inquiry scientific research argues the organizational mechanism PPP as well as possibility for competitive development of the "Bulecopack" JSC. The newly invented principle community-to-community possesses high level of business synergy turning the community green thinking into business opportunity inter alia and decreasing of the annual waste fees. Organizational mechanism is a complicated strategic element in the EU economy life and it needs from strictly adherence to consecutive steps, already mentioned above.

The EU future is obligated to take a way in environmentally oriented manufacturing business and the organizational mechanism is the answer for stable and competitive economic sectors. The innovative business partnership between "Bulecopack" JSC and the manufacturing SMEs gives opportunity for sustainable creation of the circular economy in our agenda. The organizational mechanism PPP in waste management business shows us, how the wastes could be managed effectively and to be developed an environmentally based production. The entering of the crowd funding strategy in the SPV establishment leads to inclusion of the society in providing the community services by a modern private business strategy. The innovative principal *community-to-community* possesses a high level of fairness for the society and the manufacturing business.

It also provides sustainability in the creation of the organizational mechanism PPP in waste management business in Bulgaria and European Union, as a whole.

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3.4 DEVELOPMENT OF INNOVATION POLICY OF UKRAINE UNDER STRUCTURAL REFORMS

The main precondition for structural reforms in Ukraine, economic crisis recovery, long term economic growth, social stability, and welfare is a high level of science, technology, and active innovation policy, which includes academic training of scientists, implementation of programs of innovative business cooperation between enterprises and research institutions, active international cooperation in science and technology.

In most countries, policies affecting innovation are usually formed and implemented at the national level. The state innovation policy is primarily focused on social needs of society and thus takes into account the existing potential and the specific institutional structure of the country. According to analysts, in the nearest future the most significant indicator of the prospects for economic and social development of the advanced countries should be achieving innovation policy.

Ukraine has made only the first steps of the state policy in the sphere of innovations: separate institutions of innovation have been announced in technology parks, technology transfer centres, regional innovation centres. Developing its innovative infrastructure the state must take into account that there are national companies that taking as an example experience of the world leaders are able to create their own fully effective organized innovation systems. Big business has more opportunities to implement organizational resources, scientific and technological potential: in the presence of active business environment and the lack of internal systemic crisis corporate structures can be active and develop innovative industrial science. Today, the national economy faced with long-term systemic challenges: economic, political crises, military operations in the East, falling GDP, the decline in industrial production and global trends and internal barriers in the development. In terms of accelerating the pace of globalization, the number of non-technical innovations (organizational, marketing, management) increased, innovations become more accessible (distribution of innovation is initiated by the consumers themselves) "open innovations", technological and social networks created as a result of innovative activities are actively used.

During the present study the author used certain provisions and findings of scientists working in the field of innovation, such as F. Braudel, M. Weber, P. Drucker, and A. Toffler.

Among foreign scholars whose works are of most interest for the development of innovation system, the following names should be mentioned: J. Andrew R. Cowes, D. North, C. Perez, M. Porter, P. Samuelson, R. Solow, K. Freeman, and J. Schumpeter. The significance of their researches is to deepen the fundamental laws of economics, the theoretical and empirical disclosure of the impact of macroeconomic processes on economic growth, which is exclusively associated with innovations.

Economic aspects of formation of Ukrainian national innovation system, the state's and other subjects' role in this process, as well as current and future issues of research, technology and innovation policy in modern Ukraine are investigated in the works of V. Alexandrova, L. Antoniuk, G. Androshchuk, Yu. Bazhal, B. Malyskyi, and L. Fedulova.

Researches of the aforementioned scientists reflect global trends in the development of innovative systems; they do not reflect either peculiarities of national economies or critical aspects. The above requires making appropriate sequence of actions to develop and use appropriate methods and tools of innovation policy, evaluation of possible interaction with other areas of public policy in the context of forming the prerequisites for an innovative model of economic development.

Laws and regulations on the formation and implementation of state innovation policy, statistical data of the Ministry of Finance of Ukraine, Ministry of Economic Development and Trade of Ukraine, the State Statistics Service of Ukraine, the relevant monographs, research papers of domestic and foreign scientists were used in the study of this issue.

In the study of the problem a combination of methods and approaches, allowing

implementation of conceptual integrity of the study were used. Dialectical, systemic and structural techniques were used in disclosing the problem of development of the innovation system of Ukraine in terms of structural reforms. Approaches to the formation and implementation of state regulation of the innovation system were summarized and systematized using comparative and factorial methods.

Innovation policy demonstrates the level of economic development of any country. In Ukraine, where the depreciation of tangible assets of individual enterprises is 80%, and a chronic lack of investment does not allow modernizing production, the innovative policy is declared to be one of the conditions of economic development. The outflow of capital during 2014-2016 (January-April) amounted to over 17.8 billion Euros, outflow of investments during the same period amounted to 12.4 billion Euros [226].

System analysis of revealed trends and development factors allowed us to come to the conclusion that Ukraine is now not able to ensure rapid development of technology and high-tech industries as the parameters of its innovation and technological development have long been outside the boundary intervals. Unfortunately, unequal external economic exchange, dependence on many external factors remains relevant for Ukraine; it is a supplier of natural raw materials and labour for multinational corporations and developed countries that concentrate global intellectual potential. So approved at the legislative level strategic priorities of the state still remain unfulfilled.

The analysis of the dynamics and structure of scientific and technical activity in Ukraine leads us to the conclusion that the companies at present and in the nearest future are not capable of mass highly scientific, technical, technological and innovative activities. In 2016 expenditures on research activities in Ukraine amounted to 0.16% of GDP [226]. Scientific potential of research centres reduced significantly, the volumes of R& D decreased. State enterprises practically do not introduce new technologies; private companies are more focused on the production of raw materials and their export. The current mechanism of regulation of scientific and technical activity of business entities not only avoid promoting expansion of innovative sources of financing for the development, but also prevent the attraction of off-budget funds and eliminate the possibility of forming special funds, including departmental ones and funds for funding research and development projects. Passive position of the entities regarding funding research and development and current state's attitude to the problem are today the main reasons that private sector's spending on research continue to decline.

Only certain elements of the national innovation system are created and run in Ukraine; innovative process cycles are weakly connected with each other, so the impact of scientific and technological activity remains low. One of the reasons for this situation is imperfect legislation and regulatory framework for the creation of high technologies and inadequate funding of the processes of commercialization of the latter.

Ukraine ranks on 7th place among the CIS countries in terms of GDP per capita [225]. According to the State Statistics Service in 2008 at the peak of its growth domestic GDP reached 74.2% of physical volume in 1990; according to forecasts of the Government of Ukraine it had to achieve the level of 1990 in 2015. However, due to the economic crisis in 2014-2015 the domestic GDP in 2015 was only 62.6% of the volume of 1990 [226]. These data make it possible to conclude that during the years of independence Ukraine not only made a breakthrough, but lost its economic potential.

Inconsistency of the state to develop and implement scientific, technological and innovative policies, lack of legislated system of incentives for innovation processes and support of high-tech industries have led to extremely negative structural changes in the economy, namely the decline of high-tech enterprises while strengthening and dominance of low-tech, raw industries. This is caused by lower demand for research and development and actual curtailment of innovation in the industry. Fixing these trends may lead to increased threats to national security, irreversible backlog of Ukraine from developed countries of the world and its transformation into a resource appendage of one or a group of leading countries.

The practice shows that the lack of a systematic approach formed, as well as scientifically based conceptual principles and defined structural goals of public scientific, technological and innovative policy is not offset by the increasing number of laws and regulations, numerous changes and additions to them. In addition, the low executive discipline of ministries and departments, lack of proper control of the executive authorities at all levels have caused significant failure of strategic programs, measures and proposals set out in the recommendations of the committee and parliamentary sessions. All this deepens the crisis of public administration of science and technology in Ukraine, enhances regulation of innovation processes by the state and prospective use of the state budget.

The following problems of formation of innovation policy in Ukraine have been clearly separated under the terms of the economic crisis and structural reforms:

- Violations during the transformational recession in the 90s of the last century of the innovative potential of society, which proved a catastrophic decline in income and, consequently, capital flows of the entities; decline of the development of major scientific and industrial complexes which still have not renewed their potential;
- Absence of effective mechanism for determining national innovation priorities in terms of crisis and structural reforms;
- Lack of developed market of forecasts of technological development, and formation of an excessive range of priorities, particularly in the traditional sectors of economy;
- Lack of adequate funding of basic scientific researches;
- Immaturity (lack of high-tech groups) of the machine-building industries;
- Low level of real incomes, which affects narrowing of the base of credit resources, as well as domestic markets due to low consumption;
- Imperfection of the tax system, including incentives for the implementation of innovations;
- Insufficient development of the infrastructure of financial markets which is not conducive to enhance innovative activities;
- National reforms in the money market, which is manifested in the lack of money supply and high prices of credits;
- Too low monetization of the economy;
- Excessive centralization of the government institutions, which causes reproduction mechanism of corruption on a large scale;
- Lack of an effective strategy of innovative development and construction of the national innovation system;
- Lack of understanding of the economic substance of competition for increasing the proportion of consumers that have a decisive impact on the stock market development and consumption of durables high-tech products;
- Underdevelopment of the stock market;
- Misunderstanding the nature of innovation as a system process that is reflected in the large deformations of tools of its implementation and management, including the use of free economic zones, industrial parks, i.e. the tools of innovative processes management, not to enhance the innovation process, but rather to renew the traditional capital and the whole complex of relationships associated with it.

Directions and ways to improve the state innovation policy

In recent years the world faced significant increase of the role of innovation management of certain interdependent factors, which include the following:

- First, because of the increasing influence of science and technology on economic growth, the environment and human health involving population in the management of R&D becomes more relevant;

- Second, the spread of a «new model of governance» gives a new impetus to the desire for transparency and efficiency in the innovation and research policy;
- Third, the increasingly systemic nature of innovation necessitates coordinated interaction of different types of knowledge and generators of knowledge belonging both to different disciplines and different fields of fundamental and applied research [235].

The "new model of governance" refers to reforms in public sector management (started in the 80s of the twentieth century), aimed at improving its efficiency. This approach is based on the assumption that a greater degree of orientation of the public sector to the market will ensure higher efficiency of public spending and will not have negative consequences for other purposes and policies of the government.

Given the different models of the concept of national innovation systems two approaches to innovation management can be distinguished:

- An advanced approach involves the state's ability to coordinate a large number of direct and indirect measures that affect innovation processes. In this case, the goal is to organize advanced management system so that it could facilitate the interaction and coordination of the various aspects of the innovation potential;
- A narrow approach is to use the possibilities of public services (ministries, agencies) to manage the cycle of development and implementation of policies. In this context, the question arises whether these institutions are provided with sufficient financial, intellectual and other resources to carry out this activity.

Today it became clear that macroeconomic management has exhausted itself, and the only use of fiscal instruments does not allow the country to achieve industrial and economic growth [233]. At the preliminary stage these tools have been effective, but they now require adequate public technology policy.

The essence of this policy is that the state not only simply creates the conditions for companies that make decisions in the market conditions, but rather that priority technologies and technology platforms are determined that are supported by the target method.

In February 2016 at the Economic Forum in Davos, the main attention was paid to the issue of the fourth industrial revolution. Industrial revolution is very necessary for Ukraine to ensure its economic growth.

Ukraine can make an economic breakthrough, completing the industrial revolution, and new forms of financial support for innovative businesses, the gradual formation of a system of tax incentives for innovation can play an important role here. A basic budget system reform and performance-based funding of science, institutionalization of public and private innovation funds, the development of public-private partnerships lays in the plane of financial security.

The development of science is the basis of innovative development. It is important to increase government expenditures on basic science; a system of financial incentives to increase performance of academic institutions should be introduced [220].

However, the reverse processes were held in Ukraine during 2014-2016. Financing of research, development and design works was reduced to a minimum. We cannot give an example of countries where there were similar processes.

During the last two years Ukrainian economy is in a deep crisis. The main reasons for this are entirely dependent on totally imperfect system of national economy management and military operations in the East.

After the economic crisis of 2008-2009 the economy has been successfully developing and nothing provided for economic crisis. An innovative system of Ukraine was successfully developing. The political crisis of 2013-2014 led to the fact that 124 billion dollars were taken from the country, thousands of highly qualified personnel migrated, and military actions in the East began [226].

The claim that the reformers came to power proved false. Reformers created the system of economic management of the country which is not able to realize the opportunities

of economic growth. Instead of forming motives of socially useful economic activities the governmental policy makes businessmen to aim at the appropriation of others' property and the redistribution of the earlier created wealth, but not at manufacturing.

Monopolies and big businesses joined with state and local governments. The main directions of their activity became external borrowing, but not real structural reforms. In the end, it eliminates the possibility of the formation of intellectual management style and, accordingly, the transition to an innovative development path.

In 2014 decline in GDP was 7.6%.

In 2015, GDP decline was 12.6% [227].

The decrease of industrial production in 2014 was 24.6%, in 2015 - 28.2%. The inflation rate in 2014 was 36%; in 2015 - 46%, for three months of 2016 - 32%. The external debt in 2014 amounted to 1 trillion and 200 billion UAH, in 2015 - 1.5 trillion UAH [228].

Almost all industries are unprofitable except agriculture, where in 2015 the growth was 12.6%, but changes to the Tax Code of Ukraine led to a significant deterioration in the agricultural sector [226].

Small-scale agricultural production cannot enter foreign markets and as a result the intermediaries gain all profits without investing a penny of money in the production and processing of agricultural products. This is not about innovation way of development at all.

The International Monetary Fund which is a key creditor of Ukraine dictates the terms and conditions for the Ukrainian economy.

Top managers are often focused on beautiful phrases and aggressive PR, and they forget that policy development is impossible without scientifically grounded decisions, qualified management, responsible and creatively active bureaucracy. The ineffectiveness of the economic management system existing in Ukraine and coordination of bureaucracy are incompatible with the requirements of innovation economy. An innovative economy needs highly qualified and transparent regulation that requires from state officials and managers creativity and conscientious attitude to business [218].

Through structural reforms Ukraine should solve the following main problems:

- Modernization and priority development of Ukrainian economy on the basis of a new technological structure;
- Transition to the society of knowledge;
- EU integration.

A chaos of the market freed from the state regulation has destroyed a lot of effectively working business organizations that produced complex products, such as "Pivdenmash", PA "Antonov" and others, which led to a sharp simplification of economic activity, which grew into simple and short process chains for the production and export of raw materials on the one hand, and import of finished products on the other hand. In terms of technological development, the ability to produce goods with high added value, the complexity of the economy and efficiency the Ukrainian economy was thrown back for decades.

To enter the path of innovative development Ukraine requires to introduce in governance mechanisms a competition and selection of personnel on the basis of objective results achieved by them. Without this there cannot be a competent responsible leadership.

The second step should be modernization of high-tech fields of industry and agricultural complex on the base of forefront technological and competitive ground.

Under this condition the country must have two important strategies: technological re-equipment of the sectors of national industry and innovation development.

As international experience shows a further development of the crisis should be determined by a combination of two processes: the destruction of previous economic structures and the emergence of new ones.

New structures should be of innovative nature [224]. An important step of structural reforms should be creating faster conditions for the growth of new innovative industries.

Prerequisites for entry into a new path of innovation development

To go ahead on the path of innovative development the state should create conditions under which:

- Every company that has capabilities in development of new technologies in the promising areas of economic growth, would receive subsidies for a long-term credit;
- Any R&D team that creates new technologies could get financing on implementation of their projects;
- Researchers working in key areas of formation of a new technological structure, and higher educational institutions that train specialists of the corresponding profile would receive adequate funding for the new implementation of its creative and educational potential;
- Each firm that develops new technologies could receive access to loans for research and development activities and state-regulated markets for their products;
- Consumers would be interested in purchasing new high-tech domestic products;
- Entities would have easy access to scientific and technical information and could see the prospects of their business and in time develop advanced technologies. The key task of the Ukrainian economy is to develop basic industries of a new technological structure and rapid entry of Ukrainian economy into a new long wave of growth. To do this, Ukraine should develop IT technology, biotechnology, based on the achievements of molecular biology and genetic engineering, nanotechnology, artificial intelligence systems, global information networks and integrated high-speed transport systems. The following areas being media of new technological order, which have the main demand for its products, should be added here: space technologies, production of construction materials with desired properties, aviation industry, and solar energy.

The formation of a new technological structure will be accompanied by intellectualization of production, the transition to a continuous innovation process in most industries and continuing education in most professions [230].

Ukraine will make a breakthrough if it makes a shift from mass production economy to a knowledge economy, from consumer society to the development society, on which scientific, technological and intellectual potential will have an important impact, as well as the requirements for quality of life and environmental comfort.

Today readiness for constant changes is the essence of economic innovation behaviour and thinking. To create a really favourable innovation climate in the country and in every organizational formation we require widespread basic knowledge on innovative processes. This increases the level of perception of innovations in the social and economic aspects, providing confidence in the government innovation programs, and motivation of the employees.

The strategy of innovative development of Ukraine is important in terms of structural reforms. The creativity concept, which should be considered as being composed of the idea generation process; the results of the creative process; personality traits of an individual which promote generation of new ideas; environment that promotes new ideas and behaviour plays an important role here. The questions that are now studied in the sphere of creativity are multifaceted: they include search for answers on how one nation can be more creative than the other and could it really be so; how to keep children's desire for creativity and ingenuity in adulthood; why the school system does not develop the innovative thinking outside the box.

A factor of institutional and financial opportunities for innovation summarizes the impact of levers of monetary and fiscal regulation of an innovation sector, and provided effective use it can have a positive impact in the transition from fiscal targeting to stimulus mechanisms of economic growth [235].

State support for innovative activities should be realized in the following areas:

- Identifying long-term strategy of technological development, innovation priorities, and development of innovative programs;
- State's participation in the financing of priority innovation projects;

- Promotion of innovative structures' development such as technology parks, technology incubators, innovation centres, innovation data banks;
- Organization of trainings for innovative managers;
- Promoting international cooperation in the field of innovation and technologies transfer, protection of intellectual property;
- Priority support of innovative activities aimed at final scientific and technical products.

An important difference between Ukraine and the countries of the Organisation for Economic Co-operation and Development (OECD) is a framework of scientific and research sector with is characterized by catchy prevalence of state-owned research institutes and design bureaus. Herewith the number of academic and industrial research institutes is almost two times more than the number of educational research organizations involved in research activities (universities, institutes). For most developed countries inverse relationship is typical, where most of the researches are carried out by educational research organizations and laboratories belonging to private industrial companies.

In Ukraine the bulk of the financing costs for research and development (60% of total expenditures) constitute state budget funds. This figure is the lowest among the countries of the world by 0.16% of GDP [226].

To ensure the effectiveness of innovative development of Ukraine's economy in the future it is necessary to streamline the existing system of laws and supplement it with a number of documents that would regulate and ensure all components of innovation policy: creation of innovative infrastructure, development of technology transfer, venture funding, establishing a national innovation system, development of high-tech manufacturing, integration of science, education and production, innovative regional development; formation of innovation (technological) clusters.

Today only some elements of the national innovation system have been created and are working in Ukraine; innovative process cycles are weakly connected with each other, so the impact of innovation activity remains low.

One of the reasons for this state is imperfect legislation and regulatory framework for the establishment of high technologies and insufficient funding of their commercialization processes.

In terms of structural reforms it is necessary to develop a strategy for socio-economic development, which should consist of the following priorities: economic development on innovation basis; accordingly under the strategy there must be developed a scientific policy, scientific and technological, innovative, innovative and industrial policy, regulating and specifying the course of state in the chosen direction.

In the current environment there should be revived a national innovation system as a set of various institutions which in their interaction can ensure the development and transfer of technologies and create a framework for public policy that affects innovation processes [236].

Only within such a system (NIS) it is possible to build effective system of management of scientific and technological innovation processes (namely the process aimed at obtaining outcomes, but not an activity, which reflects a specific set of functions) [234].

Today, when the world is divided according to the main markets, including high-tech markets, Ukraine faces alternative strategic tasks associated with the opportunities to use their scientific achievements:

- 1) To mobilize existing consumer technologies and revive complete internal market;
- 2) To ensure the implementation of breakthrough technologies and recover lost foreign markets of high technology products;
- 3) To integrate with technical and scientific complexes in the processing chain of the production process.

In this context it is important to determine the main directions of modern public industrial and innovation policy (Figure 3.4.1).

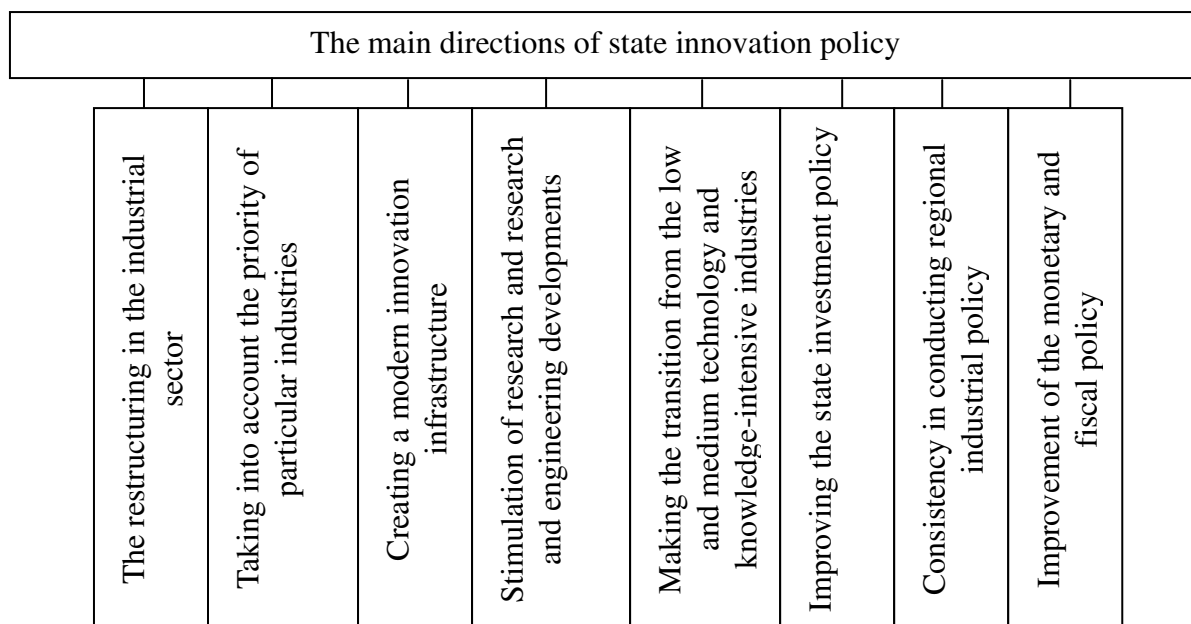


Figure 3.4.1: The main lines of industrial and innovation policy in Ukraine

Source: developed by author

These directions are interrelated and complementary. In particular, the restructuring of the industrial sector is very important for the national economy and involves the development of priority industries, government incentives and high-tech knowledge-intensive production, full and effective use of scientific and technical developments.

For example, it is possible to identify some general trends in the EU countries to address barriers and constraints: creating between departmental agencies that develop policy and monitor its implementation; merger or cooperation of the agencies; implementing systems to coordinate the activities of ministries or institutions responsible for implementation of policies at the national level; implementation of measures in order to make the policy more transparent for those using the results of research and development [221].

In recent years we notice a trend towards the introduction of mechanisms of state-private partnership. The presence of different types of infrastructure services and improvement of their quality in energy supply, water supply, transport, health and education are vital conditions for economic development and decent sustenance of its citizens [219]. Lack of financial funds for public investment in infrastructure necessitates application of a new approach in a public-private partnership in which the state moves away from the traditional role of a single infrastructure services provider.

In this context, in the sphere of innovation activities many countries have built effective mechanisms for public-private partnership, allowing quickly transforming an innovative idea into a product, service or technology [237]. The basis of the infrastructure is the systems for risks division. Chief executive or integrator of an innovative project deals only with production, sales logistics, and the rest is transferred to the outsourcing small high-tech companies. The foundation of public-private partnership in scientific and technological sphere lies in this global trend towards the division of risks and responsibilities between the creators of high technology products. A key component of this partnership is the right of all elements of the innovation chain and continuously created new knowledge (technology).

As defined by the Committee on scientific and technological policy of the Organization for Economic Cooperation and Development, a public-private partnership in scientific, technological and innovative spheres is legally equal contractual relationship for a fixed or indefinite period between the legal entities of public and private sector [237]. Also noteworthy is the following definition: "public-private partnership in the innovation sphere is institutional and organizational alliance between government and business to implement

socially important projects and programs in a wide range of industries and areas of research" [219]. Under the terms of economic crisis and military conflict in the East of Ukraine the state should actively promote public-private partnership, the development of which will allow achieving two goals:

- To transfer of state property to private partner for better management, to attract investments and to perform works (to provide services) with which the private company will cope better than public authorities;
- To support priority sectors of the economy through the private financing of infrastructure or some important projects from the budget funds to increase the investment attractiveness of projects in priority sectors of the economy to private investors and to promote innovation projects.

Studying the realities of domestic governance, we can name the following obstacles to implementing public-private partnership in scientific, technological and innovative sphere: 1) lack of relevant experience of effective cooperation between the state and private business in scientific, technological and innovative sphere; 2) imbalance and imperfection of Ukrainian legislation in all areas of the national economy; 3) different target characteristics of interaction between the scientific and research and business sectors: business orientation on short-term goals, while institutions are more likely to research aimed at obtaining new knowledge. Until we address the issue of public procurements and ensure creation of special government agencies that were able to convert the budget into technologies, so long technological barriers to the commercialization of knowledge will not be eliminated. Therefore, the establishment of foundations for establishment of a public-private partnership in scientific and technological, and innovation and financial support of innovative development of economy is out of the question.

Innovative development cannot be supported by the state budget funds only; basically it should be done by forming a demand for research and development of the non-governmental (private) sector [225]. The partnership of the private and public sectors should be a key component of the new innovation policy of Ukraine, because the right organization of this partnership ensures greater efficiency of investment in public researches, creating favourable conditions for sustainable innovation development, which is a strategic factor of economic growth.

In today's globalized world innovations play a key role and to build an efficient economy Ukraine should develop innovative policy under high competition, which increases in terms of implementation of the integration processes. It becomes obvious that the economy of the country cannot compete either in domestic or in the external environment, if it does not become innovative and thus more effectively responds to new challenges.

World experience shows that to shift the economic system to an innovative path of development, to build the economy based on knowledge and free from export or raw materials dependence, with high dynamics of economic growth, its radical restructuring, further development of energy efficiency and other advanced (breakthrough) technologies, essential increase of the volume of investment in innovation sphere is required [227]. In this context, in terms of general global economic and social challenges the international community defines a set of objectives in the field of sustainable development (OSD). These goals, which are formed by the UN along with a wide range of stakeholders, are designed to step up efforts worldwide through the implementation of specific tasks in the 2015-2030 toward reducing poverty, improving food security, healthcare, education and mitigation of the climate changes, and a number of other tasks in the economic, social and environmental spheres [233].

Ukraine adopted "Strategy of Sustainable Development of Ukraine till 2020", which defines the objectives, directions, and priorities of the country and indicators of achievement of the objectives of development. The goal of reforms is achievement of the European standards of living and decent place of Ukraine in the world. "The Strategy 2020" includes 62

reforms. They include eight reforms and two priority programs. There were defined 25 key indicators of successful development of the country and promotion of energy dependence on Ukraine in the world [228]. The main prerequisite for implementation of the Strategy is a social contract between the government, business, and civil society, where each side has its own area of responsibility. The strategy takes into account the innovative factor, but since 2014 nothing has been done to implement it.

The study found that the problem of formation and development of the national innovation system has a complex systemic nature. It cannot be solved only on the basis of a technocratic approach, but requires a systematic study using methods that are interdisciplinary in their nature, because innovative activities are not only the efforts related to the creation and application of new technological knowledge but also an objective condition of combination of production factors, the subject of which is an entrepreneur (a state, a company or an individual).

Despite numerous studies of theoretical and practical problems of the national innovation system, its individual elements, the national economics has not yet formed a holistic approach to defining the objectives, structure and orientation of the formation and development of the national innovation system from the standpoint of its impact on the stability of the process of economic growth, increasing the country's competitiveness. There are no deeply processed theoretical and methodological guidelines for the development of national innovation system, but a problem of study the effectiveness of newly-created domestic innovation institutions and structures remains.

Most work do not contain systematic study of the socio-economic conditions ensuring the effective functioning of the national innovation system, there is no comprehensive analysis of the relationship of the elements of the national innovation system and recommendations on tools to increase the efficiency of its formation. Finally, the issue of the existence of Ukrainian innovation system still remains controversial: in some studies a national innovation system is considered not as an important tool, but as a goal of innovation policy. Review of existing approaches and theoretical positions allowed us to prove the scientific position according to which the main factors of innovation development are innovation and institutional determinants (human capital, development institutions, administrative resources), which stipulates the need to adapt the existing theoretical models of economic development based on the integration of neoclassical and institutional theory and modern paradigms. Today old mechanisms of economic development are destroyed in Ukraine, so there are real conditions for creation of new mechanisms of enhancement of the process of building a national innovation system and its sub models and reasonable economic development.

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3.5 STATE PROTECTIONISM AS A MODERN ALTERNATIVE TO ECONOMIC LIBERALISM

Nowadays the problem of the heredity of ideas is of great importance. The heredity of ideas can avoid the ignorance of historical experience, in order to optimally share and apply useful thoughts and experiences of the preceding period.

We must not be afraid of the use of previous economic experience and the achievements of economic thought. Efficient application of the early ideas on economics and business will be profitable. Georgia cannot develop unless it follows the way of world civilization.

Not long ago number of economists shared the thesis, the history of philosophy is the repository of wise thoughts, while the history of economic thought is the cemetery of economic ideas. Social changes of the recent decades undermined the second part of the above thesis. The ideas, which were ignored in the past, appeared in a new power in the changed circumstances.

The situation is constantly changing. The economic doctrines, theories and concepts are also changing but the history of economic thought shows that number of economic ideas are never forgotten. Periodically, our life requires applying the early economic ideas in a new way. The goal of the transitional period to seek the ways for achieving the viability of our society is becoming more and more important. Therefore, it is inevitable to apply those economic doctrines, theories and conceptions, which were successfully used in any society in the past.

Along with the above said, it should be noted that the common objectives of economic science at different stages of its development do not imply all the economic doctrines of all the time to be identical. Any economic doctrine or theory is expressed in various form and content in any specific historical conditions. In any historical epoch they acquire some specific features expressed in different form providing different social and economic effect.

Many examples can be cited to illustrate that certain economic ideas appear in a new power and form in different situations. Therefore, in transitional period it is very important to know both old and new economic ideas properly. It allows timely to opt for any model of different possible versions and properly to implement it in contribution to human progress.

In addition, the new doctrines and theories must not be just the repetition of the old. It is necessary to express them in a new way, in modern terms and approaches; it must be an alternative collection of conceptions. It is necessary to identify fundamental aspects in them. Their systemic study and generalization according to modern requirements are necessary.

When the nation forgets its history, then it starts degradation. The history is written by those people who are most of all interested in the present day.

In the transitional period the historical analogies are dangerous, but necessary. Among the ideas expressed earlier there are many acceptable today.

The doctrine of economic liberalism developed in XVII-XVIII century with the contribution of French and English economists (I. Gurnay, A. Smith, D. Ricardo, J.S. Mill, J.B. Say, F. Basiat). Economic protectionism developed earlier in the Western Europe. Its founders were: U. Stafford and T. Man in England; J.B. Colbert and A. Monkretien in France; I. Pososhkov in Russia; A. Amilakhvari and N. Nikoladze in Georgia. In the 20th century the Swedish economists G. Kassel, K. Viksel, and G. Miurdal developed new approaches to state protectionism. The theory of state regulation of economic reached its peak by the British economist J.M. Keynes and the Neokeynesians: E. Hansen, R. Harod, E. Domar, J. Mid, P. Solou and others.

Search for the alternatives in the transitional period

As it is very important for the patient correctly to diagnose the illness, the same way it is very important for crisis-ridden economy correctly to diagnose the problem and to find a

real way out of the situation. This is the only way out for recovering the broken down economy.

The famous Georgian thinker Niko Nikoladze noted that "as there are different remedies for patients, by means of which the illness is progressed or regressed and by means of good care and treatment the patient can recover and live longer, the same way there are found and investigated different means for economics to be used in its bad conditions. There are lots of examples of other nations, who were in the worse difficulties than our society, but managed to escape difficulties quite well gaining remarkable power and wealth afterwards" [238, p. 23-24].

At any stage of economic development, no campaign application of any principle is able to succeed. No model of market system can help our economy if mechanically copied.

Transition of the economy from centralized planning to market system cannot itself solve all economic problems in the country and cannot automatically provide universal well-being. Great deal depends on the type of selected market economy and the model of economic development. "The fundamental principles of market relations are common in a certain way, but the types of market economy functioning in different countries are essentially different" [239, p. 127].

The economic theory knows different models of the market economy. Among them the American, German, Swedish, Japanese, Chinese, Chilean models of economic development as well as the East Asian model of "Tigers" (South Korea, Singapore, Taiwan, Hong Kong) are considered to be standard [240, p. 36].

According to Georgian economist, J. Kakhniashvili, it is necessary to choose an economic model on the ground of theoretically admissible and practically feasible options of economic policy providing the inertia of economic system, on the one hand, and, on the other hand, the existence of real social groups interested in any kind of development [240, p. 40]. Here, the main problem is whether to maintain economic liberalism or protectionism [240, p. 42].

Georgia must take into account the experience of the modern world, but in order to implement the liberal economic policy it is necessary to create certain material and legal basis. Even a cat can defeat a baby lion. The cub needs some time to grow and struggle for existence; otherwise it is fated to die. The same can be said about the current economy of Georgia [240, p. 43].

It is impossible to build and implement a national model of economic development unless a protectionist policy is pursued, which implies to increase tariffs on the import and to provide state subsidies for domestic production in order to protect it. This is the only policy by means of which it is possible to maintain national way of life and to provide reasonable modernization of economy with account of the world practice [240, p. 45].

It can be concluded that economic liberalism, free entrepreneurship and free trade, is good for the developed economy. For strengthening of weak economy the protectionist policy was always used. It was during the initial accumulation of capital when the mercantilist practice was introduced; the same situation was in Germany in the 19th century, where Friedrich List and the representatives of the historical school tried to develop economy by means of protectionist methods. In the 30s of the 20th century the same method was used by Keynesian economists to overcome the Great Depression.

However, it should be noted that neither the use of the old methods alone can provide a good result. In the present circumstances it would be better to use neoclassical synthesis to improve the weak economy [241, pp. 113-114].

We cannot agree with the obsessive statement of some modern politicians and economists about "Pure capitalism" and believe that no transitional period can avoid the multisystem, the mixed economy. To strengthen our position, we recall the words of the famous American economists, P. Samuelson and W. Nordhaus, that even the USA, the win hale modern economic, is developing through mixed economics. It is "mixed economics", where private and public institutions carry out economic control: the private system by means

of the invisible hand of the market mechanism, and the public institutions by means of administrative regulations and tax incentives [242, p. 19].

W. Leontiev considered it wrong to implement the free capitalist economy of American type on the territory of the Commonwealth of the Independent States (CIS). According to him, any attempt of that, undoubtedly, would be in vein. In case of successful transformation (the ideal result in a long run), the mixed economy of European type might become acceptable, where the market mechanism, is based on the competition, but at the same time, it implies a strict control from any system of public and social services, on which a considerable part of the entire national income is spent [243, p. 41].

Referring the example of Japanese positive experience W. Leontiev noted that instead of strict centralized planning we can rely on indicative, orientating industrial planning. The latter can ensure the trouble-free course of the state vessel in the planned route so that personal interests of individuals can perform just the role of the wind [243, p. 41].

The attempt of application of the classical model of capitalism should be considered as archaism. In the present situation the progress can be achieved only by means of the synthesis and development of all the former and current economic relations.

At present, priority should be given to application of the protectionist principle ("nurturing protectionism"), and afterwards, as soon as it is possible, the free entrepreneurship and free trade should be prioritized paving the way for them.

We must develop our economy in a mixed, pluralistic way. We recommend a three-sector model of mixed economy implying the coexistence of the public, private and corporate entrepreneurs [244, pp. 33-34].

Coordination of a part and a whole as the symbiosis of the of protectionism and economic liberalism

Our economy is in crisis, so it is urgent to find the ways of overcoming it. In such a process, the question of coordination of a part and a whole is highly important. The question is: Is everything acceptable to one group of people also acceptable to the whole society?

Modern American economists Paul Samuelson and William Nordhaus noted that in order to see the critical moments better some football fans try to stand up. But if everyone stands up, then it will not be well visible for anyone [242, p. 13].

If all the farmers work hard and the nature also favour the good harvest, then the farmers' gross income may decrease and perhaps it will.

One person seeking a job can solve that problem. If it is difficult for him to get a job, then he must agree on less salary. However, all the job-seekers cannot solve the problem in a similar way.

The raising prices on the products in one sector might yield a profit for those who are engaged in that sector. But if the prices rise equally in every sector, then it will be difficult to yield any profit of it. Some businesses, which cannot even cover its expenses on the whole, might turn out profitable for a company in another way. The objects cannot be considered to be such as they may seem.

In time of the Communist regime the private initiatives were neglected in our country, while they are encouraged today. Unfortunately, it has gained such a scope that is about to overwhelm the whole country. Therefore, today we consider such a model of mixed economy to be the way out, which implies coordination of the private and public, conformation of competition and regulation, symbiosis of protectionism and economic liberalism.

Mechanical application of any model of Economic development is not a way out. Our economy needs meaningful action to recover. The campaign of discussions on the market economy cannot provide the economic climate.

Based on the experience of the world, we find it possible to prevent the chaos and anarchy that might be caused by pursuing the policy of protection of domestic industry and trade. It is the government to take the responsibility for protection. Out of the numerous

models of market economy, application of the model of social market economy would be fine for us. At the current stage predominantly the state should take the burden of the social security.

It does not matter what colour the cat is as long as it catches mice, said the Chinese Den Xiaoping, who encouraged the society against the ideological dogmas. Another Chinese Chen Yun is the author of the other metaphor: "Let the bird fly, but in the cage". The bird is the economy, in this case, and the cage the state control. There is not a big difference between these two views of these two Chinese public figures. Chen Yun hinted just to the great cage, while Den Xiaoping was not against releasing the bird from the cage either.

Government care for low-income groups of the population is not only the humane act; rather it is necessary for reproduction of the labor force. To ignore this fact will lead to new problems in the future. After all, this will lead to the curtailment of the consumer market, which, in its turn, will become an obstruction to the development of economy.

It is necessary of overcome the vicious circle. It is necessary to form a domestic market in order to develop industry. And in order to develop a domestic market jobs should be created and, accordingly, the incomes provided. At the current stage it is the government to make the breakthrough in the circle.

The future development of the mixed economy will necessarily put on the agenda the question of coordination of private and corporate ownership. Gradually the individual property and generalization of individual private interests will become the objective necessity. The famous American economist Thorstein Veblen considered the origin of the absent property to be the fundamental novelty in social development. He considered it to be the corporative stock ownership, which would reform the capitalist society. It was, in his opinion, the final verdict for this society. Such property should become the most important capitalist institution, which allows a businessman to use the facilities of the others on the basis of his own small capital and the working classes will get accustomed with their conditions, since it will be quite better. In this context, the question of the micro- and macro-economy will become topical in a new force. In this respect, significant progress is achieved in many countries in the world. Especially interesting are the achievements of the Japanese corporate capitalism and Sweden corporate "socialism".

In modern highly developed economy, corporations have become the main form of capitalist enterprises. Corporations occupy key positions in all the fields of the US economy with 98% of the revenue of the whole processing industry in the US industry, 93% of the revenue of transport and communications and 70% of the revenue of internal trade.

The necessity of state protectionism: The result of the market imperfection and the policy of "Visible Hand"

The famous British politician Winston Churchill noted that free economy is a bad imperfect economy, but the other systems are worse.

Over the period between the Great Depression of 1929-1933 and the 1960s the world's politicians and economists realized that in many cases the free market economy, the world's richest economy, might be unable to satisfy some of the major social needs.

In the past, the periodic chronic unemployment also caused suffer against the economics, sometimes it caused serious suffer. During the Great Depression the unemployment rate reached 25%. The US national production dropped by 30% compared to the peak of 1929 [245, p. 12]. Great Depression highlighted the previous problems existing for a long time in a less acute form.

Over the last 60 years the economic role of the state has significantly increased. In modern time, some economists consider the problem of the public sector to be the most important topic of the economic theory. Health care, defence, education, social security, well-being, tax reform; all of these deserve permanent attention, said Professor J. Stiglitz, Princeton University, the USA [245, pp. 6-7]. According to him, our life, from birth to death,

is subjected to multiple effects of state activity. In a mixed economy a part of economic activities is carried out by private firms, while the other part by the state. Besides, the state changes the orientation of behavior by means of different regulations, taxes and subsidies. The government regulation of the economy causes significant consequences in production, employment, labor productivity, price levels and allotment of resources [246, p. 254].

The market economy is incomplete in the transformation period. It is far from the attributed harmony and ability of regulating everything.

Market system has many shortcomings, which were severely and negatively revealed in economy both qualitatively and quantitatively. The characteristic feature of market system is saturation and it is strictly oriented to satisfaction of the demands of a certain group of buyers.

It is characterized by flexible and adaptive production, which is capable to respond to the most difficult demands of consumers, on the one hand, and, on the other hand, it cannot cope with the vital problems arising in the society.

The mentioned problem objectively conditions the particular importance of the state interference in the market system, which might be of as follows:

Since the international economic relations are increasing there might be necessary such a great capital investment that is not available even in the largest manufactories. Besides, there are some businesses that cannot be entrusted to private companies. Therefore, it is upon the state to interfere.

In order to eliminate monopolisation the state must adopt an antitrust legislation and carry out antimonopoly regulation.

Cyclical development of market economy may cause social and economic tensions. It is upon the government to stabilize the situation.

The state must be able to pursue economical domestic and foreign policy so that not to be dependent on the other strong economies. It should have its own production. In this way the state will become the subject of the economy.

The population growth and urbanization seriously aggravates the environmental problems. Along with the production and consumption of a large amount of wealth pollution of air, water and soil is also increasing. In order to avoid ecological disaster, the state should be on the watch of the ecology of the country and avoid environment pollution. Nowadays, the government and its bodies in the civilized countries play an active part in economic regulation of exploitation of the nature [247, p. 500]. Active policy of environmental protection is also carried out in the developing countries throughout the world [247, p. 502].

The state should be concerning about the problems of egalitarianism. In the mid-60s of the 20th century the programs for reduction of poverty and income inequality were widely spread in developed countries, primarily in the United States. In particular, they include the development of the state programs for social insurance, unemployment allowances, social security, free medical services, food coupons, public housing. At the beginning of the 90s the United States spent 12% of the national production on such programs [245, p. 260].

The government should adopt a flexible customs policy. It is necessary to introduce low duties on the export of the finished products. Meanwhile, high tariffs and quotas should be imposed on such a kind of imported goods, which have the alternatives in the country. Instead, the duties on the import of raw materials should be low. This will stimulate domestic production.

In transitional economy, the state role must be greater, as the market mechanism is not yet fully formed and developed. The market is an insensitive, indifferent mechanism; it has no conscience at all and does not recognize the moral norms causing the income inequality [248, p. 279]. Since the free market is just a theoretical construction, in conditions of ideal market the market equality is such an ideal situation the state regulation should be aspiring to [249, p. 8]. The economic policy selected and implemented by the "visible hand" of the state is very important for achieving the market equality [249, p. 20].

According to the great majority of economists, we are in transitional conditions moving from centralized economy to market economy. We have a long way to go ahead to the developed market economy or civilized market.

We are beginning to go from the totalitarian to the market economy and then to the mixed economy. Transient to the market economy cannot be the final stage because the market is a form, the system of economy rather than the economic system [250, p. 314].

"Market economy", says a Georgian economist A. Kuratashvili "is not the name of a social order. However, in this case, the transition to the market economy implies transition to the capitalism, which is "coloured" with the words: market economy and democracy [251, p. 38]. In order to really move to the market economy, it is necessary, above all, to develop a balanced economy, because the market is always certain equilibrium, the system of public relations. However, this is just the beginning. Modern market is not beginning there, where the balance exists, but where the market drives economy, where the market mechanism makes the economy to develop. It requires increasing efficiency, reducing costs, reproduce, and achieve technological progress.

The market mechanism by its peculiar incentives is just a certain engine, a driving force in economic progress. The most difficult task in transition to the market it is the transformation of the market mechanism into a driving force for economic progress. The modern developed countries have a mixed economy, moreover, a multisystem transitional economy transformable into a market model. Along the emerging market forms the state sector should have an important place in its structure.

When the market mechanism is not effective the state interference is necessary. The state should always create the overall climate to function the economy; it determines the "rules of the game" for economic agents in any system of economy.

Participation of the state in economic life is conditioned by market volatility. It comes from the market imperfection, from its inability to successfully cope with all the problems of socio-economic development.

In transitional economy the state should be on a higher level, as the market mechanism has not completely formed and developed yet [252].

The State sets the rules of action. It is responsible for efficiency, justice and stability. The efficiency of the state activity implies to "improve" the market mistakes, such as, for instance, the monopoly. With regard to justice, the national programs provide distribution of income in favour of the poor and the poorest. According to American economists A. Samuelson and T. Nordhaus, the stabilizing policy implies to regulate the business cycle, to prevent unemployment and inflation, to support economic growth [242, p. 22].

American economist Harry Rosen indicates that the US economy, which we believe to be capitalist, more precisely can be described as mixed. This can be explained by the fact that in spite of the personal freedom of choice, there are also many laws and regulations in connection with a business [253, p. 13].

The theory of mixed economy focuses on state protectionism. The role of protectionism was repeatedly outlined in conditions of the global economic downturn starting in 2008. The governments of the leading capitalist states try to help the areas subjected to the crisis. They give them the subsidies. The US government allocated 747 billion US dollars to them. They were forced to apply to less popular protectionism. When they overcome the crisis they will return to liberalism again. The role of the state protectionism has significantly increased in transition to the market economy. It promotes the economic self-security independence of the young sovereign states.

Under the present-day conditions, the cosmopolitan theory based on free trade is increasingly losing its advocates. The principles of self-security and self-satisfaction are in the first place. Moreover, the pace of economic growth is not always caused by the open national economy. Such a pace in most cases does not depend on the exports and national industrial progress. Only some industrial countries can benefit from such relations.

The principle of self-security and self-regulation requires to use own resources to produce those products that we need and that we can produce; consume the product that you produce; take the path to the domestic development leading to national progress according to national culture [254, pp. 29-30].

We can add to the above idea that local procession of the resources and the export of the finished products will be economically profitable. Instead of exporting the timber we can locally produced wood products (parquet flooring, woodworks, etc.). Instead of exporting the scrap metal some products of metallurgy or other metal products can be produced and exported. In this process, one of the positive results will be the increase of employment, which is so painful for our country.

Sustainable economy does not mean for any nation to become insular; rather it means optimally to use comparative advantages on the basis of sustainable economy. Sustainable economy should satisfy the demands of the nation so that not to cause the risk to the existence of future generations by leaving their devastated nature and economic resources. Actually, there is no sustainable model in the world today. The air pollution is not controlled. There is a danger of drastic global pollution of environment [255, pp. 29-30].

The harmonious coordination of the relative advantage principle and the sustainable economic protectionism is possible by application of the state protectionism only. Of course, such protectionism will be mercantilist at the beginning. It is not surprising that the 20th century intellectual giant J.M. Keynes advocated the national policy of the mercantilists, their economic nationalism and the position of the state's active economic role [254, p. 3].

Overcoming the economic backwardness of the developing and transitional countries is closely linked with strengthening the economic role of the state, in particular, with implementation of long-term development program. The limited resources, their productive use, inevitably require the government participation in building of the economy.

In the process of creation of the mixed model of modern market economy the state has become an active subject of economic activity. In addition, it has not lost the status of the political institute with all its attributes. The new status is significantly limited by the market mechanisms of the economic regulation, which does not mean the restriction of the state within the action of the objective economic laws. Its intervention in the economy is possible so that to confirm those laws and responds to them.

On the whole, the object of the state regulation is the national economy. It becomes the factor, which can raise the country's economic potential, the premise of welfare for all the strata of population, on the one hand, and, on the other hand, for strengthening its position in the world economy.

In modern market economy, the problem to be solved by the state is to prevent or, at least, reduce the negative impact of the development and functioning of the market economy. The case concerns the periodical downturn of production, accompanied by the unemployment increase, inflation increase, and aggravation of social conflicts. This situation leads to objective necessity of macroeconomic regulation of economic processes; anti-recessionary regulation of the economy by means of the financial, monetary, customs, investment and other policies for mitigation of the cyclical fluctuations and releasing the production down-turn [256, pp. 137-138].

In modern market economy among the variety of forms of ownership the state property has also a part.

Within the State sector the state is the owner of the means of production performing the functions relevant to the status of the owner: it organizes the process of reproduction, runs it, hires the professional managers, and carries out appropriation of the manufactured product and its use for public interests.

Although the state property privatization has substantially reduced the public sector, it has not been absolutely minimized. The state property is reduced in such areas, where the private sector provides a higher level of efficiency. However, in conditions of creating the

modern model of market economy the state property has the right to exist. The government entrepreneurship represents an objective condition for functioning of a modern market. Today, in Switzerland 35% of ownership falls on the state sector. In China it is more than 40% providing a high level of employment with more than 800 million people employed. In this case, the important role has the cooperative sector.

A large-scale cooperative movement is widespread in Sweden. In Sweden, 50% of the self-employed population is involved in cooperatives. In Israel the agricultural cooperatives play the basic role in agriculture. At the same time, there, the collective communities (kibbutz) do industrial activities serving the tourists.

When the state has nothing to do with the economic subjects and it is the market to solve everything, then it is not liberalism, rather it is a pseudo-liberalism because liberalism implies equality of the economic subjects.

Georgian thinkers about the state protectionism and economic liberalism

At the end of the 19th century and at the beginning of the 20th century Georgian thinkers began to discuss the issues of economic protectionism and liberalism.

The advocates of the economic liberalism were the Georgian thinkers: P. Umikashvili, Al. Tsereteli, Yv. Rostomashvili and others.

The advocates of the state protectionism of economy were the publishers of the journal "Droeba-Krebuli": N. Nikoladze, S. Meskhi, G. Tsereteli and others. They considered the government led by intelligent people to have a special role in prevention of the anarchy and monopoly in production. Only the desire and the power are not enough. There are the phenomena the wise people know. The nation must realize these phenomena and use them. If the country is not in the hands of the mentally and morally worthy people, it will fall into great trouble. Such a situation will not occur when the economy is led by the personalities gifted with radical state wisdom [260, p. 213].

It should also be noted that in the second half of the 19th century and at the beginning of the 20th century among the Georgian economic thinkers Ilia Chavchavadze and Niko Nikoladze had a special role.

Ilia Chavchavadze on the state protectionism and economic liberalism

Ilia Chavchavadze played the largest role in the spiritual advancement and moral development of the Georgian people. He shared the sorrow and joy of everyday life of his native people. From the second half of the 19th century until the beginning of the 20th century Ilia Chavchavadze was actively involved in solution of any major problems in any area of life of Georgian people, their past, present and future [261, pp. 6-7].

In his article "Customs policy in Europe, and free trade and protectionism" published in 1887 I. Chavchavadze noted that in that period "all the newspapers and journals with no exception wrote about free trade or protectionism, all the publicists with no exception advised this or that system to the Government" [262, p. 317].

In the above-mentioned article I. Chavchavadze expresses sympathy with free trade and notes that this doctrine began in Europe with the effort of the famous English economist Adam Smith. At first, the doctrine troubled the ruling class, who preferred the old trouble to the new joy, but they could not do anything to Adam Smith's theory.

In those days, the whole of Europe welcomed the theory as a victory of liberalism. The advocates of the doctrine appeared not only in England, but in France too. Some well-known or less-known scientists were for the doctrine, for example, Bastia, Chevalier and others. The doctrine became so popular that it was accepted even by the international legislation.

I. Chavchavadze believed that introduction of protectionism in Europe was linked to the Franco-German war of the early 70s of the 19th century. German Chancellor of that day Otto Bismarck, who supported the free trade before, rejected this system to spite France. Bismarck addressed German customs laws to protectionism and by means of duties prevented

circulation of French goods in Germany. According to I. Chavchavadze, thanks to O. Bismarck the Europe forgot the benefit of free trade. Previously rejected system of protectionism emerged again, the system which was gladly overthrown forty years ago.

I cannot agree with I. Chavchavadze with that as if the protectionist policy of O. Bismarck was conditioned only by resistance to France. The protectionist policy of O. Bismarck was based on the statement of Friedrich List and the theorists of historical school about the necessary application of 'nurturing' protectionism for development of capitalism in Germany.

At initial stage of capital accumulation the protectionist policy was used even in England that limited every action of the merchants arrived in the country from the continent. Active protectionist policy was also carried out in France led by the Minister of Finance Colbert in the second half of the 17th century. In both countries, where the protective measures contributed to capitalist manufactures to be set up and developed, they became the production and trade-binding trusses. Logically, it was followed by liberation from those trusses and transition to free competition. I. Chavchavadze's fear that by that time the German protectionism would defeat free trade did not come true in Europe. In the 70-80s of the 19th century a powerful neoclassical school was formed in Europe by C. Menger, L. Walras and A. Marshall, who revived the doctrine of economic liberalism.

Moreover, when in Germany the protectionist measures did the nurturing mission and contributed to the German capitalism to develop, there too it became necessary to change protectionism by liberalism. In the 40s of the 20th century a powerful neoliberal direction was launched, which reached the worldwide scales in the 80s.

In his article I. Chavchavadze focuses on trade restrictions, but also discusses the issue of industrial protectionism. He pointed out that "protectionism comes from the necessity to liberate the domestic product from the competitors in the domestic market and thereby to support the liberated industry to develop in order to add to its nation one more source of earning wealth; protectionism is the advocacy, because it advocates the domestic industry and promotes its existence and strength" [262, p. 320].

Yet, I. Chavchavadze recognized the revival of protectionism in that period and said: "Well, today we see the strong protectionism almost everywhere" [262, p. 323].

I. Chavchavadze's version that the import of foreign goods would reduce the prices in the market was a generous idea, but we should not forget that the industry developing as a result of protectionist policy will create new jobs and reduce unemployment; the workers will have buying power to go to market and thereby the market will expand. In modern conditions the unpaid people cannot even buy cheap goods.

Generally, it should be said that, as Professor G. Todua notes, I. Chavchavadze exaggerated the role of the law of free trade to some extent [261, p. 214].

It should be said that if in the above said article I. Chavchavadze advocates liberalism in discussion about Mr. Meisner's project he supports the protection of domestic production from increasing foreign capital.

German businessman Meisner submitted two projects to the vice-regent of the Caucasus of that time. He wanted to establish two joint-stock companies: the first "Wine-making, wine trade and vodka-distillation in the Caucasus", and the second "Gardening and horticulture". The vicegerent gave those projects to the agricultural community.

For development of those fields Meisner suggested money in the amount of two million and a half. Those letters were discussed at the agricultural community meeting. In December 1882, in his domestic report I. Chavchavad made a long comment about the discussion with the title "Mr. Meisner's project" [263, pp. 195-230].

I. Chavchavadze concluded that: "Money alone does not mean anything when the goods are not reproduced" [263, p. 217].

Against those two million and a half that Meisner promised Ilia Chavchavadze recalls the following example: "Prussia took away five billion Reichsmark in pure gold from France,

but such a huge amount of money did not enrich Prussia, on the contrary, it happened so that its residents began immigration from Prussia immediately after that, because the life was exhausted" [263, p. 230]. Ilia Chavchavadze concluded: "Thus, whatever to say about Mr. Meisner's project, whatever promises or perception to discuss, we can see that there is no benefit in it for us rather the harm". The same said the agricultural community of Caucasus and finally rejected the project [263, p. 230].

There is one important point worth paying attention: if in the article "Customs policy in Europe, and free trade and protectionism" Ilia Chavchavadze advocated free trade in general, in the above discussion, on the contrary, he is against free trade and protects domestic production that is nothing more than protectionism.

Niko Nikoladze the flagman of the state protectionism

In the second half of the 19th century and at the beginning of the 20th century among the Georgian public figures Niko Nikoladze had a special place. His work goes beyond the borders of Georgia and Russia. He wrote in English, Russian, French and German languages.

Among Niko Nikoladze's view-points national protectionism has an important place.

First of all, Niko Nikoladze considered the state's role in reorganization of the ownership Institute. He noted that indisputably, it was an issue of national importance to give lands into ownership to them who needs it as their main mean of production and solution of that problem cannot be entrusted to private individuals. It is the state's responsibility and competence. So he called for the transition of land ownership in the hands of the State Farmers, who had the opportunity and the ability to regulate this problem in a satisfactory manner.

In solution of these issues Niko Nikoladze fought against liberalism and showed its wrong sides. For him liberalism meant servility to the existing injustice and toleration of the abnormality of life. According to Niko Nikoladze, economic liberalism cannot fight for the renewal of life and improvement of the economic, cultural and moral life of people. As he said, liberals' phrases are far from the reasonable action.

Development of industry, factories, organization of mining industry, building of railway, domestic and foreign trade regulation, connection of banks twitch trade and industry, capitalistic development of agricultural life were the key issues that Niko Nikoladze believed to be possible through state interfere in the economy.

According to Niko Nikoladze, Georgian community and organizations should pay special attention to the development of the national capital in Georgia. In this regard, he considered introduction of the protection system and by means of it to protect young Georgian industry from foreign influence as principal the way [264].

Niko Nikoladze repeatedly warned the public that "free trade" could bring bad results to our country without active involvement of the governing bodies in economic life.

But, according to Niko, only the protection system cannot revive our economy. In his article "The European Life" he draws attention to the view point of one of the French publicists, who noted that since 1848 the French society look like the cowardly frightened crowd, who went to the prison to save their lives and property, but then they emboldened so that decided to revolt against the prison warder threatening him to burn the entire prison unless the prison gate was opened on time [265, p. 284].

Obviously, each one in the crowd gradually came up with the idea: "the warder too often interferes in our affairs and restricts our personal freedom" [265, p. 284]. "Because of such a spirit dominating in the French society, said Niko Nikoladze, France was preoccupied by a theory declaring laissez faire and enormous personal freedom of individual members of the society. Niko Nikoladze considered the famous French economists' Jean-Baptiste Say and Pierre Joseph Prudon to be the founders of that theory [265, p. 285].

As is seen, in one case, Niko Nikoladze supports protectionism, while in the other case economic liberalism. At the same time, he notes that: "There is nothing in the world to be

useful and good in every sense, or totally bad and mal-efficient. It depends on the person and circumstances how the object is used. For example, a knife can be useful in the house but it can also be used for killing a person" [266, p. 25]. In some cases Niko Nikoladze supported economic liberalism, but understood that protectionism was also necessary and indicated that Prince Bismarck was considered to be the genius political figure, who managed to unify German, i.e. he managed to exercise such a combination that was considered to be an impossible romantic fantasy before. Yet this was not a novel in politics.

As is known, after the nurturing protectionism played its role in Germany, German economists and public figures opened the way to economic liberalism.

After World War II a powerful process of development of economic liberalism, which is known under the name of neo-ordoliberalism, began in Germany. As we can see, Ilia Chavchavadze and Niko Nikoladze supported protectionism at first when it was necessary, and just after that they recognized the progressive economic liberalism. This is a logical move, the dialectical negation.

Since our present reality repeats that period, it is necessary to take into account the lessons of development of capitalism in Georgia in the second half of the 19th century and at the beginning of the 20th century. We must borrow the economic ideas from our prominent predecessors to light our way.

Today the economic liberalism and the automatic mechanism of market cannot itself solve our problems. In extreme cases, the market economy cannot recover a proper balance and economic growth. In such a situation the protectionist model of economic regulation should be primarily used. Moreover, there is a great experience of that in the world. Given this experience, we recommend to carry out a mobile economic policy, when it is necessary to use protectionist principle together with the economic liberalism. After that it will be possible to pave the way for free entrepreneurship and free trade.

Today an important part of our society are longing for the economic conditions of life of foreign countries, but everyone should understand that a strong economy can be developed just by hard work and good organization of production. However, it should be noted that creation of proper working conditions and stimulation are also necessary. If appropriate conditions are provided, then it will be possible to share the experience of advanced foreign experience, attract foreign capital, create joint ventures, etc. In order to share foreign experience, it is advisable to invite experienced entrepreneurs and managers providing them with proper conditions of work and stimuli.

Also, the problem of efficient use of the credits borrowed from foreign banks and investors is worth noting. The credits must be mainly used for production development; otherwise it will cause trouble for population. Ultimately, they will carry the burden of the loan repayment and paying the interest.

Conclusion

1. Among the theoretical problems of transitional economy we consider the increase of the economic role of the state to be the priority; we proved that it is necessary to use the state protectionism for solving the problems of the transitional period; we point out, that the state should regulate the distribution of the material wealth, especially its redistribution; it should provide equality of people against law and their economic freedom.

2. We consider formation of the mixed multi-structural economy and its progress to civilized market to be the real way for overcoming the problems in transitional period.

3. The goal of the paper is to prove the alternative possibility of application of the state protectionism together with the economic liberalism in the transitional period and its primate significance in conditions of capital accumulation.

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3.6 CADASTRE APPRAISAL OF LAND AND THE PECULIARITIES OF CONDUCTING IT IN THE REPUBLIC OF BELARUS

This research deals with the topic of cadastre appraisal of land in the municipalities of the Republic of Belarus. It covers the following sub-topics: the structure of the State Cadastre, the procedure of cadastre appraisal of land, public cadastre map. It also analyzes the ways the cadastre appraisal of land is being used in the country. The authors provide the data on the cadastre value of land in the capital city of Minsk as well as in the city of Lahoysk (Minsk region). They also describe the pilot project "Mass formation and the cadastre appraisal of real estate on the territory of particular provinces of the Republic of Belarus".

Land, being one of the production factors, serves as the basis of all the interactions of a society in areas such as political, economic, social, production, communal, ecology and others. Land has a value, an accurate appraisal of which is a critical precondition for a sustainable functioning of an economy. Land is also a resource, limited in quantity and thus one that is fated to grow in value, especially in the long-term perspective.

The need to receive accurate data on the value of land and land plots is shared both by the various state bodies that deal with management of land resources, urban development, providing land and tax policy and the private land market players. Individual and mass land appraisal mechanisms are utilized for this purpose all over the world. While the individual land appraisal provides the value of particular objects, the mass land appraisal covers all the land in a country. Hence, the mass land (cadastre) appraisal fully provides all the market players with the information on land value.

Currently, the cadastre appraisal in Belarus is widely used for different purposes. Taxation happens to be most important kind of purpose of the usage of cadastre appraisal results. It is also important to understand that taxation serves as one of the principal sources of state budget formation in Belarus. Cadastre appraisal is conducted by highly qualified staff and the appraisal results are then confirmed by the local executive committees while the cadastre values of land plots go to the Value Registry of the State Cadastre.

What makes cadastre appraisal a topic of broad and current interest is the fact that accurate and balanced appraisal of land can enable the creation of the economic triggers needed to alter the current system of land usage and related taxation; and that, in turn, can help optimize the living conditions of people and bring about a more robust development of the country.

Cadastre land appraisal is an integral part of the State Land Cadastre, which, in turn, at the same time, it is part of the overall appraisal of the natural resources, used in the national economy. Providing data to the state bodies' responsible land property management and related taxation is the prime goal of cadastre land appraisal. Thus, for the purpose of better understanding of the national market for real estate, analysis of the system of mass appraisal of land should only be done considering its interdependence with other elements of the land cadastre.

Historically the State Land Cadastre was established when the need for accurate data on land, as a prime source of material wealth and a subject to taxation had evolved. The development of the relations within the society and the emergence of various forms of property have caused the evolution of the term *cadastre* itself. In its narrow definition a cadastre is a book on land plots taxation. The wider definition though implies a system of instructions for accounting, description and appraisal of land, conducted by the government with a purpose of obtaining data needed for land ownership taxation; in other words, it is an action by the state [267, p. 15].

As of today, **State Land Cadastre** is understood as a collection of systematized accounts and documents on the legal regime, state, quality, distribution status, for-profit or other usage of land and land plots (according to the Article 1 of the Code on Land of the Republic of Belarus) [268].

In the IT context, Land Cadastre can be viewed as a regularly updated data-base that contains accounts of legal, economic and aerial characteristics of land plots, as well as the coordinate, area and type of land etc. formed with the data on prime, legally homogeneous land plots.

The Code on Land happens to serve as the legal basis for the State Land Cadastre in the Republic of Belarus. The code defines the structure of the cadastre. Currently the cadastre consists of the single registry of administrative-territorial and territorial units of the Republic of Belarus, single state registry of real estate, its ownership and related transactions, of the registry of streets' and roads' names, of the registry of prices of land plots and of the registry of value of land plots of the Republic of Belarus.

Let us take a closer look at the State Land Cadastre of the Republic of Belarus. The single registry of administrative-territorial and territorial units (later on ATU and TU) of the Republic of Belarus includes records of names, size and borders of the administrative-territorial, the territorial units and their respective administrative centres [268, 269, 270]. As of beginning of 2015, the registry contained data on 28,000 objects [270]. Data on an object includes:

- unique registry number of the object;
- code of the object according to the classification "System of identification of objects of administrative-territorial division and of the municipalities";
- name of the object;
- name of the administrative centre of the object;
- category and administrative subordination of the object.

The single state registry of real estate, its ownership and related transactions (later on SSRRE) contains records and documents on registered land plots and real estate objects that are stationed on those land (including records of location of the land plots, their borders, authorization of usage type, property right, limits of the property right, easement (non-possessory right of usage) and of related transactions. The processing of the registry is executed according to the legislation on state registration of real estate, its ownership and related transactions. As of beginning of 2015, the registry contained data on 5,260,000 objects of real estate [270], including:

- 1,460,000 land plots;
- 1,780,000 buildings;
- 2,020,000 isolated apartments.

Data on the objects includes:

- Cadastre (for the land plots) or inventory (for the buildings and apartments) registration number of an object;
- address of an object;
- authorization of usage type;
- main characteristics of an object;
- records of property right and limits to property right for an object;
- records of property right holder(s);
- records of related transactions of an object;
- records of the documents that the registration of an object, property right and limitation to property right was based on.

The registry of streets contains data on the elements of the streets / roads network of the municipalities of the Republic of Belarus. As of beginning of 2015, it included data on 74,000 elements of the streets/roads network [270].

Data on the elements of the streets/roads network includes:

- unique number of the municipality that the element of the streets / roads network is situated in (according to the registry of ATU and TU);
- name of the element of the streets / roads network;

- type of the element of the streets / roads network (street, boulevard, alley etc.)

The data from the registry of streets is used during the insertion of the addresses of the real estate objects to the Single State Registry of Real Estate.

The registry of prices of the land plots (later on RP) includes records of prices of land plots and real estate objects, stationed on those land plots, as recorded during the last transaction related to the land plot or the real estate object on it. As of beginning of 2015, the registry contained data on 1,120,000 transactions [270], including:

- 54,500 transactions with land plots;
- 371,900 transactions with buildings;
- 638,600 transactions with apartments.

Data on transactions includes:

- address of the real estate object;
- main characteristics of the real estate object;
- date of the transaction;
- monetary value of the transaction.

The registry of value of land plots (later on RV) contains records of cadastre monetary value of land plots, identified during the cadastre appraisal procedure. As of beginning of 2015, the registry contained data on the cadastre value of land of [270]:

- 200 cities;
- 24,000 villages;
- 4,700 gardener societies.

The registry contains data on cadastre value of land plots and of price of 1m² of land in the appraisal zones of municipalities.

Thus, the registry of ATU and TU, SSRRE, RP and RV happen to be the prime sources of data, needed for handling of the cadastre appraisal. After the cadastre appraisal is completed and the local executive power bodies verify and confirm its results the data on cadastre value of land plots are inserted into the RV.

The way cadastre appraisal works is that on a given day a considerable number of land plots undergoes appraisal. Appraisal zoning is applied to land (i.e. land is being divided into zones and in each zone land value is approximately the same). For the cadastre appraisal the monetary values of transactions with real estate are studied; tendencies of price fluctuation, variations of demand and supply of real estate; conditions of transactions, options of financing; for how long objects had been on sale; the level of renting price in the market, conditions for signing rental agreements etc. [271].

The following types of land and land plots are subject to cadastre appraisal in the Republic of Belarus [272]:

- 1) municipalities;
- 2) villages;
- 3) gardener societies;
- 4) land that is situated outside the boundaries of municipalities or gardener societies.

During the cadastre appraisal lands of municipalities, villages, those situated outside the boundaries of municipalities as well as lands belonging to gardener societies are subject to separate appraisal according to each of the following types of authorization of usage (types of appraisal zones) [272]:

- 1) residential multi apartment zone;
- 2) residential gardener type (including gardener societies);
- 3) industrial zone;
- 4) business (office) zone;
- 5) recreational zone.

Hence, five cadastre values are calculated for each of the zones.

Before January 2015, right to order a cadastre appraisal was enjoyed provincial, city and regional executive committees as well as the State Committee on property (later on SCP)

of the Republic of Belarus. The amendments to the Code on the Land were introduced on January 9, 2015: since then the right to order a cadastre appraisal was limited to the SCP [273].

Since August 7, 2015 a new Instruction for the order of conduct of cadastre appraisal was enacted. It was adopted with an edict of SCP № 27 on June 26, 2015. According to the Instruction, a cadastre appraisal is conducted following an initiative from SCP and must take place at least **every 4 years** (according to the authorization of usage types). The required frequency was at least every 5 years before. Cadastre appraisal result in cadastre values of land, land plots that are calculated according to the agreed upon models of appraisal in Belarusian Rubles and US dollars (currency gets converted according to the official exchange rate, published by the National Bank of the Republic of Belarus on the day of the cadastre land appraisal). An agreement on conduct of cadastre land appraisal can authorize calculating and subsequent display of cadastre value of land in a different foreign currency (value in BYR gets converted to the foreign currency according to the official exchange rate, published by the National Bank of the Republic of Belarus on the day of the cadastre land appraisal), unless there is a special prohibition in the legislative system [274].

The first cadastre appraisals in the Republic of Belarus were conducted between the years 2003-2005. By January 1, 2010 village lands of all the regions but Minsk region were yet to be assessed. Cadastre appraisals were conducted in 84 municipalities between the years 2003-2004 and the results were reviewed between 2008-2009 using correction coefficients. Cadastre appraisal of land designated for industrial, transportation, communications, energy sector, national defence and for other purposes that was situated outside of municipalities or gardeners' societies was conducted in the Republic of Belarus for the first time in 2007.

Conducted cadastre land appraisal from the period between the years 2007-2013 are shown in the Table 3.6.1 (based on the analysis from the RV of State Land Cadastre of the Republic of Belarus [270]).

Table 3.6.1
Conducted cadastre land appraisals in Belarus in the period between 2007-2013

Date of the cadastre appraisal	Amount of cadastre appraisals of land depending on the type of land			
	Lands of the municipalities	Lands of villages	Lands of gardener societies	Lands situated outside the boundaries of municipalities or gardener societies
2007	2	–	–	118 provinces
2008	9	–	–	–
2009	163		1 province	–
2010	223	23 003	8 provinces	2
2011	72	–	16 provinces	2
2012	41	360	27 provinces	33
2013	11	–	7 provinces	6

Source: authorial research [270]

The calculation of the cadastre value of land according to the authorization of usage type is performed in the following order [272, 275]:

1. At first, the basic value of the lands in a given municipality is calculated according to the authorization of usage type. For that purpose, an individual appraisal of randomly selected land plots is performed in each of the appraisal zones. These individual appraisals are conducted according to one or a number of the appraisal methods:

- statistical analysis,
- scheduled insertion of corrections,
- in relation to a comparison study,
- ranging,
- pointing out,
- distribution,

- residual,
- profit (i.e. direct capitalization of income),
- presupposed usage,
- capitalization based on return on investment (discounting of the revenue streams).

The order of calculation is defined by the state standard "STB 52.2.01-2011" [272]. Basic value of land in a given municipality (BC_{III}) according to the authorization of usage type is estimated as an average using the following formula:

$$B_{\text{III}} = \frac{\sum_{j=1}^m \frac{PC_{3V}}{K_{CB}}}{m}, \quad (3.6.1)$$

where PC_{3V} is the market value of an average land plot;

K_{CB} – independent coefficient of impact of the factors of evaluation considering the scale of their impact on the cadastre value of land in the appraisal zone;

m - quantity of individual appraisals of land plots conducted according to the authorization of usage type.

2. Calculation of cadastre values of land in the appraisal zones ($KC_{\text{зоны}}$) is derived from multiplying of the basic value of the municipality's land by the independent coefficient of the impact of appraisal factors:

$$KC_{\text{зоны}} = BC_{\text{III}} \times K_{CB} \quad (3.6.2)$$

The independent coefficient of impact of the appraisal factors is derived considering the scale of the impact of the factors through the following formula:

$$K_{CB} = \prod_{i=1}^n \sum_{j=1}^m K_{ij} \frac{\text{scale}_{ij}}{\text{scale}}, \quad (3.6.3)$$

where K_{CB} - is the independent coefficient of the impact of appraisal factors;

K_{ij} - j-value of the coefficient of the i-factor of appraisal;

scale_{ij} - area of the appraisal zone that is impacted by the j-value of the coefficient of the i-factor of appraisal;

scale - area of the appraisal zone;

n - number of appraisal factors;

m - number of values of appraisal factors.

Appraisal factors and the values of the coefficients for the land of multi-apartment zones and for the gardener societies are displayed in the Table 3.6.2 [275].

A report and a verdict on cadastre appraisal in three copies are issued at the last stage of the appraisal procedure. One copy goes to the ordering party; one is saved in the archive of the conducting party while the last copy is transferred to the institution that is authorized by the State committee on property of the Republic of Belarus to keep the registry of value of land plots of the state land cadastre.

The results of the cadastre land appraisal are verified and confirmed by respective local executive committees. After the confirmation of results of the cadastre appraisal of land and land plots the local executive committee has 10 days to send the conducting party a copy of the confirmation verdict. After that, the cadastre value of land and land plots gets inserted into the RV of State Land Cadastre. The local executive committee has to be notified on that [275].

A special online resource has been developed by the state unitary enterprise "National Cadastre Agency". The goal of the online resource was to simplify the process of getting data on cadastre value of land or on the taxation basis of the land tax from the registry of value of the state land cadastre. This information can be retrieved from vl.nca.by [270]. All the data on this website is an open-source and can be accessed for free all over the world [273].

The results of cadastre land appraisal in Belarus play a significant role in state's management of land resources. The main way of using the results is applying them as a basis for calculating the taxation mechanisms.

Table 3.6.2

**Appraisal factors and coefficient values
for the land of multi-apartment zones and zones of gardener societies**

Name of the appraisal factor	Value of the coefficient
Proximity (ease of reaching) of the centre (downtown) of municipality (by foot and/or using public transportation)	
Up to 10 min.	1,00
10–20 min.	0,77
21–30 min.	0,60
31–40 min.	0,47
41–50 min.	0,36
More than 50 min.	0,28
Availability of centralized natural gas supply	1,20
Availability of centralized water supply	1,10
Availability of centralized canalization	1,05
Availability of centralized heating	1,05
Proximity (less than 500 m away) of the centre of residential district	1,10
Proximity (less than 1000 m) of botanical gardens, parks and other objects of recreational purpose	1,10
Zone of special sanitary protection regime and/or zone of increased level of noise, vibration (e.g. from railroad, airport etc.)	0,90
Quality of air:	
satisfactory	1,00
relatively satisfactory (relatively unsatisfactory)	0,95
unsatisfactory	0,90
Contamination of land with chemical elements	0,95
Ground (soil) for construction purpose:	
satisfactory	1,00
relatively satisfactory	0,95
unsatisfactory	0,90
Limitation of permit to construct	0,95

Source: authorial research [275]

According to Article 195 of the Tax Code of the Republic of Belarus the cadastre value serves as a basis for the land tax. This tax is historically an Ad Valorem tax and applies only to the owners or users of land. The land tax rates are fixed in accordance with the area and the appraisal zone coefficient. The tax basis for the land tax is fixed to the data available and assessed on January 1 and applies to:

- land plot with a single authorization of usage type based upon its cadastre value;
- land plot with multiple authorization of usage types, that thus is subject to different land tax rates, based upon a formula that takes to consideration the division of total area into areas designated for each of the usage types;
- fractions in the ownership of a land plot based upon the formula that takes to consideration the division of the total area proportionally to the ownership distribution.

Another way the results of cadastre appraisal are used is estimation of annual rental fee for a land plot. In accordance with the Decree by the President of the Republic of Belarus from March 1, 2010 № 101 "On charging a rental fee for land plots, owned by the state" the rental fee is decided upon by a local executive committee, by the administration of free economic zone:

- for a single authorization of usage type based on cadastre value of the land plot while applying designated coefficients;
- for multiple authorization of usage types that assume different coefficients based on cadastre value of the land plot and using a formula that takes to consideration the division of total area into areas designated for each of the usage types;

- fractions in the ownership of a land plot with a single authorization of usage type based upon the formula that takes to consideration the division of the total area proportionally to the ownership distribution.

- fractions in the ownership of a land plot with multiple authorization of usage types based upon the formula that takes to consideration the division of the total area proportionally to the ownership distribution and applying the respective coefficients for the types of authorization of usage of the land.

Another way the results of cadastre appraisal are used is derived from the Decree of the President of the Republic of Belarus from December 27, 2007 № 667 "On acquisition and provision of land plots". According to this decree, a purchase of a land plot for the needs of state is handled using the cadastre value of the plot for the date of the acquisition. The exception can only be made for the land plots that were previously purchased from the state through an auction. In this case, the property owner is reimbursed the value that was paid during the auction altering the price to consider also the inflation factor; the price cannot be lower than the cadastre value during the auction.

Another important area of application of cadastre appraisal results takes place during the provision of land plot by the state to an investor for construction purposes (with the constructed building then being rented out). In this case, the value of the fee for the right to sign the rental agreement for the land plot without an auction is derived from the cadastre value of the land plot while applying the coefficients. The coefficients in this case depend on the duration of the rental period and their values are decided upon by the Council of Ministers of the Republic of Belarus.

The cadastre value of land is also referred to during mortgage credit agreements signing. According to Article 50 of Code on land, land plots that are privately owned may be the subject to mortgage and the rental rights for a land plot may serve as guaranty for the credit provided by a bank. The value of the land plot that is subject to mortgage cannot be lower than its cadastre value. Hence, nowadays the results of cadastre land appraisal are widely used and applied in various spheres of life of the Belarusian society providing the necessary conditions for effective management of land resources.

In regards to the cadastre value of the land in the capital of Belarus in Minsk, 2012 was the last time land had been subject to cadastre appraisal. That cadastre appraisal was conducted according to the market data on sale/purchase transactions of apartments, residential suburban houses, commercial or industrial buildings. In five years (after the previous appraisal in 2007) app. 200,000 transactions were analyzed. Specialists relied on the data provided by the market when constructing appraisal models and conducting appraisal zoning. The cadastre value of land was identified both in Belarusian Rubles and US dollars. The minimal cadastre value of 1 square meter of land in a multi apartment zone of Minsk was \$246.7, while the maximum one was \$424.8. The residential suburban zone had the minimal cadastre value of one square meter of \$39, while the maximum one was \$213.6. In the business-office zone the minimal value of one square meter of land was \$195.5, with \$584.4 being the maximum.

The cadastre value in US dollars of land in Minsk has lowered in by the year 2012 comparing to 2007 in all zones but the residential suburban one. Yet the value in Belarusian Rubles has gone up because of the devaluation of the currency in 2011. Thus, the US dollar value of land in the multi-apartment zone of Minks has decreased by 6% comparing to 2007. In the business office zone the value had decreased by 14%, in the industrial zone by 2%. The only increase in value took place in the residential suburban zone of Minks by 32% [276].

The main statistical indicators of cadastre value of land of the appraisal zones of Minsk as of January 1, 2013 are displayed in the Table 3.6.3 [277].

For the sake of comparison the cadastre vales of land in the appraisal zones of the city of Lahoysk are displayed. Lahoysk is situated in the Minsk region, 40 km away from the city of Minsk (Table 3.6.4). The data is from January 1, 2013 [276].

Table 3.6.3**The main statistical indicators of cadastre value of land of the appraisal zones of Minsk**

Authorization of usage type of an appraisal zone	Cadastre value of 1 m ² of land in an appraisal zone		
	City of Minsk (not including the National Airport "Minsk")		National Airport "Minsk"
	min	max	
	\$/m ²	\$/m ²	\$/m ²
Residential multi-apartment zone	246,67	424,77	4,33
Residential suburban zone	38,97	213,62	3,31
Business office zone	195,55	584,38	5,09
Industrial zone	75,67	217,60	4,07
Recreational zone	41,11	70,80	1,27
Quantity of appraisal zones:	125		

Source: authorial research [277]

Table 3.6.4**The main statistical indicators of cadastre value of land of the appraisal zones of Lahoyk (Minsk region)**

Authorization of usage type of an appraisal zone	Cadastre value of 1 m ² of land in an appraisal zone	
	min	max
	\$/m ²	\$/m ²
Residential multi-apartment zone	15,03	34,21
Residential suburban zone	5,01	11,40
Business office zone	23,33	52,28
Industrial zone	11,20	24,89
Recreational zone	2,33	5,18
Quantity of appraisal zones:	17	

Source: authorial research [276]

The National Cadastre Agency of the Republic of Belarus created a new tool in 2014 "Public cadastre map". This software serves as a database of registry entrees from the registry of the State land cadastre. Public cadastre map provides a visualization of the data, stored by the National cadastre agency, based on geography with an option to choose the scale.

The tool can be accessed online at <http://map.nca.by> and can be of interest to state institutions caring out accounting and management of land resources, professionals from the real estate market of Belarus as well as to legal and natural persons. Public cadastre map has a number of layers. The Layer "**Cadastre value of land**" is based on data, contained by the registry of value of land plots of the State land cadastre. The map provides the cadastre value of one square meter of land of municipalities that situated outside municipalities and of land of gardener societies. The bar "additional information on the object" contains data on the date of cadastre appraisal, the document that the confirmation of the results was based on, and the details of the procedure of inserting the appraisal results into the registry of value.

Layer "**Registry of ATU and TU**" is based on the data from the single registry of administrative territorial units and of territorial units of the Republic of Belarus. The map contains information about registered (and present in the Registry of ATU and TU) administrative-territorial units of Belarus (regions, provinces, districts, villages, municipalities). It also includes the information about special regime territories (i.e. national parks and nature preservation institutions of different kinds).

Layer "**Land plots**" is based on the data from the single state registry of real estate, its ownership and related transactions (SSRRE), particularly from the part on registered land plots that are geographically tied to the navigation system of 1963. The map offers a search tool that refers to the cadastre number of the object.

Layer "**Address points**" is based on the data from registry of addresses of the Republic of Belarus. The map contains information about addresses of real estate objects that are part of the registry of addresses.

2015 was the year when State Communal Property of the Republic of Belarus started a pilot project aimed at testing a new system of real estate appraisal that refers to both the land plot and the building on it. The project is run on a relatively small territory of one of the central districts of Minsk and in one of the provinces of Brest region. As the project progresses a new methodology of cadastre appraisal of real estate objects of all types will be developed, introduced and probated. There is also a plan to develop and test a methodology of mass formation of land plots, buildings, and isolated apartments and to get a feasibility study of costs, related to all the necessary work on a national scale [278]. During an individual appraisal of a real estate object (building, part of a building and a land plot) experts rely on the market data on transactions of sale / purchase type, on sales offerings, on rental offerings and rental agreements, on construction costs. They also use analytics and consult real estate agents and other market players. The cadastre value of real estate will be calculated in both national and a foreign currency. The pilot project of mass formation and cadastre appraisal of real estate will identify the presence (or absence) of reason to conduct these procedures on a national scale altogether. That is because it will cover millions of real estate objects (as of end of May, 2015 there had been 2.1 million of land plots, 2.2 million of buildings and 2.7 million of isolated apartments registered in the Republic of Belarus) [278].

The evolution of the system of cadastre land appraisal in the Republic of Belarus started in the late 1990s and was associated mainly with the work on creating the methodology of appraisal procedures. Every year new legal acts were adopted that covered various aspects of appraisal process. The first cadastre land appraisals were conducted in 2003-2005. Since then not only all the land plots have been evaluated but also the land of the gardener societies and the land situated outside municipalities or gardener societies.

The cadastre land appraisal is conducted at least every four years. The ordering party is always the State Committee on property while the conducting party is an institution appointed by the committee.

The cadastre land appraisal in municipalities is conducted in accordance with the standards of evaluation of public objects of the Republic of Belarus and with the Technical Code of the adapted practice

The significance of cadastre land appraisal for the economy of Belarus is obvious. That is because the results of the appraisal are used in various spheres of life: taxation, setting auction starting prices, provision of land plots to the citizens, mortgages, reimbursement schemes, preparation of rental agreements, in acquisitions of land from citizens by the state for urban development and other purposes etc. Among the listed points of application the land tax estimation and rental fee calculation are the most important spheres where the cadastre land appraisal data is critically important.

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3.7 BALANCE OF FEED AND FOOD

The work mainly studied the forage balance, which ultimately, indirectly affect people's food.

The concept of a well-balanced diet in this scientific work is based on the perception of the formation of good in terms of needs, value, and utility, which form a chain: needs - value - utility. In the world of livestock and pet this circuit is similar in its significance. This perception will help to understand the utility, in relation to a balanced diet as a high-quality utility. The separate links of the chain in terms of a balanced diet are not specified. These concepts may be further developed by any interested researcher, if such interest arises.

In one part of the work the author examines the phenomena of famine and starvation and how these concepts are understood nowadays. The author condemns "the Nazi and KGB pseudo-scientific research and experiments" on the limits of human survival in the artificially created situations of starvation (the Gulag camps, the Nazi extermination camps, etc.), disclosing the horror of this experimentation true nature. Food rations provided in the Nazi and Gulag concentration camps were very far even from minimal means of subsistence. In Maslow's hierarchy of needs they would not satisfy even the very first basic level of physiological needs. The information related to the Soviet concentration and the German labor camps was not intended as the Soviet system inhumanity overstatement and the Nazi atrociousness understatement, neither are they compared, nor are they comparable. The author presents the facts and factual findings without any additional comment and ideological context.

Until now the issue of the balanced state of animal and livestock feed ration has been dealt with within the discussion of the balanced state of livestock feed. The outcomes of already conducted research will help to develop the principles of feed balanced state assessment further and thus to solve other related problems of animals feed and human diet completeness.

The primary and most important goal of the author's research was to attract a greater attention to the problem of assessment of the degree of the balanced state of an animal feed ration, because so far this area has not been sufficiently researched. There has been some narrow scientific research on the balanced state of a food ration, which outcomes only allow to say that the food ration or diet is "balanced" or "unbalanced".

As the basis of his research the author took research findings in the field of livestock feed carried out in the Soviet period, as well as extensive statistical records of that time (research quality base). Especially the statistics of 1983-1987 provided a lot of valuable data, since large farms were required to account for milk yield and milk production cost regularly. Therefore, the scope of study reached 87 points, which allowed the author to define mathematical relationships between the fodder balanced state and the costs and milk yield with the highest "correlation ratios".

Comparing today's level of milk yield, the yields in 1983-1987 were relatively low. Today in Latvia a dairy cattle herd with a yield of more than 10,000 kg per cow per year is not uncommon. The largest amount of milk is produced on the farm in Viesītes district "Kalna Dambrani", where there are 607 dairy cows. In 2013 on an average 12,826 kg of milk were obtained from a cow per year there. The Latvian record holder was a Holstein cow *Dance* of the 4th lactation on farm "Cerini" in Yeru district, which gave 19,663 kg of milk per year.

Milk production in Latvia was slowed down by the EU quota system. In order not to exceed the quota, many livestock farmers chose not to reduce the number of dairy cows but cut the feeding rations.

It is possible that the mathematical relationships (regression equations) may slightly alter when the milk yield increases significantly. However, the correlation principles will remain the same, and the previously obtained equations can be adjusted. The purpose of adjustment is to provide a more accurate assessment of economic efficiency corresponding to a certain balance factor.

One of the principal tasks of the present work was to define the mathematical correlation between the balance factor of feed (the feed balance degree index) and economic performance indicators, in this case the cost of milk production and milk yield. Similar relationships can be obtained with other economic indicators related to the subject or the end user. That could become the object of a further scientific research when the method of determination of the degree of a balanced state of a diet is further refined and developed.

Counting systems: Benefit validity determination is directly related to counting systems. Latvian qualified doctor, associate professor Eriks Kalninsh can pretend for the most ancient counting systems discovery. It is known how our ancient ancestors had counted: nothing (0) - 1 - 2 - a lot. However, Kalninsh counted publicly: everything - everything, omitting even "nothing" or "0". As if these theories open up a vast field of research. However, he can never get research base, because those who used this system have gone extinct before the ancient times. Why? Because if the hunters several times came back from hunting with empty hands, saying that it are all our prey, it led the entire community to death from starvation. Consequently, the author can safely say that the thesis of this topic will not come out. Therefore, on the beginning of the figures row not need to use "all" instead of "zero" and "one". Today, the civilized world is widely used decimal and binary counting. Binary systems are widely used in electronic calculators and other specific areas.

Decimal counting system occurred in the 5th century in India and China. From there with Arab mediation it went to Europe, and in the 16th century extended into general use.

FORMATION OF GOOD

Needs

The boundaries between these categories of needs mainly depend on the standard of living in a particular country. Rising living standards stimulate growing needs and this turns the differentiation of needs into important factor of economic activity revival.

Needs may be classified according to the degrees of satisfaction:

- **minimal level,**
- **basic level,**
- **higher (luxury needs satisfaction) level.**

Of course, the boundaries between these levels are relative and the division is conditional. Over time, with the increase in living standards, these levels may regroup, for example, the car was once a luxury item, but today many classes of cars are within the normal level of needs; similarly with bicycles.

In the quantitative aspect needs are multifarious, but with regard to their intensity, the situation is reversed. Each individual has their own perception of the satisfaction of a need and this depends on the nature of a need. Thus, when the level of satisfaction increases, the intensity of a need decreases.

Needs may complement each other, and needs may also compete with each other. This raises the problem of intersubstitutability of needs and their hierarchy, which can be solved by economic development organization. The optimal hierarchy of needs forms in a market economy as a result of the individual's free choice related to the market driven individual income distribution. In the Third World countries, where the standard of living is lower, the satisfaction of primary needs is a priority.

The need for food corresponds to the needs of the first (basic) level in A.H. Maslow's hierarchy of needs, representing physiological needs. However, food may be classified as:

- **Food that is absolutely necessary to maintain essential life processes.** In general, this kind of food may be unvaried and of low nutritional value. For example, the Nazis and Stalinists added sawdust to rye bread. This bread had a low nutritional value, but its weight was considerable. In order to determine the smallest food ration, which still made possible to maintain life in a human being, in Nazi concentration camps and Soviet Gulag camps, e.g. Magadan labor camps, ruthless experiments with prisoners were carried out.

Ernest Duzis, one of Gulag camp survivors, described some of such utterly inhuman experiments.

- **Food required for minimal subsistence.** Perceptions of hunger in socially developed countries have changed over time. The situation, when people may have only minimum of food so as not to die, today may occur in a number of countries, even in such a highly developed country as the United States. For instance, in New York City district Bronx, the USA poorest Congressional district, according to the US standard of living, 37% of the population live at the level of starvation. 48 million of Americans admit "food insecurity", which by the US living standards implies starvation. More than half of them are Caucasian, and more than half live outside large cities. For many families, such "food insecure" situation sets in at the end of every calendar month.

Also, in such families children are often overweight, which are the result of malnutrition and the manifestation of starvation side effect. Certain efforts are made to atone for "food insecurity" through "soup kitchens", "food banks", etc. However, handout food contains a lot of salt, sugar, and fats. Consequently, such food is of poor nutritious value.

- **High quality food (adequate nutritious diet)** may fall into the second group of "self-preservation needs" or even into the third group of "social needs". Having a sufficiently high salary or other income, an individual can afford a nutritious and healthy diet. This may be achieved by several ways. Certain types of food can show that an individual belongs to a certain social group. For instance, vegans do not use any food of animal origin, including dairy products. A glass of cognac or brandy as a night cap also may indicate that an individual belongs to an affluent social group, to people who can afford such things. Thus, in particular cases, some such needs would fall into the group of social needs.

Ever since ancient times, food has satisfied not only physiological needs, but also assisted in establishing and maintaining social contacts within social groups or outside of them, which is a new development (trend) In these cases, food and drink has always been an important part of culture, explored in detail by the science "Anthropology of food and eating".

Meals (food) serve certain purposes in social, business, political and other kinds of relationship. In the past, feasts were arranged to demonstrate belonging to a certain community group (guilds, brotherhoods, etc.). Today such demonstrations have lost their meaning, but a new form of a feast has developed business and political lunches and dinners. If such a meal serves a more general purpose of social interaction, it takes the form of a party.

As can be seen, food can satisfy not only physiological and social needs, but also the need for recognition.

Value

When *value* is understood as an economic category, it may be described in terms of usable or unusable. Consumer choice and demand affect many closely interrelated values. Also value has a great influence on the consumer. Values have many classifications. *Erik Allardt* (1995) classified values as:

- **learned values,**
- **general values,**
- **permanent values,**
- **goal-related values,**
- **choice based values.**

Understanding of the concept of value helps to make choice. Since childhood people come to know values that affect their behaviour. Some values, learnt from the environment, may be common (religion, etc.) or permanent (honesty, etc.). When a person reacts to a situation, his behaviour may be affected, for instance, by patriotism (for example, buying something produced in the country of one's origin). The individuals' choices are influenced by their set of values consciously and unconsciously. At the same time, the opposite relationship is also true when making choices creates values.

Charles. W. Morris developed his system of values based on three dimensions related to different cultures:

- **Dionysian** dimension expressed in the desire to enjoy life and free oneself from the need to create pressure;
- **Promethean** dimension expressed in ambition to have influence on the world and change the established order;
- **Buddhistical** dimension manifested as a tendency to concentrate oneself on oneself and to repress one's desires.

Different people and different cultures lay different weight to these dimensions. Consumer culture, which emphasizes individuality and high standard of living, rates Dionysian values high. There are cultures in which these key dimensions are equally appreciated. Various combinations and proportions of these three dimensions are expressed in different lifestyles and different principles of choice.

People are the products of their cultures. Culture here is understood as almost everything that has been learnt in their lives, and what has been transferred from an individual to an individual by means of symbols, which may include, for instance, customs, beliefs, unwritten laws, skills and knowledge. Culture is manifested as something given, hereditary: the older generations expect that their descendants will behave and act in the same way as they had or would have done. When the society is undergoing a rapid change, old and new values, customs and norms may co-exist in parallel and may prevail over each other. This can lead to a gap between the generations, a misunderstanding, which may be expressed in demonstrative choices and preferences, especially in the younger generation. Also, these processes can be purposefully manipulated by means of aggressive advertising.

Utility

Utility or usefulness is the main feature of goods. The Swiss mathematician *Daniel Bernoulli* (1700-1782) was the first to assert that consumers measure the utility of a good according to their individual criteria, and the first to introduce the concept of "utility" into science. *Jeremy Bentham* (1748-1832), English lawyer and philosopher and one of the founders of utilitarianism, was one of the first who started to use this term in the context of Economic Sciences. In his view, every human being aimed their activity at their wellbeing, which could be achieved by maximizing utility (Schumann, 2003).

We shall understand **utility** here as a feeling of satisfaction that a consumer obtains through utilizing a certain good. Utility is a common feature of all goods. This is a subjective value and each consumer evaluates a good in their own way. Economic theory assumes that competent consumers, taking into account their budget and the prices of goods as economic constraints, will try to maximize the total good, i.e., to satisfy their unlimited wants to a possibly highest degree.

Cardinal utility: Scientific minds have argued on the question of goods utility measurement since the 19th century. German scientist marginalists *Hermann Heinrich Gossen* (1810-1858) considered that the utility of goods can be accurately measured by measuring satisfaction (*Genuß*) that they provide to a consumer. His views were supported by English scientist *William Stanley Jevons* (1835-1882), also marginalist. So the **cardinal (numerical) method** for measuring utility was proposed. According to this method the unit of quantity of economic good is compared to figures of subjective assessment (*Marie Esprit Leon Walras* (1834-1910), *Carl Menger* (1840-1921), *William S. Jevons*). Many 19th century cardinalists utilitarians (from Lat. "*utilitas* - good", "benefit") utility considered to be a psychological phenomenon, which could be measured quantitatively in the same way as, for example, distance or temperature. For the unit of measurement they suggested a conditional (hypothetical) dimension of utility (util). According to cardinalists, utility could also be measured indirectly through the amount of money that a consumer was ready to pay for a certain good. Cardinalists felt that they were on the verge of creating an accurate cardinal unit of utility measurement (Schumann, 2003).

Nowadays it is understood that cardinal utility makes possible to subjectively compare various goods or their combinations in numerical values, for instance, the individual consumer's subjective evaluation may be as follows: the utility of two apples is 120% higher than the utility of one tomato.

Calculations of total and marginal utility are based on the cardinal (numerical) utility theory. If the utility of a good is determined by a group of consumers, then we can calculate the average value of this consumer group utility assessment. Then the method of cardinal utility measurement allows comparing even those goods that are not usually comparable against each other, but may be compared with other goods which are comparable against themselves. For example, a consumer may subjectively evaluate two different types of food and obtain the following results:

- the utility of two oranges ($2u_2$) is 90% higher than the utility of one apple (u_1);
- the utility of three bananas ($3u_3$) is 160% higher than the utility of one apple (u_1);
- oranges and bananas are not comparable against each other.

By means of mathematical calculations, we shall obtain the following results:

$$2 u_2 = 1.9 u_1 \quad (3.7.1) \qquad 3 u_3 = 2.6 u_1 \quad (3.7.2)$$

Combining the equations (1) and (2) in the system of equations and solving them, we shall obtain:

$$u_1 = 1.05 u_2 = 1.15 u_3;$$

$$u_2 = 1.06 u_3 = 0.95 u_1;$$

$$u_3 = 0.67 u_1 = 0.92 u_2.$$

Thus, it becomes possible to compare oranges (u_2) and bananas against each other (u_3):

$$u_2 = 1.06 u_3; \qquad u_3 = 0.92 u_2.$$

The individual cardinal assessment that resulted from a trade of goods can change. Of course, a person is interested in the increase of the good utility. However, the total number of goods belonging to a consumer before and after the exchange remains the same.

For instance, there are two friends - John and Peter. John evaluates goods in his possession in the following way: 2 oranges = 1 apple. Peter respectively evaluates 1 orange = 2 apples. So according to their evaluation they have the total number of goods 4.

Peter is willing to trade one his apple to an orange belonging to Peter. Both parties to the transaction are trying to exchange the goods which are higher evaluated in their individual assessment to the goods which are less valuable in their opinion.

In the result of this exchange:

John has 2 oranges - 1 orange + 1 apple + 1 apple = 1 orange + 2 apples. As can be seen, according to John, he has the goods with the aggregate good utility value: $1 + 2 \times 2 = 5$ good utility units (Rubanovskis, 2008).

Peter has 2 apples - 1 apple + 1 orange + 1 orange = 1 apple + 2 oranges. According to his evaluation, he has the goods with the aggregate good utility value: $1 + 2 \times 2 = 5$ good utility units. For both parties to this exchange transaction the utility value increased. According to the laws of physics, the amount of substance (the number of fruit) has not changed, but according to the laws of psychology, each party increased the utility value by 1 unit (5-4). However, cardinal utility measurement does not provide an objective assessment of the utility of goods, and thus does not allow comparing different levels of consumer satisfaction.

Ordinal utility: English economist and statistician *Francis Edgeworth* (1845-1926) developed another method for measuring the utility of goods - ordinal utility - differing substantially from the cardinal method. Instead of measuring the goods utility in magnitudes of the consumers' subjective assessment of their satisfaction, he measured the utility of one kind of good by the utility of another kind of goods, by the failure cost and by the consumers' subjective preferences.

Vilfredo Pareto (1848-1923) suggested that the cardinal method of utility measurement should be supplemented or replaced by the ordinal method of measurement, i.e. by consumer choice.

Among the supporters of the ordinal utility method were *J. Slutsky*, (1880-1948), *J.R. Hicks* (1904-1989), etc. (Krylov L., 2003)

The ordinal method of the goods utility measurement had been improved and applied until 1930s. It is still not altogether forgotten today.

Goods evaluated by the ordinal method are comparable against each other, without defining the difference in the utility by a numerical value. For instance, a buyer may compare the utility of three kinds of goods as follows: $u_1 > u_2 > u_3$, which means that the utility of the third kind of goods is the lowest, but the utility of the first kind of goods is the highest. If the buyer assesses the utility of these three kinds of goods as equal, then $u_1 = u_2 = u_3$. The measurement of the goods utility is always subjective as different customers' valuations vary.

All the above described valuation methods are subjective. More objective methods for measuring the utility of goods will be described below.

The easiest way to determine the utility of goods (or the utility of services as goods) is by application of two alternative terms usable or unusable. However, this approach is rather imprecise and depends on:

- objective criteria, such as women's fancy goods are unsuitable for men, Greenland Inuit do not need swimming costumes, etc.;
- subjective, psychological criteria, e.g. a representative of the European culture, not knowing what kind of meat they were offered, consumed a dish of dog meat, but having learnt what they had eaten, became sick, i.e. food, in this example a piece of dog meat, that a moment ago had been quite edible, maybe even tasty, suddenly became disgusting and inedible. There are several more precise and more objective measurements.

More objective utility assessment can be provided by a panel of experts, e.g., the jury. Generally, experts (jury), assess a certain utility criterion according to accepted grading system. This is the way how achievements in many kinds of sports, dances, and artwork are assessed, as well as the quality of beverages, confectionery, etc. Experts are not exactly lay persons and can be quite safely regarded as professionals, knowledgeable in certain fields. However, expert judgment may be affected by the expert's national characteristics, religious beliefs, etc. For instance, the Japanese value their national alcoholic drink *sake* much higher than cognac or brandy.

In reference to food products and feed stuffs for animals, the main criterion of their utility is considered to be their nutritional value and in this connection a number of theories have been developed since the XIX century (Latvietis, 1991). In the Western world, in chronological order, these theories were: hay equivalent tables, evaluation according to the quantity of digestible nutrients, the system of net energy, evaluation according to the sum total of digestible substances, Scandinavian feed units system, etc.

Hay feed value equivalent tables designed by a German scientist *A. Thaer* can be considered to be one of the first more or less scientifically based feed materials comprehensive evaluation systems. Nutritional value of different feed materials was compared against meadow hay used as a benchmark.

The described method could only satisfy the early XIX century economic needs when a portion of feed material was bartered into a quantity of another feed material by means of the nutritional value equivalent used as a reference point.

Evaluation according to quantities of digestible nutrients was a more accurate system. It was developed in the second half of the XIX century by *E. Wolff*, who in 1874 published the first dairy cows feeding standards, expressed as needs in digestible substances. Later, animal feeding standards were supplemented by separating the maintaining and productive parts (*J. Kin*, 1887), accounting feed dry matter and amide part in protein by organizing feed standards according to the specific groups of animals and productivity (*C. Lemans*, 1897). This evaluation system according to the quantities of nutrient substances as protein, fat and carbohydrate had been widely applied in many countries around the world until the early XX century.

Nutrient power evaluation according to starch equivalent was developed by German scientist *O. Kellner*. Kellner **starch equivalent** was based on the deposition of fat in the adult animal (oxen) body, and initially this equivalent was determined experimentally.

Net energy system was developed in early XX century by American scientist *H. Armsby*. He suggested accepting 1 therm or 1000 kcal of net energy as a unit of nutritive value. However, this system did not become popular even in the United States, as farmers preferred to ration animal feed according to total digestible nutrients.

The evaluation system by total digestible nutrients (TDN) is similar to the system developed *E. Wolff*, as it is also based on the amount of digestible substances. In the United States the TDN system developed independently.

Scandinavian feed unit system was designed and developed in Denmark and Sweden. Unlike Armsby's terms and Kellner's starch equivalent, this feed unit system was formed by comparing the productive value of different feed materials in the scientific experiments with cows, horses, sheep and pigs. Instead of terms and starch equivalents the Scandinavian feed unit system adopted the productive value of 1 kg of barley as a feed unit.

The important point is that feed material should be not only nutritionally balanced, but it should be balanced to a certain degree, and this degree is already a qualitative indicator. All above described systems (theories) of nutritive value measurement allowed expressing the utility of a feed product (the feed value) by means of a certain equivalent (basically cardinal utility measurement), but did not take into account such feature of a particular feed material, or groups of feeding materials as the balance of nutrients. Thus all above described feed evaluation systems were not all-inclusive. Today, the high quality feed materials for productive animals, and not only for them, include about 100 names. It is therefore very important to have all digestive nutrients in balance. The imbalance in just one group of digestive nutrients, e.g. in the group of micronutrient elements, may disrupt the balance in other groups of nutrients which otherwise may seem ideal, and as a result lower the feed value of a particular feed material.

Scientifically justified evaluation of the utility of the cattle feed, or baby food or any other kind of food can be provided by means of feed and food **balance factor**. However, sometimes it happens that animals do not eat something prepared after the best recipes of the balanced feed, because this feedstuff may not smell in a familiar way, or may be presented not in a familiar form (or in the perception of an animal it may be fed not in the appropriate way). This depends on the psychology of an animal. Therefore, better results may be achieved combining this method with expert recommendations.

The objective criteria of utility evaluation are formed by factors unrelated to human activity, e.g. climate and season change (the need in clothing and housing), human biological needs (food, water, etc.), but formation of the subjective criteria depends on human related factors, e.g. human psychology. These will include the aforementioned information awareness, recognition, fashion, advertising, conventions, public opinion, religion, propaganda, etc.

The range of goods utility evaluation criteria can include a lot of psychological factors, up to 80-85%, with a tendency to become more limited in the colder climate zones.

Main Conclusions of Part 1

Widely applied utility evaluation methods are cardinal (numerical) and ordinal methods. However, these evaluations may be significantly affected by psychological factors up to 85%. Consequently, they are subjective evaluations.

A more objective evaluation can be provided by expert assessments and, for instance, in case of human food and animal feed, through the assessment of their balance factor.

The utility criteria of food and feeding products, e.g. their nutritional value, have been in the focus of scientific thought since the XIX century. First approaches were based on empirical observations, but later, due to the development of natural sciences, they gradually

became scientifically grounded. In the result of numerous studies the method of cardinal utility measurement was developed, but it did not take into account the balance factor of food and feed products.

Scientifically justified utility assessment of animal feed and human food can be assisted by means of taking into account the balance factor of composing nutrients.

BALANCED FEED AND PRINCIPLES OF ASSESSMENT

Features of balanced feed and impact on the productivity of farm livestock

In order to ensure high productivity and high quality product of livestock not only a certain amount of animal feed should be provided, but it should have all necessary quantities of nutrients in correct proportions. This kind of feed is called balanced or complete feed.

A feeding ration is considered to be balanced if it satisfies all needs of an animal in essential nutrients and there is neither deficit nor a surplus of them.

The advantages of feeding farm livestock with balanced feed were proved long time ago. Physiological experiments showed that correctly balanced feed raises digestibility by 20-30% in comparison with feeding materials not balanced in the right way (Table 3.7.1). It appears that a balanced ration affects not only digestibility, but also energy loss resulting in the process of digesting and utilizing a feed substance. These energy losses per every kilogram of the feed substance dry matter may substantially vary depending on the degree to which a ration is balanced (Table 3.7.1).

Table 3.7.1

Average values of energy loss depending on the balance degree of a feeding

No	Ration description	Energy loss per 1 kg of feed substance dry matter (in kcal)
1.	Balanced ration	1000
2.	Protein deficit (by 20-40%) or surplus (by 60-90%)	1200 - 1400
3.	Crude fibre deficit (by 30-40%) or surplus (by 30-60%)	1100 - 1200
4.	Deficit or surplus, disbalance of calcium and phosphorus	1100 - 1200
5.	Deficit of carotene, vitamin D	1100

Source: A. Dmitrochenko (1980)

A. Dmitrochenko and A. Solun conducted a set of experiments with highly productive dairy cows that were intentionally fed a disbalanced feed ration, and proved even more conclusively the importance of feed elements balance in animal fodder (Table 3.7.2).

The disbalanced feed ration, e.g. in protein, causes overconsumption of feed material 1,5 times more per 1 kg of milk, 40% more per 1 kg of weight gain in the cattle stock and 30% in pigs (Rubanovskis A., 1991).

Balancing of feed rations that allows reducing feed material wastage and shortfall of production may be achieved by inclusion of additional feed elements high in content of limiting nutrients.

There is a growing importance of adequate nutrition balanced in all nutrients necessary for an animal, especially in livestock industry.

In our opinion the concept of "adequate nutrition" depends largely on the extent of our knowledge and the livestock farming standards. The kind of feeding that was considered balanced and thus conditionally adequate in primitive livestock farming conditions, does not correspond to the level of development of animal husbandry, agricultural industry and their modern potential (A. Dmitrochenko).

Dimitrochenko A. (1980) gave an example: "In early XX century a standard and thus conditionally acceptable system of feeding pigs was feeding them according to norms based on 5-6 criteria, which provided 90-95 kg of live body weight at the age of 240-250 days and average daily gain 450 g and 480 feed units consumption per 1 centner of gain". In our opinion, nowadays the adequate feeding of pigs is the kind of feeding that ensures at least 700-800 g of average daily gain provided by 340-370 feed units per 1 centner of gain.

Table 3.7.2

**Milk yield decrease as a result of feeding cows
with disbalanced feed ration during long periods of time**

Observation year	Lactation index of a feed group	Average milk yield per cow per year in kg	Percentage in reference to the initial yield	Observation site	Name of researcher
1.	III	6863	100.0%	Vologda region	A. Dmitrochenko
2.	IY	6686	97.4%		
3.	Y	2430	35.4%		
1.	YI	1023	14.9%	Research experimental farm of Timiryazev Agricultural Academy (Moscow region)	A. Solun
2.	IY	8593	100.0%		
3.	Y	52	61.1%		
4.	YI	1206	14.0%		

Source: A. Dmitrochenko (1980)

(Dimitrochenko A., 1980) gave an example: "In early XX century a standard and thus conditionally acceptable system of feeding pigs was feeding them according to norms based on 5-6 criteria, which provided 90-95 kg of live body weight at the age of 240-250 days and average daily gain 450 g and 480 feed units consumption per 1 centner of gain". In our opinion, nowadays the adequate feeding of pigs is the kind of feeding that ensures at least 700-800 g of average daily gain provided by 340-370 feed units per 1 centner of gain.

In milk production, a reasonable modern feeding standard may be considered the one providing the level of efficiency of 5000-6000kg of milk yield and consumption of 95-100 feed units per 1 centner of milk.

In beef production: approximately 1000g of average daily gain and consumption of not more than 750 feed units per 1 centner of gain.

In poultry industry: egg production capacity at least 250-260 eggs per year and consumption of 240 feed units per 1 centner of gain in chicken broiler.

Table 3.7.3

**Milk yield of dairy cows and efficiency depending
on the quantity of balanced components in the feeding ration**

Year of experiment	Group	4% milk yield		Quantity per 1 kg of 4% milk	
		kg	Gain in %	Feed units	Decrease in %
1st	a) Experimental group	3553	8.6	1.10	6.8
	b) Control group	3273		1.17	
2nd	a) Experimental group	4006	4.8	1.04	1.9
	b) Control group	3824		1.06	
3rd	a) Experimental group	3666	13.8	1.09	9.2
	b) Control group	3221		1.19	
4th	a) Experimental group	3586	23.8	1.12	5.3
	b) Control group	3151		1.18	

Note: the feed ration for the experimental group is balanced according to 22 components, for the control groups according to 6 components

Source: Estimation according to L. Karkla (1979)

Already at the end of XX century adequate feeding standards were met by far stricter requirements (Rubanovskis A., 1990):

- 500-600 feed units for production of 1 centner of beef and lamb meet,
- 280-300 feed units for production of 1 centner of pork,
- 180-200 feed units for production of 1 centner of chicken broiler meat.

The efficiency of balanced feed rations for cows in specific numbers expressing their productivity and the cost of feed was researched experimentally by L. Karkla (see Table 3.7.3) (Karkla, 1979).

The feed rations for dairy cows, balanced according to 22 components, increased their productivity by 4.8-13.8% and reduced fodder consumption for production of 1 centner of 4%

milk by 1.9-9.2%. Similar results were obtained in experiments conducted by J. Latvietis: feeding rations for dairy cows balanced according to 20 and more elements, in comparison with rations balanced according to 5 elements, improved the milk yield by 7-12% and reduced fodder consumption by 5-10% (Latvietis, 1986).

Nowadays it is viewed as essential to design animal feeding rations according to 70-100 criteria. Detailed standards of feeding, revised lately with due account for recent information on the chemical composition of feeding materials and feed supplements, include feeding materials completed according to 30-40 indicators (according to data of Latvian agricultural scientific research institutes).

Testing results and comparison of traditional and updated feeding standards showed that feeding of cows, young fat stock, breeding sows, bacon and meet type hogs and other farm animals according to the above mentioned updated standards, raised milk yield by 1.7%-13.4%; the average daily weight gain in young fat stock, piggery and fattening pigs, as well as multiple foetation and milkness of breeding sows and pig crop by 12-49%. At that, feed consumption reduced by 3-15% per unit of output.

The increase in productivity of farm livestock at a standard feed consumption per unit of output and optimized feeding rations is explained by better digestion and utilization of nutritional substances. This is proved by a number of physiological experiments, which showed that animals fed by balanced rations digested protein better by 3-8%, crude fibre by 3-4%, etc. (Latvietis, 1986).

Formulation of balanced feed rations including even 30-40 components is not an easy task. In order to assist planning of animal feed production, optimization of feed rations and distribution of feed resources, computer assisted management program "Fodder-2" was developed at Latvian Agricultural Academy in 1981. Basically, "Fodder-2" was an improved and revised version of the earlier program "Fodder-1" (Latvietis, 1983). Practical design and development of the program was implemented by National Collaborative Computing Centre under LR Agro-industrial Committee, which worked with farming enterprises on the contractual basis (Leja, 1983).

Similar support systems have been created and operated in agricultural research establishments of Czech Republic, Romania, Denmark, Finland, Bulgaria, Germany, Belarus, Russia and many other countries (Rubanovskis, 1991).

Feed ration balance index

Up to a point in specialized scientific literature not enough attention was paid to economic and statistical evaluation of the completeness or a balance state of animal feed materials. Feed rations were evaluated in terms of "well-balanced" or "insufficiently balanced", and the criteria of 'a balanced state' or "completeness" was also not objective.

In that regard E. Kiveisha, Doctor of Economics from the Republic of Belarus, studying theoretical principles of fodder and fodder production, introduced the term "coefficient of the nutritive value of the combined mass of feeding materials "C" (Kiveisha (1980)) and proposed the following formula for this index calculation" (Kiveisha, 1986):

$$C = 1/n \cdot (Pr_{actual}/Pr_{opt} + Su_{actual}/Su_{opt} + Car_{actual}/Car_{opt} + Min_{actual}/Min_{opt} + \dots + O_{actual}/O_{opt}) \quad (3.7.3)$$

Where:

Pr_{actual} is actual content of protein and Pr_{opt} is optimal content of protein per 1 feed unit for all kinds of feedstuff in grams;

n - total number of coefficients for separate nutrients;

Su - sugar;

Car - carotene;

Min - dietary mineral nutrients and

O - other nutrients.

E. Kiveisha takes into account only the following values:

$$Pr_{actual} \leq Pr_{opt}; Su_{actual} \leq Su_{opt}; Car_{actual} \leq Car_{opt}; Min_{actual} \leq Min_{opt}; \dots O_{actual} \leq O_{opt} \quad (3.7.4)$$

In the conditions of real life, the values may be different, e.g. $Pr_{actual} > Pr_{opt}$ or even mixed. This goes to prove that the above formula (3.7.3) is not universal and may be applied in isolated cases only when certain conditions are observed.

Having developed and processed Je. Kiveisha's idea mathematically, we shall obtain the following formula, which provides:

- a separate feed material (element):

$$C_s = FM_a / FM_s \quad (3.7.5)$$

- a group of feed materials (or elements):

$$C_g = (\sum_{i=1}^n (FM_a / FM_s)) : n \quad (3.7.6)$$

where:

FM is nutrient (element) content in the unit of feed;

FM_a is actual nutrient (element) content in the unit of feed;

FM_s is standard nutrient (element) content in the unit of feed;

$i =$ from 1 to n is the quantity of nutrients (elements).

The Latvian National Collaborative Computing Centre under LR Agro-industrial Committee approached the problem differently and defined the ratio of nutritive elements as "actual consumption to standard consumption" and as the balance index of a nutrient. The values of this index are characterized by certain magnitudes of the complete or theoretically balanced state of a nutrient $C_i = 1.000$. If actual index values are inserted in the formula 3.7.3, then relative alignment of values may take place and actual balanced state of a feed material will not correspond to the calculated average index value. Thus it becomes necessary to reduce all balance index values to a single, intercomparable and illustrative system of indicators. If we take the index of a ration imbalanced in protein and divide it into the index of a ration balanced in protein we shall obtain:

$$C_{prot} = 1400/1000 = 1.400 \quad (3.7.7)$$

This ratio will characterize the impact of the imbalanced feed ration or physiological influence of feed material on a cow.

These balance index values, logically, can be greater than "1" ($FM_a > FM_s$) or less than "1" ($FM_a < FM_s$). Of course, if the feed element is balanced (and corresponds to standards), then $C_i = 1.000$. The values applied by Latvian Institute of Animal Husbandry and Veterinary (LIAHV) are not appropriate for the analysis of groups of nutrients, as it may happen that for particular nutrients C_i is not 1.000. For instance, if $C_1 = 1.050$ and $C_2 = 0.950$, then the balance index for these two nutrients equals to 1.000, which shows the ideal balanced state because $C = (1.050 + 0.950) / 2 = 2.000 / 2 = 1.000$.

Similar results can also be obtained when the number of nutrients (elements) is greater.

For example: $C_1 = 0.950$; $C_2 = 1.150$; $C_3 = 0.900$

$C = (0.950 + 1.150 + 0.900) / 3 = 1.000$ – which looks like a perfect balanced state.

This paradox may be explained by the physiological nature of this index, when essentially incomparable amounts are counted, and respectively this index mathematically equalizes. In order to obtain comparable average balance index of feed materials, the author proposes to take as a basis E. Kiveisha's formula 3.7.3 and where $C < 1.000$, reduce it to $C > 1.000$.

Proceeding from the unreduced value of a specific feed balance index we multiply it by a correction factor, which expresses the impact of imbalanced feed material or physiological influence. For illustration, Figure 3.7.1 shows a geometrical interpretation, where $C_1 = 0.950 < 1.000$, which is line C_1 ; $C_2 = 1.050 > 1.000$ and $\alpha_1 = \alpha_2 = 0.050$ (Rubanovskis, 1990). Line $C_1 = 0.950$ is reduced to $C_2 = 1.050$ symmetrically to $C_i = 1.000$, which corresponds to the ideal balanced state of a feed material at an angle $\alpha_1 = \alpha_2$.

Applying the reduced C_1 and C_3 values yields:

$C = (1.050 + 1.150 + 1.100) / 3 = 1.100$ - not a perfect balanced state (see the previous page).

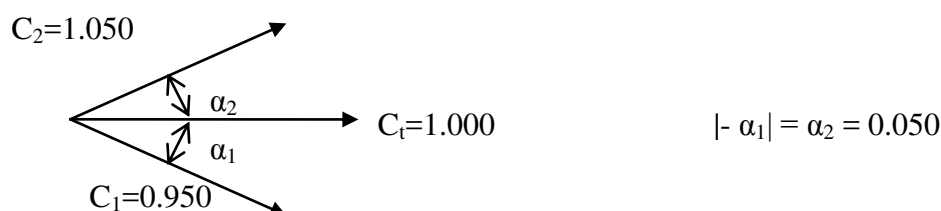


Figure 3.7.1: Schematic diagram of feed balance index reduction from $C_1 = 0.950$ to $C_2 = 1.050$

Source: author's construction

The following analysis will show that a corrective coefficient should be applied (Table 3.7.5) when the balance index exceeds limits, scientifically recognized as acceptable deficiency or surplus for a particular feed element (Table 3.7.4), if values of the balance index within this range are considered acceptable. The author has developed the gradation for corrective coefficients.

When index values are reduced to $C_t = 1.000$, the physiological significance of the nutrient element balance in a feed material remains valid, with the exception for carotene and vitamin D. If all balance index values is reduced respectively to $C < 1.000$, then the physiological significance of the feed balance is fully preserved. But to reduce C for crude fibre where $C = 2.500$ to the value less than 1 is rather difficult.

For instance, in Latvia most feed balance indices have values greater than 1. Thus, in terms of practicality, it is advisable to make all balance index values $C_0 > 1.000$ and so reduce the number of arithmetic operations.

Table 3.7.4

Nutrient element permissible deviations from the normative

No.	Feed element name	Deviation as a percentage of the normative	
		Deficit	Surplus
1.	Carotene	10%	-
2.	Protein	20%	10%
3.	Crude fibre	20%	20%
4.	Phosphorus	10%	10%
5.	Calcium	10%	10%
6.	Sugar	20%	20%
7.	Vitamin D	10%	-

Source: Dmitrochenko (1980)

Table 3.7.5

Feed consumption by livestock of inadequately balanced feed

No.	Feed element name	Deviation as a percentage of the normative		Feeding utilization ration in calories
		Deficit	Surplus	
1.	Balanced feeding ration	-	-	1000
2.	Protein	20-40%	60-90%	1200-1400
3.	Crude fibre	30-40%	30-60%	1100-1200
4.	Calcium	>10%	>10%	1100-1200
5.	Phosphorus	>10%	>10%	1100-1200
6.	Carotene	>10%	-	1100
7.	Vitamin D	>10%	-	1100

Source: Dmitrochenko (1980)

The relevance of having all balance indices $C' > 1.000$ may be exemplified by the following: let us assume, that digestible protein is provided in a ration at the level of 90%, which means that $C_{prot} = 0.90 < 1.000$. If multiplied by a correction factor $F_{cor} = 1.100$, the result will be which looks like an ideally balanced state. But it is obvious that digestible protein shows a deficit,

$$C = C_{prot} \cdot F_{cor} = 0.900 \cdot 1.100 = 0.990 \approx 1.000 \quad (3.7.8)$$

because $C_{prot} = 0.900$. The gradations of reduction coefficients are shown in Table 3.7.6.

How to adjust for this difference is shown in Figure 3.7.2, where the reduced value of the calcium balance index value C' is multiplied by the correction $F_{cor}=1.100$.

Example

datum: calcium $C_{actual} = C_1 = 0.890$

establish: reduced value calcium = $C_2 = ?$

reduced value multiplied by the correction factor calcium = $C = ?$ see Figure 3.7.2.

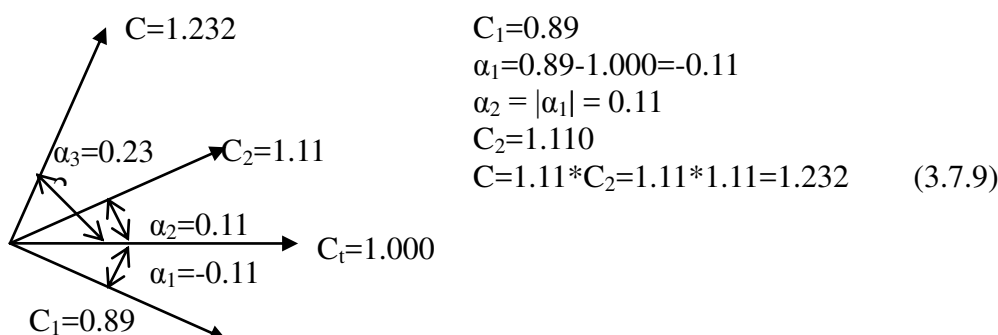


Figure 3.7.2: Balance index for calcium, reduced and corrected values

Source: author's construction

Only now it can be said that a true logical value of disbalance in calcium has been obtained with due account for physiological influence of disbalanced feed on animals.

If all feed balance index values are reduced respectively to $C < 1.000$, then the correction factor F_{cor} should be used as an agent of division and not multiplication, which means that a kind of a psychological barrier should be crossed, because it is generally considered that this factor should be the agent of multiplication and not of division.

The necessity for all balance index values to be $C > 1.000$ is proved by examples when average balance index values are defined for groups of feed elements.

Example: the following balance indices for three feed elements are given:

$$C_1 = 0.900; C_2 = 1.150; C_3 = 0.950 \quad (3.7.9)$$

$$1) \text{ Unreduced values: } C_{average} = (0.900 + 1.150 + 0.950) : 3 = 1.000 \quad (3.7.10)$$

which seems an ideal balanced state, but in fact all feed elements balance indices underwent a relative alignment.

$$2) \text{ Reduced values: } C_{average} = (1.100 + 1.150 + 1.050) : 3 = 1.100 \quad (3.7.11)$$

which shows that the balance index for the feed material including the above mentioned elements is less adequate.

Reduction of the feed balance index values respectively to $C > 1.000$ eliminates the relative alignment of balance index values for separate feed elements.

The value of the correction factor F_{cor} should be found before reducing the feed balance index, and then the reduced value should be multiplied by F_{cor} .

Consequently, taking into account the reduced values of C , it may be concluded that the smaller is the value of C , i.e. the closer it is to $C = 1.000$, and the better is the balanced state or completeness of a feed material or its elements. The described method may be used for finding the average values of balance index for:

- a) all feed elements;
- b) major nutriment (protein, sugar, crude fibre, etc.);
- c) minor mineral elements;
- d) a specific group of major nutrient elements.

Correction factor gradation (Table 3.7.6): The author designed the gradation of correction factors that takes into account physiological influence on livestock according to the balance degree of a feed element under the guidance of Professor J. Latvietis and P. Leia, Doctor of Agricultural Science, and following methodological instructions of Prof. A. Ratkevitch, Hab. Doctor of Economics.

Table 3.2.6

Gradations of the correction factor for balanced feed

Balance ratio	The reduced balance ratio	Correction factors			Correction factor for sugar	Correction factor for phosphorus and calcium
		Carotene	Protein	Crude fibre		
1	2	3	4	5	6	7
1.92	1.92	1.000	1.413	1.360	1.180	1.410
1.90	1.90	1.000	1.400	1.350	1.175	1.400
1.80	1.88	1.000	1.387	1.340	1.170	1.403
1.86	1.86	1.000	1.373	1.330	1.165	1.396
1.84	1.84	1.000	1.360	1.320	1.160	1.389
1.82	1.82	1.000	1.347	1.310	1.155	1.382
1.80	1.80	1.000	1.333	1.300	1.150	1.375
1.78	1.78	1.000	1.320	1.290	1.145	1.368
1.76	1.76	1.000	1.307	1.280	1.140	1.361
1.74	1.74	1.000	1.293	1.270	1.135	1.354
1.72	1.72	1.000	1.280	1.260	1.130	1.347
1.70	1.70	1.000	1.267	1.250	1.125	1.340
1.68	1.68	1.000	1.253	1.240	1.120	1.333
1.66	1.66	1.000	1.240	1.230	1.115	1.326
1.64	1.64	1.000	1.227	1.220	1.110	1.319
1.62	1.62	1.000	1.213	1.210	1.105	1.312
1.60	1.60	1.000	1.200	1.200	1.100	1.305
1.58	1.58	1.000	1.193	1.19	1.095	1.300
1.56	1.56	1.000	1.187	1.18	1.090	1.295
1.54	1.54	1.000	1.180	1.17	1.085	1.290
1.52	1.52	1.000	1.173	1.16	1.080	1.285
1.50	1.50	1.000	1.167	1.15	1.075	1.280
1.48	1.48	1.000	1.160	1.14	1.070	1.275
1.46	1.46	1.000	1.153	1.13	1.065	1.270
1.44	1.44	1.000	1.147	1.12	1.060	1.265
1.42	1.42	1.000	1.140	1.11	1.055	1.260
1.40	1.40	1.000	1.133	1.200	1.050	1.255
1.38	1.38	1.000	1.127	1.180	1.045	1.250
1.36	1.36	1.000	1.120	1.160	1.040	1.245
1.34	1.34	1.000	1.113	1.140	1.035	1.240
1.32	1.32	1.000	1.107	1.120	1.030	1.235
1.30	1.30	1.000	1.100	1.100	1.025	1.230
1.28	1.28	1.000	1.093	1.093	1.020	1.225
1.26	1.26	1.000	1.087	1.087	1.015	1.220
1.24	1.24	1.000	1.080	1.080	1.010	1.215
1.22	1.22	1.000	1.073	1.073	1.005	1.210
1.20	1.20	1.000	1.067	1.067	1.000	1.200
1.18	1.18	1.000	1.060	1.060	1.000	1.180
1.16	1.16	1.000	1.053	1.053	1.000	1.160
1.14	1.14	1.000	1.047	1.047	1.000	1.140
1.12	1.12	1.000	1.040	1.040	1.000	1.120
1.10	1.10	1.000	1.033	1.033	1.000	1.100
1.08	1.08	1.000	1.027	1.027	1.000	1.080
1.06	1.06	1.000	1.020	1.020	1.000	1.060
1.04	1.04	1.000	1.013	1.013	1.000	1.040
1.02	1.02	1.000	1.007	1.007	1.000	1.020
1.00	1.00	1.000	1.000	1.000	1.000	1.000
0.98	1.02	1.000	1.020	1.007	1.000	1.020
0.96	1.04	1.000	1.040	1.013	1.000	1.040
0.94	1.06	1.000	1.060	1.020	1.000	1.060
0.92	1.08	1.000	1.080	1.027	1.000	1.080
0.90	1.10	1.000	1.100	1.033	1.000	1.100
0.88	1.12	1.010	1.120	1.040	1.000	1.120
0.86	1.14	1.020	1.140	1.047	1.000	1.140
0.84	1.16	1.030	1.160	1.053	1.000	1.160
0.82	1.18	1.040	1.180	1.060	1.000	1.180

0.80	1.20	1.050	1.200	1.067	1.000	1.200
0.78	1.22	1.060	1.220	1.073	1.005	1.210
0.76	1.24	1.070	1.240	1.080	1.010	1.215
0.74	1.26	1.080	1.260	1.087	1.015	1.220
0.72	1.28	1.090	1.280	1.093	1.020	1.225
0.70	1.30	1.100	1.300	1.100	1.025	1.230
0.68	1.32	1.100	1.320	1.120	1.030	1.235
0.66	1.34	1.100	1.340	1.140	1.035	1.240
0.64	1.36	1.100	1.360	1.160	1.040	1.245
0.62	1.38	1.100	1.380	1.180	1.045	1.250
0.60	1.40	1.100	1.400	1.200	1.050	1.255
0.58	1.42	1.100	1.423	1.223	1.055	1.260
0.56	1.44	1.100	1.427	1.247	1.060	1.265
0.54	1.46	1.100	1.430	1.270	1.065	1.270
0.52	1.48	1.100	1.433	1.293	1.070	1.275
0.50	1.50	1.100	1.437	1.317	1.075	1.280
0.48	1.52	1.100	1.440	1.340	1.080	1.285

Note: Practically any data of a specialized laboratory may be applied

Source: The table is designed and completed by the author

In developing the table of gradation of balance indices, the author was guided by the "principle of the uneven length of the barrel clapboards". According to this principle the volume of a barrel is determined not by the longest, but by the shortest clapboards. According to this analogy, "one of these clapboards" is the reduced nutrient balance factor, and "another one" is the actually utilized calorie value of a ration. One affecting factor is the nutrient deviation from the normative value (deficit or surplus), but the other affecting factor is the dietary utilization of a ration according to its various degrees of balanceness (deviations from the normative).

The correction factor gradation values for a feed element to be physiologically effective, depending on the feed balance factor, are determined according to the following principles:

- Carotene and vitamin D deficit up to 10% ($C \leq 0.90$) is allowed as acceptable and the gradation factor $F_{cor1} = F_{cor2} = 1.000$.
- Ratio sugar/digestible protein to the limit of 0.8-1.5 is allowed as acceptable, and in this range the correction factor $F_{cor} = 1.000$.
- Deficit or surplus of disbalanced ratio of calcium to phosphorus up to 10% ($C \geq 0.90$; $C \leq 1.10$) are allowed as acceptable and the corrective factor is $F_{cor/calc} = F_{cor/ph} = 1.00$;
- Deficit up to 20% ($C \geq 0.80$) or surplus up to 50% of protein ($C \leq 1.50$) are allowed as acceptable and the correction factor is $F_{cor/prot} = 1.00$.
- Deficit of surplus up to 20% ($C \geq 0.80$; $C \leq 1.20$) of crude fibre are allowed as acceptable, and the correction factor is $F_{cor/cf} = 1.00$.

The proposed procedure allows determining the average feed balance index value for the housing season, grazing or any other season, which is used for analysis and depends on the scope of analysis. The average value feed balance index per year may be determined when primarily to define the balance index value for the housing season (C_h) and separately for the grazing season (C_g), then add them up and divide in 2:

$$C = (C_h + C_g):2 \quad (3.7.12)$$

For farming husbandries and agricultural districts a special gradation system may be designed which will allow applying a five-point grading scale or any other grading scale for evaluating the feed balance index. This will promote a better performance analysis for crop farms in providing animal farms with feed materials. When an animal farm signs a contract with a producer of animal feed, it will be the feed balance index that will determine the terms of delivery of feed materials and the order of payments for the delivered production.

The division of a year into two parts is recommended, because in summers and winters animals are not fed the same ration. However, a well-balanced feed ration may be secured also in these periods, even when cows are kept in a barn throughout the year.

Short periods in autumn should also be taken into account, when the cattle is moved from pastures to barns, and especially in spring, when the cattle is moved from the holding barns to grazing pastures. However, these two periods have little impact on the average balance factor of a ration, and attention should be paid generally to major feed elements, macro and micro nutrients. Spring and autumn transition periods should be taken into account when very precise calculations are required.

The feed balance index may be applied also to the analysis of livestock productivity, e.g. dairy cow milk yield.

Deviation evaluation alternatives

This method, which could be called "the method of symmetrical deviations transfer", may be seen as an alternative method to the one used in statistics, "the sum squared deviation method", in which no negative mutual flattening or deletion of deviations take place. Technically, the proposed alternative method can be applied in practice. However, in that case it is more difficult to show the transformation (reduction) process. Specifically, axis $C_t = 1.00$ should be considered as 0 axis; values that are smaller than $C_t = 1.00$ should be regarded as negative; values that are greater than $C_t = 1.00$ as positive. According to the proposed method of symmetrical deviations transfer, the values that are greater than $C_t = 1.00$, are not transformed (reduced), but the correction factor is applied in the first degree.

Statisticians apply the method of the sum squared deviations, which excludes mutual flattening of deviations, if some indicators have both positive and negative deviations. When there is no need to deal with negative deviations, which require additional mathematical operations in statistics, the problem of negative deviations may be neglected.

In this scientific study the author had to deal with the problem of negative deviations and thus there emerged the necessity to perform additional mathematical operations and other operations with them. Also the author had to consider uneven deviations from some basic values, which could be recognized as acceptable, for example, protein is allowed 20% deficit and 60% surplus. Technically, the squared deviation method can be applied even in cases when additional mathematical operations with negative deviations have to be carried out. However, it may require several additional assumptions, which will over-complicate the application of this method.

In order to solve not only the above mentioned problem, but also others that may arise, the author has developed a method that could be called "the method of symmetrical deviation transfer". In geometrical interpretation of this method the following designations and assumptions are used (see Figure 3.7.2):

- The ray corresponding to basic values (in this case the perfect balance);
- The ray corresponding to the deviation from the basic value less than 1.000 (in this case deviation from the ideal balanced state);
- The ray corresponding to the deviation from the basic value more than 1.000 (in this case deviation from the ideal balanced state);
- All rays exit from one centre;
- Angle $-\alpha_1$ is equal to the angle between the rays representing the basic value and deviation thereof which is less than 1.000;
- Angle α_2 is equal to the angle between the rays representing the basic value and the deviation thereof greater than 1.000.

Angles α_1 and α_2 are measured not in degrees or radians, but in conditionally accepted decimal units of measurement. This system of measurement does not require to provide the precise visual representation of the angle, but rather to show the deviation reduction and other manipulations by schematic rays corresponding to the size of the angle. This representation is illustrative enough for the set task, i.e. to exemplify the method of deviation symmetrical transfer. The traditional technique used in designating the values of angles, is a relatively time-consuming process, which in this case is not justifiable.

The method of deviation symmetrical transfer may be combined with application of the algebraic method of deviation interpretation. However, when the method of algebraic interpretation is applied and the subsequent operations are required (multiplication, summation, etc.) the picture is not as illustrative as when deviation geometric interpretation is used.

Economic importance of the feed balance index

Latvian National Collaborative Computing Centre under LR Agro-industrial Committee designed a special program for feed consumption analysis in production of farm animal products of various kinds. On demand of farming enterprises the Centre analyzed consumption of various kinds of feed materials, including also the relation of actual consumption to standard or normative consumption, and determined the feed balance index as one value for housing and grazing seasons, for the whole year and for all feeding elements, digestible protein, carotene, sugar and crude fibre. This one value index was easy to use, and programmers could always add new information to the data already available, determine the required values, and provide the required parameters.

In our opinion the feed balance index should not be determined as one value for the whole year as the obtained results would be incorrect. For instance, in summer carotene is in surplus, but in winter in deficit, and the summer surplus physiologically is not compensated during winter. For this reason group index C should be calculated according to formula (3.7.13).

The following most common regression equations for all groups were determined from mathematical sets:

$$y = Ax + B \quad (3.7.13)$$

$$y = A / x + B \quad (3.7.14)$$

$$y = A * \ln x + B \quad (3.7.15)$$

$$y = e^A + x^B \quad (3.7.16)$$

$$y = e^{Ax} + B \quad (3.7.17)$$

$$y = A * x^B \quad (3.7.18)$$

$$y = A * e^{Bx} \quad (3.7.19)$$

Preparing figures for computer-based calculations, the units of measurement for values x and y should be selected so that their accuracy was identical, otherwise the calculated results would be incorrect.

If regression equations are applied mostly for calculating resulting characteristics of predicted values for some units of mathematical sets, then the variables of correlation ratio may be recognized as variables of regression equations. Qualitative variables of regression equations may be determined by means of variance analysis applying f-criterion.

This calculation is quite complicated, but the variables of correlation ratio may also be determined empirically. In our case the gradation system described by Krastins (Krastins, 1985), which is sufficiently precise, is applicable.

Correlation ratio of the feed balance index and standard milk yield

The feed balance index is $C = x$ and milk yield with the standard fat content $Y_{standard} = Y_s = y$. Correlation ratio $|R|$ or $|i|$ is less than 0.4, which means that it may be neglected (Krastins (1985)). This is justified by the practical necessity to balance the feed stuff also for a dairy herd with low yield, in which case C and Y_s are not correlated.

From the point of view of economic justification for production of 1 unit of output it is necessary to use more feed materials. Physiological justification: a low yield is a result of insufficient feeding, although the feed material may be balanced, i.e. less energy turns into milk. For instance, at the feeding level that ensures the milk yield 2500 kg per year per cow, 46% of forage energy turns into milk, but at the milk yield 5000 kg per year per cow, 60% of forage energy turns into milk (Rubanovskis, 1991). Thus the cost of consumed feeding material at lower levels of yield will be higher and the production cost of such milk will be higher too.

Correlation ratio of reduced value of production cost

$$/PC_{red} = C \cdot PC = x/ \text{ and milk yield } /Y_{standard} = y/$$

In order to determine this correlation ration, a new term PC_{red} - production cost reduced – is introduced. The production cost reduced is the cost of production, in this case the production of milk, multiplied by C .

Let us assume that $Y_{standard}$ and PC_{red} have a correlation ratio that cannot be neglected. Then we determine $C_{average}$ according to the above described method designed by the Computing Centre: for the feed units of the housing season, digestible protein, carotene, sugar, sugar to protein ratio and crude fibre, and for the same parameters of the grazing season except for carotene.

The algorithm of calculation $C_{average}$ will be the following: the entries for factual (F) and normative (N) values F/H are filled in by the Computing Centre; the reduced values of feed balance index are introduced in Column C_g . If F/N is larger than 1.000 ($F/N > 1.000$) then the relevant value is transferred from column F/N to Column C_g . According to Appendix 1 corrections are entered to Column 'Corrected', and the feed balance index for housing and pasture seasons is shown in Table 3.7.7

Table 3.7.7

Algorithm for determining the average balance factor of feed

Feed units				Protein					
Housing season		Grazing season		Housing season			Grazing season		
F/N	R	F/N	R	F/N	R	F _{cor}	F/N	R	F _{cor}
1	2	3	4	5	6	7	8	9	10
Carotene				Sugar					
Housing season			Housing season			Grazing season			
F/N	R	F _{cor}	F/N	R	F _{cor}	F/N	R	F _{cor}	
11	12	13	14	15	16	17	18	19	
Crude fibre						Balanced feed rations			
Housing season			Grazing season			Housing season	Grazing season		
F/N	R	F _{cor}	F/N	R	F _{cor}	C _h	C _g		
20	21	22	23	24	25	26	27		

Source: composed by author

$$C_h = (2+6x7+12x13+15x16+21x22) / 5 \quad (3.7.20)$$

$$C_g = (4+9x10+18x19+24x25) / 4 \quad (3.7.21)$$

$$C_{average} = (C_h + C_g) / 2 \quad (3.7.22)$$

calculated according to the formulation:

$$C_h = (2+6+x7+12x13+16+21x22):5 - \text{for housing season}$$

$$C_g = (4+9x10+19+24x25):4 - \text{for grazing season.}$$

The average feed balance index for the whole year is calculated according to formula 3.7.13

In the described procedure the symbols correspond to:

F/N - ratio of factual consumption to standard consumption;

R - reduced value;

F_{cor} - correction factor, which expresses the physiological influence of the feed element balance index;

$C_{h/average}$ - average feed balance index for the housing season;

$C_{g/average}$ - average feed balance index for the grazing season;

1, 2, 3, 4 ... 25, 26, 27 - numbers of columns (Table 3.7.7)

A. Regression equations for groupings of farms in administrative territorial districts showed the following values of correlation ratio:

- $R < 0.4$ – 15% from the total number of members of the mathematical set;
- $0.4 \leq |R| < 0.7$ – 39.0% from the total number of members of the mathematical set;
- $0.7 \leq |R| < 0.9$ – 46.0% from the total number of members of the mathematical set.

B. Regression equations for Latvian agro-economic groups showed the following values of correlation ratio:

- a) $|R| < 0.4$ – 3.0% from the total number of members of the mathematical set;
- b) $0.4 \leq |R| < 0.7$ – 37% from the total number of members of the mathematical set;
- c) $0.7 \leq |R| < 0.9$ – 60% from the total number of members of the mathematical set.

C. Regression equations regarding milk yield showed the following values of correlation ratio:

- a) $|R| < 0.4$ – 75% from the total number of members of the mathematical set;
- b) $0.4 \leq |R| < 0.7$ – 25% from the total number of members of the mathematical set;
- c) $0.7 \leq |R| < 0.9$ – 10% from the total number of members of the mathematical set.

The symbols used refer to:

i – correlation index;

R – correlation ratio.

The above described data for the groupings (A – C) show that the reduced production cost PC_{red} and milk yield $/Y_s/$ in the majority of cases are closely correlated – $0.7 \leq |R| < 0.9$, or significantly correlated – $0.4 \leq |R| < 0.7$. The closest correlations occur in farms integrated in agro-economic groups as they are better accomplished to meet agro-economic conditions of animal farming. The smallest correlation ratios were obtained in the data analysis of farms grouped according to milk yield (**Grouping B**). This category of grouping is not important, because its insignificant correlation ratios may be neglected.

The best results deduced from the above described regression equations were:

a) $y = e^{Ax} + B$ (3.7.17) - 51.4% from the total number of members of mathematical set (578 Latvian farms, including agro-industrial districts and taking into account mean values of their agro-economic average performance in the republic within a period of five years gives $578 \cdot 6 = 3468$ members of the mathematical set).

b) $y = e^A + x^B$ (3.7.16) - 25.7%. The remaining seven regression equations showed just 22.9% (combined).

Thus the optimal regression equation for correlation ratio of the reduced production cost and standard milk yield will be:

$$y = e^{Ax} + B \quad (3.7.23)$$

The most permanent and high correlation ratio was shown by the regression equation (3.7.14), which represented Aluksne district (within 0.6733-0.8619). The best correlation ratio was shown in the regression equation (3.7.18) representing Gulbene district in 1987 - 0.9126 (other results were all within 0.6676-0.8316).

The above described results are final, i.e. without intermediate results. By way of example in Appendix 1, a broader picture of data processing operation is given. The example includes 30 collective farms and state owned agricultural enterprises where in 1987 the highest standard milk yield was received (items 1-30), administrative districts on average countrywide (items 31-57), and 30 collective farms and state owned agricultural enterprises where in 1987 the lowest standard milk yield was received (items 58-87).

The following figures are given for all items from 1 to 87: standard milk yield (columns 5, 8, 11, 14, 17, 20), reduced production cost (columns 4, 7, 10, 13, 16, 19), feed balance index values (columns 3, 6, 9, 12, 15, 18). These figures allow assessing the performance of a particular enterprise within the marked period or on average for the period of 1983-1987.

Appendix 1 shows the correlation ratio for the periods and groupings under review according to 5 most widely applied regression equations that had produced the best results:

$$y = Ax + B \quad (3.7.13)$$

$$y = A / x + B \quad (3.7.14)$$

$$y = A * \ln x + B \quad (3.7.15)$$

$$y = e^A + x^B \quad (3.7.16)$$

$$y = e^{Ax} + B \quad (3.7.17)$$

The obtained correlation ratios are summarized in Table 3.7.8., where

- a) $|R| < 0.4$ - 0.0%
- b) $0.4 \leq |R| < 0.7$ - 16.7%
- c) $0.7 \leq |R| < 0.9$ - 83.3% - from sum total of all members of the mathematical set.

The best correlation ratio is represented in the regression equation (3.7.17) - 75% from all members of the mathematical set.

Appendix 1 shows "close" and "significant" correlation ratios (according to the absolute values of R). The best result is shown in *Variant "B" 3* (see Table 3.7.8).

Table 3.7.8

Correlation ratios for the reduced cost and standard milk yield

Years	Regression equations and correlation ratios				
	$y = Ax + B$	$y = A / x +$	$y = A * \ln x + B$	$y = e^A + x^B$	$y = e^{Ax} + B$
	1	2	3	4	5
A. Districts and national average values (items 31-57, Appendix)					
1983	- 0.4903	0.4824	- 0.4866	- 0.5225	- 0.5286
1984	- 0.4322	0.4497	- 0.4414	- 0.4513	- 0.4440
1985	- 0.7204	0.7343	- 0.7288	- 0.7395	- 0.7348
1986	- 0.7180	0.7242	- 0.7218	- 0.7185	- 0.7177
1987	- 0.7774	0.7742	- 0.7781	- 0.7774	- 0.7866
Average of period 1983-1987					
	- 0.7247	0.7312	- 0.7295	- 0.7401	- 0.7391
B. All groupings (items 1-87, Appendix)					
1983	- 0.7160	0.7283	- 0.7287	- 0.7831	- 0.7765
1984	- 0.7646	0.8051	- 0.7980	- 0.8180	- 0.7928
1985	- 0.7635	0.8097	- 0.7948	- 0.8184	- 0.7956
1986	- 0.7637	0.7815	- 0.7815	- 0.8079	- 0.7958
1987	- 0.7450	0.7917	- 0.7834	- 0.8118	- 0.7778
Average of period 1983-1987					
	- 0.8052	0.8241	- 0.8218	- 0.8571	- 0.8484

Source: composed by author

Table 3.7.8 shows optimal regression equations produced by high correlation ratios.

If we insert the reduced value of production cost in the respective regression equation ($PC_{red} = C \cdot PC = x$) we shall obtain the estimated standard milk yield (Y_s) for a specific agro-economic enterprise.

The same principle may be applied when the influence of C on the milk yield rate needs to be analyzed. For this purpose, not the factual C should be inserted in columns 3, 6, 9, 12, 15, and 18 of Appendix, but its reduced value C_{red} .

The obtained conditional reduced production cost would correspond to the performance based on better balanced feed materials.

Thus, in 1983-1987 national average was $C = 1.14$ (see Appendix), correspondingly $x = 33.47$. If for the given period the balance index value C was improved by 0.05, then $C_{red} = 1.14 - 0.05 = 1.09$ and the conditional reduced value of the production cost for milk would be:

$$PC_{red} = 32.00 \quad (3.7.24)$$

If we insert x_{red} in the regression equation, we shall obtain a respective estimated yield, which shows a hypothetically possible yield per cow on condition that the feed balance index was enhanced (in this example by 0.05). Table 3.7.9 describes the algorithm of efficiency determination for the improved feed balance index.

The program was based on national average key values for the feed materials chemical composition, but for the farm "Krimulda" these values were higher (see Table 3.7.10) except for calcium. Recalculation of the feeding program was accomplished in the following way: they applied factual values of the feed material chemical composition (see Table 3.7.11), determined the ratios of nutritive elements (see Tables 3.7.12 and 3.7.13.), increased the content of grass feed in fodder (according to available feed reserves), and determined the feed balance index values (see Tables 3.7.12 and 3.7.13).

Table 3.7.9

**Algorithm for determination of the basic standard milk yield gain
due to the improved feed balance index**

Name of farm, region etc.	Improved feed balance index		Reduced cost of 1 dt of milk, in RUB*	
	Average	Reduced	At the mean value of balance index x_i	At the reduced value of balance index x_i'
1	2	3	4	5
Basic standard milk yield per year, in dt	Estimated annual milk yield (according to trend lines), in dt		Ratios of estimated yields 8:7	Basic standard milk yield gain dt (9x6)-6
	At the mean value of balance index y_i	At reduced value of balance index y_i'		
6	7	8	9	10

* Can be in any currency, in this case the Soviet Ruble before 1998 (RUR)

Table 3.7.10

**Modified feed materials for the dairy herd on experimental farm "Krimulda" in the
period 3.10.1987 to 30.04.1988**

Feed materials			Feed material comprises, in kg				
Names	Division	Quantity, in kg	Feed units	Protein	Sugar	Carotene	
Hay	Per unit	1	0.500	0.470	0.0400	0.002324	
	In total	1667000	833500	78349	66680	3874	
	Per unit	1	0.522	0.0738	0.1110	0.004220	
	In total	1667000	870174	123025	185037	7035	
Silage	Per unit	1	0.160	0.0140	0.0020	0.00276	
	In total	2430000	388800	34020	4860	6707	
	Per unit	1	0.200	0.213	0.0045	0.00286	
	In total	2430000	486000	51759	10935	6950	
Haylage	N	Per unit	1	0.300	0.0300	0.0350	0.00320
	In total	77300	23190	2319	27055	247	
	F	Per unit	1	0.300	0.0394	0.0456	0.00672
	In total	77300	23190	3046	35249	519	
In total	By normative standards		1245490	114688	98595	10828	
	In actual practice		1379364	177830	231221	14504	
Monocalcium phosphate		8500					
Compound animal feed	Per unit	1	0.972	0.134	0.027	0.0018	
	In total	137730	133874	18456	3719	248	
Planned deficit of fodder		x	0.0	35900	125700	2843	
Balance of changes		x	0.0	8786	3207	585	
Feed materials			Feed material comprises, in kg				
Names	Division	Fat	Feed dry matter	Crude fibre	Calcium	Phosphor	
Hay	N	Per unit	0.0211	0.850	0.265	0.00662	0.001976
	In total	35174	1416950	441755	11036	3294	
	F	Per unit	0.0281	0.894	0.300	0.00512	0.001976
	In total	46843	1489798	500267	8535	3317	
Silage	N	Per unit	0.0064	0.200	0.770	0.001868	0.00043
	In total	15552	486000	170100	4539	1045	
	F	Per unit	0.0082	0.303	0.111	0.000619	0.00039
	In total	19926	735804	269001	1504	948	
Haylage	N	Per unit	0.0123	0.440	0.180	0.004187	0.001063
	In total	951	340120	139140	324	822	
	F	Per unit	0.0133	0.526	0.178	0.003470	0.001300
	In total	1028	406598	137594	268	1005	
In total	By normative standards	51677	2243070	750995	15899	5161	
	in actual practice	67797	2632200	906862	10307	5270	
Monocalcium phosphate					6900	1600	
Compound animal feed	Per unit	0.00251	0.862	0.076	0.009125	0.009725	
	In total	346	118723	10467	1257	1339	
Planned deficit of fodder		22893	232690	105570	0.0	0.0	
Balance of changes		- 7119	37717	39830	51	370	

N - by normative standards, chemical composition according to the data of the Computing centre

F - in actual practice, factual chemical composition according to laboratory analyses

Source: The author's calculations according to the data on file provided by research experimental farm "Krimulda"

Effect of corrected feed material composition on its balance index and cost

The balance of feed elements in a feed material defines its quality. The following is the analysis of various feeding materials at the research experimental farm "Krimulda" in 1989-1990 during the housing period from 3.10.1989 to 30.4.1990. The Computing Centre designed feeding programs for the dairy herd comprising 1450 animals and fattening herd comprising 4000 animals.

Table 3.7.11

Provision of the dairy herd with fodder on the experimental farm "Krimulda" in the period 3.10.1987 – 30.04.1988 (in %)

Fodder in units of measurement	Quantity	Protein	Sugar	Carotene	Fat	Feed dry matter	Crude fibre	Calcium	Phosphor
1	2	3	4	5	6	7	8	9	10
1. Modified fodder Standard consumption in centners	37881.11	3791.11	3610.94	185.77	1083.10	41595.64	10665.55	454.95	259.19
Actual supply in centners	37876.22	3879.00	3642.91	191.62	1011.91	41972.81	11063.85	455.46	262.89
Estimation %	100.0	102.3	100.9	103.1	93.4	100.9	103.7	100.1	101.4
2. Given feed material as planned Standard consumption in centners	37881.11	3791.14	3610.94	185.77	1083.10	41595.64	10665.55	454.95	259.19
Actual supply in canters	37876.22	3432.14	3485.24	157.34	854.17	39268.74	9609.85	454.95	259.19
Estimation %	100.0	90.5	96.5	84.7	78.9	94.4	90.1	100.0	100.0

Source: author's calculations according to data on file provided by research experimental farm "Krimulda"

Table 3.7.12

Balanced state of planned fodder on the experimental farm "Krimulda"

Names of nutrients in fodder	Supply, in kg		Fodder balance index	Reduced values of fodder balance index
	by normative standards	in actual practice		
1.	2.	3.	4.	5.
Feed units	3788111	3787622	1.000	1.000
Protein	379114	343214	0.905	1.095
Carotene	18577	15734	0.847	1.153
Sugar	361084	235384	0.652	1.348
Fat	108310	85417	0.789	1.211
Crude fibre	1066555	960985	0.801	1.099
Feed dry matter	4159566	3926874	0.944	1.056
Calcium	45495	45495	1.000	1.000
Phosphorus	25919	25919	1.000	1.000

Source: author's calculations according to data on file provided by research experimental farm "Krimulda" (3.10.1987-30.04.1988)

The recalculation stated that proportions of silage, hay and haylage had changed. Correspondingly proportions of mineral additives had changed too. The following results were obtained (Rubanovskis, 1991):

Table 3.7.13

Balanced state of modified fodder on the experimental farm "Krimulda"

Names of nutrients in fodder	Supply, in kg		Fodder balance index	Reduced values of fodder balance index
	by normative standards	in actual practice		
Feed units	3788111	3787622	1.000	1.000
Protein	379114	378900	0.977	1.023
Carotene	18577	19162	1.031	1.031
Sugar	361084	364291	1.009	1.009
Fat	108310	101191	0.934	1.066
Crude fibre	1066555	1106385	1.037	1.037
Feed dry matter	4159564	4197281	1.009	1.009
Calcium	45495	45546	1.001	1.001
Phosphorus	25919	26289	1.014	1.014

Source: author's calculations according to data on file provided by research experimental farm "Krimulda" (3.10.1987-30.04.1988)

Table 3.7.14

The cost price of a feed unit depending on the quality of fodder (3.10.1987-30.04.1988)

Ratios	The cost price of 1 t of feed units										
	grade I	grade II	Appreciation, in %		Grade III	Appreciation, in %		Grade IV	Appreciation, in %		Average
			To grade I	To next grade		To grade I	To next grade		To grade I	To next grade	
1	2	3	4	5	6	7	8	9	10	11	12
Perennial grass hay:											
1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.	12.
A) RUB/t of feed units;	57.40	64.00	11.5	11.5	70.90	23.5	10.8	80.90	40.9	14.1	67.60
B) in % to the average value	84.9	94.7	X	X	104.9	X	X	119.7	X	X	100.0
Haylage:											
A) RUB/c of feed units;	85.30	86.80	1.8	1.8	98.10	15.0	13.0	X	X	X	88.30
B) in % to the average value	96.6	98.3	X	X	111.1	X	X	X	X	X	100.0
Silage made of wilted grass:											
A) RUB/c of fodder units;	95.50	100.80	5.5	5.5	108.90	14.0	8.0	X	X	X	101.20
B) in % to average value	94.40	99.6	X	X	107.6	X	X	X	X	X	100.0
Silage made of corn and other silage crops											
A) RUB/c of fodder units;	115.30	155.40	0.1	0.1	179.90	15.8	15.8	219.30	41.2	41.1	178.60
B) in % to the average value	87.0	87.0	X	X	100.7	X	X	122.8	X	X	100.0

Note: RUB, the Soviet currency before 1997

Source: author's calculations according to agricultural statistics for 1987-1988

- 133730 of feed units were saved for the whole housing season;
- feed balance index was improved by 0.099 per unit – $C_{planned} - C_{corrected} = 1.120 - 1.021 = 0.099$;
- corrected overall ration for the bovine cattle was cheaper than previously planned by 15,196.98 RUB;
- improvement of feed balance ratio by 0.1 per feed unit effected saving of 15,300 RUB. Therefore, feed balance index should be taken into account when feed ration is planned.

Effect of improved feed balance index on the quality of feed material and reduction of wastage

The efficiency of a feeding material largely depends on its quality. When it is of low quality animals do not get nutrition as required and do not provide the expected producing ability. The Academy Fellow of VASHNIL (Russian abbreviation meaning the All-Union Academy of Agricultural Sciences) K. Solntsev calculated the quality factor of feeding materials. According to him, this quality factor depends on the efficiency of conservation methods, which retain organic, mineral and biological substances in the form available for animals, and provides more objective criteria for valuation of feeding materials quality and nutritive value (Rubanovskis, 1991).

The content of fodder units in the natural weight of fodder decreases in the fodder of lower grades, and the production cost of one fodder unit increases by 14-37% for 1st - 4th grade (Rubanovskis (1991')). There is also certain regularity in the correlation between the production cost of 1 fodder unit and the total content of fodder units in the feed ration, which may be expressed in the following regression equation:

$$y + 22.38 \cdot 1/x + 17.02 /R = 0.987/ \quad (3.7.25)$$

where: y is the production cost of 1 fodder unit;

x – the amount of fodder units in 1 kg of feed ration.

The equation shows the inverse curvilinear relationship between the production cost and the amount of fodder units.

If the fodder quality is not taken into account when the feed ration nutrient density is valued, then animals will have productive ability lower than predesigned. For instance, if lactation cows are fed by rough and succulent fodder of 1st grade, then for the production of 10 kg of milk their ration should be supplemented with 2.5 kg of mixed cattle feed. If fodder is of 3rd grade, then already 7 kg of mixed cattle feed is required per cow and the overconsumption of concentrated cattle feed will amount to 550-600 kg per year.

The inspection data of national agro-industrial enterprises in the period of 1985-1987 concerning the fodder quality are summarized in Table 2.15.

If data of Table 2.15. were based on 80% of 1st grade fodder and 20% of 2nd grade, then the average production cost of 1 fodder unit of hay, silage and haylage would be lower by 3.0-4.7% (for hay by 0.2%, silage by 3.1-5.9% and haylage by 4.7-5.1%).

Quality variations even within one grade are important indicators of the feed material quality. For example, the quality indicators on two farms with excellent grades of haylage were compared according to laboratory evaluations:

1) Yaunpils experimental livestock farm in Tukums district notable for its excellent haylage because of well-adjusted mechanism of haymaking and storage; and

2) Research and experimental farm "Krimulda" in Riga district, with lower quality indicators for haylage regarding feed units, protein, sugar, crude fibre, etc., although the pattern of fodder crops is similar on both farms, which explained the choice for comparison of these particular farms.

According to the author's calculations (Rubanovskis, 1991) the improvement of quality indicators for haylage on farm "Krimulda" up to the level of indicators on Yaunpils farm allowed saving of 5411 kg of feed units, i.e. in monetary terms 608.33 RUB, or 5567 kg of compound animal feed. This again points to the fact that the valuation of fodder according to the grades of quality is less reliable than valuation according to the feed balance factor.

The scientific approach to feeding animals has recently been expressed in attention to the feed material balance factor. In the production of milk, as is seen in Latvian statistics countrywide in 1984-1987 the balance factor of feeding materials improved on an average from 1.21 to 1.11 (in 1984 - 1.21; in 1985 - 1.15; in 1986 - 1.12; in 1987 - 1.11). Year 1983 is not representative as the feed ration standards were changed then. Accordingly, milk yield per cow increased from 35.86 centner to 40.89 centner on an average (35.86 in 1984; 38.34 in 1985; 39.76 in 1986; 40.89 in 1987), which is by 5.03 centners.

Table 3.7.15

Qualitative characteristics for basic rations on Latvian farms for 1985-1987

№	Grade	Hay	Haylage	Silage
1.	I – II	81-95	84-86	79-98
2.	III – IV	5-19	-	2-21
3.	III	-	14-16	-

Note: grade IV is undergrade.

Source: agroindustrial statistics for 1983-1987

This increment in yield Y_{incr} attributable to the feeding factor F_f is calculated according to:

$$Y_{incr} = Y \cdot F_f + 5.03 \times 0.59 = 2.97, \text{ in centner} \quad (3.7.26)$$

Where Y_{incr} is increase in milk yield in centre and F_f equals to 0.59 because in Latvia the productivity of animals is determined up to 59% by the feeding factor.

Let us consider what increment in milk yield per cow may be calculated according. The basis of estimation will be data of 1984 with due consideration of the improved balance factor by 0.1 per unit.

The best correlation ratio is shown in the regression equation (3.7.17):

$$y = e^{Ax} + B = e^{-0.0306x} + 4.4721 \quad (R = -0.818) \quad (3.7.27)$$

The relevant figures are inserted in the algorithm of Table 2.9 and further calculations are performed according to equation 3.7.27.

J. Mikens and A. Rubanovskis (Mikens and Rubanovskis (1989)) analyzed the impact of fodder wastage during extraction, transportation and feeding on the economic evaluation of feed materials (Table 3.7.16).

Table 3.7.16

**Impact of fodder wastage during extraction,
transportation and feeding on the economic evaluation of feed materials**

№	Fodder	Normative losses	Real losses including			
			In total	In storage	On transport	Remained in feeding trough
1.	Hay	1.1-1.6	4-11	2	2-9	-
2.	Haylage and pre-wilted silage in trenches	15	22-29	10-12	5-8	7-9
3.	The same in sealed forage towers	15	1,2	-	-	-
4.	Silage from silage crops	15	28-38	15-18	5-8	8-12
	Feeding root crops	2.8-3.0	14	-	-	-

Source: Mikens and Rubanovskis (1989)

When feeding materials are valued from the standpoint of economic potential, this wastage is usually not taken into account, but is included in the costs of animal production. As a consequence, the consumption of fodder per 1 unit of production exceeds zoo technically validated rates. Actual wastage usually exceeds normative standards significantly, and depends on the type of storage place, methods of extraction, transportation and delivery. As a rule, the natural weight of fodder is usually written off instead of its cost, which increases significantly the cost of 1 unit of consumed fodder. For instance, the cost of actually consumed hay, made of perennial grasses, increases on an average by 3.9%; that of haylage and pre-wilted silage from concrete trenches by 33.2%, from forage towers of "Vitkovets" type by 1.5%, silage made of silage crops by 42.1%, feeding root crops by 16.2% (Rubanovskis, 1991).

Most significantly the quality of feeding materials is affected by storage method and storage period of virtually all kinds of feeding materials: grain feed, hay, grass meal, root

crops and presser (pulp) (Mikens J. and Rubanovskis A. (1989)). For instance, according to Belgorod Research Institute of animal husbandry, carotene is preserved best of all when grass meal is stored in nitrogen medium (Table 3.7.17).

The choice of fodder storage technology depends largely on the possibilities to build necessary structures and buildings. It is therefore necessary to balance the local food resources and needs with feed storage technology, building capabilities and financial ability. For instance, when choosing silage storage technology it is necessary to seriously consider different options, as according to all indicators airtight towers are twice costly than unsealed towers, but keeping silage in sealed towers ensures much higher quality (Table 3.7.18.).

Table 3.7.17

Carotene content in grass meal depending on the storage method

№	Method of storage	Carotene content				
		Upon placement in storage	In 2 months		In 12 months	
			Mg/kg	%	Mg/kg	%
1.	Conventional stack yard	197	88	44.7	36	18.2
2.	Cold store chamber	197	140	71.1	93	47.2
3.	Nitrogen medium	197	197	100.0	134	68.0
4.	Carbon dioxide medium	197	147	74.6	112	56.9
5.	Addition of sodium pyrosulphate	197	143	72.6	125	63.5

Source: according to Belgorod research Institute of animal husbandry

The amount of wastage largely depends on fodder harvesting technology. For instance, if clover should not be exposed to the sun, then it should be dried indoors scattered in a thin layer.

Table 3.7.18

Costs of storage of silage in different containers (%)

№	Criteria	Trenches	Towers	Airtight towers
1.	Capital investments on 1 cubic meter of silage	100	200	400
2.	Annual depreciation and maintenance on 1 cubic meter of silage	100	200	400
3.	Total storage costs of 1 ton of dry weight (mass)	100	283	565

Source: Mikens and Rubanovskis (1989)

Fodder wastage may be reduced at all stages of processing and depends on:

- methods and place of haymaking and drying, when the optimal time and cutting height are taken into account;
- method of storage, the choice of the storage place and the ways of fodder preparation, e.g. conservation, silage making, etc.;
- methods of transportation;
- methods of feeding, including preparation, delivery and dispensation, e.g. feeding with combined fodder enriched with vegetable oil increases milk yield by 9.8% on average, feeding with unpelletized wet combined fodder reduces its wastage by 7-9%.

Therefore, it may be concluded, that in this regard, such specialists as agriculturists, farm machinery operators, herd managers, crop growers and stock raisers employed in the sphere of animal husbandry will continue to be required.

Main Conclusions of Part 2

In order to exclude the cross alignment of separate nutrient balance factors, which may lead to a wrong assessment of the degree of the balanced state of a feed element or ration, it is recommended to apply the method of symmetric transfer, thus making all balance factor values greater than 1.000. Mathematical relationships that include fodder balance factors take into account correlation ratios and productivity indicators such as the milk yield of dairy cows.

The fodder balance factor is applicable in designing animal feed rations and in clearing payments with the suppliers of animal feed or fodder.

Fodder balance degree assessment principles are applicable also to nutritional balance degree assessment of food products. In this case further scientific research will be necessary, similar to the research conducted for livestock feed, in which field the scientists have already achieved good results.

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