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**LOCAL PRODUCTION SYSTEMS:  
ANALYSIS AND FORECASTING  
OF REGIONAL ECONOMIC  
DEVELOPMENT**

Edited by  
A.S. Novoselov, V.E. Seliverstov

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This collection of papers contains the results of research carried out by the participants of the «International Project FOLPSEC № 295050 within the 7th EU Framework Programme FP7-PEOPLE-2011 IRSES» «Functioning of the Local Production Systems in the Conditions of Economic Crisis (Comparative Analysis and Benchmarking for the EU and Beyond)».

These papers study the following problems: general approaches to forecasting the development of local production systems (LPS), the possibilities of LPS-based clusters formation, methodological approaches to the creation of LPS, strategic planning of regional development, innovativeness of clusters, program approach to environmental management, local production system management, governance of local production systems in Bulgaria, Poland, Slovakia, Ukraine and Russia.

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## PREFACE

Local production systems (LPS) could be defined as a «territorial union of economic, political and social actors, whose efforts are focused on a specific group of interrelated activities» (definition is given by Local Production and Innovation System Research Network). Challenges of LPS development and functioning at the level of a region and of a country as a whole are in the focus of many researchers today.

This book being the second edition of the Institute of Economics and Industrial Engineering of the Siberian Branch of the Russian Academy of Sciences (IEIE SB RAS) collection of academic papers prepared by the participants of the International Project FOLPSEC is one of the main outputs of the project. The first edition – «Local Production Systems and Regional Economic Development» (ed. by A.S. Novoselov and V.E. Seliverstov) was published in 2014. Additionally, some of the results of studies on LPS carried out by researchers participating in FOLPSEC project have been published in the collection of scientific papers «Problems in the management of socio-economic development of regions of Siberia» (ed. by A.S. Novoselov, 2013) by the IEIE SB RAS.

Project FOLPSEC is one of the research projects of the 7th Framework Programme of the European Union FP7-PEOPLE-2011 IRSES «Functioning of the Local Production Systems in the Conditions of Economic Crisis (Comparative Analysis and Benchmarking for the EU and Beyond)» – FOLPSEC, № 295050. The Institute of Economics and Industrial Engineering, Siberian Branch of the Russian Academy of Sciences is one of the research participants of this project. Project Coordinator is the University of National and World Economy (Sofia, Bulgaria). Other participants in the project are Novosibirsk State University (Novosibirsk, Russia), the University of Lodz (Lodz, Poland), University of Matej Bel (Banska Bystrica, Slovakia) and Ternopil National Economic University (Ternopil, Ukraine).

The project is aimed at deepening theoretical research of local production systems (LPS) establishment, development and their functioning under current economic environment and their practical implementation to meet the challenges related to the world crisis overcoming. The objectives of the project are as follows:

- To exchange knowledge on research of approaches in studying LPS and to elaborate recommendations for implementation of EU good practices in the conditions of economic crisis;
- To share the results of research of LPS functioning conducted by the Project participants for speeding up regional social and economic development and overcoming regional disparities;
- To make use of knowledge gained and good practices identified for research and teaching purposes at all partners' institutions;
- To establish long-term research cooperation between the EU and Third countries and to strengthen joint research and partnerships.

An important role in this project belongs to the program of the exchange of researchers and to the greatest possible practical acquaintance with different kinds of LPS in the participating countries, as well as meetings with representatives of business and local authorities.

Within the framework of the implementation of this item of the project, each participating country has made a significant contribution to the organization and organization and realization of study visits to various LPS to examine the practical experience of their formation and operation. So extensive programs of visits were provided by all participating countries, and included not only visits to various LPS (including technoparks, clusters, special economic zones, and so on.) but acquaintance with approaches to their formation and received practical results, but also meetings with representatives of government and business structures.

In particular, the Institute of Economics and Industrial Engineering of the SB RAS has prepared and implemented a program of joint-training activities with the scientists from Bulgaria, Poland and Slovakia, including a number of scientific meetings and study visits to the bodies of regional and local authorities, meetings with the representatives of business and universities in Novosibirsk, the town of Koltsovo and Tomsk.

All this allowed to combine theoretical studies and practice of the Novosibirsk and Tomsk regions economic development and to share the results with the partner organizations doing research on LPS functioning. In addition, the participants of the project visited the Ministry of Economic Development of the Novosibirsk region and met with the administration of the Soviet District of Novosibirsk.

Five scientific meetings devoted to the problems of research on the project FOLPSEC (in 2012, 2013 and 2014) were held in the IEIE SB RAS and the program of joint-training activities was implemented.

Three international scientific conferences were also held in the framework of the project in Poland and Slovakia:

1. International Scientific Conference in Series: Knowledge, Innovativeness, Entrepreneurship and Regional Development «Territory and contemporary dilemmas of its development» on the Project FOLPSEC (Functioning of the local production systems in the conditions of economic crisis (comparative analysis and benchmarking for the EU and beyond), 25–26 of October 2013, Lodz, Poland.
2. International Scientific conference «Functioning of the local production systems in the conditions of economic crisis, closing FOLPSEC conference», 16–19 November 2014, Rzeszow, Poland.
3. International Scientific conference «Functioning of the local production systems in the conditions of economic crisis», 26–27 January 2015, Banska Bystrica, Slovakia.

Completed has been the preparatory work for publication of two monographs containing the main results of research carried out within the framework of the FOLPSEC project. One of them, «Local Production Systems in EU Member States and Beyond: from Theory to Practice. Sofia: UNWE, 2015» was prepared in Bulgaria and published in the electronic version. Second – «Functioning of the local production systems in the conditions of economic crisis (comparative analysis and benchmarking for the EU and beyond). – Lodz: University of Lodz, 2015» is published in Poland.

Joint research and scientific visits provided a platform for the direct exchange of scientific ideas and concepts, combining the knowledge and experience necessary to discuss the potential results of research, discussion of methodological approaches to the establishment and development of local production systems of participating countries in the project FOLPSEC.

# GENERAL APPROACHES TO FORECASTING THE DEVELOPMENT OF LPS

## **LPS IN THE CONTEXT OF THE RELATIONSHIP BETWEEN THE SYSTEM OF DOCUMENTS FOR STRATEGIC PLANNING AND PROGRAMMING OF REGIONAL DEVELOPMENT IN BULGARIA<sup>1</sup>**

*Stanka Tonkova<sup>2</sup>*

This article explores options for institutional support for the development of local production systems in the system of documents for strategic planning and programming of regional development and relations between them and the EU regional policy and the country, reflected in the National Development Programme during the programming period 2020: National Regional Development Strategy and Regional Development Plans. Particular attention is paid to the development of local production systems in strategic documents for economic and social development in close connection with the support of cluster development at the national or regional level.

### **INTRODUCTION**

This paper focuses on the system of documents for strategic planning and programming of regional development in Bulgaria and the relationships between them in the context of the main objective of the strategy «Europe 2020» – a European strategy for smart, sustainable and inclusive growth. Presented is the National Strategy for Regional Development, Regional Development Plans, regional development strategies and municipal development plans for sustainable integrated regional development, coordination and concentration of interventions to support the development of regions and municipalities of different territorial levels, as a prerequisite for the development of clusters, a variety of local production systems to accelerate regional development.

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<sup>1</sup> Publication under project 295050 «Functioning of the Local Production Systems in the Conditions of Economic Crisis (Comparative Analysis and Benchmarking for the EU and Beyond)» (FOLPSEC), FP7.

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Matrix includes derived priorities and sub-priorities, areas of impact and planned actions and measures contained in the National Development Programme BG 2020 and related to the development of clusters. strategic objectives in the system of planning documents of regional development with emphasis on cluster development in Bulgaria in the 2014–2020 programming period. Specified are priorities on specific objectives and areas for planning activities to create conditions for the development of clusters in different areas for enhancing the competitiveness of regional economy and economic cohesion of regions.

### **EU REGIONAL POLICY. THE SYSTEM OF DOCUMENTS FOR STRATEGIC PLANNING AND PROGRAMMING OF REGIONAL DEVELOPMENT IN BULGARIA (2012–2022 YEARS)**

After Bulgaria's accession to the EU on 01.01.2007 significant changes in economic, political and international conditions for development of the regions in the country<sup>1</sup> started the implementation of EU cohesion policy for the period 2007–2013, which predetermine the framework of regional development in the Member States in the expiring program period. The main objective of the regional policy of the European Union is to strengthen *economic, social and territorial cohesion (cohesion)* regions and Member States *by reducing disparities between the levels of prosperity and achieve a harmonious, balanced and sustainable development.*

*Community Strategic Guidelines for Cohesion Policy in 2007–2013* was the leading document for the implementation of the policy of economic, social and territorial cohesion in the EU. The emphasis it placed on the concentration of financial resources on a limited number of priorities that influence the formulation and implementation of regional policy. Defined in the Community Strategic Guidelines priorities include: *Europe and its regions – a good place for investment and life; Improving knowledge and innovation for growth; More and better jobs; Territorial cohesion and cooperation.*

As a result of lessons learned from the crisis, Member States are challenged to look beyond the short term. For the EU's exit from the economic and financial crisis in 2010 was adopted strategy «Europe 2020», which defines *priorities, headline targets and initiatives* to stimulate progress on EU priorities. Strategy «Europe 2020» needs a new approach and method of planning and programming of regional development to achieve coordination and linking different policies and national strategies with particular emphasis on territorial cohesion<sup>2</sup>.

In planning and programming period 2012–2022, the strategic planning of sustainable integrated regional and local development up to date following related questions:<sup>3</sup>

- Achievement of the objectives and priorities of the sectoral policies and strategies for the period after 2013, analyzing the territorial aspects and impacts, possible synergies and mechanisms for regional coordination and spatial concentration of resources for development;

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<sup>1</sup> In response to the regional development policy of the EU, taking into account the provisions of EU law and to achieve *vzaimnaobvarzanost* between Bulgarian legislation on regional development and EU legislation and its effective implementation is the Regional Development Act (2008).

<sup>2</sup> For the purpose of EU level is necessary to develop a macro-regional strategies for integrated development within the EU. For Bulgaria matter adoption in 2011 of an EU Strategy for the Danube region. Landmarks of EU cohesion policy are contained in: Regional Policy contributing to intelligent growth within the strategy «Europe 2020» of October 2010, in the Fifth Report on economic, social and territorial cohesion of the EU in November 2010, in the contribution of regional policy for sustainable growth within the strategy «Europe 2020» Progress Report on the strategy «Europe 2020» and others.

<sup>3</sup> Methodological guidelines for the development of the National Strategy for Development of the Republic of Bulgaria (2012–2022), Regional Development Plans for the areas of level 2 (2014–2020), Regional strategies for *razitie* (2012–2020), Municipal Development Plans (2014–2020). Works, S., 2011, pp. 42–44.



- Defining a common approach to decommissioning and coordination of priority areas to support regional development in line with the requirements of EU funds and future operational programs for Bulgaria;
- Interpret and coverage strategies and plans for regional and local development in an appropriate manner the specific contribution of different territorial levels to achieve the overall objectives of the Strategy «Europe 2020», including and the contribution of Bulgarian regions and municipalities to European objectives in the form of «Regional and Local Agenda 2020» presented by specific targets to reach by the end of 2020;
- Integration of environmental aspects into the strategic planning process at regional and local level and taking appropriate action to anticipate and meet the challenges;
- Using the opportunities of the information society in the process of strategic planning by developing integrated information systems for effective monitoring and evaluation of results and impact on regional and local development and achieving compatibility and interaction between systems planning and management information system and monitoring of EU Structural Instruments in Bulgaria;
- European cities are the focus of cohesion policy and financial instruments for economic, social and territorial cohesion. Should therefore seek and apply an integrated approach to solving the problems of urban regeneration and development and strengthening of the city-region<sup>1</sup>;
- Reporting the findings and recommendations contained in the interim evaluations of the implementation of strategies and plans for regional and local development to build a unified database implemented initiatives and projects;
- The effectiveness and efficiency of interventions in regional and local development is increasingly driven by institutional mechanisms for coordination and interaction of controls by territorial levels.

Strategic planning of regional systems covers the development and updating of the system of documents for achieving sustainable integrated regional and local development, including and cross-border, transnational and interregional level. The system of documents for strategic planning of regional development include:<sup>2</sup>

- National Strategy for Regional Development 2012–2022;
- Regional development plans for the 2014–2020;
- Regional development strategies for the 2014–2020;
- Municipal Development Plans 2014–2020;

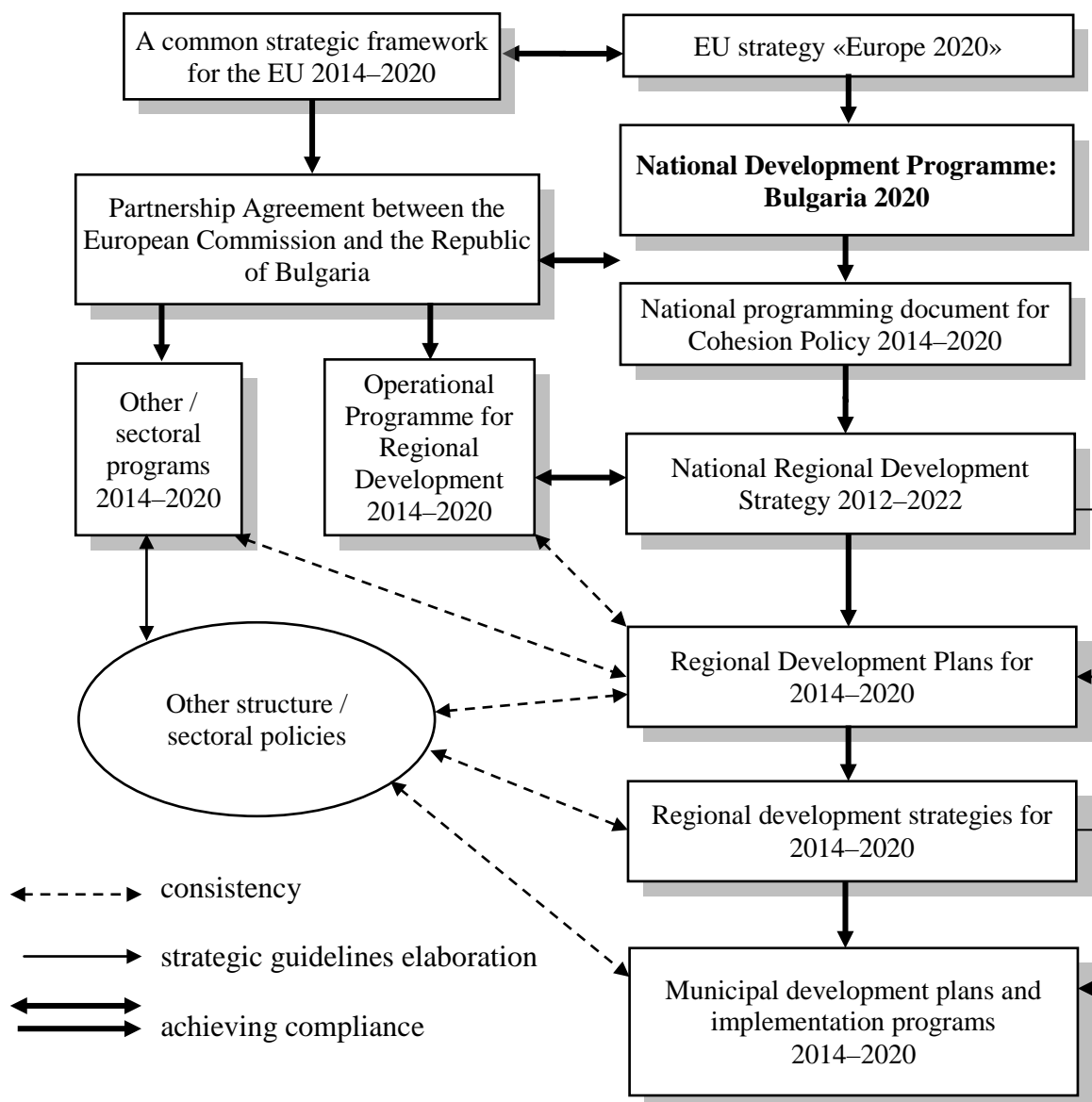
Interrelationship between strategic and planning documents directly related to regional development, both in terms of the essential functions and in terms of their content and logic of development, adoption, coordination and control over their implementation are presented in Figure 1<sup>3</sup>. *The National Development Programme (NDP) «Bulgaria 2020»* as a framework document for the long period of 10 years for all sectors of government, including their territorial aspects and dimensions, is assigned a strategic role. This is evident from Chart 1. In practical application plan NDP «Bulgaria 2020» of each particular stage of work on planning documents have a leading role in determining the overall *strategic orientation of the system of documents for strategic planning and programming of regional and local development*.

<sup>1</sup> See: Methodological guidelines for the development and implementation of integrated urban regeneration and development, S., 2010.

<sup>2</sup> See: Regional Development Act, in force from 21.08.2008 Prom. SG. 50 of May 30, 2008, amended. SG. 47 of 23.06.2009, as amended. SG. 82 of 16.10.2009, SG. 93 of 24.11.2009 The adoption of our country as a full member of the EU and the entry into force of the Regional Development Act (2008) and Regulations for its application in 2008 necessitated updating and improving the existing system of strategic documents.

<sup>3</sup> Methodological guidelines for the development of the National strategy for development of the Republic of Bulgaria (2012–2022), Regional Development Plans Level 2 (2014–2020), Regional Development Strategies (2012–2020), the Municipal Development Plan (2014–2020). Ministry of regional development and public works, S., 2011. P.35.

In the development of strategic planning documents of regional development should respect EU financial framework for the new programming period<sup>1</sup> proposed by the Commission in June 2011, which focuses on: the main elements of the financial package for the period 2014–2020 which are crucial for the implementation of the strategy «Europe 2020» – the cohesion policy, rural development and policies in the field of maritime affairs and fisheries; structural policies to concentrate funding on a smaller number of priorities, intimately linked with the strategy «Europe 2020».



**Fig.1.** Relationship between documents for strategic planning and programming of the regional development<sup>2</sup>

<sup>1</sup> The concrete proposals of the European Commission in October 2011 on the financing instruments of structural policy includes general rules that apply for the European Regional Development Fund, European Social Fund, Cohesion Fund, European Agricultural Fund for Rural Development, Fonds European Fund for Maritime Affairs and Fisheries to increase compatibility between them. The changes in the financing instruments to enhance their efficiency and create a common strategic framework guaranteeing integrated use of resources to achieve common objectives within the strategy «Europe 2020».

<sup>2</sup> See: Methodological guidelines for the development of the National Strategy for Development of the Republic of Bulgaria (2012–2022), Regional Development Plans for the areas of level 2 (2014–2020), Regional strategies for razitie (2012–2020), Municipal Development Plans (2014–2020). Works, S., 2011

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*National Strategy for Regional Development (NSRD)* is strategic document that defines long-term objectives and priorities of the state policy for regional development, and its compliance with other structure policies<sup>1</sup>. *National Strategy for Regional Development (2012–2022)*, is a document of primary importance, which sets the overall strategic orientation of the planning process. It defines «*long-term objectives of government policy for regional development, aimed at creating conditions for balanced and sustainable integrated development of the regions and municipalities*»<sup>2</sup>. Developed for 11 years of operation. During the duration of the NSRD does not coincide with the period of implementation of the Regional development plans (RDP), the Regional development strategies (RDS) and Municipal development plans (MDP), where he was 7 years duration. When comparing the two periods of action showed that in the NSRD it is four years longer than in other regional planning documents. The discrepancy between the period of validity is not accidental. It is dictated by the need to provide sufficient time (two years) for the preparation and adoption of the RDP, RDS and MDP and ensuring time (two years) for reporting results and impact of the application documents at regional and local level. Thus not only provides continuity and continuity, but also the flexibility of the planning process in terms of economic, social and environmental realities.

Unlike the programming period 2005–2015, the new programming period 2012–2022, at the analytical part of the NSRD paying particular attention to the spatial aspect and sectoral development policies and the impact achieved. Emphasis on issues related to: the role of cities in developing regions as a whole and/or discrete areas; the influence of the polis growth of a transnational and European, national and regional importance; characteristics and importance of major and minor axes of development; problems and challenges in urban, urbanized areas and areas with specific needs; guidelines and priorities for urban regeneration and development; problems and possible solutions for the development of border areas, the participation in territorial cooperation programs. Socio-economic analysis should include the results of sectoral analyzes taking into account the specificities of regional development.

*Strategic objectives and priorities for sustainable integrated regional development* are aligned with national priorities and regional needs of society and its expectations for the prospects in terms of quality of life and development of regions and municipalities in the country. Reported findings of an analysis of the socio-economic development of the regions, as well as the results of the SWOT-analysis and development potential of each area. Formulation of strategic objectives and priorities is consistent with the terminology used in the documents of the EU, which is a prerequisite to facilitate the identification of national priorities in relation to these pursued of Community regional policy.

National Strategy for Regional Development *overall assessment of the resources needed to achieve the objectives of the strategy* and include expert assessments of the four major sources of funds for implementation of the NSRF into account the limitations in financing economic sectors arising from the legislation on state aid intensity allowable aid under regional aid map in areas and rules on competition in the provision of support to the private manufacturing sector, particularly SMEs: National public funding (national, municipal budgets, and financial resources from other sources – public funds, businesses, foundations, associations, etc.); European funds (from the EU funds); International financial institutions; Private financing (companies, banks, insurance companies and others.). The total

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<sup>1</sup> See: Regional Development Act, in force from 21.08.2008 Prom. SG. 50 of May 30, 2008, amended. SG. 47 of 23.06.2009, as amended. SG. 82 of 16.10.2009, SG. 93 of 24.11.2009.

<sup>2</sup> See: See: Methodological guidelines for the development of the National Strategy for Development of the Republic of Bulgaria (2012–2022), Regional Development Plans for the areas of level 2 (2014–2020), Regional strategies for development (2012–2020), Municipal Development Plans (2014–2020). Ministry of regional development and public works, S., 2011, P. 45.

multiannual financial framework is indicative of the volume of funds for the whole period in years, priorities and areas.

*Regional Development Plans (RDP) (2014–2020)* have been developed for each of the regions of NUTS II level in accordance with the NSRF sectoral priorities and investments as found on other structure policies for the area. As a medium-term planning documents they define the objectives and priorities for sustainable integrated regional and local development in the territory of the region in accordance with the provisions of the NSRF and other structure policies. Developed in accordance with EU regional policy and national objectives and reflect the specific conditions and potential for development of the area, including specificity and needs of structural adjustment and achieve accelerated European average levels of development.

*Regional development plans contain a general assessment of the resources required for implementation of the plan* – expert evaluation of the overall financial framework of RDP on priorities years, sources of funding, including of the EU contribution (European Regional Development Fund, European Social Fund, European Fund for Rural Development), a national public participation (central budget, local budgets Other public funds), private sector, other financial instruments (European Investment Bank, European Fund for Reconstruction and Development, etc.). Among the funds, which have a leading role in the financing of programs, contributing to the development of this district is the ERDF, but do not underestimate the importance of the other supplementary funds. Financial framework is a prerequisite for achieving the objectives and priorities for development at the end of 2020 the financial framework is seen as a prerequisite for mobilizing additional resources from other sources, which are not included in the expert evaluation. Financial framework influence investors (external and internal) to produce their idea of the investment climate in this region and the sectors concerned by the selected priority areas of public funding. It is aimed at overcoming differences and disparities in the development of the regions in order to reach the average for EU regions development levels.

*Regional development strategies (RDS)* as the medium document for strategic planning of the regional development of the region (NUTS III – Nomenclature of Territorial Units for Statistics III)<sup>1</sup> and is closely related to RDP (NUTS II – Nomenclature of Territorial Units for Statistics II)<sup>2</sup> and the Municipal Development Plan (MDP). RDS define the objectives and priorities for sustainable integrated regional development taking into account specific regional characteristics and development potential. Made in compliance with the current socio-economic situation of the region and the strategic orientation of regional policy in the EU and national goals and priorities for regional development, incl.: the objectives and priorities of the EU in the programming period 2014–2020, and forecasts of operational programs, which are developed in accordance with the strategic framework of EU regional policy; achieve better compliance and interaction with RDP and highlight the strategic prospects for the implementation of the MDP; effective coordination and complementarity of sectoral objectives and priorities for development of the field; development of territorial cooperation for joint activities to achieve the objectives of regional development – cross-border, inter-regional and transnational nature; identifying appropriate mechanisms and incentives to promote balanced and sustainable development and concentration of resources in the most disadvantaged areas and others.

Strategic orientation in the development of the district for the programming period 2012–2020, and without limiting the possibility of including other priority axes contain the following priority areas<sup>3</sup>. *Development of industrial policy and improving the business*

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<sup>1</sup> NUTS III – areas with a population of 150000 to 3 million.

<sup>2</sup> NUTS II – areas with populations of 800000 to 3 million.

<sup>3</sup> Ibid, pp. 90–91.

*environment* to attract competitive investment in the manufacturing sector; *Create a transition* to a low carbon economy, reducing energy dependence on traditional sources through the widespread adoption of renewable energy, energy efficiency and modernization of the transport sector; *Promote innovation and research potential* by supporting cooperation between education, research and development bodies and businesses, including and through international cooperation and transfer of new knowledge, technologies, products and services; *Development of the information society, e-government, public e-services and e-commerce market* and provide broadband for people and businesses; *Adapting to change and modernize the labor market* by developing labor mobility, youth employment, vocational education systems, forms of training and retraining and lifelong learning; Strengthening social integration, reducing poverty and promoting social inclusion of disadvantaged groups of the population, territorial dimensions; *Development of territorial cohesion and cooperation between the regional authorities* to carry out cross-border and inter-regional initiatives in the way of public-private partnerships and expanding access to funding sources.

The overall assessment of the resources needed to achieve the objectives of the strategy are systematized in tables and present possibilities of linking the priorities of the RDS in time with funding sources. They are similar to those of the RDP.

*Municipal Development Plans* (MDP) are defined medium-term objectives and priorities of development of the municipality in accordance with the regional development strategies /RDS/<sup>1</sup>. These special attention is paid to the requirements related to the development content of the planning document in the analytical and strategic part, as an integral document of the national system of strategic planning of regional and local development in the country: compliance with specific conditions and requirements on the instrument for the implementation of regulations in local government, regional development, environmental protection, cadastre, land registry and others.

As an integral document of the national system of strategic planning of regional development in Bulgaria, MDP<sup>2</sup> is necessary in them to achieve adequacy ratios of correspondences with the strategic documents of the entire system of planning, namely: reflection of the strategic objectives and priorities of the NSRD (2012–2020) and in particular those relating to key areas of local and regional development as a improving competitiveness and employment, infrastructure development and accessibility, sustainability and social inclusion; integration of planning approaches «bottom-up» and «top-down» for compliance of the MDP with the strategic framework of RDP, which takes into account the specific long-term goals and priorities of development of regions and municipalities entering the territorial scope of the area; compliance objectives and priorities of the municipal development priorities of the RDS, which is essential to ensure access to financial schemes and development of territorial cooperation between municipalities and regions. Area boundaries for targeted support at the municipal level is defined in the RDS, and this is a prerequisite for opportunities for additional funding of projects; reflect the objectives and priorities of EU regional policy and the objectives of the strategy «Europe 2020». In particular MDP contains recommended priorities<sup>3</sup> are summarized in Table. 1.

In the *indicative financial table* summarizes the necessary resources for implementation of the plan. It is essentially a financial framework of commitments on the implementation of the plan by all stakeholders in the leading role of local authorities and with the help of the municipal administration. In the indicative financial table priorities of integrated local development by 2020 gives total and annual volume envisaged for their implementation, as well as the sources and structure of financial resources, taking into account the envisaged

<sup>1</sup> To assist municipalities in the development of the CFP (2014–2020) Ministry of Regional Development and urbanization and develop methodological guidelines that spell out requirements for the volume and structure of the plan.

<sup>2</sup> See: Methodical instructions ..., S., Works, 2011, pp. 108–109.

<sup>3</sup> In methodological guidelines, pp. 109–110.

measures and projects to be included in the program for the implementation of the MDP. In developing the indicative financial table are reported as macroeconomic indicators at national, regional and district levels and trends in socio-economic development of the municipality until 2020 and medium-term forecasts for the municipal budget (revenue, expenditure, subsidies) and feasibility resources from EU funds. For the realization of the priorities of the plan is acceptable use of three groups of financial sources:

- Local public sources: municipal budget, municipal or other local public funds and budgetary and extra-budgetary accounts;
- External public sources: state budget, structural funds and the Cohesion Fund, the European Agricultural Fund for Rural Development, European Fisheries Fund, other sources – banks, funds and foundations, EU programs, international financial institutions, funds NGOs and others. public financial sources;
- Private financing: banks, funds, projects and resources of companies and NGOs in private benefit.

*Table 1*

**Priority policy areas for sustainable integrated local development (2014-2020)**

Priority areas	Contents of the priority areas
1. Creating conditions for the development of local knowledge societies	Creating a highly productive «knowledge» of the local level to achieve specific integrated development goals.
2. Supporting the development of the internal potential of the local economy and markets	Promoting local potential and entrepreneurship and opening of the market for goods and services for sustainable economic growth. Providing access to financial resources, risk capital and financial engineering schemes in small and medium-sized municipalities for the development of entrepreneurship, generating growth and jobs.
3. Development of the local labor market	Increasing the number of people participating in the labor market and promote the creation of new enterprises in the municipalities, intensifying the process of creating new jobs and improving the adaptability of workers and firms. Striking a balance between flexibility and security in the labor market.
4. Support the sustainable development of the local community and territory	Implementing effective policies on the environment and promote «low-carbon» economy that will foster innovation, create new jobs and increase the competitive power by achieving more efficient use of resources and create new investment opportunities.

*Program for the implementation* of MDP operational nature. It contains a package of measures and projects to achieve the objectives and priorities for community development and resource provision – financial resources, administrative management structures. The program includes activities and monitoring and evaluation of projects, performance indicators of the program and the municipal development plan, action to ensure communication, information and publicity in the implementation of measures and projects included in the program. Program as well as MDP can be updated periodically to ensure efficiency and effectiveness in implementing the plan and achieving the objectives and priorities in the development of the municipality. The program contains the following main components: operational guidelines and program objectives (political, institutional, organisational, information and communication, financial and control interventions); measures and activities are foreseen to provide funding schemes; list of projects; Indicators for specific products and results; organization and monitoring activities and communication mechanism.

**PRIORITIES AND STRATEGIC OBJECTIVES IN THE SYSTEM  
OF PLANNING DOCUMENTS OF REGIONAL DEVELOPMENT  
WITH EMPHASIS ON THE DEVELOPMENT OF CLUSTERS  
AS COMPONENTS OF LPS**

Development of local production systems in strategic documents for economic and social development is seen here in close connection with the support of cluster development in the national or regional level. At national level, the support of cluster development site located in the National Programme for Bulgaria BG2020 in close connection with the increasing competitiveness of the Bulgarian economy. As contained in the program *Priority 5. Support for innovation and investment activities to increase the competitiveness of the economy* of science and innovation is assigned the role of the key factors for the passage of the Bulgarian economy towards smart, sustainable and inclusive growth, and, in parallel, tackling pressing challenges public. Of course, increasing the innovativeness of the economy is linked to the intensive investment in modern production facilities and construction of innovative infrastructure (incl. Technology centers, parks, innovation networks, etc.)<sup>1</sup>. Activities in the priority related to stimulate research and innovation, the creation and development of high-tech industrial base, as well as increasing the role of science in the economy. It is in this priority to small and medium-sized enterprises play the role of main target group policy for competitiveness and sustainable development, special attention was paid to the policy to encourage the formation of clusters and cooperation networks. Moreover, the successful implementation of measures will contribute to the achievement of *Goal 3 of the NDP BG2020: Improving the competitiveness of the economy by creating a favorable business environment, investment promotion, implementing innovative solutions and increase resource efficiency.*

Relationship *Priority 5. Support innovation and investment activities to increase the competitiveness of the economy* defined sub-priorities and areas of impact are reflected in Table 2.

*Table 2*

**Priorities and sub-priorities in the NDP BG2020**

Name of sub-priority	Affected Areas / Actions
<b>Sub-priority 5.1 Creating a favorable institutional environment</b>	<p><b>Innovation and investment environment / Actions and Adoption</b> Act innovation, which defines mechanisms for the formation, implementation and monitoring of implementation of innovation policy; Development and implementation of innovative strategies for smart specialization 2014–2020, instruments for implementation of the measures of innovation policy is the Bulgarian Fund for Innovation;</p> <p>Extension of scope of the law to encourage investment by creating additional opportunities for certification and promotion of projects mainly in hi-tech activities;</p> <p>Conducting proactive investment marketing to attract investors from target sectors and countries;</p> <p><b>Support the creation of conditions for public-private partnership</b> including to provide suitable land with infrastructure projects for «green» in support of local and foreign investors to develop industrial zones.</p> <p>Support for SMEs: Creation and application of the legal institutional framework in support of the SME sector and adaptation the National Strategy for Promotion of SMEs to the «Small Business Act».</p>

<sup>1</sup> National Development Programme: Bulgaria 2020.

Name of sub-priority	Affected Areas / Actions
<p><b>Sub-priority 5.2. Improving the quality and effectiveness of research and innovation</b></p>	<p><b>Greater integration between the elements of the «knowledge triangle»:</b> Creation of a national interactive platform for communication «education-science-business» through the establishment of inter-institutional centers of research for the benefit of the economy; Development of scientific applications; internships for graduate students and post-docs in high-tech centers; introduction of fixed-term contracts assistants in priority areas to work in scientific organizations and subsequent realization in the industry.</p> <p>Stimulating the creation and development of high-tech incubators for start-ups, technology centers, technology transfer, innovation clusters, technology parks and renovation of research infrastructure</p> <p>Providing financial and other support for the deployment and use of modern ICT in the research, development and innovation in SMEs.</p> <p><b>Building scientific and innovation infrastructure:</b> Stimulate the creation and development of high-tech incubators for start-ups, technology centers, technology transfer, innovation clusters, technology parks and renovation of research infrastructure;</p> <p>Providing financial and other support for the deployment and use of modern ICT in the research, development and innovation in SMEs.</p> <p><b>Partnerships between innovative companies and holders of innovative potential:</b> Encouraging direct cooperation between research institutions and enterprises, in particular encouraging the development of new products, processes and services, involvement of young scientists in the practical applications of their scientific achievements in real business, encouraging the recruitment of highly qualified personnel for the purposes of innovation and the adoption of service or specialization students, they are encouraged later (after graduation) to take them to work.</p> <p><b>Financing the activities of research and innovation of enterprises, including SMEs:</b> Improving funding mechanisms and support for applied research and innovation in enterprises, including SMEs, the introduction of technologies ensuring efficient use of resource recovery of waste by recycling, re-use, expanding the responsibilities of manufacturers.</p> <p><b>Internationalization of the innovation process.</b> Promoting the participation of enterprises and research organizations in the European initiatives and programs in the field of research and innovation.</p>
<p><b>Sub-priority 5.5. Increasing competitiveness and vitality mainly SMEs</b></p>	<p><b>Improving access to finance mainly SMEs,</b> the financial instruments JEREMIE, National Investment Fund, Fund for Scientific Research; support the preparation and implementation of projects under European programs.</p> <p><b>Stimulation of patent activities of SMEs:</b> Mechanisms for financial and other support for information and education campaigns and registration of intellectual property.</p> <p><b>Stimulate internationalization mainly SMEs:</b> Application of mechanisms for financial and other support for information and education campaigns and internationalization activities.</p> <p><b>Stimulating the implementation of good practices primarily in SMEs:</b> Implementation of mechanisms for financial and other support for to extend the application of best practices in SMEs: promotion of best practices in the application of ICT in the development of human resources and the implementation of marketing and business models for planning activities.</p> <p><b>Encouraging implementation of standards primarily in SMEs:</b> Stimulating cooperation between enterprises and research organizations. Formation of entrepreneurial skills among students and youth. Support start-ups and the «second chance». Support the development of women, youth and social entrepreneurship.</p>



When studying the relationship between strategic documents for regional planning is necessary to outline the place of the National Strategy for Regional Development of Bulgaria (2012–2022) in them. As contained in the NSRD SWOT analysis have highlighted both strengths and weaknesses. Among the weaknesses identified are significant internal differences / inequalities in areas relations «center–periphery», which are some of the key issues for achieving sustainable regional development. Among the country's potential in the analysis appears to establish and support the development of innovative clusters and structures in the regions. The results of this analysis and evaluation of the implementation of the NSRD in the previous programming period are placed at the core of formulating and structuring strategic set of goals and priorities of the NSRD for the period 2012–2022, who were divided into two groups of arguments: the first stems from internal problems and needs derived from updated analysis of regional development, and the second group – arose from the current framework package of strategic documents of the EU and Bulgaria<sup>1</sup>. That is why NSRD sets target «triad» – economic, social and territorial cohesion at European, national and regional level in the focus of regional development policy for the period 2014–2020. Defined main strategic goal of the NSRD is «Achieving sustainable integrated regional development based on the use of local potential and cohesion of the regions in economic, social and territorial aspect» disaggregate of interrelated and complementary strategic objectives, priorities and specific objectives.

Namely in the *Strategic Objective 1: Economic convergence in European, national and intra plan by developing their own potential and environmental protection, Specific Objective 3: Improving the competitiveness of the regions through the development of new business models for SMEs, introducing new technologies and innovation in SMEs in backward, rural areas and areas targeted for support include SMEs in rural areas and in the most deprived areas, namely North-West and North Central regions. There will also continue to help improve the management of SME and business infrastructure in production areas and the promotion of business networking and clustering*<sup>2</sup>.

To obtain a more complete picture of the relationship between strategic documents at national and regional level there will be presented the results of a survey of the place which is given to the cluster as a variety of PPE to accelerate the development of the regions.

In the regional plan for the development of the Northeastern region (2014–2020) for the implementation of cluster policy in *Priority 1.2. Support for the economy with sea* defined two specific objectives: *Specific objective 1.2.1. Creation and development of regional clusters based on marine industry and specific objective 1.2.2. Improvement of infrastructure related to the development of the maritime industry.* Planned activities for the implementation of specific objectives are aimed at: creating a cluster of ports in Varna, Varna and Beloslav lakes and its establishment as a logistics and distribution center connection between the Pan-European Transport Corridors VII, VIII, IX and TRACECA; establishment of coastal Atlas and implementation of maritime spatial planning; creating archaeological atlas of the sea for the development of coastal tourism; use of marine resources in the pharmaceutical and cosmetics industry; use of marine resources in the pharmaceutical and cosmetics industry; support and stimulate market-oriented projects jointly

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<sup>1</sup> National Strategy for Development of Research 2020, the National Strategy for the Promotion of Small and Medium Enterprises in Bulgaria (2007–2013), the National Strategy for the promotion of the production of organic fruit and vegetables in Bulgaria, the National Programme for Fisheries and Aquaculture (2007–2013), the National Energy Strategy 2020. In Bulgaria cluster structures in various sectors of the economy have formalized their coordination and stated that innovation, transfer of technology and know-how are among the main tasks. Innovative strategies based on inter-regional and cross-border cooperation are also facts and in accordance with the priorities of the National Strategy for promoting the development of clusters during the 2007–2013

<sup>2</sup> Strategy «Europe 2020»; Territorial Agenda 2020; National Reform Programme 2012–2015, developing in meeting the objectives, integrated guidelines and flagship initiatives under the Strategy «Europe 2020»; National Development Programme «Bulgaria 2020» and others.

developed by research institutes and companies based aquaculture and marine mineral resources; especially maritime surveillance and better coordinated regional initiatives for marine and maritime research; application of eco-innovative technologies in shipbuilding and ship repair; integrated coastal zone management and fisheries management; support investment initiatives in the renovation and construction of fishing ports, shelters and fishing villages.

*Within Priority 1. Increasing the competitiveness of the regional economy and support for small and medium businesses in the Southeast region* to intensify the use of specific potential of the local economy provides support SMEs and create favorable conditions for their development and investment activities in the way of improvement of business infrastructure in production areas (transport connectivity, water and sanitation, internet access) and the creation of clusters. And in *Specific Objective 1. Improve access to production areas in the Southeast region and construction and reconstruction of business infrastructure, networks and clusters*, activities which are planned to be implemented are to improve access to infrastructure networks in the separate production areas in the Southeast region (water supply, sewerage, wastewater treatment, internal network of roads / streets in the production area, with electric power. energy, natural gas supply, internet access, access to logistics and warehousing services, linking the area to the national road network and railway network of the country where it is necessary and economically feasible). Particular attention is given to the provision of broadband internet access, support for the introduction of new technology businesses in the area and to promote the development of innovation and development of new products. Particular attention in this plan is paid to support the construction of new and reconstruction of existing business and industrial zones, business incubators, business centers, industrial and technological parks, regional offices for services to investors, which are an important factor in attracting investment. An important role in achieving sustainable economic growth in the region is assigned to the establishment of clusters in traditional areas: tourism, energy and agriculture.

To increase the competitiveness of SMEs in the North Central Region in *Strategic Goal 1: Economic cohesion – reaching average levels of employment, labor productivity and application of innovation in the economy characterize the Danube area*, Priority 1.1. Development of sustainable competitive knowledge-based economy, innovation and new technologies, is displayed *Specific objective 1.1.3. Increasing the competitiveness of small and medium businesses by stimulating the introduction of new technologies, innovative practices and the creation of clusters*. The region aims to provide the necessary conditions for sustainable development and growth of local SMEs, supporting their partnership initiatives, and to stimulate the construction of closed production and service cycles and complementarity of companies in clusters. It is envisaged that the implementation of initiatives to support entrepreneurship, increasing the capacity for efficient financial and investment policies at the local level; the creation of regional networks to support business and strengthen the skills of SME cooperation; of measures to create a resource or technology transfer between companies, leading to increasing the competitiveness of small and medium business; a regional concept for the development of initiatives for pilot clusters and others.

*In Specific objective 1.1.4. Diversification of the rural economy leading place* is assigned to the development of processing industries and related closing of the production cycle in the territories of the region with predominantly agricultural character by stimulating vertical integration and clusters for production and processing of agricultural production in small and medium enterprises in rural areas. For use of natural and cultural heritage of the region *Specific objective 1.1.5. Development of a strong tourism sector, based on its rich natural and cultural heritage and promoting area-specific types of tourism by introducing a «local cultural system»* (LOCUS – LOCAL CULTURAL SYSTEM) for historical, cultural and natural attractions as a valuable part of the specific geographical area, local

heritage and identity to linking a recreation areas and landscapes in the region through cultural and tourist routes, implementation of integrated projects with cross-border and transnational character and others.

In the South Central Region in Strategic Objective 1 Economic convergence in national and intra plan based on friendly / environmental-friendly use of its own resources in *Priority 1.1: Enhancing the competitiveness of small and medium business as the driving force of the regional economy* of small and medium-sized enterprises (SMEs) are assigns a key role in the economy of the area. Realization of this priority is to support connects the business for technological renovation of production areas, digitization of processes and the use of ICT in enterprises, promote the introduction of new products and technologies and the development of «green» economic activities in the SMEs sector. Important role for the opportunities for SMEs to access innovation and development and support to improve the business infrastructure in production areas and the promotion of business networking and clustering.

*In Specific objective 1. Improving access and construction of regional and local business infrastructure*, emphasis is placed on creating new or developing existing business, industrial and technological parks in large industrial centers to attract modern industries. To this end, the implementation of activities aimed at the improvement of access to infrastructure networks in the separate production areas in the region: water, sewage, wastewater treatment, internal network of roads / streets in the production area, with electric power. Energy natural gas supply, internet access, access to logistics and storage services; providing access to broadband Internet, to support the implementation of new technologies by enterprises and to promote the development of innovation and development of new products. In close connection with *Specific Objective 2 Development of research, technological development and innovation Specific objective 3 Building business networks and clusters* in the context of enhancing regional competitiveness through enhancing both internal and external sources of innovation, influenced by technology transfer, know-how, the flow of foreign investment, etc.. an important role in achieving sustainable economic growth in Raina will be clustering tourism, agriculture, forestry, electrical industry and mining industry related to energy production. A specific regional needs will determine the kind of infrastructure, regional offices for services to investors, exhibition halls, business incubators and business centers in cities with a population of over 30,000 inhabitants. Introduction of new technologies and the application of innovation is the surest way to increase the competitiveness of the South Central Region. This type of public interventions have proven sustainability and attracting desirable investments, leading to the creation of attractive jobs, retention of human capital and generate regional growth.

In the Regional Development Plan of the Northwest region in *Strategic Goal 1. Development of competitive economy by promoting own potential* the Northwest region devotes a significant role not only specific potential and growth factors in the area and their use, such as natural resources and cultural heritage . Particular attention is focusing on the need to provide targeted support for existing small and medium businesses to increase entrepreneurial activity at the local level to the creation of new small and medium enterprises for the implementation of activities related to attracting new foreign investment (local and foreign investments) for the development of not only manufacturing but also agriculture and tourism. And with the completion of Danube Bridge 2 region has all chances to develop as a logistics center. The region has realized the importance of clusters and other types of development of local PROCEDURES systems. Among Reliable financial instruments in this regard are reflected JEREMIE and the National Innovation Fund. *Priority 1.1: Support for increasing the competitiveness of small and medium business and improve the environment for doing business by achieving Sub-priority 1.1.1: Maintain the current viable local small and medium businesses* need to create the necessary conditions for increasing the sustaina-

bility of small and medium-sized enterprises by supporting their technological innovation; introducing quality standards; improve access to new markets and internationalization of SMEs; use and access to ICT and others. Admission deserves inclusion in the plan of the Northwest region of *Sub-priority 1.1.2. Promoting entrepreneurship and the development of new economic activities in SMEs and cluster development*. Namely by supporting the creation of new micro and small companies in the area, construction of a new entrepreneurial culture, supporting the process of market information and contacts with local and foreign companies, encouraging cooperation between local enterprises by supporting clustering and providing support for supply chain, especially in the case of attracting strategic investors can greatly accelerate economic and social development of this region.

As for the Southwest region, which compared to other regions in the country is the most developed in the *Strategic Goal 1: Achieve sustainable economic growth through the development of competitive diversified regional economy* provides the number of newly created clusters 2020 to reach 20 pcs. In *Priority I. Increasing the competitiveness of the regional economy Specific Objective I.2: Technological innovation and energy efficiency in SMEs* focus is on the implementation of new, effective (incl. Energy) technologies in small and medium-sized enterprises, as well as improving links businesses with research and educational centers to solve problems with technological innovation and the development of innovation to increase the competitiveness of the regional economy. Cluster development is seen as a factor promoting economic flexibility, sustainability and competitiveness of the region. In the region there are prerequisites for the creation of viable clusters in ICT, engineering, mechatronics, microelectronics, industrial digital systems, woodworking, mining industry and others. Specific vanguard of Sofia Electric Industrial Cluster (EVIC), composed of around 50 companies with a mission to introduce electromobility.

For the realization of the *specific objective I.4: Harnessing local tourist potential* of predominantly the formation of cluster structures: Cluster «Ski tourism» and Cluster «Spa and Wellness Center» on the base and organizational actions such as the formation of regional and local tourism associations and partnerships incl. and between municipalities. Of course in the regional plan are defined and the actions that should be taken for recovery of tourism resources, namely: improving infrastructure – transport, engineering, social and tourist; preserving, protecting and improving the quality of tourist resources – natural, cultural and man; institutional coordination – between administrations and companies in tourism.

## CONCLUSIONS

In the growing asymmetry in economic and social development at the regional level in the years of our country's membership in the EU over the programming period 2012–2022, the break largely development of strategic regional documents templates. They reported in an appropriate manner not only the specific contribution of different territorial levels to achieve the overall objectives of the strategy «Europe 2020», including the contribution of Bulgarian regions and municipalities to European objectives in the form of «Regional and Local Agenda 2020» through specific targets to reach by the end of 2020 Indicator refraction pattern is reporting a high degree of distinctive characteristics of the areas relating to: location and available natural resources, population and labor resources, spatial organization of the territory, economic conditions and the efficiency of operation of the business, administrative employees and management and social infrastructure level and dynamics of development of public administration, the availability of public consensus on the vision, goals and priorities of regional development in the country. Reason for the above findings, the author of this publication is the active participation of business structures and representa-

tives of civil society in the strategic regional planning. In the planning process require the establishment of appropriate working style appropriate style of work, allowing maximum interaction between stakeholders.

To achieve a harmonious, balanced regional development in Bulgaria in the new programming period 2020–2022 a leading role among the approaches for effective planning of regional development was assigned to the strategic approach. The strategic approach was oriented to a limited number of key medium and long-term goals and development priorities in regional terms. This is found in the process of examination of the place of clusters as a variety of local production systems in strategic documents developed at different levels of strategic planning. Cluster is assigned a significant role in increasing the competitiveness of the areas of economic convergence of the regions, not only in the country but also in the Danube area, to enhance the competitiveness of small and medium businesses through technological innovation and energy efficiency in small and medium-sized enterprises as a driving force of the regional economy, development of comp by promoting the use of their own potential areas.

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# DEVELOPMENT OF MANAGEMENT METHODS FOR LOCAL PRODUCTION SYSTEMS<sup>1</sup>

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## INTRODUCTION

Peculiarity of the current moment in the economic development in Russia may be characterized by the famous saying «there would be no happiness if unhappiness does not help». Price drop for energy sources, massive depreciation of ruble, sanctions of the West for Russia make real the unachievable dream of many years about lowering the petroleum dependence and objective need for deep structural changes as a base for sustainable development and condition for economic self-sufficiency of the country. It is necessary to pay for the possibility of such twist: recession of economic development is staring us in the face, investments are coming down, and inflation is growing. By estimates of the Ministry of Finance of the Russian Federation, only the federal budget will not get 2 trillion rubles in 2015. Noticeable fall of production and population's life level is expected. Many investment programs and projects are getting frozen or transferred for later time. The government of the Russian Federation has formulated the program of anti-crises measures as a plan of current actions providing a wide set of events, starting from strict economic rationalization of financial resources and finalizing by transfer to manual method of control, at least, for the highest bodies of administration. At that, this program is considered as a starting point of systematic changes for the Russian economy directed to creating the conditions for sustain-able social and economic development of the country, its regions and economic complexes.

Regions are as a peculiar acid test, specific touchstone for testing seriousness of the intentions in regards to fundamental modernization of the economy. The base of the developed economies refers to self-sufficient primary elements of a country, i.e. households, municipal bodies and their associations. With serious grounds, we can expect that while preserving the existing conditions in regards to these primary elements, any transfer to the sustain-able economic development along the lines of the developed countries is hardly possible. Strategically, positive changes in this direction are connected with strengthening the possibilities for extended reproduction of economic, social and demographic relations at the local level, within the local social and economic systems. Regional authorities can and have to play the defining role in this process, consistently and systematically improving tools and methods of sub-federal social and economic policy of a region.

## IDEAL MANAGEMENT SCHEME FOR SOCIO-ECONOMIC DEVELOPMENT OF A REGION

Such a scheme should be based on the objective estimates of the socio-economic and financial situation of territorial formations and complex consideration of the management tasks for their development. This kind of approach presupposes systematization of the main tasks and functions of regional administrations in regard to enlarging economic po-

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tential and strengthening financial base of territorial formations, making more precise the principles and rules for improving inter-level relations in a region, income growth of population and provision of its living activities.

The ideal management scheme is based on a set of quite evident prerequisites. Suppose, that there exist and is accessible any necessary information, the needed techniques are developed, and estimates are regularly conducted which refer to socio-economic and financial situation of region's cities and towns by any indicator needed for objective, unprejudiced comparison of territories. There also exist «plowed up investment field» of a region, i.e. there is enough respectable banks for potential investment projects on different economic sectors. Law on forecasting is acting, efficiently providing bodies of management and control with all necessary forecasting information. Accuracy of economic forecasts and estimates of external situation are quite enough for using them while developing the main financial documents, financial balances and budgets (for regions, cities and other administrative units). Procedures of developing regional programs and criteria for choosing among them into the plan are well adjusted, i.e. there exist a forecast of the next forecasted cycle. Programs per se are brought to the methodic, systematic perfection: they have territorial cross-sectional view, and they can, with the enviable proportion of accuracy, tell you about the performance of the supposed program measures not only from the view-point of the general economic results but also in regards to financial indicators. Moreover, while being under development, each of such programs is oriented onto the priorities dictated by tasks for strengthening economic and financial potential of cities and other units of a region, for lowering of differentiation level within their socio-economic development, for rise and convergence of population's life level.

Income budget sources of all levels and distribution of legal power of corresponding management bodies are brought to the maximally possible correlation. There exists a system of state social standards and corresponding adjusting coefficients which objectively differentiate these standards by types of territorial formations and types of services. Financial standards for services costs of the budget sphere sectors, taking into account territorial differences, are developed. Obviously, under these conditions the main function of inter-budget relations consists in renewal of income budget sources for cities and other regional units up to the level which will provide fulfillment of budget spending in each city and other unit in volumes, correlating to the variant chosen in the forecast of economic development and to lowering nonobjective differences in the population's life level of cities and districts of a region.

Conditions of real life are far from the described ideal scheme. However, it is useful to consider this scheme at least because it shows the directions of improving the work of regional and local authorities, of different levels of management. Underneath we discuss two groups of questions: development of methods for setting up the addressed territorial socio-economic policy of a region and grounding the approaches for estimating the complex influence of investment projects on the development of local production systems.

### **DEVELOPMENT OF METHODS FOR SETTING UP THE ADDRESSED TERRITORIAL SOCIO-ECONOMIC POLICY OF A REGION**

It is quite typical for Siberian regions when economic activity is concentrated in the regional capital cities. In this way, for example, in the Novosibirsk region about 70% of its economic potential is determined by the city of Novosibirsk. Therefore, the city of Novosibirsk is the main source for the regional budget, the donor for local budgets and for special purpose programs implemented in different parts of the region. The other manifestation of such distribution of the economic potential refers to the absence of sustainable resources

for self-development of the majority of the municipal formations within a region which badly need massive attraction of resources for functioning and development. Organizing inter-level financial flows (region - to local territorial formations) is a main compensatory mechanism buffering the settled territorial distributions of economic activity.

For upgrading the parameters' justification for such resources redistribution, it appears instructive to add the system of correcting coefficients used in calculating the indicators for municipal entities development (provision with minimal budget, territorial cross-sectional cut of different programs, etc.) with the coefficients characterizing true to life territorial differences between cities and districts of a Russian region under consideration, i.e. territorial remoteness, availability of services financed by the regional budget, quality of life.

*Coefficients of territorial remoteness.* They characterize a degree of spatial closeness (vicinity) of a regional district or city (town) to regional center, taking into account variants of transportation links: railroad, mixed (when a train is available only for a part of the route), or by car when there is no railroad. With the example of the Novosibirsk region, we have constructed a table, i.e. a unit scale (escalation) with the maximal coefficient at the city of Novosibirsk. For any other city (town) or district the remoteness coefficient is set by reciprocal value of multiplying distance from the center in hundreds of kilometers (another variant may refer to average time of a trip to the center) by the rank of a transport link (3 – only automobile type of link, 2 – mixed, 1 – railroad). The formula has got a correction which provides, while using it, a coefficient equal to 1 for the city of Novosibirsk.

As one can see in Table 1, coefficients of remoteness, calculated in this way, gradate districts and cities of a region in a quite natural way.

There are two possible ways, directions, of potential using the proposed remoteness coefficients for towns and districts of a region.

(1) While using these coefficients, average budget provision for a citizen of a region by the regional budget may be differentiated for districts and towns, and, consequently, the whole budget provision by the consolidated budget will have considerable variations in regards to the average provision. Indicators of the whole budget provision characterize, more true to life, the quality of regional budget policy in its territorial aspect, and they may be useful while formulating plans and programs for the development of municipal entities.

(2) The other way of using territorial remoteness coefficients for budget assignments in a region refers to distributing a part of transfers to districts and towns as a compensation for remoteness, not connecting them with any particular norms and standards of social circumstances. At least, such approach works not worse for an idea of increasing homogeneity socio-economic conditions of towns and districts development in comparison with complicated and bulky system of calculating the minimal budget provision. First, this system is far from being able to guarantee the achievement of its calculations, and second, it is quite far from solving on its base the tasks of decreasing territorial differences of population's living abilities.

*Territorial coefficients of life quality.* In Table 2 there is the second group of coefficients which is ranking territorial entities of a region, taking into account inter-district non-homogeneity of conditions for population's living. There are represented villages (rank 1), settlements of urban type (2), towns (3), towns of regional significance (4), towns within the Novosibirsk agglomeration (town of Ob and town of Berdsk) – (5), city of Novosibirsk – (6). Consolidated coefficient of life quality has been obtained by weighing out numbers of settlements in a district of individual ranks.

The other variant may consist in weighing out particular ranks by the number of population, living in different types of settlements. The resulting column ranks districts and towns of the region in a quite convincing way.



Table 1

**Coefficients of territorial remoteness, with an example of the Novosibirsk region**

Districts and towns	Distance from the regional center, in kilometers	Rank of link quality	Coefficient of remoteness
Baganskiy	250	2	0.14
Barabinskiy	340	2	0.11
Bolotninskiy	130	2	0.22
Vengerovski	390	2	0.10
Dovolenskiy	290	3	0.13
Zdvinskiy	430	2	0.09
Iskitimskiy	50	2	0.33
Karasukskiy	390	2	0.10
Kargatskiy	190	2	0.11
Kolyvanskiy	40	3	0.24
Kochenevskiy	60	2	0.21
Kochkovskiy	200	3	0.11
Krasnoozerskiy	250	3	0.10
Kuibyshevskiy	340	2	0.11
Kupinskiy	530	2	0.08
Kyshtovskiy	510	2	0.08
Maslyaninskiy	170	2	0.19
Moshkovskiy	70	2	0.29
Novosibirskiy rural	30	2	0.26
Ordynskiy	100	3	0.17
Severnyi	460	2	0.09
Suzunskiy	190	2	0.17
Tatarskiy	470	2	0.09
Toguchinskiy	110	2	0.24
Ubinskiy	240	2	0,15
Ust-Tarkskiy	460	2	0,09
Chanovskiy	430	2	0,09
Cherepanovskiy	100	2	0,25
Chistoozernyi	500	2	0,08
Chulymskiy	140	2	0,21
Town of Barabinsk	340	1	0,23
Town of Berdsk	30	1	0,77
Town of Iskitim	50	1	0,67
Town of Kuibyshev	340	1	0,23
Town of Ob	15	1	0,95
Town of Tatarsk	470	1	0,18
City of Novosibirsk	0	1	1,00

Table 2

**Territorial coefficients of life quality**

Districts and towns	Number of settlements			Coefficient of life quality
	rural settlements	settlements of urban type	towns	
Baganskiy	9			1.00
Barabinskiy	11		1	1.00
Bolotninskiy	11			1.17
Vengerovski	20			1.00
Dovolenskiy	13			1.00
Zdvinskiy	14			1.00
Iskitimskiy	18	2	1	1.10
Karasukskiy	11		1	1.17
Kargatskiy	10			1.18
Kolyvanskiy	11	1		1.08
Kochenevskiy	14	2		1.13
Kochkovskiy	10			1.00
Krasnoozerskiy	18	1		1.05
Kujbyshevskiy	17		1	1.00
Kupinskiy	15			1.13
Kyshtovskiy	17			1.00
Maslyaninskiy	11	1		1.08
Moshkovskiy	9	2		1.18
Novosibirsk rural	17	2		1.11
Ordynskiy	20	1		1.05
Severnyi	12			1.00
Suzunskiy	14	1		1.07
Tatarskiy	21		1	1.00
Toguchinskiy	20	1		1.14
Ubinskiy	16			1.00
Ust-Tarkskiy	13			1.00
Chanovskiy	13	1	1	1.07
Cherepanovskiy	11	2		1.29
Chistoozernyi	16	1	1	1.06
Chulymskiy	13		1	1.14
Town of Barabinsk			1	4.00
Town of Berdsk			1	5.00
Town of Iskitim			1	4.00
Town of Kuibyshev			1	4.00
Town of Ob			1	5.00
Town of Tatarsk				4.00

Table 3

**Availability of services financed by the Novosibirsk regional budget**

Districts and towns	Number of population, thousands of persons	Coefficient of remoteness	Availability of services, %
Baganskiy	19.8	0.14	0.2
Barabinskiy	18.9	0.11	0.1
Bolotninskiy	36.2	0.22	0.4
Vengerovskiy	24.9	0.10	0.1
Dovolenskiy	22.1	0.13	0.2
Zdvinskiy	21.2	0.09	0.1
Iskitimskiy	71.9	0.33	1.4
Karasukskiy	52.7	0.10	0.3
Kargatskiy	24.0	0.11	0.2
Kolyvanskiy	28.4	0.24	0.4
Kochenevskiy	48.9	0.21	0.6
Kochkovskiy	17.2	0.11	0.1
Krasnoozerskiy	40.6	0.10	0.2
Kuibyshevskiy	21.3	0.11	0.1
Kupinskiy	41.4	0.08	0.2
Kyshtovskiy	18.6	0.08	0.1
Maslyaninskiy	28.1	0.19	0.3
Moshkovskiy	41.5	0.29	0.7
Novosibirskiy rural	114.0	0.26	1.7
Ordynskiy	40.4	0.17	0.4
Severnyi	12.5	0.09	0.1
Suzunskiy	37.6	0.17	0.4
Tatarskiy	21.4	0.09	0.1
Toguchinskiy	68.8	0.24	0.9
Ubinskiy	20.2	0.15	0.2
Ust-Tarskiy	15.2	0.09	0.1
Chanovskiy	33.8	0.09	0.2
Cherepanovskiy	54.8	0.25	0.8
Chistoozernyi	23.8	0.08	0.1
Chulymskiy	30.4	0.21	0.4
Town of Barabinsk	34.9	0.23	0.5
Town of Berds	86.7	0.77	3.8
Town of Iskitim	68.4	0.67	2.6
Town of Kuibyshev	52.4	0.23	0.7
Town of Ob	25.6	0.95	1.5
Town of Tatarsk	28.2	0.18	0.3
City of Novosibirsk	1400.6	1.00	79.8

Table 4

**Aggregated ranks and ratings of districts and towns by characteristics of remoteness,  
services availability and life quality**

Districts and towns	Rank (sum of places)	Rating
Baganskiy	20	0.41
Barabinskiy	26	0.35
Bolotninskiy	12	0.53
Vengerovskiy	25	0.35
Dovolenskiy	21	0.39
Zdvinskiy	29	0.33
Iskitimskiy	7	0.59
Karasukskiy	19	0.39
Kargatskiy	22	0.37
Kolyvanskiy	11	0.56
Kochenevskiy	13	0.52
Kochkovskiy	27	0.35
Krasnoozerskiy	23	0.37
Kuibyshevskiy	24	0.36
Kupinskiy	30	0.33
Kyshtovskiy	35	0.30
Maslyaninskiy	16	0.49
Moshkovskiy	6	0.60
Novosibirskiy rural	9	0.58
Ordynskiy	18	0.46
Severnyi	36	0.30
Suzunskiy	17	0.47
Tatarskiy	31	0.32
Toguchinskiy	10	0.56
Ubinskiy	19	0.41
Ust-Tarkskiy	33	0.31
Chanovskiy	28	0.35
Cherepanovskiy	8	0.59
Chistoozernyi	34	0.31
Chulymskiy	14	0.52
Town of Barabinsk	5	0.62
Town of Berdsk	1	0.88
Town of Iskitim	3	0.84
Town of Kuibyshev	4	0.70
Town of Ob	2	0.88
Town of Tatarsk	15	0.49

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*Availability coefficients of services financed from the regional budget.* With use of coefficients of remoteness we can construct special coefficients characterizing territorial irregularity of services availability (all services or part of them), financed from the regional budget. Formally its funds are supposed to provide financing the general population's needs of a region (administration, law protection activity, special types of healthcare, education, culture, etc.). In this sense, they must be equally available for each inhabitant of a region, no matter where exactly he/she lives. In reality, the factor of remoteness often influences on the territorial consumption of these services. Residents of regional capital (in this case, the city of Novosibirsk), and districts and towns in its vicinity, have advantages. Some types of services financed from the regional budget are practically not available, or only partially available, for residents of the remote territorial entities.

Percent of possible consumption of such services is determined in Table 3 in proportion to remoteness coefficient and population number of a territorial formation.

*Integral coefficients of territorial differences.* The concluding Table 4 integrates separate coefficients of remoteness, coefficients of services availability and coefficients of life quality into united coefficients of objective territorial differences. It is worthwhile to use exactly these coefficients while distributing part of subsidies from regional budget in a form of the territorial rent, which is supposed to neutralize, to a certain extent, objective differences in life conditions of population in different districts and towns.

## **FORMATION OF RESOURCES FOR DEVELOPING MUNICIPAL ENTITIES**

Diversity of forms and methods for renewal of development resources and expenses for current functioning of municipal entities may be grouped in three directions:

- direct financing of general expenditures;
- support of local budgets;
- support of local investment projects and programs.

*Direct financing of general expenditures.* In a really acting budget system one can admit different ways of financing general expenditures which are regulated by normative acts of federal or regional level (pension fund scheme, child allowance, subsidies due to federal law about veterans, etc.). On a regional level, under chronic deficit of local budgets, it is possible to increase the addressed use of the regional budget, i.e. budget assignments of all-regional status should get a form of direct financing, without offset of those sums in the income base of local budgets. First of all, such assignments should include the following budget expenditures:

- financing of transportation expenditures (complete or partly) on service operation of inter-town (inter-district) passengers traffic, on deliveries to districts products, fuel resources, materials, medical supplies, etc. for providing the functioning of municipal social sphere;
- financing of inter-district bodies of socio-cultural assignment (specialized bodies for health-resort treatment, educational bodies, cultural and sports bodies, etc.)
- subsidies for persons with privileges (rural teachers, medical doctors, etc.) for buying fuel, paying for electricity, etc.

*Support of local budgets.* Another part of financial support of territorial entities should be transferred to the local budgets directly, strengthening their revenue base and stimulating local administrations to consolidate and to develop a district's economic potential. We suggest distinguishing two types of such transfers. The first type of transfers is intended to reimburse (fully or partially) a local budget for its losses due to preferential taxation and tax release introduced by federal and regional legislation. The second type of transfers reimburses (also fully or partially) the taxes deducted to federal and regional budgets. Thus, stimulating transfers reconstruct the situation when revenue sources of lo-

cal budgets are brought to their own taxable capacity. Since the absolute majority of rural districts are clearly subsidized (i.e. they receive significantly more finances from superior budgets than they transfer to them), this change in the receipt of funds order does not lead to the general growth of transfer load on a regional budget. In this situation it becomes inexpedient to conceal tax base; the only way to increase subsidies coming from regional budget is to show a growth of production and increase of tax revenues coming into federal and regional budgets connected with this growth. It is important that no special data or calculations are required for introduction of these transfers: they can be determined on the base of tax statistical indicators.

And only the third component of financial support of territorial budgets is directly connected with the adjustment of fiscal capacity among territorial entities. Adjusting transfers, along with the local budget revenues and stimulating transfers, should provide financing of the budget expenditures at the level determined by the system of minimum social standards. The system of minimum standards itself should be differentiated (including differentiation on the basis of territorial coefficients suggested above) and focused on the convergence of different levels of services provision for population in various territorial entities. Another restriction refers to requirement of standards consistency with the overall size of would-be transfer fund.

*Support of local projects and programs.* As a part of direct and indirect participants it is necessary to consider local related enterprises (external and internal consumers of manufactured goods, suppliers of equipment, components and materials, required by technology), companies in infrastructure industries supplying heat, water, electricity, gas, and fuel to the production, planned within a framework of the project; building contractors and construction materials plants, population and recipients of tax and non-tax deductions (local, regional, and federal budgets, and non-budget funds). Direct and indirect influence of the project (program) is performed in regards to many sides of territorial entity development exactly through this environment which is surrounding a considered project. The main function of the regional level management is to select projects and territories for further support. And the support should be for those territories where projects will be most efficiently implemented i.e. will achieve regional resource saving in comparison with expenditures which would be carried out by regional budget to achieve similar indicators in territorial entity. Approaches to the integrated assessment of investment projects implementation in a region can make up a base for calculation technique of such estimates.

## **APPROACHES TO INTEGRATED ASSESSMENT OF THE INVESTMENT PROJECTS IMPLEMENTATION**

Prospects of social and economic development of a region and its municipalities depend largely on a sensible investment policy, expressed, ideally, in rightly selected priorities for investments, as well as in mobilization of all possible sources of financing the investments. Creating favorable investment climate (development of investment legislation, stabilizing economy, creating pool of investment projects, increasing infrastructural development of the territory, etc.) makes regional authorities the participants in the investment processes in the region, reasonably claiming an appropriate part of financial results of the investment projects implementation. Similar considerations can be expressed about the rest of the investment processes participants in the region. Conceptually, an idea of the proposed approach consists in further construction of the project analysis techniques, targeted to the assessment of projects internal efficiency, by blocks. Each block contains project expenditures and revenues which are distributed among all direct and indirect project participants.

Local, regional and external (in relation to region) components can be distinguished in the project's «regional environment». Effects from project implementation as well as costs for its realization can be manifested at every level. Therefore, overall assessment of the project's efficiency can be divided into local (at the place of project implementation), regional

and external components. In their turn, in regards to positions of region-wide interrelations, the project's revenues and expenditures may include direct and indirect components. Direct components are project's indicators per se, and indirect components are «circles» at the territory, occurring due to project's implementation: multiplicative effects of secondary employment, local market revival, influenced by demand for products and resources required for project implementation, etc. (the best example refers to implementation of projects on agricultural products processing). Therefore, taking into account the investment project's «regional environment», while supplementing direct revenues and expenditures with indirect ones, in some cases can strengthen them, in other cases weaken them, and thirdly to strengthen (or to weaken) local complete estimates by influencing regional projections of complete effects in the opposite direction, etc.

Finally, this approach, while being with needed developed tools, must answer the question: what is a full effect of an investment project implementation for a local level, for a region, and for the state in total? And comparison of alternative projects, according to this supplemented method, will enable to see the priorities in structural changes in economy, understood with the help of filters of territorial hierarchy efficiencies. For example, it is obvious that projects focused on providing high external or at least regional efficiency, will be less useful and important for a depressed administrative district than the projects mostly focused on resolving local issues of this district.

Traditionally, investment projects are evaluated from a perspective of their efficiency for general investor or overall integral parameters of their implementation. As a rule, the main criteria are the payback period, internal rate of return and some others. It is implicitly expected that the projects with the highest integral estimated figures will be equally preferred for all subjects, which interests are affected in implementing the selected projects. Traditional techniques often take into consideration uncertainty of many factors, which influence the project implementation and its efficiency. In this case, final project estimates show to the investor the related risks. The fragments focused on taking into account social impact of estimated project (for example, estimation of work places created due to the project implementation) are the components of advanced techniques. In some cases, even so called budgetary efficiency may be assessed. This indicator is mainly considered as aggregate tax revenue to the budgets of all levels, provided after the project implementation.

### **SUBJECTS OF INVESTMENT PROJECT'S SCOPE AND THEIR INTERESTS**

The following subjects should be considered as the main subjects of the investment project's scope: general investor; population which directly or indirectly is influenced by the project under consideration; participants of commodity or services market, which can be considered as a competition to production, created as a result of the project implementation; local administration (administration of the settlement, where the project is implemented); higher level administration, in cases when the project scale is not limited by local territories; enterprises and organizations of infrastructure and related industries, directly or indirectly related to the project implementation.

*General investor* usually is a bank, a financial company, a joint-stock company, etc. It bears the main expenditures of its own and borrowed capital. General investor is an owner of the project results (goods, services, and financial results). Exactly this investor is mainly interested in the traditional indicators of project efficiency. Moreover, the structure of needed validations for the project is often subject to his interests. Exactly general investor attempts to receive some benefits (on preferential terms) for project implementation from authorities, appealing to the additional (above mentioned) estimations of social and/or budget efficiency of the project.





fect considered as benefit-cost ratio can be arbitrary large. It is unfair to other level administrations and budgets. Recognizing the equivalence of all levels of territorial hierarchy, it would be fair, for example, to introduce into investment legislation tax concessions for federal taxes or preferential government credits, which level (or, at least, converge) individual estimates of project efficiency for different levels.

*Enterprises and organizations of infrastructure industries.* Power and heat supply facilities, water and communal services, transport and road facilities, etc. belong to this category, in the first place. Every investment project has to be tied to the sources of engineering, production and technical infrastructure services needed for the project. Currently, when the general range of economic activity decreases and, thus, the capacity reserves of infrastructure objects exist, as a rule, the investment project implementation revives infrastructure services market as well. And this result should be estimated as a positive input in project results evaluation. If there are no such reserves or they are small, the projects with substantial demands in infrastructure supply are doomed to failure. Then, the task of the regional or local authorities is to eliminate the infrastructure resources deficit. Consequently, the authorities act as a general investor initiating special infrastructure projects and raising necessary funds and guarantees on their own responsibility.

*Related productions.* Raw and other materials production used in the project should be included into this category, as well as the productions which continue the technological chain generated by project. Obviously, under all other things being equal, the project targeting to local raw materials or permitting to increase local processing chain, will have more chances to win than the project which has not got these properties.

*Principals of the integrated assessment of an investment project.* The detailed elaboration of the integrated assessment techniques is a large, time and labor consuming task. However, the fundamental principles of it, resulted from the previous discussion, could be formulated as follows:

1. The investment project indicators, developed up to the business plan stage, give an opportunity, in general, to represent in sufficient detail the constituents of the direct particular estimates of the investment project efficiency, corresponding to every participant of its implementation.

2. The calculation of the indirect effects and costs requires the attraction of extra data: the state of the local markets of infrastructure resources, raw and other materials, labor resources, interconnected industries production.

3. For the integrated assessment the stages of objects creation and objects functioning should be defined separately; the objects which are included in the assessed investment project. At each stage it is necessary to keep track of the direct and indirect costs and benefits. As distinct from the traditional approach, in the course of the integrated assessment of the investment project efficiency there are positive constituents of the outcome as late as at the investment implementation stage (revival of the labor market, building materials market, etc.).

4. The distribution of the total effect of the project among all its participants causes the task to compare the projects in terms of particular estimates vectors. That requires using special procedures of indicators sets sorting. The constructive core of these procedures could be based on the preliminary analysis of territorial, industrial, resource situation in general in the region and on the sorting (ranking) of the particular components of the implementation effect of the investment projects on this basis.

*Suggested list of indicators for the integrated assessment of an investment project.* It could be different for the stage of construction and the stage of functioning.

*A. Stage of construction (by years of construction):*

- Investments to the fixed assets;
- Volumes of the construction and assembly works;

- Construction needs for equipment and construction materials which includes equipment and construction materials of local production;
- Construction needs for infrastructure resources (heat, water, electric energy, transport, labor power, etc.);
- Monetary evaluation of all physical indicators listed above, in constant basic prices;
- Monetary evaluation of the same indicators taking into account tax liabilities and payments into the non-budget funds (with so called market prices). Alternatively, there could be a scheme, in which these indicators are calculated rates. Then, the input parameters are local, republican and federal tax rates and rates of nontax payments. In calculations, these rates are applicable to the previous indicators at the constant prices;
- Prime costs and profits of construction organizations;
- The revenues of the different level budgets and payments into the non-budget funds from construction organizations and enterprises, from local infrastructure and population incomes, connected with the project directly or indirectly; land allocation revenue, issuance of licenses revenue and revenue from the registration of rights and licenses for project implementation, etc.

*B. Stage of functioning (by years of mastering a projected capacity):*

- Volumes of commodities and services production within the project;
- Volumes of related production stipulated by supply of the project production and services, at the connected enterprises;
- Volumes of raw and other materials consumption, including local production;
- Volumes of infrastructure resources consumption, including labor force;
- Financial results of the basic production, related industries and infrastructure units in the part related to the volumes of project basic production (prime costs, profit, remuneration of labor, volumes of products realization, basic taxes);
- Revenues of local, republican and federal budgets and non-budget funds resulted from functioning of implemented project production, the revenues of the related industries and infrastructure facilities in the part conditioned upon the project load on them;
- Expenditures (direct and indirect, in the form of the tax benefits and other advantages) of these budgets and non-budget funds for realization of this investment project;
- Incomes of population involved in a project, directly or indirectly. Total growth of efficient workplaces in the whole production chain of the implemented project.

It appears that the suggested approach could be highly efficient in the following particular cases:

- for the territories which have no unique opportunities to attract big general investors;
- for the projects which affect directly or indirectly the interests of a big number of regional economical subjects;
- for the projects targeted to overcome the depressiveness of some territories, local level included;
- for the projects wherein indirect effects are bigger than direct ones.

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# **PROGRAM APPROACH TO THE ENVIRONMENTAL MANAGEMENT IN THE REGION<sup>1</sup>**

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The paper is devoted to the main methodological and methodical aspects of the development of the strategies for the protection of the environment on the example of the Novosibirsk region. The logic diagram of development of the strategy of environmental activities in the region is shown. Major environmental problems of the Novosibirsk region and their possible solutions are identified. The system of environmental protection measures determining the need to mitigate or prevent potential environmental problems is proposed. Calculations forecast air pollution area on the most common pollutants emitted from stationary sources in the period until 2025 with taking into account environmental measures, are fulfilled. The results of the research allow carrying out a more informed choice of the main directions of environmental activities in the region under consideration, which avoid the possible risks and the best use of available resources. All of this is a prerequisite for the formulation of priorities in the environmental field and the development of strategies for the protection of the environment as an element of social and economic development of the region as a whole. Recommendations were made to improve the management mechanism of the regional eco-economic system.

## **APPOINTMENT OF AN ENVIRONMENTAL PROGRAM**

One of the most important tools of management of the environmental sphere of the region and of forecasting its condition is strategic planning. The strategic planning process provides the basis for managing the region as a whole and its individual spheres, including, in particular, environmental. Development of a regional environmental strategy involves determining the environmental mission of the region and its ecological image of the future, the choice priority objectives and goals, detailing their in specific projects and programs, developing mechanisms for implementation, analysis and evaluation of results and consequences of implementing projects and programs. Consider the example of the Novosibirsk Oblast the main methodological aspects of the development of environmental strategy.

The Novosibirsk region environmental policies are aimed at maintaining the integrity of natural systems and providing a favorable environment for people. At the same time it's necessary to consider that not only is a lot of accumulated in the past and so far unresolved environmental problems, but also the fact that the prospects of socio-economic development of the region associated with a possible further increase of the load on the environment. This, in turn, determines the relevance of development and implementation in the medium and long term, an adequate system of environmental measures that could form the basis for the strategy of environmental activities in the region and, consequently, to determine the main directions of improving the environmental regulatory system in this region that minimize the negative impacts of human activities on the environment and in general of ecological safety of the economic development of the Novosibirsk region.

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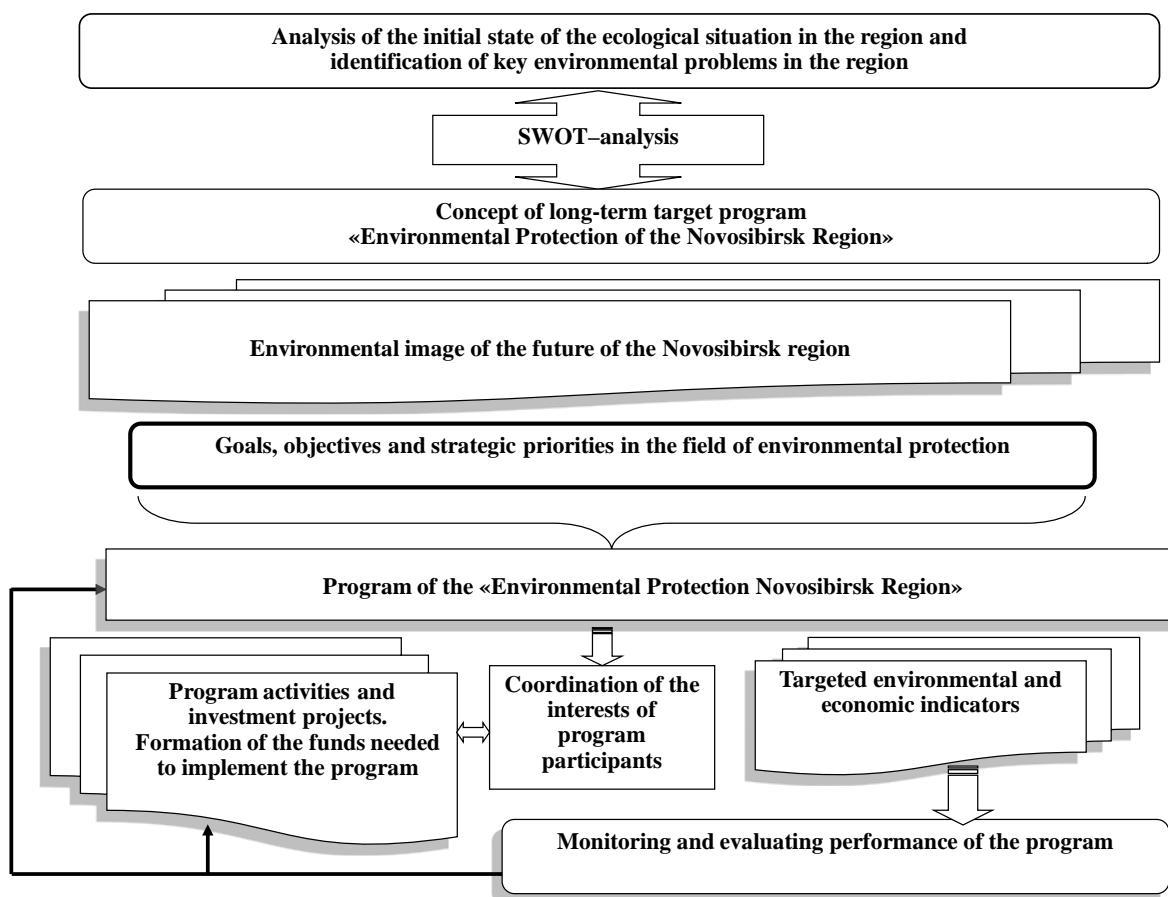
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The basis of the system of prediction of the environmental situation in the Novosibirsk region is the development and implementation of a number of interconnected documents, including the following elements:

1) the section «Ensuring environmental safety and environmental protection» as part of the Strategy for Socio-Economic Development of the Novosibirsk region for the period up to 2025 [1];

2) long-term target program «Environment of the Novosibirsk Region» within the Programme of the Socio-Economic Development of the Novosibirsk region up to 2015 [2, 3];

3) subsection «Solving the environmental problems» of the Strategy of socio-economic development of Siberia up to 2020 (Section IV. Priority Interbranch Development Directions of Siberia) [4, 5].



*Fig. 1.* Structure and scheme of the process of the development and implementation of the Program «Environmental Protection the Novosibirsk region»

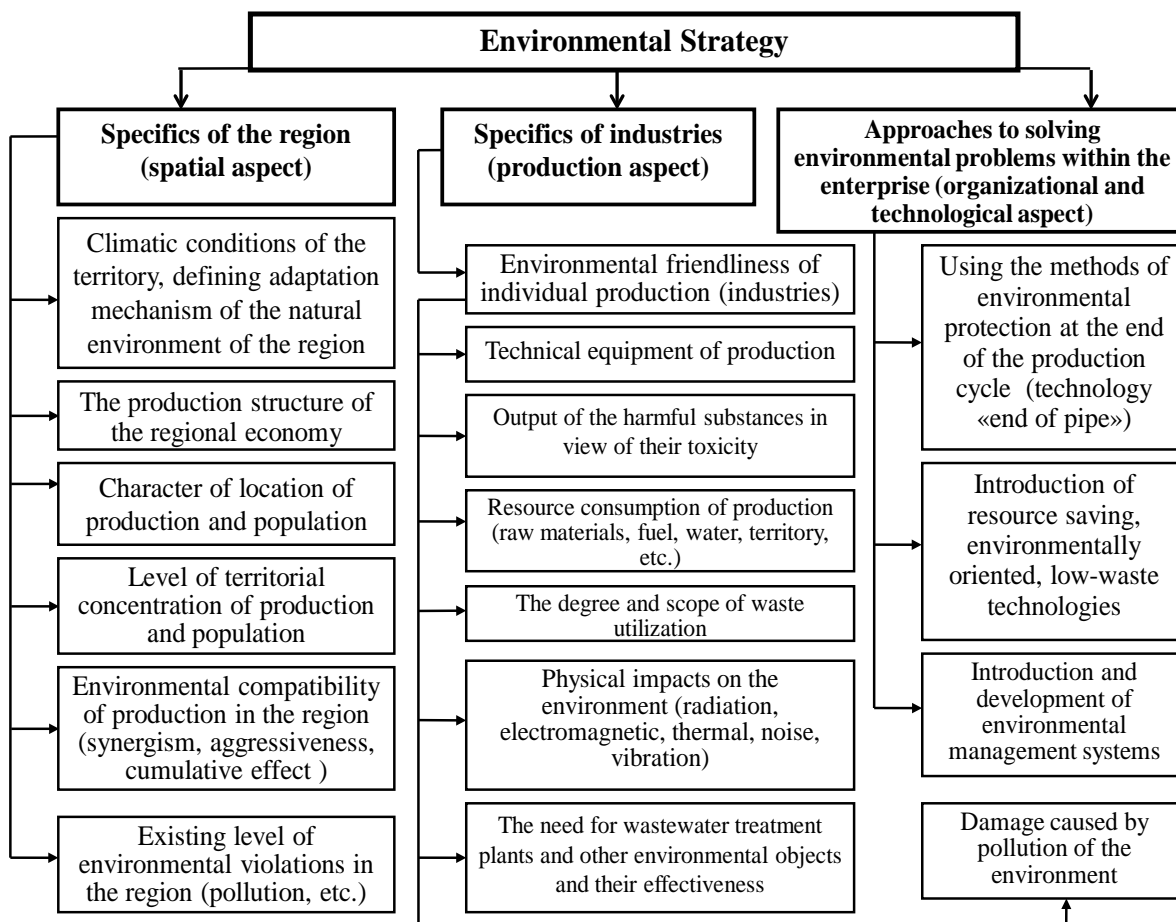
It is important to note that forward-looking strategic developments in the field of environmental protection are part of the general system of strategic planning documents of socio-economic development in the region [5, 6, 7, 8, 9] and have a close connections with economic and social issues in the region, as oriented on a comprehensive solution economic, social and environmental problems. In accordance with this, the formation of long-term target program «Environmental Protection Novosibirsk Region» (hereinafter – the Program) suggests as a first phase the elaboration of the project concept of this program, which are built with taking into account the connection with the Program of socio-economic development of the Novosibirsk region in 2025 [1, 2, 7]. The concept of long-term program «Environmental Protection the Novosibirsk region» is intended to further the formation of the long-term program, as well as definitions of the main contours of

the internal structure of the section dedicated to environmental protection, its place in the program of socio-economic development of the Novosibirsk region and the total system of strategic planning area.

Development and implementation of the Program should begin with an analysis of the initial state of the environment in the region and should end with the elaboration of defined measures for the desired adjustments of the nature management and forming a healthy environment within the territory under conditions of the quality control of the entire process of development and implementation of the Program, the necessary coordination in the relevant activities and evaluation of the results (Figure 1).

### FACTORS AFFECTING THE DEVELOPMENT OF THE ENVIRONMENTAL SITUATION IN THE REGION

Regional environmental policy is largely dependent on how adequately factors affecting the development of the environmental situation are taken into account. Analysis of these factors in relation to the possibility of the environmental governance allows identifying the most significant for a specific period of time environmental problems and offer the ways for their solutions. It is important to be clear about whether the critical factors amenable to be controlled by the environmental agencies are internal or external within the scope of regulation of environmental field or external conditions on which the regional authorities are not able to affect directly.



*Fig. 2.* Factors influencing the choice of environmental policy in the region

In every region of the environmental situation, priority environmental issues and finding approaches to their solution are determined, as a rule, by three groups of aggregated factors (Figure 2): 1) the specific conditions of the region; 2) industry features productions that are presented in the region; 3) approaches to environmental problems within the individual businesses.

Results of imposition of these factors on the territory of the Novosibirsk region testify that from the standpoint of the formation conditions of the environmental situation, the region relatively lucky only with branch structure of production (meaning first of all the absence of typical polluting industries). For the remaining factors the situation is sufficiently urgent that in the perspective of socio-economic development of the region under study determines the urgency of developing and implementing the necessary environmental measures that form the basis of the program in the field of environmental protection and determine the main directions of improving the system of environmental management in the region.

<b>Specificity of territory of the Novosibirsk region</b>	<b>The natural and climatic conditions that determine the adaptation mechanism of region's environment</b>	<ul style="list-style-type: none"> <li>• <i>Good conditions for dispersion of pollutants in the atmosphere due to flat landscape and a favorable the wind rose</i></li> <li>• Frequent calms, ground inversions and anticyclonic weather that causes the growth of pollution</li> <li>• Increased level of natural radionuclide contamination in Novosibirsk</li> <li>• The natural foci of infection (tick borne encephalitis)</li> </ul>
	<b>The production structure of the regional economy</b>	<ul style="list-style-type: none"> <li>• <i>The predominance of production facilities (machine-building, infrastructure complex) which have no significant impact on the environment</i></li> <li>• Technological backwardness of production, which determines its low environmental friendliness</li> <li>• Thermal energy on carbon</li> <li>• Lack of industry for environmental purposes, little groundwork for the production of environmental equipment and provision of environmental services</li> <li>• The rapid growth of the vehicle fleet</li> <li>• Absence effectively working garbage recycling plants</li> </ul>
	<b>Character placement of production and population, the level of their territorial concentration</b>	<ul style="list-style-type: none"> <li>• <i>Reconstruction of treatment facilities of the sewer system in the regional center</i></li> <li>• High concentration of production and the population in the regional center and, consequently, environmental pollution and restrictions for expansion of production</li> <li>• Insufficient equipment and low efficiency of the existing environmental equipment</li> <li>• Lack equipped in accordance with sanitary norms of municipal solid waste landfills in the districts of the region</li> </ul>
	<b>Availability of resources, environmental compatibility of production in the region, etc.</b>	<ul style="list-style-type: none"> <li>• <i>Availability of the free territories for location of production</i></li> <li>• <i>Water reserves to meet the needs of production and population</i></li> <li>• Deficit of clean drinking water in the area</li> <li>• Insufficient study of the radiation situation in Novosibirsk region</li> <li>• Imperfect system of environmental monitoring</li> <li>• Lack of infrastructure for R &amp; D in the field of practical environmental protection</li> </ul>
	<b>Current level of violations of the environment in the region</b>	<ul style="list-style-type: none"> <li>• Unsatisfactory water quality in water bodies</li> <li>• Growth of air pollution from motor vehicles</li> <li>• Growth of volumes waste of the production and consumption, particularly municipal solid waste</li> <li>• Imperfection of the collection systems, account of the formation and accumulation of municipal solid waste</li> <li>• Availability of large areas of disturbed land, soil pollution, the ongoing processes of desertification and degradation of vegetation cover</li> <li>• Disruption of ecosystems Lakes region; flooding of territories</li> <li>• Unsatisfactory state of the hydraulic engineering constructions</li> <li>• Elevated groundwater levels</li> <li>• Reducing the number of individual species of plants and animals</li> </ul>

**Fig. 3.** Features of the Novosibirsk region from positions forming the ecological situation (Favorable factors are marked in italics)

Features of the environmental situation in the Novosibirsk region and emerging environmental problems are mainly caused by local climatic conditions and character of influence on them the region's economy (industry, energy, transportation, utilities and agriculture), which in turn depends largely on the specific location of industrial enterprises, their capacities, technologies used, the extent of the territorial concentration of production and population, the existing level of a violation of the natural environment in the region and other conditions. Concretization of these conditions with respect to the considered region is shown in Figure 3.

Projected in the Novosibirsk region economic development involves the growth of the fuel industry, ferrous and non-ferrous metallurgy, chemical industries, construction materials industry (cement) and freight turnover transport [1]. This can lead to increased pressure on all parts of the environment that will require conducting adequate environmental measures.

### **ANALYSIS OF THE INITIAL STATE OF THE ENVIRONMENT AND THE MAJOR PROBLEMS**

Modern ecological situation in the Novosibirsk region is very heterogeneous both in component and in the territorial context. With respect to the elements of the environment stand out above all air pollution, water pollution and land disturbance associated with the placement of solid waste production and consumption. With regard to the territorial aspect, environmental impact differs sharply according to the city area. By the level of environmental pollution cities and regions may be divided into three groups. Novosibirsk refers to the first category, where a high concentration of industrial production and population results in an increased flow of pollutants into the environment of the city, posing a threat to a human health. With a large margin from Novosibirsk are followed Kuibyshev Iskitim, Berdsk, Barabinsk, Tatarsk, Linevo. And finally, the third group includes all other cities and districts of the region.

Main indicators characterizing the state of the environment in the territory of the Novosibirsk region from positions of atmospheric air, water basins and waste in the dynamics are shown in Table 1 [10, 11, 12, 13, 14, 15].

Quite a strenuous situation in the region is connected with the air pollution, although environmental activities carried out in enterprises of Novosibirsk and area (in particular, technical re-equipment of «Novosibirskenergo», transition from coal to gas of a number of boilers and others) allowed to lower its sharpness. In the structure of total emissions to the atmosphere in the region (Table 1) is allocated the motor transport (about 61% of the total emissions of the area in 2008, 60.5% – in 2009 and 55.1% – in 2012). The contribution of other sources of pollution in 2012 was as follows: industry – about 20.9% combined heat and power and heating boilers with housing and communal services – 24%.

Emissions from stationary sources have been relatively stable in the past 10 years, while the amount of pollutants received from air emissions from motor vehicles, from 2004 to 2009 grew and in 2009 began to decline. This decrease is attributable to a decrease in the share of trucks and buses in the vehicle fleet structure of the region (33.6% and 16.3% respectively in 2011, while increasing the share of passenger cars by 7.6%).

Problem of drinking water quality and pollution of water bodies in the Novosibirsk region remained rather sharp. Although the provision of region by water resources is quite high, but the quality is poor. Modern state of the majority of water bodies and coastal areas is not in compliance with environmental and town planning requirements. The situation is exacerbated by the high content in water of iron and manganese of natural origin. Pollution and groundwater as the main source of drinking water is increased. Practically every district

of region is characterized by inadequate water supplies and poor quality of drinking water. This is primarily due to water shortage in some areas, as well as deterioration of structures and networks of drinking water supply. More than 1 million residents of the region drink poor quality water.

Under the terms of drinking water supply from fresh groundwater, among territories of the Novosibirsk region by water with mineralization up to 1 g/l are provided mainly northern parts of the region, part of the left bank of the Ob river, the right bank and the southern parts of Karasuk and Krasnozersk districts. In the rest of the region under consideration the water supply of population can be satisfied, under the resolution of public sanitary inspection, from the groundwater with mineralization advantageously from 1 to 1.5 gram/liter. Under unfavorable conditions exist western regions (Tatarsk, Chany), where groundwater of all the major aquifers have mineralization from 1.5 to 3 g/l. High quality drinking water in the area is typical for Novosibirsk thanks to the work of company «Gorvodokanal». In the last years there has been a trend of gradual reduction of volumes fresh water intake (Table 1).

Table 1

**Main indicators characterizing the impact of economic activity  
on the environment the Novosibirsk Oblast\***

Indicators	The year						
	2005	2007	2008	2009	2010	2011	2012
Extraction of water from natural water bodies – total, million m <sup>3</sup> , including:	836,0	768,0	835,6	755,2	763,6	676,0	703,9
– from surface water bodies	734,5	673,5	738,7	659,5	696,5	613,4	642,8
– from underground sources	101,6	94,6	97,0	95,7	67,1	62,6	61,1
Wastewater discharges into surface water bodies total, million m <sup>3</sup> , including:	615,7	568,7	624,6	588,2	604,2	527,1	544,2
– discharge of polluted wastewater, million m <sup>3</sup>	72,5	101,5	104,6	98,4	106/ 48,3***	92/ 34,9***	112,5/ 40,1***
– discharge normatively treated wastewater, million m <sup>3</sup>	271,4	250,5	273,0	254,1	280,18		
Air emissions, thousand tons:							
– from stationary sources	213,2	204,0	231,5	233,5	228,4	234,0	224,5
– from motor vehicles	287,8**	365,7**	358,0**	358,4	319,9	287,4	286,2
Pollutant emissions from stationary sources, per 1 inhabitant, kg	80,5	88,7	100,7	88,1	85,7	87,1	83
Waste generation of production and consumption, million tons	1,98	1,68	1,74	1,91	2,07	2,5	1,8

## Notes:

\* The table is compiled using data of the Novosibirskstat and the Department of Natural Resources and Environmental Protection of the Novosibirsk region, as well as sources [10–15].

\*\* Calculations are made by the Department of Natural Resources and Environmental Protection of the Novosibirsk region under the simplified procedure developed by «SRI Atmosphere», using specific emission factors.

\*\*\* In the denominator polluted waste water without treatment is indicated (in total volume of wastewater discharges).



Water pollution is primarily associated with industrial activity and functioning social and domestic sector. The main sources of pollution of water bodies in the Novosibirsk region are housing and utilities of the cities Novosibirsk, Kuibyshev, Barabinsk, Cherepanovo and Tatarsk, and a number of industrial facilities. The main pollutants in the Ob river basin are nitrogen compounds, oil products, phenols and iron. At the same time small rivers are polluted to a much greater extent than the Ob, which, being one of the most full-flowing rivers in the country, has a high self-cleaning ability. From the point of view of the level of pollution of surface water sources, evaluated by an index of water pollution, water quality main river of the region – Obi – estimated in its entirety within the Novosibirsk region as referring mainly to classes IV and V (i.e., as contaminated water and dirty). Among the most polluted water bodies in the region are the Novosibirsk Reservoir, the Lake Ubinskoye and surface water sources in the area of the Maslyanino and Iskitim. Here water quality corresponds to V and VI classes, i.e. it is dirty and very dirty. Among the main types of pollutants are allocated petroleum, detergents, phenols and chlorides.

Serious problem in the region (especially in Novosibirsk) is the efficient management of waste of production and consumption (Table 1). Every year in the regional center about 2 million m<sup>3</sup> of waste are produced, including 800 tons of municipal solid waste (MSW), which is more than 530 kg per person per year. The main problems are connected with municipal solid waste, unusable plant protection products, mercury-containing wastes. The overwhelming majority of waste generation (nearly 70%) refers to waste hazard class V. Most of them large-capacity – ash and slag wastes of «Novosibirskenergo» and municipal waste. 85% of the total waste production and consumption in the region is formed by three types of activities: a) the production and distribution of electricity, gas and water; b) at the facilities of agriculture; c) at the manufacturing enterprises.

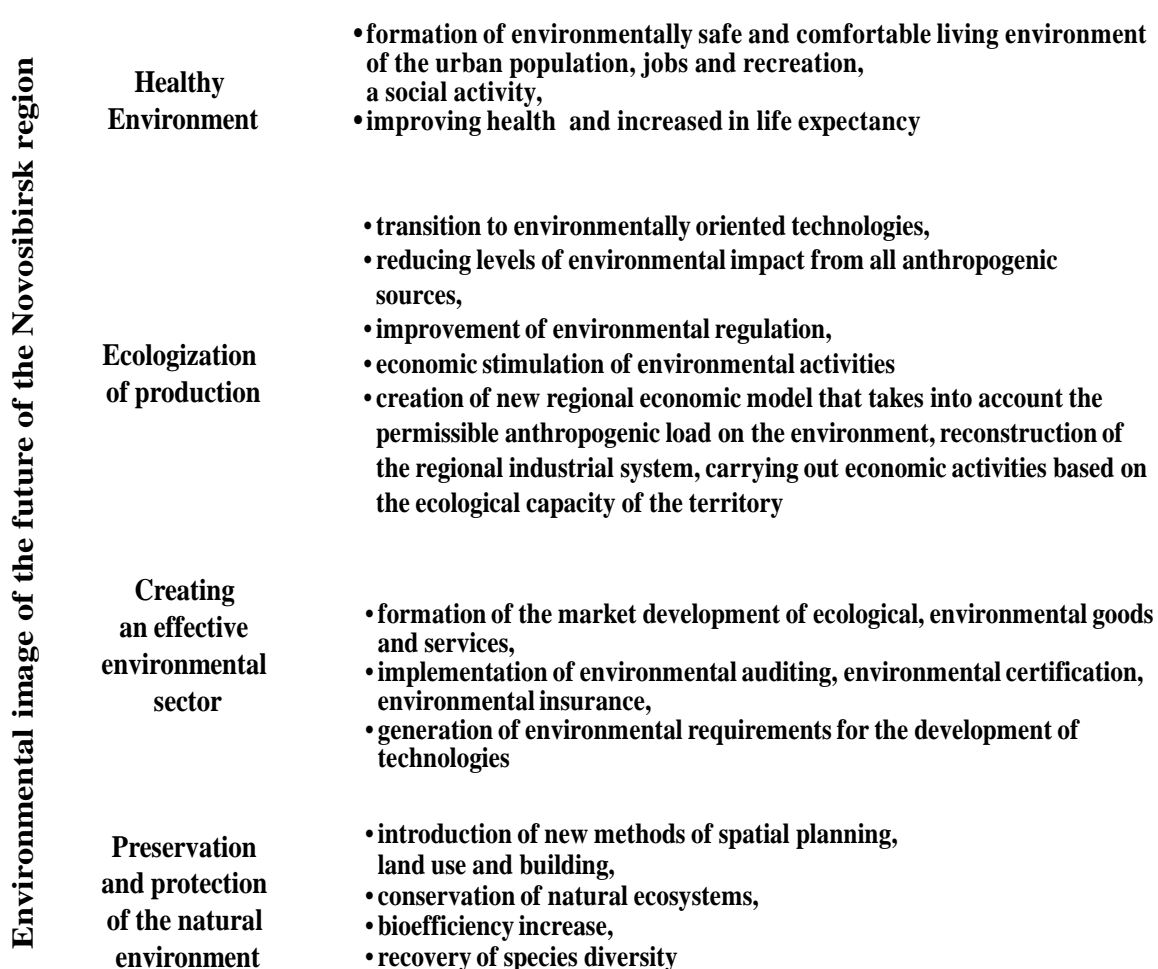
Accumulation of waste production and consumption is accompanied by increased size of the territory occupied by them (today Novosibirsk, Berdsk and other settlements of the region experiencing a shortage of land for placement of waste). Due to the lack of specialized multi landfills (disposal) of hazardous industrial wastes, many companies are forced to temporarily store waste at industrial sites. Unorganized dumps of industrial and household waste are generated spontaneously and are located mainly in floodplains, ravines and forest areas. Currently in the Novosibirsk region there are 1034 municipal solid waste landfills, including 670 unauthorized. Processing of most types of waste production and consumption is hampered by lack debugged system of collection. Low level of using waste production and consumption leads to the fact that the bulk of the waste is located on the objects of the long-term storage (more than 1.3 million tons) [11].

Besides characterized aspects of the formation of the ecological situation in the Novosibirsk region to the number of acute problems rather should also include: soil pollution, desertification and degradation of vegetation; reduction of the species composition of flora and fauna; safety operation of hydraulic structures, preservation, reproduction and rational use of natural resources; safety operation of hydraulic structures, preservation, reproduction and rational use of natural resources; air pollution in the zone of fire unauthorized dumps full of municipal solid waste; contamination of soil, groundwater and surface water at the locations of waste dumps; flooding of settlements; business waste storage plant protection products; condition of hydraulic structures, processing of the Novosibirsk reservoir shores; natural focal infections (encephalitis).

Based on the analysis of the environmental situation in the Novosibirsk region one can formulate environmental vision of the future of the region, the challenges in creating favorable environmental conditions, as well as identify strategic environmental priorities and directions of the environmental performance [16].

## ENVIRONMENTAL IMAGE OF THE FUTURE OF THE REGION, THE CHALLENGES IN CREATING A FAVORABLE ECOLOGICAL SITUATION, STRATEGIC ENVIRONMENTAL GOALS, OBJECTIVES AND PRIORITIES

The main elements of the image of the future of the region must be such characteristics that suggest improvement in the quality of the natural environment and ecological conditions of human life, including a healthy environment, the greening of production, creation of effective environmental sector and the conservation and protection of nature (Figure 4). Formation of ecological vision of the future (which, however, in territorial aspect is versatile enough because it is formed on the basis of common social, economic and environmental requirements) provides for forming of such foundation on which perspective should be the necessary conditions in order to make the harmonious interaction of economy and ecology in the region by reality.



*Fig. 4.* Environmental image of the future of the region

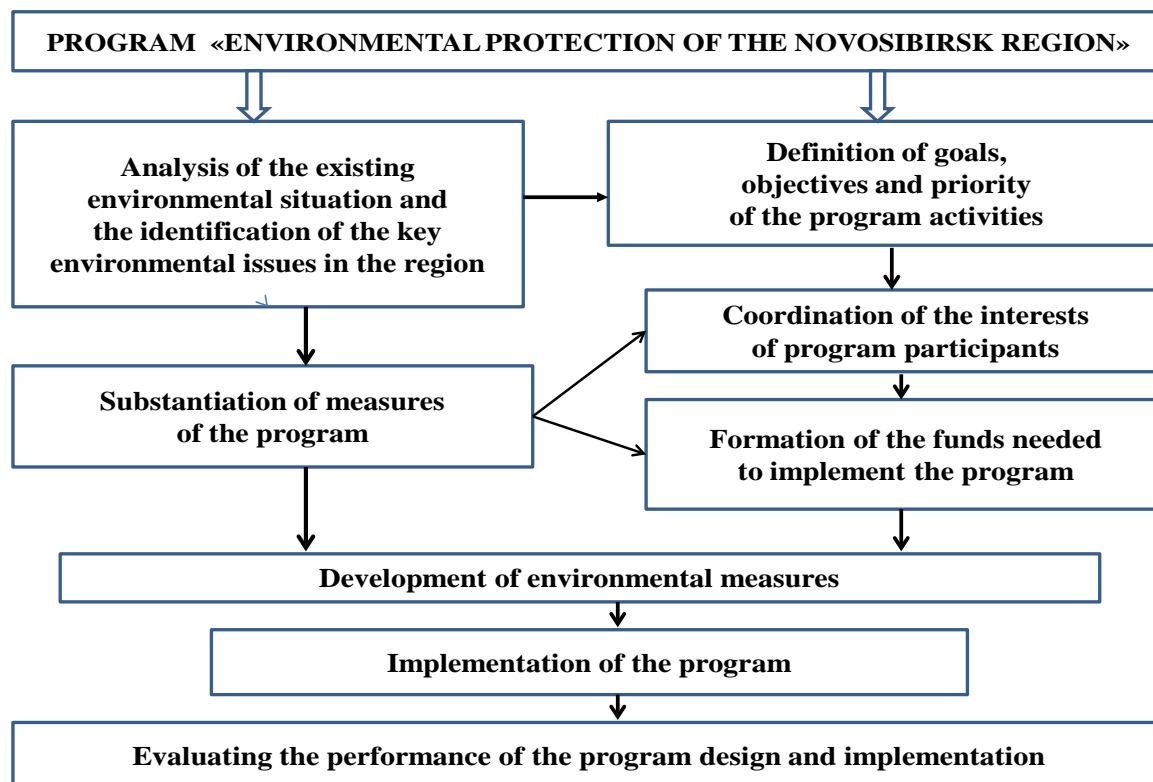
In modern conditions of economic development the main challenges in the formation of the ecological situation in the regions of the country conditioned by the following circumstances:

1) the transition to new standards of life and environmental safety, the introduction of resource-saving and environmentally sound technologies;

- 2) the weakness of the modern state of environmental policy in the Russian Federation;
- 3) imperfection of the techniques to determine of economic damage caused by the economy and health by pollution of the environment;
- 4) low investment activity among the nature users into the conservation activities;
- 5) weak economic interest of the nature users in the complying with environmental requirements;
- 6) the imperfection of statistical reporting on the use of natural resources and protection of the environment, lack of control of financial discipline in the field of resource and environmental charges;
- 7) the tightening of conditions for access to international markets from the viewpoint of environmental standardization and regulation;
- 8) increasing international competition due to increasing demands for environmental quality and safety, the transition to the taking into account the environmental parameters of technologies used for production;
- 9) low environmental responsibility of business and generally low ecological culture of people.

Basis of environmental activities of the Novosibirsk region is composed of identified and formulated already existing environmental problems, and of those that may arise in the process of the planned investment projects implementation, as well as of the system of environmental protection measures which are determined by the need to mitigate or prevent potential environmental problems (Table 2).

The development and implementation of the regional environmental program include the following sequence of actions (Figure 5).



*Fig. 5.* Scheme of the process of development and implementation of the Program «Environmental Protection Novosibirsk Region»

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In accordance with the represented logic, consider the basic steps of development strategies for environmental protection in the region, including the formulation of strategic goals, objectives and priorities in the field of environmental protection in the region, substantiation of necessity of the decision problem in the framework program-goal approach, possible solutions to the problem.

Strategic goal of the regional environmental program can be formulated as providing the environmental safety of the Novosibirsk region due to stabilization and environmental improvement, preservation and restoration of the integrity of natural ecosystems.

These goals could through the following objectives:

1. Meet the needs of the population and economy of the region in various kinds of natural resources on the principles of an integrated, efficient and rational use.
2. Maintaining and improving the quality of the environment, reducing the negative impact on it in the conditions of the innovative development of the regional economy.
3. Protection of the population, economic facilities and the region from the harmful effects of water.
4. Creation of a waste management system of production and consumption.
5. Ensuring the radiation safety of the territory, reduction to a socially acceptable level of risk of radiation impact on man and his environment.
6. Implementation of measures for the protection and reproduction (restoration) of renewable natural resources as environmental components.
7. Compliance with environmental regulation of economic activities involving compliance of its scope and risk of exposure to environmental capacity of natural systems.
8. Developing a network of protected areas and biodiversity conservation.
9. Improving the management system and mechanisms regulating the use of natural resources and environmental protection.
10. Increasing the level environmental education, promotion caring attitude towards nature.

Basis of environmental activity of the Novosibirsk region consists in the identified and formulated environmental problems, which as have been established in its territory and may arise in the process of implementation of the planned investment projects, as well as the system of environmental protection measures, determined the need to mitigate or prevent potential environmental problems (Table 1).

Achieving the goals and objectives is aimed at addressing health improvement of the environment within the Novosibirsk region, reducing the anthropogenic load, maintaining acceptable levels of air pollution from stationary and mobile sources of emissions, organization of rational use and protection of water resources, improvement of the treatment of waste production and consumption, as well as identifying possible directions of improving control mechanisms in the field of environmental protection. Orientation to manufacture high-tech products, realization of the project on gasification of industrial and household sectors of the region and other projects provided for in the Novosibirsk region in the long term, will contribute (along with carrying out the conservation measures) improve environmental performance of the economy of the Novosibirsk region. Exit to the intended target environmental guidelines will testify about the possibility of not only preserving the achieved quality of the environment (primarily due to air quality), but also its progressive improvement.

In accordance with the goals and objectives of the Program, as well as the main provisions of the Strategy for Socio-Economic Development of the Novosibirsk region in 2025, the general strategic priorities in the field of environmental protection are as follows.

1. Increased use of environmentally sound technologies (both existing and projected on to the creation of industries) with goal to provide the technological basis for environmentally sound development of economic activities in the framework of the transition of the economy of the region and the whole country on the path of innovative development.

2. Supplying enterprises with environmental equipment, technological re-equipment and phasing-out of enterprises with obsolete equipment, a reduction in specific water consumption in production and housing and communal services, the development of systems of secondary resources, including waste.

3. Ensure environmental regulation of economic activity, envisaging correspondence of scope and risk of exposure to individual production facilities (primarily fuel and energy, metallurgical and chemical complexes as ecologically most important sectors of the economy region) and territorial concentration of production in some parts of the region, primarily in the regional center, with the established environmental standards.

4. Develop and implement measures to strengthen regional institutional structures in the field of environmental protection, the development of environmental monitoring systems, the expansion of environmental control, including potentially hazardous industries and activities, regardless of departmental affiliation and ownership.

5. Forecasting level of expenses for environmental purposes of the area as a whole and the individual elements of its economic complex taking into account the planned production growth.

6. Formation mechanism of environmental responsibility of business entities for the negative impact on the environment and increase their interest in the conservation effort, including by improving the collection of payments for negative impact on the environment.

In accordance with the above environmental priorities in the Novosibirsk region the environmental activities should be primarily focused on:

- consistent reduction of negative anthropogenic impact on the environment;
- avoiding degradation of natural systems in the implementation of new investment projects;
- use of natural factors to restore and improve the health of people (primarily through the development of tourism and recreational zones formation);
- improving the quality of drinking water;
- struggle with flooding areas and natural focal infections (*tick encephalitis*).

Orientation to listed priorities will ensure the continued improvement of environmental quality in the area and on this basis the implementation of the principles of sustainable development of the region over the medium and long term, taking into account the solution of problems in the environment.

### **USING A PROGRAM-ORIENTED APPROACH AND THE POSSIBLE VARIANTS OF SOLUTIONS OF THE PROBLEMS**

Integrated solution of the mentioned problems of natural resource management and environmental protection in the Novosibirsk region requires the use of program-oriented approach, which allows you:

1) to take into account the magnitude, complexity and diversity of environmental problems of the region, the solution of which requires the consolidation of efforts and funding sources for the development and implementation of complex interrelated specific tasks, resources, and implementing activities of different nature to achieve the goals;

2) to coordinate the goals and objectives of the Program with goals and objectives of the other long-term programs of the Novosibirsk region («Development and distribution of productive forces the Novosibirsk region», «Development of innovative activity in the economy and the social sphere in the Novosibirsk Region», «Development of transport infrastructure Novosibirsk Region», «Energy development, energy efficiency and energy security of the Novosibirsk region», etc.);

3) to combine the administrative and control tools of management and market economic principles, thus ensuring the coordination of various aspects of environmental activities of businesses;

4) to consistently integrate environmental objectives into the process of the socio-economic development of the area in order to ensure sustainable development;

5) to ensure the harmonization of setting and achieving balanced current and long-term environmental objectives;

6) to establish a clear priority in meeting the investment needs in the field of environmental protection, given the limited resources.

Thus, the program «Environment of the Novosibirsk Region» is seen as a key tool for planning, forecasting and implementation of regional environmental policies, as well as coordination of environmental activities in the Novosibirsk region. At the same time, the program acts as a method of implementation of the Strategy of socio-economic development of the Novosibirsk region for the period until 2025 and the Socio-Economic Development of the Novosibirsk region for the period until 2020.

The task can be solved by the several options corresponding mobilization (baseline) scenario Strategy of socio-economic development of the Novosibirsk region until 2025 [1]. Under this scenario, we consider two possibilities, reflecting the minimum and maximum options of mobilization scenario. Minimum scenario simulates the development of the Novosibirsk region on inertial type (reproducing the conditions and restrictions of 2000–2005). Maximum scenario describes the most complete use of the basic potential conditions for the development of the Novosibirsk region. Accordingly, there are two possible options for solving environmental problems.

The first option largely reflects current trends of development and distribution of productive forces of the Novosibirsk region and provides for the implementation approach to solving environmental problems, including mainly the establishment and improvement of methods and means to protect the environment at the end of the production cycle. In this case, the completion (or addition) of existing fixed manufacturing technologies or individual objects by different systems disposal of waste is carried out in order to prevent certain scale negative impacts on the environment (including treatment facilities for treatment of contaminated wastewater, installations for dust and gas extraction, water recycling system, the organization of waste management, construction of waste treatment plants, etc.) as well as activities to eliminate negative already committed violations in the state of the environment.

However, the possibility of the first variant, first and foremost in terms of economic and environmental efficiency of the technologies «end of pipe» are rather limited mainly due to the difficulties in achieving sufficiently high degree of purification of emissions and discharges, as well as in connection with an exponential relationship between the degree of extraction of harmful substances contaminants and level of expenditure for the necessary environmental protection measures.

At the same time, the failure to comply with of measures of this option significantly increases the risk of harm to the environment and human health. In addition, the cost of rehabilitation of territory in the event of violations (especially pollution) greatly exceeds the amount of investment required to prevent such violations.

In the capacity of the ecological risk assessments can be used indicators characterizing:

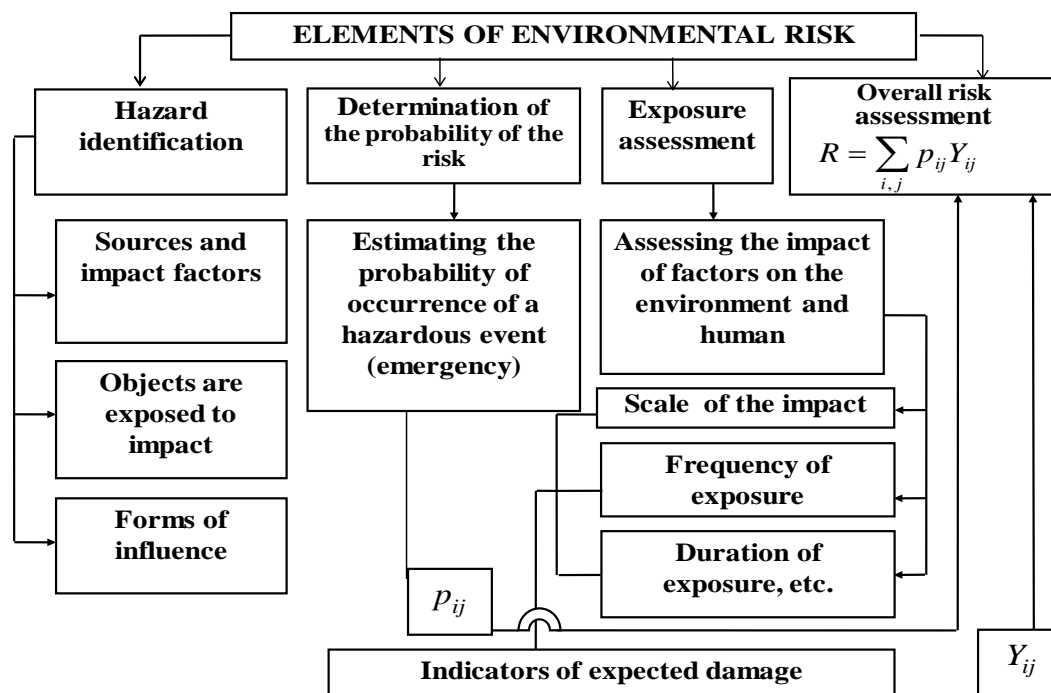
1) an increase in air pollution and acid rain formation (due to huge amounts of emissions of sulfur dioxide and nitrogen oxides produced during combustion, acid rain reduces the crop, destroys vegetation, destroys life in fresh water, destroys buildings, increases corrosion of metals and etc.);

2) changes in the qualitative and quantitative status of surface and underground water sources (under the influence of excess pollution, violations of the hydrological regime of rivers caused by different kinds of human impact, etc.);

- 3) formation of hazardous waste (toxic and radioactive) above permissible limits;
- 4) expected economic damage (calculated and prevented) from possible contamination of the environment (air, water, soil, mineral wealth, etc.);
- 5) the volume of greenhouse gases (carbon dioxide, nitrogen oxides, methane, chlorine, etc.) and their accumulation in the atmosphere above certain concentrations (established the environmental standards for relevant ingredients);
- 6) emissions of ozone-depleting substances (CFCs, chlorine and its compounds with oxygen, greenhouse gases); known that reducing the ozone layer by 1% leads to an increase of ultraviolet radiation by 1.5% and a corresponding increase in skin cancer from 2–3 to 5–7%. In addition, fall harvest crops, reduced phytoplankton productivity, the loss of many species of fish and marine invertebrates, etc. take place.

The procedure for evaluating the likely environmental risk is shown in Figure 6.

In the case of using the second variant of solution to the problem in addition to the measures of the first variant modernization and technical re-equipment of production through the introduction of resource-saving and low-waste technologies is provided. This variant is characterized by a high economic and environmental performance compared to the first, it will allow qualitatively change the ecological situation in the region through technical upgrading of existing facilities and the introduction of new facilities on the basis of high technologies for environmental safety operation of enterprises.



**Fig. 6.** Procedure for evaluating the environmental risk

Currently, however, the second solution to the problem seems to be premature in view of the fact that in modern Russian conditions, exacerbated by the effects of a deep global economic and financial crisis the implementation of such large-scale, technically complex and expensive programs without preparatory activities and to develop mechanisms public-private partnership has a high degree of economic risk.

In this regard, the advantage goes to the first embodiment of solving the problem, in accordance with which provides for the implementation of measures aimed at the progressive reduction to the lowest acceptable level of risk the negative impact of economic activities on the environment and the population of the region.

## **MECHANISM FOR IMPLEMENTING ENVIRONMENTAL STRATEGY**

One of the most important conditions for effective implementation of the strategic developments in the region is to strengthen state regulation in the field of environmental protection. Of particular relevance in this connection acquires the solution of problems of the formation of the economic mechanism of environmental regulation aimed at promoting environmental management and environmental protection, promotion and support of environmentally responsible business, improving the organizational structure of management and legal foundations of environmental protection. The effectiveness of implementation of medium- and long-term forecasting documents in the field of ecology depends largely on the quality of an appropriate mechanism.

Mechanism for the implementation of the regional program requires a definite complex of legal, economic, organizational, informational, and other measures, which are an integral part of the national environmental policy. Achieving favorable ecological situation as a prerequisite for a decent quality of life and health is possible only on condition of concerted action of regional authorities, business and the public in the field of environmental protection. Main directions of the formation mechanism of the Program depend on both the measures taken at the federal level and on the powers of the subject of the Russian Federation, in cooperation with local authorities and, in our opinion, should primarily include:

- development and implementation of long-term and / or departmental target programs Novosibirsk region in cooperation with environmental problems;
- development and implementation of projects and plans of the executive authorities of the Novosibirsk region, local governments;
- implementation of investment projects and plans for development of enterprises that use natural resources;
- improvement of the legal base in the field of environmental protection and environmental safety;
- motivation of local governments, enterprises that use natural, scientific and expert community to actively participate in the implementation of planned activities;
- attracting resources of the federal and local budgets, private sector and civil society organizations for the implementation of programs and projects;
- maintaining continuous monitoring and analyzing the effectiveness of programs and projects.

Implementation of the strategic directions of environmental activities in the Novosibirsk region requires the creation of adequate financing environmental protection, which requires:

- attracting investment in the environmental sector, mainly due to companies' own funds, increasing the share of equity in natural resources conservation activities;
- a clear delineation between the sources of funding for the protection of ambient between the company's own funds, extra-budgetary and budgetary sources;
- improving the system of environmental charges and charges for using of natural resources;
- use of the federal budget, increasing the financing of interregional environmental measures at the expense of the federal budget as co-financing;
- strengthening the role of regional budgets in financing environmental programs and environmental protection measures, increase in funds for environmental measures as a part the budgets of the subjects of the Federation;
- improvement of regional environmental funds;
- increasing investment activity to the resource-saving technologies;



- attraction of credits of the banks;
- introduction of obligatory ecological insurance for series of potentially hazardous industries and technologies, etc.

For the purpose facilitating and supplement intraregional environmental financing are considered as key direction the mobilization of domestic resources which are the main source of funding for environmental activities, as well as more effective use of external resources. The main focus should be placed on expanding the budget and resource base and on improving the use of budgetary funds.

### **TARGETED ENVIRONMENTAL INDICATORS**

As the criteria for assessing the performance carried out in the region environmental policy from the standpoint of achieving the goals and objectives can be used indicators characterizing the ecological processes in the region, including a set of parameters designed to provide an adequate assessment of the state of the environment.

The objectives of environmental and economic efficiency evaluation of the Program implementation are to obtain quantitative criteria for deciding on the admissibility or inadmissibility of an activity, to select an option to ensure the planned economic activity at the lowest cost, to obtain quantitative criteria for evaluating the effectiveness of planned conservation programs.

The main generalized indicators of performance implementation of the Program in the region can be indicators characterizing:

- 1) specific yield of pollutants into the environment (air, water pool – respectively in tons and cubic meters per person per year);
- 2) reducing the volume of pollution released to the atmosphere per unit of GRP from stationary sources;
- 3) reducing the volume of pollution released to the atmosphere per unit of GRP from mobile sources;
- 4) average annual increase (decrease) in the volume of polluted water bodies per unit of GRP;
- 5) reducing the unprocessed waste of production and consumption.

Reduction of pollutants into the environment per unit of the GRP means strengthening ecological compatibility of the technologies used, increase the efficiency of abatement equipment, reduction of energy intensity of production, improving quality of the environment, reducing the negative impact of the economy on health. Increasing the degree of processing and disposal of waste would entail reducing the environmental hazards of waste accumulation, will serve as a characteristic of the management system effectiveness on waste.

Increasing the degree of processing and disposal of waste will entail reducing the environmental hazards of waste accumulation that will serve as a characteristic of the effectiveness of waste management. Exit to the envisaged target environmental landmarks will testify about the possibility of not only preserving the achieved quality of the environment, but also its progressive improvement.

Furthermore, to assess results in achieving the goals and objectives of the program can be used by specific private indicators characterizing the various aspects of the environmental impact of the region, taking into account its economic, social and environmental specificity.

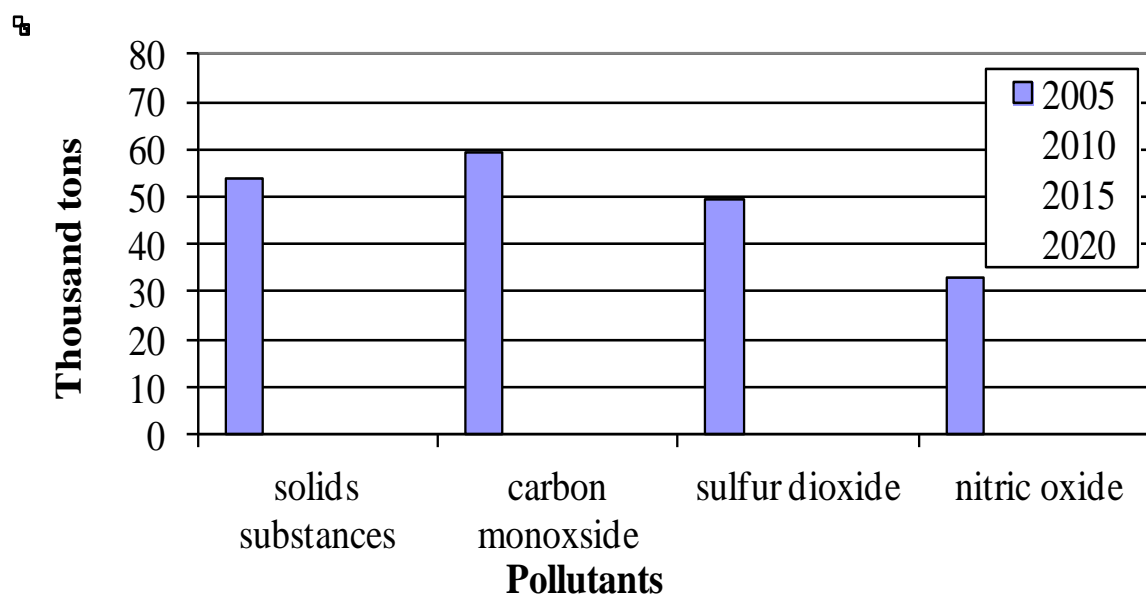
To solve the tasks is required get off at target environmental landmarks – the performance indicators of environmental quality management, which are presented in Table 2 (forecast estimates executed on the basis of the mobilization scenario Novosibirsk region).

Table 2

### Forecasted target environmental indicators for the Novosibirsk region

Indicators	2010–2013	2014–20016	2017–2020
Average annual increase in the volume of emissions into the atmospheric air from stationary sources per unit of the GRP	8–10	7–9	5–7
Average annual increase in the volume of emissions into the air from mobile sources per unit of the GRP	13–15	12–14	10–12
Average annual increase in the volume of waste water discharged into water bodies per unit the GRP	16–18	12–14	9–11
Volume of reduction of the unprocessed waste production and consumption, thousand tons	120–150	160–200	210–250

In particular, the calculations carried out for the forecast of air pollution in the Novosibirsk region on the most common pollutants emitted from the stationary sources in the 2005–2025 period, with taking into account of the parameters of the mobilization scenario [1] indicate the real possibility of the formation of the trend of the gradual improving air quality in the region (Figure 7).



**Fig. 7.** Forecast of air pollution by the major pollutants by 2025

Targeted environmental indicators reflecting the strategic environmental priorities and key environmental issues are intended for use by regional authorities as a tool for monitoring activities in the field of sustainable development of the territory. This provides an opportunity to timely develop and revise the program of activities aimed at achieving the environmental objectives of development in the region, if the activity is not effective enough. At the same time, the indicators used must be accessible and understandable for a wide range of other stakeholders, including civil society organizations and people of the region. Providing such understanding is a very important condition, because the process of ensuring environmental wellbeing in equal measure depends on the actions of individual persons, and from the work performed by the regional authorities. The corresponding struc-

tural units of administration of federal subject are collecting data and preparing reports on the actual values of indicators of sustainable development for all stakeholders to get an idea about the effectiveness of the implementing the program.

Achieving the goals and objectives will help to solve the problem of improving the environment within the Novosibirsk region, to reduce human-induced pressures to maintain an acceptable level of air pollution from stationary and mobile sources of emissions, organize the rational use and protection of water resources, improve the system of treatment of waste production and consumption, as well as identify areas for improvement of governance in the field of environmental protection. Orientation to manufacture high-tech products, realizations of the gasification project industrial and household sectors of the field and other projects provided for in the Novosibirsk region in the long term, will contribute, along with conservation measures and improve environmental performance of the economy of the Novosibirsk region. Exit on the intended target environmental guidelines will testify about the possibility of not only preserving the achieved quality of the environment (primarily due to air quality), but also its progressive improvement.

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# BALANCING STATE AND COMPANIES INVESTMENT GOALS

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Actuality of the article is preconditioned by the enduring dilemma: how should the investment goals of the state and those of the companies operating within its territory be optimally balanced? Investment activity is one of the keys to the development of a country, moreover, a matter in question is not only domestic, but also foreign investment. In this article, we focus mostly on foreign direct investment as a manifestation of capital mobility in the modern world economy.

The task of this article is to single out the advantages and threats for both the state and the company generated in result of their investment activity.

The history proves foreign direct investment to be more secure than portfolio or other types of investments. Proceeding from its definition, foreign direct investment entails investments of not only monetary funds, but also intangible assets. Thence, the states, especially the developing ones, are quite interested in attracting the «true» direct investors. The developed countries being active players on the global market are usually the largest beneficiaries and this explains the development of science and technology base and pioneer technologies in these countries.

What are foreign investments for the receiving country? In the first place, they are an additional source of project financing for the country's own development and improvement of its competitiveness level. This is true for all branches of the economy, since a normally functioning economic system is characterised by favourable business environment (stimuli for the innovation and investment activity, favourable fiscal policy, high quality of products and services offered on the market), sufficient number of jobs (low level of unemployment), and proper social security of population (salaries and wages paid, government's social programmes). Given the lack of its own sources of project financing, the government places central importance on (1) the strategy of stimulating domestic investment processes and (2) the development of investment attractiveness and attraction of foreign investors.

The main goal here is to achieve the macroeconomic consensus which commits politicians to focus on support of market stability and confidence (for example, inflation-curling). At that, inclusive development views fiscal policy to be the main instrument of growth stimulation, primarily by means of regulating the scope of investments. The monetary policy is given only the secondary role: mostly to ensure considerably low real rates and sufficient stock of credit for stimulation of private investments.

We should also keep in mind the global goals that are currently connected with ambitious strategies of increasing the people's welfare in the least developed countries and communities. The least developed countries should focus their efforts on better mobilisation of internal resources, which in its turn requires serious rethinking of international cooperation. Significant external financing of the budget deficit will continue in 2015. In view of this, the countries' main tasks should consist in making decisions that will stimulate

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the mobilisation of internal resources. On the other hand, mobilisation of internal revenues provides for the viable long-term financing as a basis for spending development.

The structural causes of this process consist in the fact that the majority of labour force is constrained by low productivity of labour, which is often informal and non-standardised (agriculture, administrative services). A somewhat better situation can be observed in the services sector.

From 1980s onwards, the policy regarding FDIs has been going through gradual liberalisation nationally, which was as a dominant type of policy change in most of the countries (opening of economic sectors). The basic motives for liberalisation include imports of capital from traditional to innovative means of external financing. FDIs proved that this type of investments is characterised by lower propensity to sudden «reversals» in capital flows.

In support of the above-mentioned, let's consider the results of a review performed by the JBIC Institute:

FDIs are an important and probably dominant channel of technology transfer. TNCs are the key drivers of FDIs, the powerful and effective «means of transport» for diffusion of technology from the developed to developing countries. Often they appear to be the only source of new and innovative technology which is inaccessible on the market of one or another country.

However, it should be kept in mind that mobilisation of internal resources remains to be a more important task than attraction of FDIs for financing.

FDIs help to finance the long-term development of knowledge and technology transfer, new job creation, improvement of overall labour productivity, increased competitiveness and improvement of business environment, as well as reduction (or sometimes eradication) of poverty through economic growth and development. In view of this, FDIs can be characterised as «an investment package».

Along with that, we can often find opposite views on the role of FDIs in national development. For example, The Economist offered the following statements against TNCs:

- 1) TNCs are large, irresponsible monopoly monsters;
- 2) some TNCs are more powerful than state institutions.

Looking back at the mentioned JBIC Institute review, it is worth admitting that FDIs cannot be used with regard to small countries with low per capita incomes (investment projects constraint); FDIs can crowd out domestic investments if local enterprises are not competitive; there is a threat of non-developing technical and management assets on local enterprises; economic influence of FDIs can remain relatively weak in poor countries.

As have already been mentioned, it may turn out that FDIs produce a negative impact or become a threat for local companies. At the same time, competition will contribute to growth of the «strategically thinking» companies which will be forced to develop in their urge to remain on the market.

We have analysed the criteria for selection of potential projects in a set of investment funds. Thus, for example, the West Mountain Company (USA) selects investment projects based on the following basic criteria: availability of a viable product or service; the market and prospects of its development; competitive advantage(s); powerful management team; the business plan. General assessment of one or another company entails analysing not only its return on investment, but also the influence of its business operations on the society and environment. That is, the leveling of social and ecological goals with commercial goals; progress reports on reaching the goals of sustainable development; integration of business practice into the social and ecological goals.

Main attention is paid to social responsibility of management and assurance of sustainable development: management of all levels; health and safety of employees, training,

etc.; salaries and wages as a source (means) of access to goods; participation in public development initiatives; efficient use of energy and resources.

Foreign investment funds and companies are already using successfully the so called social screening as a process of selecting companies for investing based on assessment of not only financial results, but also social and/or ecological efficiency [3].

There are two forms of social screening: avoidance or negative screening, and positive screening. In addition, there are several levels of screening. It is best when investment and social goals are harmonized. In the other words, socially responsible investing is called for. But it is only in theory. In practice, many companies are constrained only by the investment goals which are preconditioned by low requirements of the country's society and politicians.

As for the Ukraine, the data of the newly established Ukrainian Venture Capital and Private Equity Association (UVCA) shows that investors are primarily concerned with (1) faith in the country's long-term perspectives; (2) well-functioning judiciary system; (3) support or at least non-involvement of the state; and (4) corruption minimization [2].

Favourable investment climate should not be created by the private market: it includes the framework and the environment created by the state.

The country's long-term perspectives are very important for the investors which are guided by long-term strategies of market operations in a given country, not by short-term benefits. Ukraine faces great perspectives, but it is high time already to move on from words to practical forming of the environment which will contribute to creation of real success stories for both investors and businessmen, as well as generation of real and transparent income. There are stories that could motivate investors towards considering a country as an attractive investing destination. For example, Nokia and later Rovio (Angry Birds) were creating such success stories in Finland, whereas Skype did it in Estonia [1].

A well-functioning judiciary system is the guarantee of fair settlement of court cases and protection of property rights.

Ideally, the state should create and regulate such an ecosystem for investing that would stimulate different levels of investments – from business angels to large direct investments. For example, in England and many other countries, companies can decrease their income taxes if they invest in start-ups or growing innovative companies [1].

By the way, it is only this year that Ukraine created the Association for private investors of Ukraine or, in other words, business angels. We hope that they will be actively developing this level of investing as is the case in successful economies.

One of the main reasons why foreign investors are careful with regard to Ukraine is not even the war, but corruption. It was already before the war that Ukraine held very low positions on the corruption perceptions ratings, and this situation still persists. In 2013 it was on the 144th place among 177 countries [1].

Thence, the most important is the last point: corruption minimization. Corruption erodes business, competition, property rights protection, etc. All strategies of the company can turn to nothing when it encounters corrupt behaviour of regulators.

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# POTENTIAL HOUSEHOLDS' DEMAND FOR THE UNPAID WORK MARKET SUBSTITUTES IN SLOVAK REGIONS<sup>1</sup>

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To understand the economic situation in any particular country, it is necessary to understand the demand for goods and services. Not only real, effective demand, but also potential demand plays an important role in the economic growth and development. In Slovakia, however, potential demand is not determined on regular basis. In 2012, interdisciplinary team of researchers from the Faculty of Economics, Matej Bel University in Banská Bystrica, Slovakia started to focus on a possible fraction of the potential demand – transformation of traditionally unpaid household activities to the paid market supply of goods and services. Firstly, it was necessary to calculate volume and extend of the unpaid work activities performed by individuals and households. Research showed that individuals spend in average 222 minutes per day by unpaid work activities. Even more research confirmed, that unpaid work in Slovakia covers approximately 30% of Gross Domestic Product. This is a strong argument according to which we can assume that, in case of transforming unpaid work activities into paid goods and services offered by market, there will be possibility to increase a real demand by a significant amount. This research assumption is a part of our new research project VEGA no. 1/0935/13 «Unpaid work as a potential source of socio-economic development of society and the determinant of individual well-being».

This paper focuses on households' potential demand calculated according to the willingness of households to replace unpaid work activities by market substitutes. Because of the significant differences in Slovak regions, we focus not only on the whole Slovak situation, but also on the regional potential households' demand. Even if this demand represents only a part of the whole potential demand of the Slovak households, it could have important influence on the decision makers (country, regional as well as local), about the future economic development of Slovakia.

## INTRODUCTION

Demand, in general, has been a matter of the economic analysis in different circumstances for many years. We can define demand as a willingness and ability of the consumers (households or individuals) to purchase certain amount of goods and services at the certain price level. Demand of the households is, however, permanently changing due to the various economic and non-economic factors. Not only price level of goods and services, but also incomes level, consumers' preferences, habits and way of live can influence the demand. To understand demand's patters is crucial for the supply side (producers) and for reaching market equilibrium as well as for the early reaction on new requirements and needs of the consumers.

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In the article, we focus on the potential households' demand. This potential demand could be, in certain circumstances and conditions, transformed into the real or, more accurately, efficient demand. We can define potential demand as that kind of demand, which does not occur in reality yet, but which exists and could be possibly changed into the real demand. One of the possibilities, how to calculate potential demand, is to find out and evaluate how much some households spend by unpaid work activities (such as food preparation, children and adults care). According to the international methodology (Time Use Survey), persons perform following activities during the day: personal care, household activities, caring for and helping household members, caring for and helping non-household members, work and work-related activities, education, consumer purchases, professional and personal care service, household services, government services and civic obligations, eating and drinking, socializing, relaxing and leisure, sports, exercise and recreation, religious and spiritual activities, volunteer activities, telephone calls, traveling (source: <http://www.bls.gov/tus/lexiconwex2013.pdf>). As an unpaid work activities, we can consider mostly household activities, caring for and helping household members, household services, and volunteer activities.

Volume of the unpaid work has not been officially verified in Slovakia so far. However, research team from the Matej Bel University in Banská Bystrica has been determining and analysing unpaid work in Slovakia already for three years. The team tries to determine volume of the unpaid work, motives (economic and non-economic) for the unpaid work activities, regional particularities of unpaid work, as well as reasons why and at which circumstances households prefer to arrange certain activities through the market goods and services. It means, that we try to find out (besides other research questions) whether there is a potential households' demand for the market substitutes that can replace standard unpaid work activities in households. Not only existence of the potential demand, but also its extent and structure is matter of our research.

Knowing the extent of the unpaid work of households, as well as potential households' demand for the market substitutes, is important not only from the theoretical point of view, but also for the practical purposes. Practical contribution of determining potential households' demand for certain goods and services (it means demand that is not evident or is not quantified) has several dimensions. For the purpose of our research, it is important, that transformation of the potential demand on the real (efficient) demand could stimulate development of the entrepreneurial activities (more in Foltys, 2012), increase of the local employment (Hronec, 2012) as well as higher households' satisfaction, quality of life and better utilisation of the leisure time.

Knowing the extent of the unpaid work activities and the extent of the potential households' demand in the whole Slovakia is not sufficient for understanding all features of unpaid work. Potential demand for market substitutes is different in various localities of Slovakia and will depend on particular socio-economic, cultural and environmental conditions in which households live (more about regional differences in Borseková, Vaňová, Petříková, 2012). This is one of the reasons, why we consider crucial to find out how big differences in unpaid work and potential demand are in particular regions in Slovakia. In our research in 2011 and 2012 we confirmed, that there is really potential households' demand (we verified it on 1559 households and 4435 individuals). According to this result we suggested a hypothesis that there are differences in potential households' demand in particular regions in Slovakia (we consider regions as 8 self-governing territorial units, level NUTS 3).

It is evident that identical regional policy in different types of regions (undeveloped contra developed ones) could not lead to the expected effects (more about regional development in Kollár, Uramová, Tuschlová, 2013). Development, or support of the entrepreneurial activities in regions should take in account particularities of certain territory, as well



as particular needs, requests and possibilities of consumers/households in that territory (including their potential demand for the market substitutes). This subject matter has not been researched in Slovakia yet. It means, that results of our research bring very original point of view and they can contribute to the development of the entrepreneurial activities in particular regions in Slovakia.

## METHODOLOGY AND UNPAID WORK RESEARCH

The aim of this article is to focus (according to the results of the unpaid work research) on the possibility of transformation chosen forms of the unpaid work activities on the paid work represented by market supply of different kind of services. This possible paid work could be utilised by entrepreneurial entities as well as by municipalities (and self-government regions) as a specific and so far unexploited source of the economic growth of particular territory. On the other side, development of such market services could lead to the more rational utilization of the households' and individuals' daily time. They will be able to spend their daily time by other activities (we suppose by more productive and meaningful ones than unpaid work activities). This could consequently lead to the better quality of life and higher subjective satisfaction of individuals and households.

In 2011 and 2012, the interdisciplinary team of researchers from the Faculty of Economics, Matej Bel University in Banská Bystrica, focused on the unpaid work in Slovak households and its particularities (project VEGA 1/1141/11). It was the first systematic attempt to understand and evaluate unpaid work in Slovak republic. The aim of the research was to find out extent of the unpaid work, types of activities performed as unpaid work, as well as to understand trends in the development of the unpaid work in Slovak households. As a part of research, we also tried to find out motives (economic and non-economic) of Slovak households to perform unpaid work activities.

Besides other results we also found out that individuals spent in average 25.8 hours per week by unpaid work (it is approximately 3.7 hours or 222 minutes per day). According the extent of the unpaid work, we can divide European countries into three groups. The first group includes Austria, Belgium, Finland, France, Germany, Hungary, Ireland, Italy, Netherlands, Norway, Sweden and United Kingdom. In these countries, individuals spend from 190 to 215 minutes per day by unpaid work activities. In the second group, where extent of unpaid work is between 216 and 229 minutes per day, there are Denmark, Portugal, and Spain. In addition, Slovakia, where unpaid work of individuals found out from our research is 222 minutes per day, belongs also to the second group. The last group includes states in which unpaid work of individuals is 130 and more minutes per day. In this group, there are Estonia, Poland a Slovenia (Uramová, Nedelová, Tuschlová, 2014).

According to the gender structure of the respondents, men spent 21.41 hours per week by unpaid work activities, while women spent about 35.58 hours per week by these activities. Households living in rural areas spent in average 75.8 hours per week by unpaid work activities, while households living in urban areas spent by these activities only 61.79 hours per week in average.

In 2013, we launched a new pre-research. It focused on finding the most important motives for unpaid work activities, as well as on identifying reasons for utilising (eventually not utilising) market services that could replace unpaid work. This pre-research was a first step of the project VEGA no. 1/0935/13 «Unpaid work as a potential source of socio-economic development of society and the determinant of individual well-being».

The main research of the project VEGA no. 1/0935/13 was realised in April 2014. The aim of the research was to find out, whether Slovak households use market services that replace unpaid work in households (divided into following categories: preparation and

delivery of the cooked food, household cleaning, laundering and ironing, delivery and preparation of the fuel, care of the plants in garden, harvesting and etc., dwelling maintenance, equipment and furniture maintenance, cars and mechanism maintenance, buying of foods and other consumables, care of children and adult (old or ill) persons). In the research we also tried to find out what are the main reasons of utilising or not utilising market services, plan to use or not to use these services in the future including information about the possible amount of money that households plan to dedicate for these services.

Our article is based on the data, which we collected within the main research of VEGA no. 1/0935/13 research. In the research, there were 1142 respondents (households) included and results of the research are adequate and representative according to the number of household's members and place of living of the respondents (8 regions on the NUTS 3 level).

### **ESTIMATION OF THE POTENTIAL HOUSEHOLDS' DEMAND FOR THE UNPAID WORK MARKET SUBSTITUTES IN SLOVAK REGIONS**

To calculate potential demand for the services, that could replace unpaid work in households, we have divided all unpaid work activities into five groups. Table 1 includes these five categories of activities, number of households which are willing to replace unpaid work by market substitutes (data from our research), as well as average sum of money that households want to spend for market services per year.

*Table 1*

#### **Number of households willing to replace unpaid work by market substitutes and possible average yearly expenditures for market services**

	<b>Food and Beverages</b>	<b>Household Chores</b>	<b>Maintenance (dwelling, equipments)</b>	<b>Maintenance of Cars</b>	<b>Care (children and adults)</b>
No. of households that think on trade substitutes	667	135	385	596	84
Average amount of money (eur) to spend per year	266.93	618.33	747.83	345.42	1080.16

*Source:* Own elaboration.

In the field research, respondents could have chosen more activities which they are willing to replace by market substitutes. This is the reason, why there are different frequencies of answers in particular categories of activities. The highest sum of money in average per year would households like to spend for the children and adults care (more than 1000 euro per year per household), for household chores (more than 600 euro per year per household) and for the dwelling and equipment maintenance (almost 750 euro per year per household). These amounts represent potential demand of the requested households. It means, how much money requested households would spend for market activities that could replace traditionally unpaid work activities in the household.

There are many differences in Slovak regions regarding the socio-economic particularities (see more in Kožiak, Uramová, 2008). That is why we focused also on the regional differences in potential households' demand for the market substitutes of the unpaid work activities. In Table 2, there are data concerning potential households' demand for market

substitutes of unpaid work activities (expressed in money term) in Slovak regions (Bratislava region, Nitra region, Trnava region, Trenčín region, Banská Bystrica region, Žilina region, Prešov region and Košice region).

The highest interest of the households to pay for the market substitutes of unpaid work activities is in Bratislava region. This could be link with the fact, that Bratislava region is the most developed region in Slovakia, there is the highest ratio of the urban population (by the end of 2013 this ratio was almost 81%; comparing to rest of Slovakia with ratio of urban population of less than 51% (source: Statistical Office of the Slovak republic)), the highest net income per household's member (468.5 euro per person; comparing to amount between 327.7 euro and 384.6 euro per person in other regions (source: Statistical Office of the Slovak republic)), as well as the lowest unemployment rate (on 31.12.2013 only 5,6% comparing to the Slovak average of 13.17% (source: Statistical Office of the Slovak republic)).

Table 2

**Potential households' demand for market substitutes of unpaid work activities in Slovak regions**

Region		Food and Beverages	Household Chores	Maintenance (dwelling, equipments)	Maintenance of Cars	Care (children and adults)
Bratislava Region	No. of households that think on trade substitutes	105	36	44	79	14
	Average amount of money (eur) to spend per year	360.58	1047.54	824.75	457.52	2200.94
Trnava Region	No. of households that think on trade substitutes	94	24	12	35	0
	Average amount of money (eur) to spend per year	291.38	617.49	800.00	597.32	
Trenčín Region	No. of households that think on trade substitutes	68	11	53	69	7
	Average amount of money (eur) to spend per year	233.80	131.89	616.22	289.63	993.62
Nitra Region	No. of households that think on trade substitutes	80	16	70	92	11
	Average amount of money (eur) to spend per year	218.28	391.14	827.37	241.67	1197.31
Žilina Region	No. of households that think on trade substitutes	66	12	48	68	9
	Average amount of money (eur) to spend per year	262.84	256.41	781.88	317.89	942.85

Region		Food and Beverages	Household Chores	Maintenance (dwelling, equipments)	Maintenance of Cars	Care (children and adults)
Banská Bystrica Region	No. of households that think on trade substitutes	83	20	51	81	13
	Average amount of money (eur) to spend per year	254.25	589.14	714.16	370.59	1006.64
Prešov Region	No. of households that think on trade substitutes	79	11	47	79	10
	Average amount of money (eur) to spend per year	231.73	445.19	878.76	365.01	624.86
Košice Region	No. of households that think on trade substitutes	91	6	60	92	20
	Average amount of money (eur) to spend per year	245.82	622.97	604.70	280.17	618.

Source: Own elaboration.

Households in all eight regions would like to spend the highest amount of money for services that could replace children and adults care and dwellings and equipment maintenance. According to the results of VEGA 1/1141/11 project we found out, that children and adults care cover one the highest part of time that households spend within the unpaid work activities (women about 5.7 hours per week in average and men 3.5 hours per week in average (source: Kaščáková, Nedelová, 2014)). We assume, that mostly tendency to confide children and adults (for example disabled or retained adults) to the care of professional care services, is the reason why households would like to spend most of money on these market substitutes.

Another group of activities for which households would spend money at the market, is dwelling and equipment maintenance. These activities are linked with higher level of professional knowledge and abilities and households are not always able to arrange them by themselves (eventually by friends or neighbours). This is one of the reasons, why households need to find out maintenance services offered by market.

On the other side, the lowest amount of money (it means also the lowest demand) will households spend for market services linked with food and beverages preparation. According to the results of VEGA 1/1141/11 project, preparation of food and beverages covers the biggest portion of the daily time of households and individuals (it is in average 7.8 hours per week in case of women and almost 3.5 hours per week in case of men ((source: Kaščáková, Nedelová, 2014)). It is interesting, that most of the researched households in all eight regions would prefer to replace food and beverages preparation by paid market substitutes. However, households are not willing to pay significant amount for these services. It means, there is a high potential households' demand for these market services (if it is expressed in the amount of households), but this potential demand is quite low (if it is expressed in money term).



of households to spend money for paid household chores services and number of retired persons in the household (reason is probably the same, as in case of food and beverages preparation). There is also a weak negative correlation between the car maintenance and number of economically active members of the household and number of retired persons in the household.

Table 3

**Correlations between the potential demand for unpaid work market substitutes  
and socio-economic particularities of Slovak households**

		No. Of Household Members	No. Of Children	No. Of Economically Active Members	No. Of Retaired Members	Income Group	Household Type	Kind of Living
Food and Beverages	Pearson Correlation	<b>-.099*</b>	-.066	-.056	-.078*	<b>.169**</b>	.337	<b>0.393</b>
	Sig. (2-tailed)	.011	.089	.147	.045	.000	.070	.000
	N	667	667	667	667	666	661	657
Household Chores	Pearson Correlation	-.048	.038	.000	<b>-.173*</b>	<b>.448**</b>	.639	<b>.751</b>
	Sig. (2-tailed)	.580	.666	.996	.045	.000	.273	.001
	N	135	135	135	135	135	128	130
Maintanance (dwelling, equipments)	Pearson Correlation	<b>.188**</b>	<b>.123*</b>	<b>.219**</b>	-.046	<b>.252**</b>	.440	0.387
	Sig. (2-tailed)	.000	.016	.000	.363	.000	.230	.910
	N	385	385	385	385	385	377	383
Maintanance of Cars	Pearson Correlation	-.072	-.052	<b>-.104*</b>	-.090*	.078	<b>.390</b>	<b>0.453</b>
	Sig. (2-tailed)	.079	.204	.011	.029	.057	.000	.000
	N	596	596	596	596	594	591	591
Care (children and adults)	Pearson Correlation	-.055	-.117	.050	.062	<b>.458**</b>	<b>.838</b>	.751
	Sig. (2-tailed)	.620	.289	.651	.574	.000	.005	.181
	N	84	84	84	84	84	81	83

\*\* Correlation is significant at the 0.01 level (2-tailed).

\* Correlation is significant at the 0,05 level (2-tailed).

Source: Own elaboration on the basis of SPSS output.

Not only particularities of the households, but also socio-economic particularities of the regions play an important role in estimating potential households' demand for unpaid work market substitutes. By the means of Pearson correlation coefficient, we tried to find out correlations between the potential households' demand and chosen socio-economic particularities of Slovak regions. In Table 4, there are basic socio-economic particularities of regions, which we considered important for determining potential households' demand.

Table 4

**Basic socio-economic particularities of Slovak regions (NUTS 3) in 2012**

	Bratislava region	Trnava region	Trenčín region	Nitra region	Žilina region	Banská Bystrica region	Prešov region	Košice region
Share of urban population (%)	80.9	47.5	56.1	45.9	49.2	53.3	48.1	55.6
Share of rural population (%)	19.1	52.5	43.9	54.1	50.8	46.7	51.9	44.4
Number of towns	7	16	18	15	18	24	23	17
Number of villages	66	235	258	339	297	492	642	423
Share of men in population (%)	47.38	48.87	49.04	48.54	49.09	48.43	49.36	48.8
Share of women in population (%)	52.62	51.13	50.96	51.46	50.91	51.57	50.64	51.2
Unemployment rate (%)	5.6	11.4	9	13.3	14.3	18	18.3	19.7
Unemployment rate men (%)	5.6	10.8	8	11	13.6	19.9	17.5	19
Unemployment rate women (%)	5.7	12.1	10.2	16.1	15.2	15.6	19.2	20.7
Average gross nominal monthly earnings of employee (eur)	1184	848	798	776	816	772	718	853
Net monthly income per capita in household (eur)	468.5	384.6	371	352.2	367	353.1	327.7	333.8
Net monthly expenditure per capita in household (eur)	409.3	335	325.8	313.8	333.1	313.4	285.3	289.3
Total expenditure per capita (eur)	409.3	335	325.8	313.8	333.1	313.4	285.3	289.3
Average gross monthly earnings (eur)	1157	819	766	742	783	740	680	814

Source: own elaboration according to Statistical Office of Slovak Republic data.

We have found out, that not all regional particularities influence extent of the potential households' demand for the market substitutes of the unpaid work activities. Demand for the services replacing maintenance of the dwellings and equipment, as well as maintenance of cars is not depending on the regional particularities at all (or there is only a very little correlation). On the other side, services replacing children care and adults care are depending almost on all regional particularities (except the men unemployment rate). There is a positive correlation in case of the rate of urban population (it means, the higher the rate of urban population, the more of households in the particular region are willing to pay for the services connected with the children and adults care); in case of rate of women in population, in case of average gross nominal monthly earnings of employees, in case of net monthly income per capita in household and in case of net monthly expenditures per capita in households. There is a positive dependence also in case of the correlation between the services linked with the food and beverages preparation and all the regional income and expenditures particularities.

On the other side, negative correlation is evident in case of relationship between the demand for the services linked with the food and beverages preparation as well as demand for the children and adults care and the women rate of unemployment. This negative correlation seems to be logic, because women that are not employed (and do not spend part of the day by the paid activities) dedicate much more time for the unpaid work activities in the household. According to our results from project VEGA 1/1141/11, preparation of the food and beverages as well as children and adults care represent the highest part of the unpaid work of women in all regions. That is why we suppose that also unemployed women spent most of their daily time by these activities and there is no any special reason to replace these activities by market substitutes.

## CONCLUSIONS

In the paper, we focused on the possible estimation of the potential households' demand for the unpaid work market substitutes. As we confirmed in the previous researches, unpaid work plays an important role in the life of individuals and households. Persons spend about 222 minutes per day by these activities, what covers significant part of the daily time. Even if households and their members still have motivation (economic and non-economic) to perform unpaid work activities personally, there is a growing interest to replace traditional household works by paid market substitutes. Particularly willingness of Slovak households to pay for market services, which will replace unpaid work activities, was the subject-matter of our interest in this paper.

Our research showed of that households would like to spend the most of money for the children and adults care (more than 1000 euro per year per household), for household chores (more than 600 euro per year per household) and for the dwelling and equipment maintenance (almost 750 euro per year per household). These activities required high level of professionalism and particular knowledge and training. This could be the main reason to demand them at the market.

Another interesting (however, not surprising) results occurred regarding the differences between the Slovak regions. We confirmed, that households in Bratislava region (as the most advanced region in Slovakia) are the most interested in replacing unpaid work activities by paid market services. Regarding the particular activities, households in all eight regions would spent the most for children and adults care and any kind of maintenance.

In the paper, we also tried to determine correlations between the potential households' demands for unpaid work market substitutes and chosen socio-economic particularities of Slovak households and regions. We confirmed, that mostly income level of the households is a statistically significant feature, that influences willingness of households to replace unpaid work activities by market substitutes (we confirmed strong positive correlation between them). Another significant feature is the fact, whether there is a retired person or persons in the household. We confirmed negative correlation between the food and drinks preparation and household chores on one side and number of retired persons in the household on the other side. Regarding the regional particularities, we confirmed that mostly rate of urban population, average gross nominal monthly earnings of employees, net monthly income per capita in household and net monthly expenditures per capita in households are the most significant features that influence potential households' demand for unpaid work market substitutes.

Knowing, whether there is a potential demand on the side of households, is only the first step to utilise potential demand in reality. There are still many questions that must be answered. Is it really possible to transform potential demand into the real, efficient demand? Are companies able to provide services that households required? Are the prices



that households would like to pay for market services really reliable? Should these market services be provided by private companies for market prices, or should they be provided by municipalities (regions, state) for regulated prices? Is there any possibility to create private-public partnerships or eventually clusters to provide these market services to the households? Only after answering these and many other questions, it will be possible to fully utilise potential households' demand for unpaid work market substitutes.

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# **E-MARKETING OF TERRITORIES – MODERN APPROACHES AND TOOLS**

*Evgeniya Tonkova*<sup>1</sup>

The development of territories is of considerable importance for the prosperity of particular regions and countries. The various resources, the capacity and potential of territories bring up the issue of how adequately they will be worked out. Using the tools of e-marketing and information-based approaches is presented in this paper as an opportunity for favorable market positioning of the territory through attracting stakeholders and providing market distribution for the goods and services that are produced and offered on the territory. Particular attention is drawn to the opportunities of e-marketing for making popular cultural-and-historical values, unique products and those with comparative advantages that are produced on the territory in particular. E-marketing working out of events on the territory is a prerequisite to involve stakeholders actively in order to achieve higher direct and transfer effect from carrying out those events.

## **INTRODUCTION**

Modern territory management has an exceptionally strong relation to applying marketing. Competitiveness of territories and various places of residence in particular, is a key factor for the economic<sup>2</sup>, social development and prosperity. The chance to put low-cost marketing activities with high direct and transfer effect into practice focuses the attention on the use of e-marketing tools that are oriented to increase the competitiveness of territories<sup>3</sup>. The marketing approach in managing territories is a compulsory component in the contemporary conditions of competition and mobility.

Ousting the traditional marketing tool from new ones in e-environment requires that marketing of territories be reconsidered. The increasing number of Internet users and the variety of products and services that are on demand and supplied online is a prerequisite for the active involvement of the various institutions in a marketing activity in e-environment.

## **THE NEED FOR AN INTEGRATED APPROACH IN MARKETING OF TERRITORIES**

The independent marketing of subjects on a territory is not enough to generate considerable effect for its overall development. As a result of carrying out only unit marketing there are observed certain issues in a territory's development like, for example: disproportions in development, lack of a complete organization and coordination, difficulties for the users of services, inaccuracies in planning and others. Besides, the lack of integrated marketing of territories questions the efficiency of individual projects, as well as the efficiency of the projects in the public sphere. In order for a territory to have complete development

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<sup>2</sup> T. Metaxas views place marketing as a tool for local economic development in Metaxas T. Place / City Marketing as a Tool for Local Economic Development and City's Competitiveness: A Competitive Evaluation of Place Marketing Policies in European Cities, Euro Conference: Urban and Spatial European Policies: Levels of Territorial Government, 2002.

<sup>3</sup> An interesting associative link between resources, marketing strategies and social responsibility is made by Dinis A. Territorial Marketing: a Useful Tool for Competitiveness of Rural and Peripheral Areas, 44<sup>th</sup> European Congress of ERSA, University of Porto, 25–29 August 2004.

it is necessary that the marketing, carried out by subjects, be related, integrated<sup>1</sup> and based on a professional ground. Local authorities in cooperation with the stakeholders are responsible for the design, realization and coordination of the marketing of territories. The subjects interested in applying an integrated approach to marketing of territories are:

- ✓ Local authorities;
- ✓ The population that lives on the territory permanently<sup>2</sup>;
- ✓ The population that stays in the territory for a certain period of time;
- ✓ Visitors/Tourists<sup>3</sup>;
- ✓ The companies that do business on the territory;
- ✓ Educational and cultural institutions;
- ✓ Craftsmen with specific skills;
- ✓ Potential investors on the territory<sup>4</sup>;
- ✓ Sponsors and others.

The arguments in favor of integrated marketing of territories may be various. Firstly, development in a system requires an integrated marketing approach. Secondly, transfer effects in a system are strongly manifested which means that every individual marketing activity could generate high transfer effect (positive or negative) to the remaining subjects. Thirdly, the coordination of marketing activities is a prerequisite for generating transfer effect. Fourthly, the role of using experience and sharing it for making good practices popular will be considerable. Establishing marketing of territories on a professional ground is a modern issue that can be solved by enlarging the circle of marketing specialties in universities, offering specialized training courses in the sphere of public marketing and setting up departments in municipalities and district institutions. The opportunities for public-and-private partnership between subjects are a driver for developing marketing of territories.

### **E-MARKETING OF TERRITORIES: A NECESSITY AND POTENTIAL BENEFITS**

The increasing number of Internet users, having more sales of products and services online and the higher relative share of sales in the multi-channel distribution is conditions that favor the marketing involvement of local authorities in e-environment. The communication aspect of e-marketing involvement of local authorities is an exceptionally important effect on the public in the following trends:

- ✓ Branding the place<sup>5</sup>;
- ✓ Making the region more recognizable and helping it to be accepted positively<sup>6</sup>;
- ✓ Promoting the regions for international investment<sup>7</sup>;
- ✓ Enhancing the quality of life;
- ✓ Making popular the intentions of local authorities for developing the territories;
- ✓ Making popular places, products, ideas, cultural and historical values;

<sup>1</sup> See in detail: Braun E. *City Marketing Towards an Integrated Approach*, 2008, p. 6–7.

<sup>2</sup> Population, on the one hand, is viewed by T. Sachuk as a resource on a territory and, on the other, as users of products and services in: Sachuk T. *Territorialnyy marketing*, Piter, 2009, s. 67.

<sup>3</sup> An interesting approach to defining the image of a tourist destination is applied by L. Anastasova, *Imidzh na turisticheskata destinatsiya – teoretichni i izsledovatelски aspekti*, Sbornik s dokladi, Sofiyski Universitet «Sveti Kliment Ohridski», 2002, s. 13–22.

<sup>4</sup> See in detail: Pankruhin A. *Marketing territorii*, Piter, 2006, s. 231–241.

<sup>5</sup> Historically tendencies in place branding are viewed in K. Mihalıs «Branding the City through Culture and Entertainment».

<sup>6</sup> See in detail: Анастасова Л., *Маркетинг на регион: специфика и приложение, Съвременни управленски практики V, том II*, БСУ, с. 137.

<sup>7</sup> See in detail: Schuster C., A. Coskun Samli. *Promoting a Region for International Investment: An Integrated Marketing Program*. JPP&M, Vol.8, 1989, pp. 252–264.

- ✓ Development and management of tourist destinations<sup>1</sup>;
- ✓ Navigation of potential users on the territory;
- ✓ Sharing experience and good practices on the territory;
- ✓ Informing about upcoming events and covering past ones;
- ✓ Feedback with users and others.

The marketing aspect of e-marketing involvement is related to the favorable positioning on the territory (place) and the accumulation of direct and transfer effects in the development through resources and assets that are of key importance for them (Table 1).

Table 1

### Direct communication and market effect from the application of integrated marketing of territories

Direct effect	Particularities
Effect of a single activity related to marketing of territories	Characterizes the positive or negative change as a result of a particular marketing activity. It is measured through specific indicators that concern the form of activity.
Effect of integrated marketing activity	Shows the positive or negative change as a result of integrated marketing activity on a territory. It is measured through specific indicators that concern the forms of activity.
Target effect of integrated marketing activity	Direct effect corresponding to the aim of the particular activity.

In practice, however, the effect that is achieved through integrated marketing of territories goes beyond the limits of the preliminary target outlets (Table 2).

Table 2

### Transfer effect from implementing integrated marketing of territories

Transfer communication and market effect	Particularities
Transfer effect related to audiences	A set of tools oriented to a particular target audience, with the respective informing it generates transfer effect on the remaining audiences. For example, good navigation in a place of residence concerning tourists has a favorable effect on the companies that do business on the territory.
Transfer effect on the ground of cross sell effect	The means for stimulating products and services can also have a transfer effect on others with related or complementary demand. Developing integrated marketing on the territory, these relations need to be reported in order to gain maximum income on the territory.
Transfer effect on the ground of sharing	Sharing in social networks and traditional means have exceptional potential for generating a considerable positive effect for all audiences.
Transfer effect on the ground of making good practices popular	Showing good practices or initiatives increases the chance for them to be multiplied and lead to a considerable effect on the development of territories.
Transfer effect based on capacities	Attracting audiences has transfer impact on loading capacities in various spheres – hotels, museums, cinemas and so on. For example, a major event on the territory will generate transfer effects on the demand for accommodation, food, transport services and so on.
Transfer effect based on economies of scale	An effect which is related to distributing overheads, especially important for a business with high overheads. Horizontal and vertical integrations are a prerequisite for generating the effect of economies of scale.

<sup>1</sup> See in detail: Qirici E., Theodhori O., Elmazi L. E-marketing and ICT-supported Tourist Destination Management. Implications for Tourism Industry in Global Recession. International Journal of Management Cases, January, 2011, p. 156.

The globalization of markets, accessibility of information and branding places are a prerequisite for successfully involving subjects in the integrated marketing of territories with favorable effect on their economic and social development. Using the platforms for integrated marketing of territories provides the following advantages for the interested subjects (Table 3).

Table 3

### Advantages of using integrated marketing of territories

Interested subjects	Advantages of using integrated marketing of territories
Municipalities and public management <sup>1</sup>	Improving the indicators for socio-economic development of municipalities through a planned, coordinated and synchronized marketing of the territory. Putting marketing activity on professional grounds in municipalities and enlarging marketing partnerships contribute for increasing the efficiency of marketing investments on the territory. A balance in the various components of a territory's development is achieved.
Inhabitants of the territory	Better environment for living and professional realization. Favorable environment for practicing sport and hobbies. Improved access to various information concerning the territory's development. Adequate navigation on the territory. Promotion of personal commitment in favor of local products. Archiving information, recognizing and keeping cultural values and others. Decreasing investment risks for inhabitants and others. Working out integrated marketing on the ground of population segmentation (for example, school children, students and so on) through targeting has specific advantages for generating a positive effect on the territory's development.
Visitors (tourists)	Complexity of supply, an opportunity for multi-language servicing, adding a value for tourists, adequate navigation on the territory, an opportunity for prepaying a combination of products and services, planning visits, relevant information and others.
Companies on the territory	Making local products and services popular, informing about events, improving business navigation on the territory, taking part in partnerships, getting involved in integrated distribution networks, getting familiar with upcoming changes on the territory, getting involved in project partnerships and others.
Potential and real investors	Complex information about the territory, plans and programs for the territory's development, investment projects, discussions about investing, balance between public and private investments, balance in key sectors, following the interest in investing and the results from it, and others.
Cultural and educational institutions	Making popular cultural and historical treasures, attracting users of educational services, partnerships between cultural and educational institutions, encouraging people to visit museums, theatres, cinemas and others; increasing incomes from selling tickets in those, making popular arts, crafts and others that are specific for the territory.
Craftsmen with specific skills	Making popular locally developed crafts and products of craftsmanship. Stimulating the interest in products as well as in training on behalf of people from all over the world who show interest.
Sponsors	Covering sponsors' activities. Stimulating sponsorship campaigns. Following the results of sponsorship and others.

<sup>1</sup> See in detail: McMahon L., Phillimore J., State and Territory Government Strategic Plans: Exercises in Managing, Monitoring and Marketing. Australian Journal of Public Administration, Vol. 72, no.4, pp. 404–418/

The integrated approach in implementing marketing of territories is a necessity in modern conditions. Municipalities' individual activity or campaigns on a territory are not able to generate considerable effect for audiences. Significant synergetic effect is observed when the subjects' marketing activity on the territory is integrated and coordinated purposefully in a system.

### **MUNICIPALITIES ISSUES THAT MAY BE SOLVED USING INTEGRATED MARKETING**

Deepening socio-economic problems in municipalities in conditions of a recession combined with unfavorable demographic tendencies set to the fore the issues of solving these problems in the following trends (Table 4).

*Table 4*

#### **Recent issues of municipalities and marketing aspects for solving them**

<b>Current issues of municipalities</b>	<b>Marketing aspects in solving the issues</b>
Problems in using means from EU	Making popular incoming projects and results from ongoing and finished projects. Seeking suitable partners, implementing preparation stages of project proposals and others.
Investing and using the capacity of municipalities	Investing in high-return marketing. Improving the use of capacity and its effective usage.
Increasing the efficiency in servicing users	Perfecting the supply of services to interested individuals through working out new distribution channels. Stimulating audiences to use services from more efficient channels. Keeping a feedback from users.
Insufficient financial means	Seeking opportunities for stimulating subjects to carry out an activity that has direct or transfer contribution to municipalities' incomes. Making new products and services with a potential for generating income. Stimulating volunteering in representing a territory.
Insufficient territory's own incomes	Communication and administrative support to local business. Macro-marketing campaigns for attracting tourists, investments and donations.
Unfavorable tendencies in the demographic development	Through long-term integrated marketing on territories there can be achieved a favorable effect on the demography of the place (attracting efficient individuals through creating new jobs and better urban environment).
Aging population	Stimulating young people to contribute demographically for the territory's development through economic and social mechanisms.

*Remark:* the current issues of municipalities are pointed out on the ground of secondary sources of information that concern their functioning in the period 01.01.2012–01.05. 2013.

The unique resources (natural, cultural-and-historical, technological and social) of places and the specific managerial potential for their implementation presuppose a difference in the means and channels for reaching the target audiences. E-marketing on the territory is actually a part of the thorough concept for e-business with the participation of various subjects that is oriented to the territory's development (Figure 1).

	<b>B</b>	<b>C</b>	<b>G</b>	<b>E</b>	<b>NP</b>
<b>B</b>	B2B	C2B	G2B	E2B	NP2B
<b>C</b>	B2C	C2C	G2C	E2C	NP2C
<b>G</b>	B2G	C2G	G2G	E2G	NP2G
<b>E</b>	B2E	C2E	G2E	E2E	NP2E
<b>NP</b>	B2NP	C2NP	G2NP	E2NP	NP2NP

B – Business subjects; C – Users; G – Governmental institutions; E – Workers; NP – Non-profit institutions.

*Fig. 1.* Subjects of E-marketing on territories

Linking e-marketing of particular subjects in an integrated system has a number of advantages that accumulate a major effect:

- Particular subjects being informed as part of a communication effect which is a prerequisite for achieving market effect;
- Balancing the development of a territory (economy, culture, sport and so on.);
- Synchronizing marketing activities on the territory (for example event marketing);
- Coordinating the marketing activity of particular individuals in conditions of horizontally and vertically integrated marketing;
- Overcoming marketing risks and conflicts;
- Active marketing position in the sphere of donation;
- Creating a strong territorial brand;
- Achieving a synergetic effect on the territory's development and others.

### **E-MARKETING SET OF TOOLS FOR DEVELOPING A TERRITORY**

The e-platforms for integrated marketing on territories are a modern tool for achieving sustainable development. Benefits are generated for all subjects – population, local authorities, business, non-profit organizations, tourists, trainees and so on. At the beginning, the application of integrated approach is directed at tourists who, in choosing a destination look for various information that concerns their visit and stay on the territory (transport, accommodation, places of historical interest, museums, places for dining, parks and so on). The individual supply of products and services in this sphere does not always bring the potential for success. Experience shows that supplying those to tourists in an integrated way is exceptionally successful (for example, the experience of big European cities with a developed market of cards for prepaid services and discounts meant for tourists). However, the interest in these platforms is not only on behalf of tourists. Involving business in various forms contributes for making popular the products of local manufacturing, attracting new users and creating new opportunities for managing capacities. Informing about the investment intentions of particular subjects is a prerequisite for investing in the supply of products and services with cross sell effect. Sharing experience in successfully invested means exerts influence on another target audience – that of potential investors. In the framework of the platform for integrated marketing they can find information about real investments on the territory, the opportunities for making investment, potential partners, the investment profile of the municipality and others. For the population on the territory e-platforms also generate benefits. Besides the good navigation on the territory, there is provided information that is structured in various trends and adequate visualization.

The population has the opportunity to get acquainted with plans, programs, intentions and so on that affect the territory's development and take active part in making, discussing, implementing and sharing them. Also, through the integrated e-platforms there is achieved high awareness of the population on upcoming events. This is a prerequisite for achieving efficiency. Integrated platforms have exceptionally significant importance for the development of cultural institutions. As products and services supplied to the inhabitants and tourists, they have crucial contribution for forming the cultural profile. Of essential importance for their functioning is the relevant management of their capacity. Supplying them individually is not always successful, that is why in highly developed municipalities there are offered integrated models for supply which is a prerequisite for more visits, greater frequency, bigger number of places visited, buying more products and services and the whole positive impact on using the particular capacities. There can be achieved a positive effect of applying the integrated marketing of cultural institutions in revenues from sales too. From the information provided in Table 5 one can see that in the structure of museums' revenues in the country there prevails the share of the budget subsidy (72.4%), which shows the problem of their general management, including marketing in the cultural institutions.

Table 5

**Revenues and costs of museums in the Republic of Bulgaria  
according to the types of museums in 2013<sup>1</sup>**

Types of museums	Museums number	Revenues – thousands of BGN		Share of the budget subsidy	Costs – thousands of BGN, total
		total	including that from the budget subsidy		
Total for the country	187	42 801	30 984	72.4%	39713
General	87	23 001	15 787	68.6%	21 863
Specialized	100	19 800	15 197	76.8%	17 850
Including art galleries	36	5 804	4 971	85.6%	4 886

Source: National Institute of Statistics, Bulgaria

The integrated offers of cultural institutions on a territory made through e-platforms have the following advantages:

- 1) An opportunity for profiling potential users.
- 2) Multi variety of offers.
- 3) Working out new channels for putting offered products and services into effect;
- 4) Flexible marketing;
- 5) Flexible management of capacities;
- 6) Increasing revenues from sales;
- 7) Increasing the average value of a purchase;
- 8) Increasing the intensity of a purchase and others.

The platform can exert considerable influence concerning the equality in offering the various types of products and services.

A similar application of the platform can be made in stimulating sales in cinemas, theatres, circuses, attraction and others.

E-platforms for integrated marketing can be of interest, also, to non-profit organizations. They can make an important contribution for the success of campaigns that are put into practice on local or national level and can be used as an integrated channel for raising money for the benefit of socially significant causes.

<sup>1</sup> www.nsi.bg



In conclusion, one can point out the undisputable advantages in using e-platforms for integrated marketing on territories. These advantages are: relevance of the offer, coordination, equality, dynamics, creativity and interaction. Free mobility of individuals in EU raises the question about the multi-language servicing of users on a territory which can come true through e-platforms.

In the last decade e-communications have been viewed as a prerequisite for successful development of territories. The reasons are as follow: more users available online, increase of online purchases and sales, development of new offers in the supply and demand of offers, the user's active role in transactional processes, increased influence of social networks and others. The e-advertising means of marketing on a territory have the following applications:

- ✓ Making the territory's brand popular;
- ✓ Making traditional crafts and products popular;
- ✓ Stimulating interest and involving activities on the territory;
- ✓ Encouragement of sharing positive experience of target audiences;
- ✓ Balancing the supply and demand in various trends;
- ✓ Generating ideas for the territory's favorable development;
- ✓ Product-and-market expansion on the ground of territorial resources;
- ✓ Encouraging the consumption of products that are locally made;
- ✓ Activating personal commitment and contribution for the development of the place itself and others.

E-advertising on a territory can be also viewed as part of a complete concept for applying low cost marketing in conditions of economic crisis.

Another aspect of e-marketing on territories is creativity. The active involvement of target audiences in generating ideas for development is an essential driver for social-and-economic development with the following undisputable benefits:

- ✓ Using the potential of individuals who have interest in the territory's development;
- ✓ Volunteer gratuitous participation in solving particular problems;
- ✓ Achieving better symmetry between the institutional marketing offered and the one expected by users;
- ✓ An opportunity for applying real-time marketing for the benefit of institutions, campaigns, users and the society as a whole.

Working out multi-channel distribution for products and services on a territory is also viewed as a factor for improving market positions and increasing efficiency as whole. The changing user preferences in regard to a preferred channel for buying are definitely favorable for the development of e-channels. The speed, integration, accessibility and independence of the subjective factor make them preferred to the traditional forms of distribution. The opportunity for registering users, profiling and working out whole CRM systems could be of use for individual subjects, as well as for the development of the territory as a whole.

Working out e-services for users is a priority both for the business and the municipalities. Adding new channels to the existing ones could contribute for increasing the overall efficiency of supply through taking advantage of their ability for integration (involvement in partnership networks<sup>1</sup>) and applying low cost marketing.

The local-authority institution, therefore, needs to adapt its managerial structures, open the door to new ideas and create conditions for applying modern marketing in using new opportunities and solving current issues.

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<sup>1</sup> See in details: Arzhenovskiy I. Marketing regionov, Yuniti, Moskva, s. 95–100.

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# **SOME PROBLEMS OF THE FUNDING OF THE LOCAL PRODUCTION SYSTEMS: ENVIRONMENTAL ASPECT<sup>1</sup>**

*Olga Burmatova,<sup>2</sup>  
Tatiana Sumskaya<sup>3</sup>*

The paper is devoted to the problems of formation of financial mechanism of environmental protection in the framework of local production systems. The authors have identified main sources of costs for environmental purposes and analyzed the trend of reducing fiscal costs of environmental protection. A special emphasis has been placed on the legal aspects of using payments for negative environmental impacts, including the abandonment of targeted use of payments to the budget as a pollution fee. The importance of environmental funds in the financing of environmental activities has been shown; the importance of program-oriented approach to solving environmental problems is marked. The possible elements of the financial mechanism for the implementation of environmental protection measures have been proposed. The main difficulties including stimulating effect in the economic mechanism of nature conservation and environmental protection have been considered.

Local production systems (LPS's) are territorial-industrial combinations characterized, first, by the presence of its own economic capacity for self-development of the territory and ensuring its competitiveness. Only in this case, we have the necessary preconditions for the progressive modification of the production and spatial structure of the economy within the limits of LPS's, for the growth of their level of economic development and for the creation of conditions for social prosperity.

Secondly, LPS's must have an efficient management system, in which economic complex of the area, its social services and the natural environment are considered as a control object. With this as the subject of management can act the public authorities, local governments, and special management bodies for the implementation within the LPS's of any long-term projects and programs. Management of local production systems should be understood as an activity to regulate the processes of socio-economic development of the area in accordance with a pre-designed program and aimed at achieving the goals of improved quality of life. Under conditions of economic crisis, an important task of management bodies is to create tools to encourage the output of the region's economy of the depression and the providing conditions for development. Obviously, the development of regions, surviving depression and their further prosperity should be stimulated by the authorities.

Third, the LPS's are characterized by the existence of various public (government) and private institutions that perform, in particular, the various functions for the provision of educational services and training, research and implementation of innovation, securing funding, and others.

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Thus, the formation and functioning of LPS depends on many factors, including:

- economic (economic and geographical situation and the level of infrastructural development of the territory, transport, energy, innovation policy, the investment policy and territorial forms of social organization of production, etc.);
- social (including human capital, labor, employment, social protection of the population, the demographic balance, etc.);
- environmental (natural-resource potential, ecological potential, human impact on the environment, etc.);
- institutional (legal system and rule of law, judicial system, scientific and technical, financial and investment aspects, the system of governance, the system of market infrastructure, including credit and financial and other aspects, the system of education and science, cultural and religious values, etc.).

One of the important aspects of the study of the LPS's is to provide reliable financing process of their operation. In this article, we will focus on the problems of the formation of the system of financing environmental activities typical of the different levels of government, including the level of the LPS's.

In the field of environmental protection level of the local production systems is concentrating financial resources of various origins - from state allocations of funds to individual industries and companies – sources of pollution.

The main purpose of the economic mechanism in the field of the environmental regulation is not only providing accumulation of funds and compensation of expenses for environmental protection, but also (it's more importantly) stimulation of environmental activities, strengthening of the economic interest of industrial facilities in the rational use of natural resources and reducing pollution, in the organization of waste management and the use of secondary resources, etc. One of the important elements of the mechanism of the state environmental policy is the funding system. From as far as it is reliable and effective, depends largely on the state of the environment in the country and its regions.

Financial mechanism of protection of the environment is a complex of various financial and economic instruments aimed at promoting of environmental measures. These levers include an environmental tax policy, the system of payments for natural resources and negative impacts on the environment, environmental insurance, improving pricing for the products of industries that exploit natural resources, and other environmentally oriented industries, especially for environmentally friendly products and technologies, etc .

The purpose of the financial mechanism for the protection of the environment is to improve the environmental situation in the country with minimal material, financial and human resources through the provision of favorable economic conditions for environmental activities of the enterprises and industries. It is clear that the financial mechanism of nature management in any country reflects conducted by the state environmental policy.

To achieve these objectives it is necessary first of all to solve the following tasks:

- enhance the role of budgets of different levels of funding environmental programs, environmental activities and environmental government agencies; improve the system of public environmental funds;
- implement of the system of environmental taxation and compulsory environmental insurance schemes;
- clearly define the sources of funding for environmental activities between the company's own funds, extra-budgetary and budgetary sources, as well as to ensure the reliability and sufficiency of the funds in the market conditions.

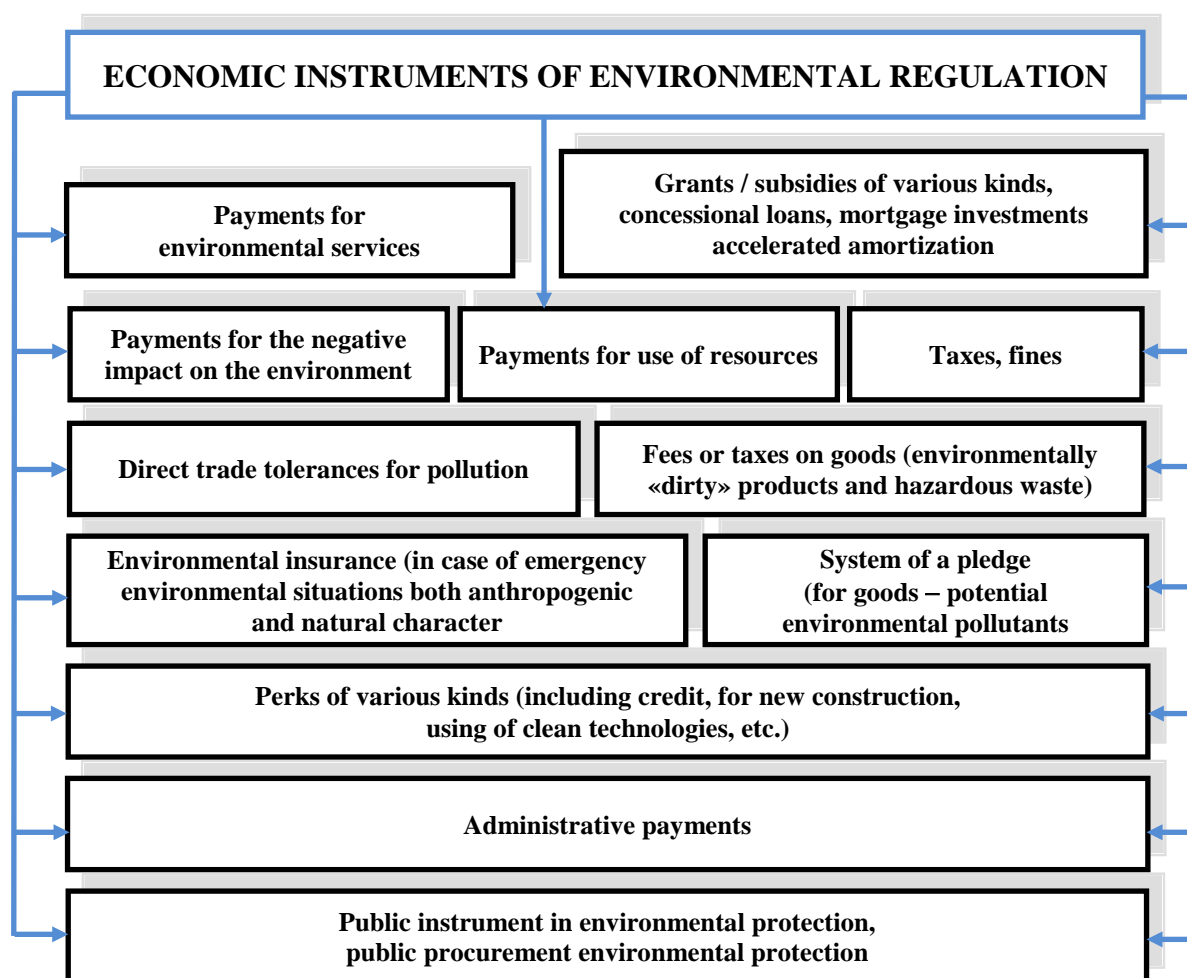
In countries with developed market economies with typically a significant advancement in the field of environmental policy, the hallmark of the existing system of environ-

mental management is the use of economic regulators to promote environmental management while maintaining and strengthening the state and public control and regulation in the field of environmental environment.

Economic methods of environmental regulation include a set of measures aimed at changing the attitudes of economic actors in a direction of changing favorable to the state of natural resources and the environment, by affecting the cost and benefits of the various options that are available to participants of economic activity.

The main purpose of economic methods is primarily in providing incentives of the environmental activities primarily through the introduction of environmentally friendly and environmentally sound technologies, and to find ways to minimize the economic costs which will be incurred by the company in order to achieve the desired state of the environment and its individual components.

Financing environmental measures in developed countries is both at the national and at the regional and local levels through national budgets, expenditures of regional and local authorities, facilities companies and enterprises. The main sources for expenditures for environmental purposes, as a rule, the government grants, loans, and loans with interest, fees and penalties for discharges and emissions, administrative fees, costs of environmental nature, payments for the use of natural resources, grants from the state and other tools (Figure 1).



*Fig. 1.* Tools of the financial mechanism of nature management in developed countries

In this case, the experience of developed countries shows that the focus is increasingly on not restrictive measures and punishment, but rewarding the efforts of those natural resource users whose economic behavior is to create the most favorable environment.

The existing financial mechanism of environmental protection in Russia is fragmented and consists of individual structural units. It consists of the following subsystems:

- financing of measures on the protection of the environment;
- forecasting and development of environmental programs;
- environmental pricing and taxation;
- payment for natural resources and environmental pollution;
- environmental insurance, etc.

Despite the importance of these sub-systems in environmental financing the degree of development and practical use of them is different, some of them have not yet been properly developed. To date, the basis of the mechanism of financing environmental protection constitute the payments for natural resources and payments for negative impact on the environment, including payments for emissions of air pollutants, water pollution, disposal of waste production and consumption, contamination of the subsoil and soil, etc. (Figure 2).

The introduction of charges for the use of natural resources and pollution of the environment in the Russian Federation was the result of changing relationships in the field of the nature management in connection with the transition to market economic principles. In this regard, one of the tasks of the national environmental policy is the organization of the work to ensure compliance with the principle of payment for environmental management. However, this principle does not always adequately reflected in the legislation on taxes and fees, which affects the receipt of resource payments to the budget of the country.

The implementation of the financing of environmental programs and environmental activities in the Russian Federation provides the possibility of using financing different sources, whose role varies. Among these sources, we can identify: budget funds (federal, regional and local budgets); funds of enterprises, institutions and organizations; environmental funds; environmental insurance funds; bank loans; voluntary contributions of the population; foreign legal entities and individuals, and other sources.

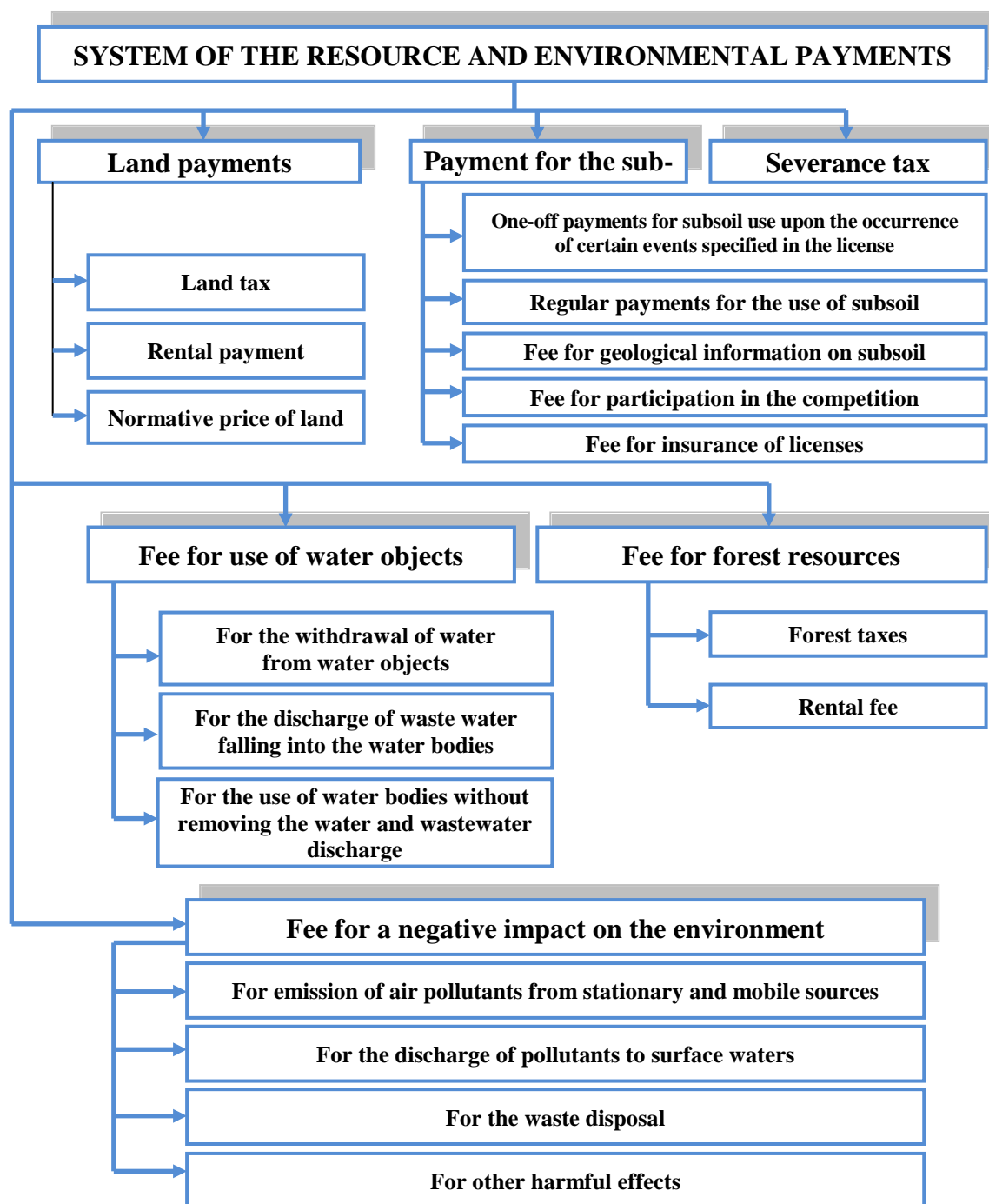
In general, the current Russian system of environmental financing is far from perfect and can not boast of any extensive array of different instruments and techniques, no significant grants from.

Since the early 90s there is a tendency to reduce budget expenditures for environmental protection in Russia. So, in 1995, for this purpose has been allocated 0.6% of the expenditure side of the budget, in 1996 it was 0.5%, in 1997 – 0.4%, in 1998 – 0.5% 1999 – 0.87% of the expenditure side of the federal budget.

The last decade government spending on environmental protection were scanty value being in the range from 0.14 to 0.2% of total federal spending. In the federal budget for 2011, the costs of environmental protection are provided in the amount of 14.5 billion rubles. It corresponds to 0.14% of the total expenditures or 0.03% of GDP (compared to developed European countries, the level of environmental costs estimated in the range of 4–6%, in Japan – more than 8% of GDP) [1–3].

At the 2013 budgetary allocation for environmental protection in the Russian Federation are expected to reach 16.7 billion rubles or 0, 12% of the expenditures of the federal budget, which corresponds to 0.02% of GDP.

The plans of the Government of the Russian Federation is scheduled to increase to 2023 the share of the costs of environmental protection to 0.3% of the expenditure side of the federal budget, the problems, of course, does not solve. According to environmental experts, only to stabilize the environmental situation is required at least 2.5%, and for improving the situation need the facilities in the amount of 4%.



*Fig.2.* Resource and environmental payments in the Russian Federation

In 2000–2001 was liquidated Federal Environment Facility and, although formally environmental funds of the subjects of the Federation (regional funds) and district (municipal and local) environmental funds are not abolished, but their activity in the majority of cases declined. Thus, the environmental activities lost, though relatively small, but reliably collected target means at the federal, regional and local levels.

The final blow to this source of funding caused the collapse of the system of payments for environmental pollution due to environmental funds were formed. At the same time, through a system of environmental funds has financed provision provision by equipment Inspections of analytical control, works on environmental monitoring, environmental re-

search, environmental education programs, support of the reserves and other protected areas, a publication of environmental literature and other kind of environmental practices. After the destruction of the system of environmental funds these activities ceased in the vast majority of the subjects of the Federation.

In addition, under the conditions of Russian flexible mechanisms of environmental financing in the form of a market for pollution rights, environmental risks insurance and others is not being used.

In general, the existing system of government target environmental funds justified itself and, in our opinion, it is necessary its recovery. Means of such specialized funds could be one of the sources of funding of federal programs in the environmental field. Today, there is a reduction of funding and the closure of federal target environmental programs.

The abolition of federal target programs that have been funded primarily from federal and regional budgets (for example such as «Revival of the Volga», «Ecology and Natural Resources of Russia», «Waste», «State support of state natural reserves and national parks», «Protection of Lake Baikal», «Security and Development of Nuclear energy», «Energy Efficient Economy», etc.) has led to a decrease in the targeted budget funding for corresponding directions in the areas of environmental protection, which should be under constant supervision and care of the state. Since 2004, in the country is not realized none environmental program. Despite the fact that the current in the Russian federal target programs for the most part ineffective, and a number of them exist only on paper, under the closure were determined primarily environmental (or connected with protection of the environment) programs. This once again demonstrated setting the priority of the economy over the environment.

In the budget for 2013–2015. among federal target programs there occur only two environmental – Federal Program «World Ocean» and «Protection of Lake Baikal and the socio-economic development of the Baikal natural territory for 2012–2020». The share of program-oriented approach to solving environmental problems during this period is only 13–15% of the budget allocation.

Another important issue is connected with the fact that there is still the issue of payments for negative impact on the environment is not regulated in legal terms. The relevant law has not been adopted so far, although its necessity follows from the federal law «On Environmental Protection» 2002. The current system of environmental payments, not having the necessary legal framework, essentially exhausted itself and is now playing a purely symbolic role – especially because of the exceptionally low base rates. Although in the 90-ies the system is practically and did not perform a regulatory function in the part of the capital environmental costs (due to the economic crisis and the difficult economic situation of enterprises), but it is done quite well with that function in the part the current activities of enterprises and served fiscal function. Now this system of environmental charges is based on the extremely low base rates (approximately 10% of the rates taken in Kazakhstan, Belarus, Moldova, Georgia, and only about 2% of the rates acting in most countries of the European Union). That does not stimulate enterprises to implement environmental activities.

It should also be noted, and such, in our view, an extremely important moment (again, who had a negative impact on the environmental sphere) as a rejection of the use of funds incoming to the budget as payment for pollution. If, before the adoption of the new Law «On Environmental Protection» in 2002, the card was designed exclusively for the purpose of restoring damaged environment, which was confirmed in the previous federal law «On Environmental Protection» of 19 December 1991, then after the cancellation of the last and adoption of the new law regarding the prohibition of the use of payments for pollution of the environment for any purpose, other than environmental, disappeared.



Later, a similar approach was used in making new versions of the forest, water and other codes and federal laws. As a result, the sphere of environmental protection in Russia, has always funded at an unacceptably low level, and lost what little that was. According to Ministry of Economic Development of the Russian Federation, currently the payment within the standards for emissions (discharges) of pollutants and waste disposal is only 0.04–0.05% of the cost of industrial products, which actually imperceptibly as stimulating factor or punishment for environmentally hazardous activities.

Apart from the aforementioned shortcomings of the system of payments for negative impact on the environment, the practice of using them also showed that the set of substances for which payments were set far from complete. Besides that, there are major flaws with the point of view of the inflation factor: the value the correction coefficient is incomparable with the actual rate of inflation. As a result, the system of payments for negative impact on the environment, that is intended to be used as one of the sources of financing of the environmental sphere, and also to some extent, encourage enterprises to implement environmental protection measures, in reality (as a result of successive emasculating its essence) does not perform any fiscal or regulatory, much more stimulating, functions. The value of environmental payments should be such that not only create strong incentives for effective environmental management (and thus for the introduction of resource- and energy-saving technologies), but also be compatible (in terms of technical and technological feasibility of attainability of ecological and economic parity) with the conduct of economic activity in all sectors of the economy. In addition, these payments must receive sufficient funds to provide targeted funding for environmental protection.

Not correspond to the actual economic assessment and prevailing in the Russian system of payments for the use of natural resources. The level of these payments artificially low, and significantly (at least one order of magnitude), which proves ineffective implementation by the state the function of owner of the natural resources when huge part of the revenues from natural resource passes by budget.

In light of this, it seems necessary, first of all, the widespread introduction and development of the following elements of the financial mechanism for the implementation of environmental measures [4, 5]:

- establishing tax privileges for environmentally responsible companies who outsource production to the best available technology (in particular, this may be exemption such enterprises from value-added tax (VAT) for a period of technical and technological re-equipment of fixed productive assets, ensuring resources saving and environmental safety of functioning production, etc.);
- the establishment of higher taxes for environmentally dangerous products and kinds of activities;
- preferential lending (for example, on the creation and implementation of new resource-saving and environmentally friendly technologies and equipment);
- accelerated amortization of the fixed productive assets of the environmental appointment;
- establishment of price premiums for green products or for the use of environmentally friendly equipment, etc.;
- introduction of the various kinds of the payments that could perform stimulating, compensatory, punitive functions, as well as regulatory, above permitted standard and other functions.

Use of regulators to encourage the greening of production, transition to the advanced technology, requires of modernization of tax and budget legislation. It is absolutely necessary to establish clear understandable rules for investors, for producers who are planning any economic activity, will clearly understand what would be the economic and administra-

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tive implications of the lack of attention to the environment. Require as well a revision of penal sanctions for environmental offenses, the level of which is now so low that companies simply ignore environmental requirements. The problem consists first of all in the fact that on the one hand, to generate interest of business in environmental activities (including through the modernization of production and the introduction of new technologies, environmental innovation, etc.), and, on the other hand, environmental violations should be strictly followed the rigid responsibility, with using the appropriate penalties. In this case, success is possible only under condition of achieving a balance between sanctions for environmental violations and receiving the benefits of environmental activities. Greening the tax system will give an additional impetus for conducting the structural and technological policy, in particular, for the transition from the use of natural materials to using recyclable materials and waste.

Of particular note is the problem of development of economic mechanism of stimulating rational nature management and environmental protection, promotion and support of environmentally responsible business. As already mentioned, formed in the Russian mechanism of the environmental regulatory does not have a stimulating effect. This is manifested, in particular, in the imperfection of estimates of taxable base of using natural resources, including low interest rates of the payment for the use of natural resources and the restoration of natural resources; at extremely low base rate payments for negative impact on the environment; in unjustified reduction in the payment rates for the use of natural resources and their reproduction by individual of natural resources users; in an underestimation of the value of natural resources, the substantial absence of payments for re-use of collateral and natural resources.

Without the development and implementation of the relevant elements in a system of levers and methods of management a shift towards active transition to resource-saving and environmentally friendly technologies can not be achieved.

It's necessary the direct economic interest of business in solving environmental issues and the state's task - to create this interest, to support resource-and energy-efficient technologies and products, including through the introduction of market regulators in the field of environmental protection, which would stimulate enterprise actually reduce anthropogenic pressure on the environment, introduce modern resource-saving and environmentally friendly technologies. Business needs to understand that environmental protection – is not only an additional burden on the budget of the companies, but also one of the conditions to improve product quality, increase its competitiveness in world markets.

Under the conditions of Russia absolutely do not used the flexible mechanisms of environmental financing in the form of a market for pollution rights, environmental risks insurance, etc.

It is clear that the transition to eco-oriented technology – an extremely complex process that requires not only a huge time and money, but also the political will of the government. Such a transition is impossible without adequate serious preparation for the implementation of measures, including legislative and regulatory support, development of new technical and technological solutions, creating an effective economic mechanism of environmental regulation, etc.

Modern crises are making significant features in the relationship of the economy and the environment. Impact of the crisis on the state of affairs in the environmental field is usually two-fold character, causing on the one hand, environmental degradation, and on the other hand - its relative improvement, allowing to reduce the load on the environment.

Decline in production, reduction of transportation leads to a reduction in emissions and discharges, as well as reduced energy demand, which in turn leads to a decrease in revenues of carbon dioxide and mitigate the greenhouse effect.

However, such a reduction in environmental impact is temporary and, as experience shows, as the crisis pressure on the environment not only restored to the same level, but, as a rule, much stronger. This occurs, in particular, because of the desire of enterprises during the economic crisis, to reduce production costs, saving on all reflected in the reduction of industrial and environmental safety of the facilities. In addition, during the crisis of power, especially in the local level, local authorities often mitigate environmental requirements in relation to individual producers and generally weakened control by the environmental authorities. As a result of the ecological situation in the region is usually much worse.

The decline in production is accompanied by a decline in the financial resources from the producers, forcing companies to seek out additional sources of internal funds. This is most often seen in curtailing environmental activities, as it is not directly involved in the main production process and the company will first try to save on the environmental costs, which leads off environmental equipment, saving on electricity, expensive reagents, etc. This was shown by the experience of the crisis of the 1997–1998's in Russia, when the reduction of environmental pollution was far inadequate drop in production, and in some cases there was a marked deterioration of the environmental situation.

During the crisis, reducing the cost of environmental protection is specific not to the production level, but also to all levels of territorial administration – from federal to local, leading to partial or complete curtailment of environmental programs.

Along with this economic crisis generates and some opportunities to solve environmental problems [6, 7, 8]. First of all, participation of the state in solving economic problems increases and thus the opportunity for radical structural and technological change, the transition from resource-based economy to an innovative environmentally sustainable economy are appeared.

Reduction of financial resources at the federal level may force the authorities to review the energy policy of the country and abandon the expensive and environmentally hazardous projects for the construction of new (often highly questionable in terms of their economic and environmental studies, and did not pass most of the state environmental expertise) hydro- and nuclear power plants, as well as the implementation of many other nature-large projects.

The structural transformation of the economy require significant investment and time to implement them. The action of the Russian government to rescue the major energy and metals companies show not only the consolidation of the commodity nature of the economy, but also lead to a shortage of funds for investment in the modernization and diversification of production. As a result, instead of the formation and development of high-tech industries and, as a consequence, the reduction of environmental pollution and waste of natural resources, we will have the opposite effect.

The consequences of economic crisis in Russia, especially in Siberia, the impact on the ecological situation faster and stronger, if a significant missed opportunity to modernize production, which resulted from new technologies industry can become the new «environmental» track. However, one can not ignore the fact that in today's crisis, the Russian company in the search for additional sources of finance are not on the way to finding the best technical solutions, and cost savings, and especially the environment. Therefore, it seems that the appeal of the country's leadership for Russian companies to exploit the situation to the modernization of production (including environmental) is unlikely to be heard by them, and after the crisis should expect any significant increase of human pressure on the environment.

In keeping with today's financial crisis is problematic to expect a radical change for the environment for the better. It is also important to consider that environmental problems require, as a rule, long-term solutions, which focus on the crisis reduced.

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An important aspect of financial support environmental measures in times of crisis (and not only) is that the lack of funds to main production activities pushes aside everything else, first of all, the environment. At the same time, environmental protection measures, as long-term, require long-term investment for a fairly large investment lag when payback not only requires long periods, but it can not be achieved at all (for example, under the existing criteria of investments, ignoring usually economic damage from pollution).

Under current conditions in Russia of the functioning the financial system, when one of the biggest problems is the lack of funding so-called «long» money (i.e. funds to banks for more than one year), environmental sphere remains outside the immediate interests. One solution to this problem is to use these new financing mechanisms, as collective investors (mutual funds), as well as syndication and bond issues [9]. The advantages of these sources of funding are, first, their low cost compared to commercial loans, and second, their big attraction for investors through the use of new technologies, the effect of participation, transparency, operating international reporting systems, improve the quality of products and services and ensuring the environmental safety of the production.

In the end, what environmental scenario would have the best chance for the implementation will largely depend not only on the legislative and regulatory support, forming an effective economic mechanism of environmental regulation, and many other conditions, but also the political will of government officials, their real steps on the use of modern situation for the modernization of the economy. It should be added that in today's market the current level of environmental protection and resource saving technologies and determines the competitiveness of the Russian economy in the world (or rather, its lack of competitiveness). At the same time, the increasing demands for environmental quality and safety of products, the transition to the integration of environmental parameters of the technologies used for the production of products, is one of the important directions of increasing international competition.

Environmental innovation development can not only gradually reduce the level of negative human impact on the environment, but also bring benefits of environmentally responsible business (which requires the establishment of appropriate economic rules of the game), contributing to the overall output of the country on a sustainable path of socio-economic development. In turn, the choice of the ways out of the crisis give a chance and allows the state to conduct structural and technological restructuring of the economy in favor of resource-saving and environmentally safe production and establishment of an environmentally sustainable and innovative development of the country and its regions. One of the conditions for successful development in this direction and to achieve good environmental situation as a necessary element of a decent quality of life and health is to ensure coherence of the regional government, business and the public in the field of environmental protection.

Contemporary crisis showed that the state must be present in the economy, not so much as an owner, how much and above all as a regulatory and guiding force. It is not only the failure of the market, the need to internalize the external effects, including those related to environmental pollution. Launch large-scale processes such as modernization and innovative transformation of the economy by government forces only.

In general, the problems of modernization, facing the Russian economy, require a change of value criteria for a wide range of relationships, including relationships with the natural environment. Then reduces to only upgrade technological aspects seem unpromising without creating appropriate institutional environment, one element of which is to build relationships with the natural environment. A new paradigm in the field of environmental protection, based on the concept of sustainable development, proceeds from the awareness of the need to reject consumer attitude towards the environment and building a partnership with her. Environmental and economic consequences of such a partnership, arising from

the consistency of the coexistence of natural, technical and human capacities are obvious. It is not just about the transition to resource-saving and environmental-oriented technology with all its consequences for the economy, the environment and humans, but also the formation of an environmental ethic, respect for the natural environment, the strengthening of the principles of eco-efficiency and environmental justice.

In other words, it is necessary to change the criteria and to form an adequate institutional framework otherwise the modernization of the economy is doomed. Institutional reforms should be aimed at creating a new and better legal and economic mechanisms to regulate the interaction of different levels of government and natural resources, subject to the mandatory inclusion of environmental requirements in the procedure for assessing the socio-economic benefits of management decisions.

In general, formed to date, financing in the Russian in the sphere of environmental protection (including budget) does not provide sufficient economic mechanism of respect for the right of citizens to a healthy environment. At the same time, environmental goals can the only really be prioritized and effective when for their achievement will be allocated prioritized resources.

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# INTERNATIONAL PRODUCTION CHAINS IN EUROPE: POSITION OF UKRAINE

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International production chains concern to the transnationalization and internationalization of production, international trade. The first historically known theory describing spatial processes of production placing is a theory of Johann Heinrich von Thünenstandorta (1826). For her optimal companies' location scheme is a system of concentration circles around «central destination» separating zone location production of various types of production.

The Thünen model suggests that accessibility to the market (town) can create a complete system of agricultural land use. His model envisaged a single market surrounded by farmland, both situated on a plain of complete physical homogeneity. Transportation costs over the plain are related only to the distance traveled and the volume shipped. The model assumes that farmers surrounding the market will produce crops which have the highest market value (highest rent) that will give them the maximum net profit (the location, or land, rent). The determining factor in the location rent will be the transportation costs. When transportation costs are low, the location rent will be high, and vice versa. This situation produces a rent gradient along which the location rent decreases with distance from the market, eventually reaching zero. The Thünen model also addressed the location of intensive versus extensive agriculture in relation to the same market. Intensive agriculture will possess a steep gradient and will locate closer to the market than extensive agriculture. Different crops will possess different rent gradients. Perishable crops (vegetables and dairy products) will possess steep gradients while less perishable crops (grains) will possess less steep gradients.

In 1909 the German location economist Alfred Weber formulated a theory of industrial location in his book entitled «Über den Standort der Industrien» (Theory of the Location of Industries, 1929). Weber's theory, called the location triangle, sought the optimum location for the production of a good based on the fixed locations of the market and two raw material sources, which geographically form a triangle. He sought to determine the least-cost production location within the triangle by figuring the total costs of transporting raw material from both sites to the production site and product from the production site to the market. The weight of the raw materials and the final commodity are important determinants of the transport costs and the location of production. Commodities that lose mass during production can be transported less expensively from the production site to the market than from the raw material site to the production site. The production site, therefore, will be located near the raw material sources. Where there is no great loss of mass during production, total transportation costs will be lower when located near the market.

Once a least-transport-cost location had been established within the triangle, Weber attempted to determine a cheap-labour alternate location. First he plotted the variation of transportation costs against the least-transport-cost location. Next he identified sites around the triangle that had lower labour costs than did the least-transport-cost location.

Another major contribution to location theory was Walter Christaller's formulation of the *central place theory*, which offered geometric explanations as to how settlements

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and places are located in relation to one another and why settlements function as hamlets, villages, towns, or cities.

William Alonso (Location and Land Use: Toward a General Theory of Land Rent, 1964) built upon the Thünen model to account for intra-urban variations in land use. He attempted to apply accessibility requirements to the city centre for various types of land use (housing, commercial, and industry). According to his theory, each land use type has its own rent gradient or bid rent curve. The curve sets the maximum amount of rent any land use type will yield for a specific location. Households, commercial establishments, and industries compete for locations according to each individual bid rent curve and their requirements for access to the city centre.

The Thünen, Weber, Alonso, and Christaller models are not the sole contributors to location theory, but they are its foundation. These theories have been expanded upon and refined by geographers, economists, and regional scientists.

Basic researchments about the participation of the country in the international production chains are in the scientific articles of S. Arndt, G. Grossman, A. Deardorf, R. Jones, P. Diken, B. Dluhosh, V. Eteyer, G. Kyerzhkovskyy, P. Krugman, K. Lankaster, P. Finstra, H. Henson, E. Helpman, I. Egorov, A. Miller, N. Myhaylenko, T. Smith, Y. Savelyev, V. Chuzhykov, A. Rogach, A. Filippenko, Y. Pakhomov, V. Heyets, D. Lukyanenko, V. Sidenko, S. Sokolenko, V. Novitsky, A. Shnyrkov.

Firstly, we identify the level of the country's participation in the international production chain and secondly, we analyze the sector structure of economy some country.

The structural analysis of the country's production describes such aspects:

- the level of the production stability;
- the level of the country's specialization;
- the level of the national production coherence.

Such structural analysis has complex aim: identification basic sectors of economy and evaluation of intensity basic production functions in the country with the identification of the spatiality among sectors, serving sector production and support services production (distribution, marketing, transportation etc.).

The important issues in this evaluation are the concentration level, the degree of economic development and the dominant technological development level.

Economic diversity is generally associated with stable economies, where local populations enjoy a higher quality of life. Diversified economies assist the growth of leading industry sectors through strong support industries, and sustain longer term economic prosperity through various industry lifecycles. The concentration ratio is a measure of the total output produced in the industry by a given number of firms in the industry. In this research international trade multiplier is important in the context of the classical Keynesian Theory including GDP, consumption and foreign trade.<sup>1</sup>

In this analysis the basic problem is choosing of functional connection between these indicators. We formed groups by the cluster analysis via the next grouping variables:

- the number of enterprises by economic activity;
- number of employees by economic activity,
- sector volumes,
- finished goods imports/exports,
- intermediate goods imports/exports.

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<sup>1</sup>  $GDP=I+C+Exp-Imp_{cons}-Imp_{inv}$ ;  $GDP$  – gross domestic product of country (region);  $I$  – investment;  $C$  – consumption;  $Exp$  – export;  $Imp_{cons}$  – import of consumption goods (final consumption);  $Imp_{inv}$  – import of invested goods (intermediate consumption).

$GDP=k \times (I - Imp_{inv} + Exp_{inv} + Exp_{cons})$ ;

$GDP=k \times (I + Imp_{inv} + Exp_{inv} + Exp_{cons})$ .

As a result, we received seven groups of countries which are more similar to each other (Table 1). This allows identifying the regions of cooperation between Ukraine and EU in the conditions of formation of production chain and developing generalized strategies for specific groups of countries.

Table 1

### Groups of countries the most similar to each other

Country	Group
Austria, Great Britain, Denmark, the Netherlands, Poland, Finland, France, Sweden	1
Germany	2
Belgium	3
Estonia, Latvia, Lithuania, Slovakia, Slovenia, Hungary, Ukraine, Czech Republic	4
Greece, Portugal	5
Ireland	6
Spain, Italy	7

Source: made by the author

The main components of GDP (exports of goods and services, imports of goods and services, total consumption, gross investment) used for identification the specific macro-economic features of each correlation group according to the Keynesian Theory.

Thus, significant correlations were found between the export and import of goods and total consumption in the first group (Table 2).

Table 2

### Correlations in the First group ( $p < 0.05$ )

	Export of goods	Import of goods	Total consumption	Export of services	Import of services
<b>Austria</b>					
Exports of goods		0.995208	0.984330	0.993751	0.990332
Imports of goods	0.995208		0.978969	0.987392	0.986330
Aggregate consumption	0.984330	0.978969		0.987298	0.994689
Exports of services	0.993751	0.987392	0.987298		0.995604
Imports of services	0.990332	0.986330	0.994689	0.995604	
<b>Poland</b>					
Exports of goods		0.986895	0.994422		0.966758
Imports of goods	0.986895		0.975129		0.989915
Aggregate consumption	0.994422	0.975129			0.942966
Imports of services	0.966758	0.989915	0.942966		
<b>Denmark</b>					
Exports of goods		0.991352	0.979064	0.982088	0.989158
Imports of goods	0.991352		0.973337	0.994439	0.997330
Aggregate consumption	0.979064	0.973337		0.958876	0.968371
Exports of services	0.982088	0.994439	0.958876		0.997548
Imports of services	0.989158	0.997330	0.968371	0.997548	



	Export of goods	Import of goods	Total consumption	Export of services	Import of services
<b>Sweden</b>					
Exports of goods		0.996844	0.908516	0.967949	0.959045
Imports of goods	0.996844		0.898202	0.970645	0.970168
Aggregate consumption	0.908516	0.898202		0.956522	0.914520
Exports of services	0.967949	0.970645	0.956522		0.990700
Imports of services	0.959045	0.970168	0.914520	0.990700	
<b>France</b>					
Exports of goods		0.993583	0.889955	0.958175	0.979387
Imports of goods	0.993583		0.894617	0.950515	0.988095
Aggregate consumption	0.889955	0.894617		0.829222	0.937455
Exports of services	0.958175	0.950515	0.829222		0.931421
Imports of services	0.979387	0.988095	0.937455	0.931421	
<b>Finland</b>					
Exports of goods		0.973063	0.827172	0.864619	0.933806
Imports of goods	0.973063		0.927572	0.929020	0.984093
Aggregate consumption	0.827172	0.927572		0.947364	0.941092
Exports of services	0.864619	0.929020	0.947364		0.957657
Imports of services	0.933806	0.984093	0.941092	0.957657	
<b>Netherlands</b>					
Exports of goods		0.996409	0.918344	0.944705	0.925055
Imports of goods	0.996409		0.889667	0.914271	0.895115
Aggregate consumption	0.918344	0.889667		0.971683	0.985151
Exports of services	0.944705	0.914271	0.971683		0.983300
Imports of services	0.925055	0.895115	0.985151	0.983300	
<b>Great Britain</b>					
Exports of goods		0.883687			
Imports of goods	0.883687		0.841828	0.898770	0.931801
Aggregate consumption		0.841828		0.972736	0.969857
Exports of services		0.898770	0.972736		0.988306
Imports of services		0.931801	0.969857	0.988306	

Source: made by the author

The close correlation indicates that these countries specialize in the processes generating greatest value added: R&D, marketing, management consulting in all countries of this group (except Poland) between exports and imports of services in production chains. Thus a significant impact on aggregate consumption imports / exports of goods and services in all countries (except Poland) indicates the goods produced in the international chains used for foreign trade and for domestic consumption.

In Poland chains focused on performing basic production functions. Poland has coordinator networks (businesses, which are the main networks). Poland is intermediate in the value chain within the international production networks.

There are many companies – active participants of the productions chains created a large proportion of the total value added in group 2 – Germany (Table 3).

Table 3

#### Correlations between the components of GDP in group 2 – Germany ( $p < 0.05$ )

	Export of goods	Import of goods	Total consumption	Export of services	Import of services
Exports of goods		0.980708	0.910490	0.984188	0.989353
Imports of goods	0.980708		0.864554	0.986934	0.983479
Aggregate consumption	0.910490	0.864554		0.901867	0.909452
Exports of services	0.984188	0.986934	0.901867		0.997548
Imports of services	0.989353	0.983479	0.909452	0.997548	

Source: made by author

A similar situation is in Belgium among the main components of trade flows. Belgium is represented in the third group (Table 4).

Table 4

#### Correlations between the components of GDP in group 3 – Belgium ( $p < 0.05$ )

	Export of goods	Import of goods	Total consumption	Export of services	Import of services
Exports of goods		0.995091	0.961007	0.973593	0.950393
Imports of goods	0.995091		0.932586	0.962149	0.936557
Aggregate consumption	0.961007	0.932586		0.963525	0.944376
Exports of services	0.973593	0.962149	0.963525		0.993334
Imports of services	0.950393	0.936557	0.944376	0.993334	

Source: made by the author

There are differences from earlier groups, including – smaller values of correlation in some countries between the components of GDP.

There is no correlation between exports of goods, services exports and imports in Estonia (appendix 1, 2). There is a significant correlation between consumption, export and import services. This is a significant linear correlation existing between import and export services. It indicates that Estonia is either a supplier, or a primary exporter of fragmented production services. Hungary also differs from other countries position in the group, where correlation is founded between aggregate consumption and export services. This indicates that in these countries: (1) the basic production functions are concentrated within the chain; (2) companies are suppliers of components and semi-finished products to other countries within the international production chains.

The correlation in the fifth group allows asserting that Portugal and Greece have different positions in the system chain, because Greece doesn't have any connection between aggregate consumption and imports of services, between imports and imports of goods and services. This indicates that Greece is concentrated on the performance of «zero» level of the value chain and goods produced within these international chain (Table 5).

Table 5

### Correlations between the components of GDP in group 5 ( $p < 0.05$ )

	Export of goods	Import of goods	Total consumption	Export of services	Import of services
<b>Portugal</b>					
Exports of goods		0.972256	0.925808	0.995505	0.978041
Imports of goods	0.972256		0.890980	0.973830	0.996413
Aggregate consumption	0.925808	0.890980		0.919725	0.906992
Exports of services	0.995505	0.973830	0.919725		0.979097
Imports of services	0.978041	0.996413	0.906992	0.979097	
<b>Greece</b>					
Exports of goods		0.964419	0.906542	0.941461	0.846811
Imports of goods	0.964419		0.965260	0.933593	
Aggregate consumption	0.906542	0.965260		0.921689	
Exports of services	0.941461	0.933593	0.921689		0.769899
Imports of services	0.846811				

Source: made by the author

The position of Ireland is unique. It represents the sixth group (Table 6). There is no correlation between export and import of goods and aggregate consumption, but only traced relationship between trade flows of services (Table 6).

Table 6

### Correlations between the components of GDP in group 6 ( $p < 0.05$ )

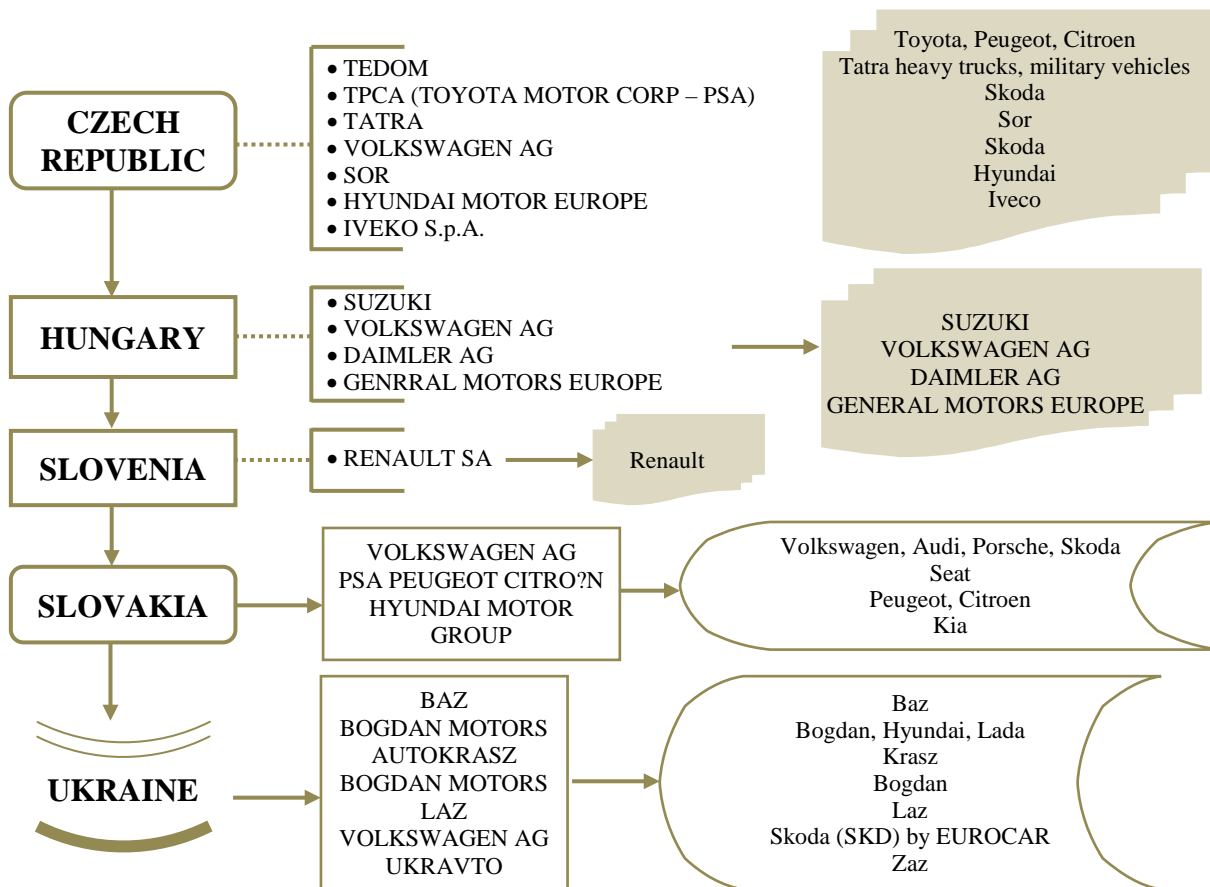
Ireland	Export of goods	Import of goods	Total consumption	Export of services	Import of services
Exports of goods					
Imports of goods					
Total investments					
Aggregate consumption				0.996801	0.996674
Exports of services			0.996801		0.994779
Imports of services			0.996674	0.994779	

Source: made by the author

It may be explained by the fact that Ireland concentrated production of tertiary and quaternary economic activities. The significant correlation between the components of GDP in the seventh group indicates the dependence on the nature of these values similar to the groups of the economically developed countries.

Analysis of structural similarity allows to conclude that all of the studied countries are characterized by close integration of trade flows in total consumption, which make it impossible to use only basic macroeconomic indicators.

Therefore, it is necessary to form a system of partner-countries of Ukraine concerning its accession to the international production chain or network. Strategic partner considers the country with the lowest degree of differences and the degree of its introduction to the international production chain. The evaluation of structural similarity EU reflects the topology of international production chain within meta-region with asymmetry of international industrial relations between the countries. This justifies a need for a differentiated approach to the international industrial cooperation within the EU networks or chain (Figure 1).



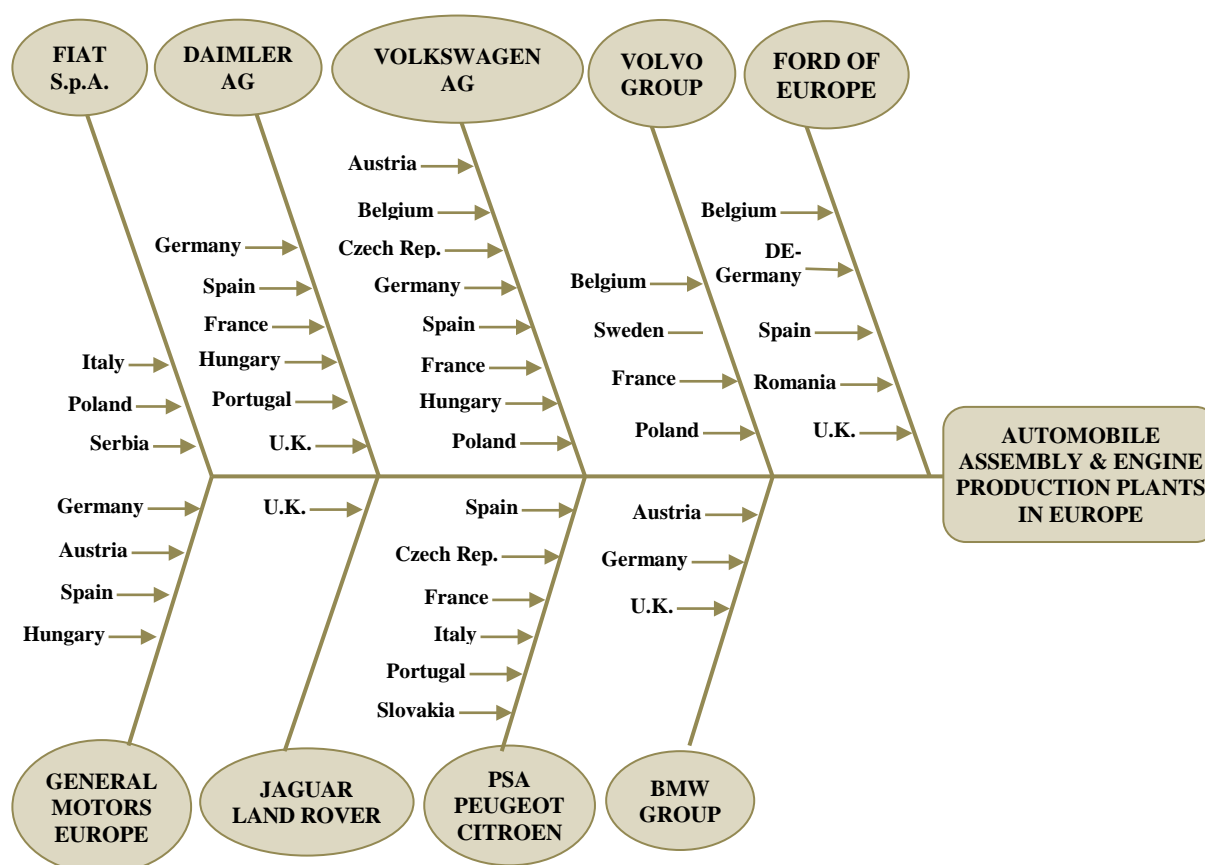
Source: made by author

Fig. 1. Ukraine and car production chain

The global financial crisis and the most recent recession in the euro area have increased the degree of synchronisation of the business cycles of CEE with EA countries and decreased cross-country differences in CEE. The existing literature singles out Hungary, Poland, and Slovenia as exhibiting notably higher positive correlation with the EA business cycle, followed by the Czech Republic. Our analysis shows a similar dispersion of correlation coefficients across CEE countries (Appendix 1). Inclusion of the turbulent post-2008 period in the sample increases the strength of association between CEE business cycles and that of Germany across all CEE countries and decreases cross-country differences. In contrast, results for euro area countries remain broadly unchanged between the full and truncated samples.

We show that a large share of exports from the CEE region passes through euro area-affiliated cross-border production chains, in which CEE exporters are, in general,

located further downstream than their euro area partners. This production model which is both pan-European and globally-integrated in nature, has several important implications (Figure 2). In the short run, it constitutes an important channel for transmitting output fluctuations between the euro area and CEE countries, via the propagation of industry-specific shocks and of inventory adjustments along the supply chain. In the longer run, however, the economic prospects of CEE countries would depend less on euro area than on world demand and the ability of euro area and CEE exporters to remain competitive on the global stage. In this context, the high degree of synchronization of CEE and euro area business cycles since the onset of the global financial crisis can be seen as a manifestation of common demand shocks and/or supply-side shocks that transmit along global value chains. The associated propagation of inventory adjustments along global supply chains further reinforces the synchronization of economic activity across Europe. At the same time, the high degree of openness of the CEE region, achieved through its integration in global value chains, may have reduced the exposure of each country to domestic shocks. Finally, there will likely be increasing «halo effects» from the participation of CEE countries in global value chains, as suggested by the on-going efforts of CEE exporters to set up own value chains within their region.



Source: made by the author

**Fig.2.** Car industry production chain

Food and drink industry is the largest manufacturing sector in the EU in terms of turnover (14.6%) and value added (12.5%). The industry is active in all Member States and is the largest manufacturing industry in several of them (Table 7). The food and drink industry is the leading employer in the EU manufacturing sector (15.5%). The 4.24 million

jobs are spread across all Member States and are mostly located in rural areas. SMEs account for:

- 51.6% of the food and drink sector turnover;
- 64.3% of the food and drink sector employment;
- 99.1% of the food and drink sector companies.

The food and drink industry is a key member of the food supply chain, which generates 11% of total EU employment and 6% of the EU Gross Domestic Product (GDP). The EU positive trade balance for food and drink reached a record level of €23 billion. The EU is the number one exporter and the number two importer of food and drink products worldwide. The biggest manufacturing sector in the EU both in terms of turnover and employment (4.24 million jobs directly):

- A non-cyclical and resilient pillar of the EU economy;
- Processing 70% of EU agricultural produce while providing safe and nutritious food of the highest quality to European consumers;
- The largest global exporter of food and drink products.

The EU food and drink industry is a stable, non-cyclical and robust manufacturing sector which has demonstrated its resilience during the recent economic downturn. It generates 1.8% of EU GDP and will therefore be a major contributor to the 20% target proposed for the industry in the context of the EU 2020 Strategy.

*Table 7*

#### **Top position companies in the EU food and drink industry**

<b>This Year</b>	<b>Last Year</b>	<b>Company</b>	<b>2013 Food Sales</b>	<b>2012 Food Sales</b>	<b>2013 Total Company Sales</b>	<b>2013 Net Income (-Loss)</b>	<b>2012 Net Income (-Loss)</b>
1	1	Pepsico Inc.	37,806	37,618	66,415	6,74	6,178
2	2	Tyson Foods Inc. (9/28/13)	32,999	31,614	34,374	778	576
3	3	Nestle (U.S. & Canada)	27,3	27,2	103536C	11,000C	10500C
4	4	JBS USA	22,14	20,979E	41,000C	429	351CR
5	11	Coca-Cola Co.	21,6	21656R	46,854	8,626	9,086
6	5	Anheuser-Busch In Bev	16,023	16,028	43,195	16,518	9,325R
7	6	Kraft Foods Inc.	14,346	14,358R	18,218	2,715	1,642
8	8	Smithfield Foods Inc.	12,531	11753A	14	NA-Private	361
9	7	General Mills Inc. (5/25/14)	12,524	12,574	17,91	1,861	1,893
10	12	ConAgra Foods Inc. (5/25/14)	11,511	9,360R	17,703	315	786
11	10	Mars Inc.	11000E	11	33,000E	NA-Private	NA-Private

As short supply chains are the product of a collective endeavour and a multi-actor process, the effectiveness of public policies is higher when support measures are framed into broader territorial and collective projects. Most interesting examples of successful public support come from projects aligning short food supply chains with actions related to the development of local products, creation of thematic tourist routes and public pro-

curement. The implementation of specific policies should require an assessment of the potential in terms of SFSCs contribution to development goals. For example, sustainability assessment should be carried out, as not necessarily short is sustainable.

Attention should also be given to avoiding excess of demand on supply. For example, financing farmers' markets infrastructures without an appropriate analysis of the production environment could put stress on the production system itself, encouraging sourcing from outside and the transformation of farmers' markets into more conventional retail markets. The implementation of specific policies should require an assessment of the potential in terms of SFSCs contribution to development goals. For example, sustainability assessment should be carried out, as not necessarily short is sustainable.

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## APPENDIX 1

Correlations between the components of GDP in group 4 ( $p < 0.05$ )

	Export of goods	Import of goods	Total consumption	Export of services	Import of services
<b>Lithuania</b>					
Exports of goods		0.992988	0.990131	0.977785	0.987082
Imports of goods	0.992988		0.982066	0.986084	0.992247
Aggregate consumption	0.990131	0.982066		0.946404	0.965965
Exports of services	0.977785	0.986084	0.946404		0.996508
Imports of services	0.987082	0.992247	0.965965	0.996508	
<b>Latvia</b>					
Exports of goods		0.997563	0.988980	0.988867	0.991420
Imports of goods	0.997563		0.996072	0.980974	0.996420
Aggregate consumption	0.988980	0.996072		0.965883	0.997421
Exports of services	0.988867	0.980974	0.965883		0.971602
Imports of services	0.991420	0.996420	0.997421	0.971602	
<b>Estonia</b>					
Exports of goods		0.831284	0.835122		
Imports of goods	0.831284		0.884927	0.768748	
Aggregate consumption	0.835122	0.884927		0.915599	0.907445
Exports of services	0.698144	0.768748	0.915599		0.793094
Imports of services	0.633220	0.683834	0.907445	0.793094	
<b>Slovakia</b>					
Exports of goods		0.997448	0.977969	0.969750	0.984707
Imports of goods	0.997448		0.984064	0.977453	0.984511
Aggregate consumption	0.977969	0.984064		0.947685	0.967488
Exports of services	0.969750	0.977453	0.947685		0.984976
Imports of services	0.984707	0.984511	0.967488	0.984976	
<b>Slovenia</b>					
Exports of goods		0.996685	0.981176	0.997214	0.993166
Imports of goods	0.996685		0.970625	0.992305	0.986771
Aggregate consumption	0.981176	0.970625		0.986774	0.989237
Exports of services	0.997214	0.992305	0.986774		0.994150
Imports of services	0.993166	0.986771	0.989237	0.994150	
<b>Czech</b>					
Exports of goods		0.999514	0.958376	0.950307	0.994951
Imports of goods	0.999514		0.956740	0.951132	0.993985
Aggregate consumption	0.958376	0.956740		0.832025	0.939758
Exports of services	0.950307	0.951132	0.832025		0.963465
Imports of services	0.994951	0.993985	0.939758	0.963465	
<b>Hungary</b>					
Exports of goods		0.998854	0.820657	0.929647	0.968882
Imports of goods	0.998854		0.836560	0.915528	0.959733
Aggregate consumption	0.820657	0.836560			0.796790

Source: made by author



## APPENDIX 2

**Correlations between the components of GDP in group 7 ( $p < 0.05$ )**

	<b>Export of goods</b>	<b>Import of goods</b>	<b>Total consumption</b>	<b>Export of services</b>	<b>Import of services</b>
<b>Italy</b>					
Exports of goods		0.989783	0.902477	0.989916	0.991571
Imports of goods	0.989783		0.922323	0.995128	0.985759
Aggregate consumption	0.902477	0.922323		0.932488	0.924043
Exports of services	0.989916	0.995128	0.932488		0.983754
Imports of services	0.991571	0.985759	0.924043	0.983754	
<b>Spain</b>					
Exports of goods		0.994228	0.979173	0.995863	0.997855
Imports of goods	0.994228		0.973179	0.987561	0.993325
Aggregate consumption	0.979173	0.973179		0.981678	0.983847
Exports of services	0.995863	0.987561	0.981678		0.998525
Imports of services	0.997855	0.993325	0.983847	0.998525	

Source: made by author

# SMALL AND MEDIUM-SIZED ENTERPRISES AND REGIONAL DEVELOPMENT – THE CASE OF SLOVAKIA

*Soňa Čapková*<sup>1</sup>

Micro, small and medium-sized enterprises (SMEs) are considered to be one of the essential driving forces in national and regional economies. They are flexible and can adapt quickly to changing market conditions. They generate employment, help diversify economic activity and make a significant contribution to exports and trade. SMEs also play an important role in innovation and the high-tech business, due to their flexibility and creativity many of them became large businesses. SME sector has gained additional attention in the economic crisis, as it is widely viewed as a key aspect of economic dynamism.

## SMES IN NATIONAL ECONOMY

The Slovak economy is heavily dependent on SMEs, as they provide 72% of employment and 67% of value added, well above the respective EU averages of 67% and 58% (EC, 2014). In this part we present a few basic indicators describing the significance of SMEs in Slovakia in a broader international context. In more details we compare the size structure, employment and labour productivity of SMEs in different sectors in four FOLPSEC countries.

The last internationally comparable indicators of the enterprise size structure are provided by OECD-Eurostat Entrepreneurship Indicators Programme which breaks down enterprises in five size classes based on the number of persons employed: 1–9, 10–19, 20–49, 50–249, 250+ (Figure 1). This classification reflects the EU «number of employees» criteria used (along with turnover or balance sheet total) to define SMEs: micro < 10, small < 50, medium – sized < 250.

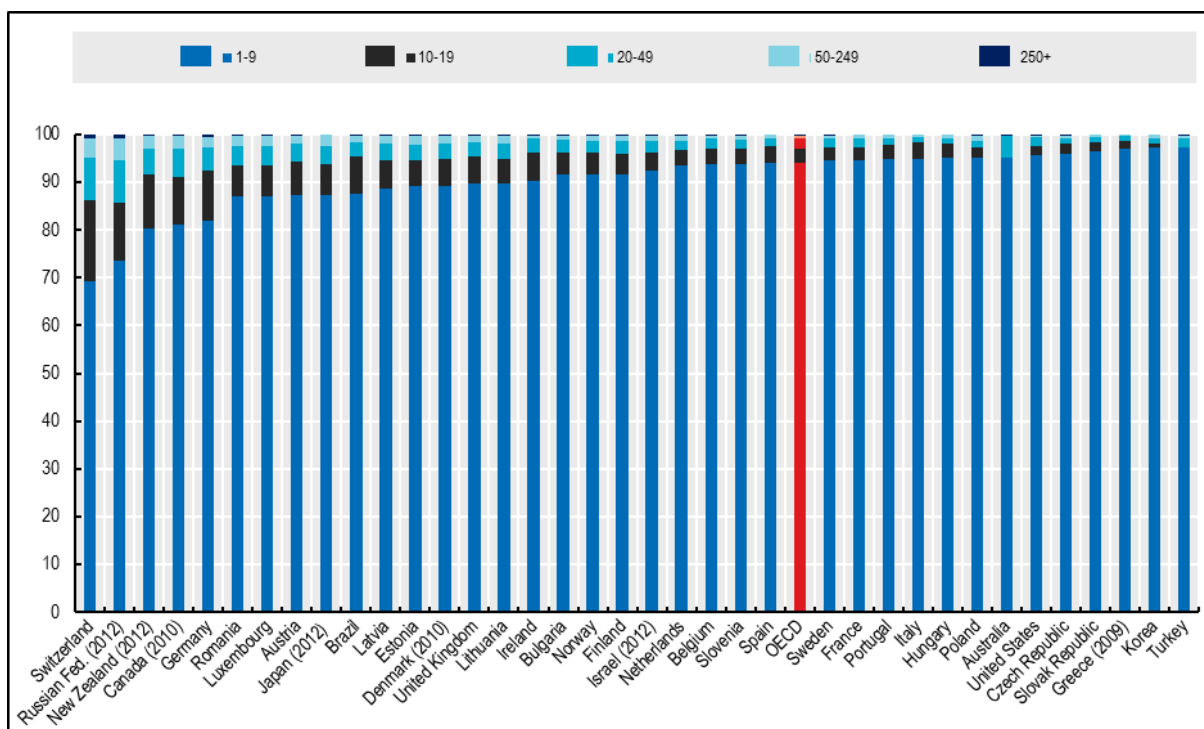
In Slovakia as in all countries most businesses are micro-enterprises, i.e. firms with fewer than 10 employees. Moreover, micro firms in Slovakia are more common than in the EU or OECD as a whole and account for a higher than average proportion of firms and employment.

In Slovakia, micro-enterprises account for 96% of all firms with the highest proportion of micro-enterprises found in the construction sector. However, there is a substantial variation in the percentage of the workforce employed by micro-enterprises. Micro-enterprises in services account for almost 48% and in the construction sector even more than 72% of total employment in their sectors, while in manufacturing the contribution is only 23.4%. Employment in manufacturing is dominated by the largest firms: they employ around 37% of people working in the sector, despite accounting for less than half a percent of all manufacturing firms (Table 1).

Firm size matters for productivity. Similarly to most other countries larger firms in Slovakia are on average more productive than smaller ones, particularly in the manufacturing sector (Labour productivity level has been measured as current price gross value added per person employed). However, this is not universally true. In some countries, for example Switzerland, data indicates that medium-sized firms have higher productivity than larger firms (OECD, 2014)

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Source: OECD (2014a), Enterprises by size: Percentage, 2011 or latest available year, in *Entrepreneurship at a Glance 2014*, OECD Publishing, Paris.

**Fig. 1.** Enterprises by size in percentage, 2011

*Table 1*

**Proportion of enterprise number, employment and productivity by size and sector**

Sector	Manufacturing					Services					Construction				
	1-9	10-19	20-49	50-249	250+	1-9	10-19	20-49	50-249	250+	1-9	10-19	20-49	50-249	250+
% of enterprise number															
Bulgaria	77,7	9,1	8,0	4,3	0,9	93,6	4,0	1,8	0,5	0,1	87,9	8,1	2,8	0,9	0,3
Poland	86,9	4,1	4,3	3,8	0,9	96,6	1,6	1,1	0,6	0,1	95,8	2,0	1,3	0,7	0,1
Russian Federation (2012)	79,5	9,2	6,8	3,8	0,7	79,5	9,2	6,8	3,8	0,7	79,5	9,2	6,8	3,8	0,7
Slovak Republic	94,9	2,0	1,6	1,3	0,3	95,6	2,9	1,0	0,4	0,1	99,0	0,18	0,6	0,22	0,003
% of person employed															
Bulgaria	11,7	6,2	14,8	32,9	34,3	43,7	13,5	13,8	14,2	14,7	32,2	10,8	14,1	24,5	18,5
Poland	16,5	3,8	9,0	29,9	40,8	52,5	4,7	8,3	13,0	21,6	51,3	7,6	10,2	18,2	12,6
Russian Federation (2010)	0,3	0,6	1,7	17,3	80,1	1,6	2,2	5,8	28,6	61,9	-	-	-	-	-
Slovak Republic	23,4	5,3	8,8	25,7	36,8	47,9	12,8	9,1	13,0	17,2	72,1	1,6	11,5	13,4	1,4
Labour productivity*															
Bulgaria	64,4	59,3	57,5	84,6	152,7	66,7	101,9	113,9	141,4	144,1	81,9	79,2	61,8	137,1	123,6
Poland	42,1	66,2	72,4	88,1	141,3	53,8	127,7	157,5	157,8	149,6	73,2	99,7	129,5	115,8	162,4
Slovak Republic	53,1	68,1	88,0	101,9	135,8	74,0	97,0	179,2	128,7	111,0	80,6	150,0	102,7	186,4	188,2

\* Average per sector = 100

Source of data: OECD (2014a), *Entrepreneurship at a Glance 2014*, OECD Publishing, Paris.

**REGIONAL DEVELOPMENT IN SLOVAKIA**

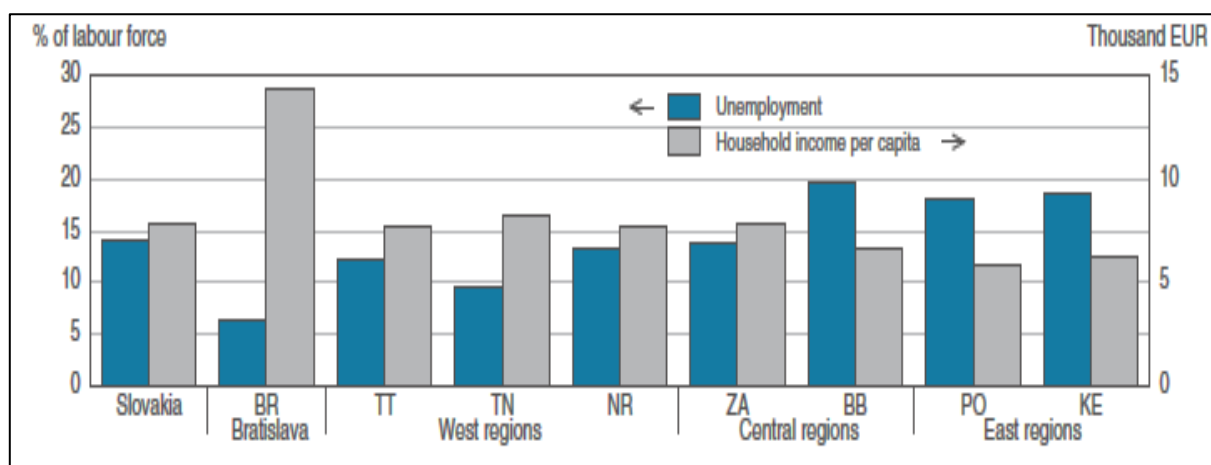
SMEs are a critical component of regional economies. Their small size enables them to be flexible and adaptive, to innovatively diversify and to reduce production costs. Many local and regional governments are recognising the critical role SMEs have for their regions and are implementing strategies to facilitate SME development. Global financial crisis has highlighted the need for more information on the situation and performance of micro, small and medium sized businesses in regions. SMEs indicators at the national level can hide disparities at the regional level and may be imperfect in informing policies designed to address regional differences in income, employment and production.

Regions of Slovakia are statistically divided according to EU territorial classification into four NUTS 2 level regions – Bratislava region, Western Slovakia, Central Slovakia and Eastern Slovakia. In terms of territorial administration, the Slovak Republic is divided into 8 regions (corresponding to the EU's NUTS 3 level).

Regional inequality is in Slovakia among the highest in the OECD and is increasing (OECD 2014b). Regional disparities were already high before the economic crisis. Regional inequality is apparent in terms of GDP per capita, employment and income indicators. The eastern regions have a much higher incidence of poverty, as economic activity is heavily concentrated in the west, particularly around the capital, Bratislava. GDP per capita in Bratislava region is the 5th highest among 272 regions in the EU28. Regional GDP per capita ranges from 186 per cent of EU average in Bratislava to only 51% in Eastern Slovakia. The economic crisis has increased the gap in GDP per capita between leading and lagging regions, the poorest regions got worse off and the richest region got better.

Unemployment is concentrated in the central and eastern regions. Two thirds of the unemployed live in the eastern and central regions. On the other side, skills shortages in the Bratislava region persist alongside skills mismatches and uneven availability of technological and human resources in the central and eastern regions.

The disposable income of households is a better indicator of the material wellbeing of citizens than gross domestic product per inhabitant. Disparities in regional income per capita within countries are generally smaller than GDP per capita. Still in the Slovak Republic inhabitants in the top income region were more than 60 percent richer than the median citizen in 2011 (Figure 2).



Source: OECD (2014b), *OECD Economic Surveys: Slovak Republic 2014*, OECD Publishing, ISBN 978-92-64-11357-2

**Fig. 2.** Regional disparities: Unemployment and household incomes per capita in 2011

According to OECD analysis (OECD, 2014b) the main reason for the significant regional disparity is the combination of low job creation in the east and central part of the country and insufficient labour mobility to the west, in particular from low-skilled workers. Inadequate transport infrastructure raises costs for those who might establish firms in the lagging regions. The mobility of low skilled unemployed is hampered by the lack of affordable housing where the jobs are.

## SMES IN REGIONS

Recent analyses (Partnership agreement, 2014) have shown that interregional disparities mainly between capital city region and the rest of the country are reflected also in SME sector. More than a third of the total number of SMEs (excluding self-employed) is concentrated in the Bratislava. SMEs in the Bratislava region generate more than 30% of total sales and nearly a third (32.6%) of the added value created in the sector (2011). Companies in this region provide jobs to a fifth (20.1%) of employees in Slovakia (2012). The region exhibits a high degree of entrepreneurial activity – 38.9% of all start-ups in the SR were registered in Bratislava region in 2012. Result of the survey conducted by Slovak Statistical Office show that more than a quarter of high-tech industrial enterprises, more than a fifth of mid-tech enterprises and almost a half of the enterprises providing knowledge-intensive services operate in this region. Within high-tech sectors, as much as a half of the total number of high-tech enterprises and knowledge-intensive services started up in capital region. This data reaffirm, that the highest rates of entrepreneurial activity are generally found in most developed region.

Table 2

### Regional distribution of SMEs in 2011

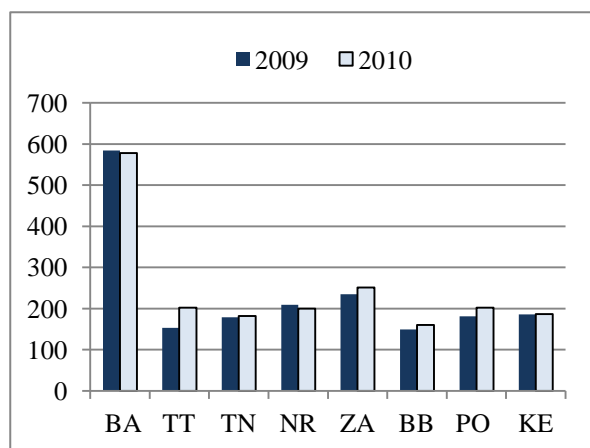
	Bratislava	West			Central		East	
	BA	TT	TN	NR	ZA	BB	KE	PO
Number of SMEs per 1000 persons of labour force	153,1	47,2	41,5	43,8	41,3	39,9	43,4	37,1
Number of small trade licencess per 1000 person of labour force	159,8	134,1	142,0	131,3	172,8	119,6	102,0	144,6
Regional structure of SMEs export	24,7	15,4	11,7	14,9	10,2	7,9	7,3	8,0

Source of data: SBA (2013), Report on the State of Small and Medium Enterprises in the Slovak Republic in 2011, Bratislava June 2012.

Small and medium entrepreneurship plays in Slovak republic the irreplaceable role in balanced regional development. At the regional level, development of the SME sector is determined by a number of local factors. SMEs statistics at the regional level provide important insights to these differences. Therefore we have looked at SMEs in all Slovak regions in the light of the comparable numbers of small trade licences, small and medium-sized enterprises, their share in export (Table 2), but we also explore some qualitative characteristics of the SME sectors in regions with different levels of development.

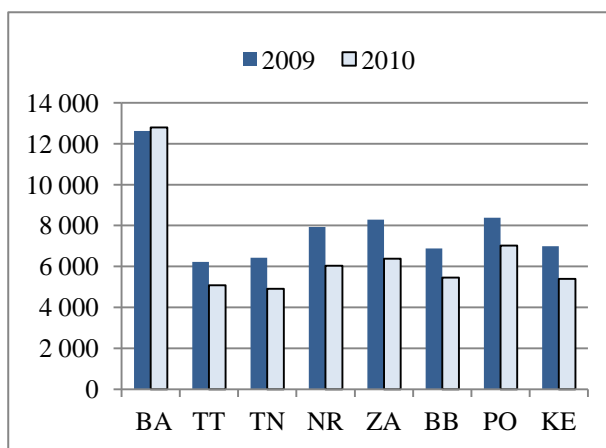
The situation of SMEs in different areas is related to the manner in which local entrepreneurs perform their functions. From this perspective, not only the number of SMEs is an important factor, but also the performance of these businesses. As the recent crisis, characterised by tighter credit restrictions, has arguably hampered new start-ups and impeded growth in existing businesses we have explored the number of births of enterprises (Figure 4) and the number of high growth enterprises (Figure 3) in Slovak regions.

The Slovakia case confirms that birth rates of enterprises tend to be higher in the capital region compared to the national average (OECD 2014a). Overall, regional disparities in the development of SME sector are relatively small, except for the region of the capital Bratislava, which is distanced from the other regions in particular with respect to the performance achieved.



Source of data: Eurostat

**Fig. 3.** Number of high growth enterprises measured in employment (growth by 10% or more)



Source of data: Eurostat

**Fig. 4.** Number of births of enterprises

Table 3

**Innovation in small and medium-sized enterprises**

	Number of employees	Bratislava region	Western Slovakia	Central Slovakia	Eastern Slovakia
% of enterprises with innovation activities	10–49	37,6	25,5	28,8	27,2
	50–249	48,0	37,7	34,6	41,7
% of enterprises with technological innovation	10–49	22,3	13,3	12,2	15,3
	50–249	29,5	24,0	22,4	27,0

Source of data: Statistical Office of the Slovak Republic (2014). Innovation Activity of Enterprises in the Slovak Republic 2010–2012.

Innovation is an important driver of entrepreneurship and of growth. The innovation performance of SMEs in region will not only depend on the endogenous capacities of the firms but also on their relationships with other firms and external institutions. The regional differences that exist in innovation performance of SMEs are presented in Table 3.

Innovation by small firms appears to be more affected by hampering factors than in medium firms. Despite, small businesses can be important drivers of growth and innovation. At the same time, larger businesses typically have competitive advantages in technological innovations, e.g. economies of scale, cheaper credit, etc. (Table 3).

Different challenges to innovation exist and affect firms in different ways depending on their size, region (amongst other factors). Understanding the factors that hamper innovation and how these differ for small and medium firms, as well as for different regions

provides an important tool to support different policy responses to foster innovation. The initial support for incubators and business innovation centres have in the past few years shifted towards more strategic emphasis on supporting entrepreneurship and on providing access to finance.

However, public support to SMEs faces several problems in context of regional policy. It is too general, supply-driven and commonly of inferior quality. Moreover, effectiveness of invested public resources is often questionable. Collecting and exploring indicator on structure and characteristics of SME sector at the regional level provide important insights to its contribution to economic growth, job creation and innovations and highlight the efficiency of national and regional entrepreneurship policies.

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# SECTION II POSSIBILITIES OF FORMING LPS-BASED CLUSTERS

## CLUSTER APPROACH TO THE REGIONAL ECONOMIC POLICY DESIGN

*Alexander S. Novoselov<sup>1</sup>,  
Asya S. Marshalova<sup>2</sup>,*

This paper focuses on methodological approaches to regional economic policy design. Identified are principal objectives, structure and content of regional economic policy. Prerequisites for and limitations on regional socio-economic development affecting the competitiveness of a region have been analyzed. Cluster approach to the regional economic policy design is proposed and its major directions and priorities are described. Considered are different types of clusters on the example of Novosibirsk oblast. Mechanisms ensuring effective regional economic policy implementation are proposed.

### INTRODUCTION

The increased importance placed on regional policy issues is due to many factors, the major ones being the following. First, state economic strategy detached from the problems of regional economic development becomes nonviable as shown by declining economic growth that goes on despite the relatively high prices for the energy resources on the world market. The second factor is the national economic policy inconsistency manifested in the fact that its declared priorities have little to do with the extremely expensive image-generating investment projects, the costs of which are incommensurate with their negligible effect on the economic development of the projects implementation territories. The third factor is the increasingly growing disparity in the regional socio-economic development. The longer this tendency will proceed, the farther a significant part of them

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will plunge into a depression, and the more difficult and expensive will be their way out of the impasse. Nobody doubts in the seriousness of economic and social consequences of this situation.

Each subject of the Russian Federation is characterized by its own spatial factors that influence the regularities of its economic growth and opportunities for interregional cooperation.

This has created a need for sub-federal policy challenges study with the aim of fostering socio-economic development of regions and municipal units and ensuring their economic advance. In an increasingly competitive environment in the context of transition to a new governance system it has also become essential to give credence to the priorities of spatial socio-economic development and to substantiate the need for strengthening the role of innovation-based economic growth, developing business sector and providing a sustainable regional development.

Economic studies analyze regional economic policy challenges through various aspects, such as: interrelationship between the elements of a region's environment; ensuring integrated socio-economic development of a region; coordination of State interests with those of regions; integrated solution of the problems of socio-economic development of a region on the basis of its competitive advantages; a whole complex of regional aspects of different types of policies; regional integration and sustainability in the common economic space, interregional socio-economic disparities.

Economic literature considers two levels of regional policy – federal and sub-federal that differ in the level of governance and its actors, problem-solving dimensions and complexity, as well as in methods and mechanisms used to attract investment. Regional authorities play a dual role: they act both as the objects of federal regional policy (in terms of management of socio-economic development of a region as a whole) and as the main subjects of federal policy (in terms of spatial organization of the economy of a region and creation proper living and working conditions for its population).

In the Russian Federation, with its huge territory and diversity of regional specific features, the challenge of ensuring a relative homogeneity of economic space of the country is extremely topical. The increasing role of regions with high competitiveness and a favorable business climate leads to increased migration of labor resources and financial flows. This raises the issue of financial and economic support for depressed regions, in order to avoid social tensions and ethnic conflicts.

The structure of regional policy of a subject of the Russian Federation includes the following subsystems:

- regional economic policy aimed at the improvement of regional economy competitiveness, support and development of the real sector of the economy, the creation and development of regional infrastructure, the efficient use of state property and others;
- regional innovation policy aimed at creating conditions and incentives for innovative activity in a region, development of regional innovative infrastructure, innovative development territories, innovation clusters and networks;
- regional social policy aimed at achieving a high standard of living in each region, harmonizing differences in the level of personal incomes of regional population, the creation of equal opportunities for all citizens, regardless of residence, ensuring the right of free choice of place of residence and work, solving the problems of unemployment and creation of new jobs, the development of social infrastructure, the regulation of population and labor force migration, the revival of villages and small towns, prevention of intense social conflicts in regions;

- regional investment policy aimed at establishing a favorable economic climate for attracting domestic and foreign investment to regions, encouraging priority investment projects of construction, the provision of State guarantees;
- regional competition policy aimed at promoting competition, ensuring freedom of entrepreneurial activity, overcoming administrative barriers, prevention of monopolistic activities, government regulation natural monopolies activities in a region;
- regional fiscal policies aimed at effective distribution and redistribution of financial resources between regions and municipalities
- regional environmental policy aimed at the implementation of measures to maintain the necessary level of environmental safety in regions, the prevention of crisis situations in areas with high environmental impact, support for regions in the case of environmental emergencies, regulation of natural resources tax rates depending on their quality and location;
- regional foreign economic policy aimed at fostering the development of export-oriented and import-substituting production in regions that have enabling environment for that, as well as the development of the essential elements of foreign economic activities infrastructure.

### **REGIONAL ECONOMIC POLICY DESIGN ON THE EXAMPLE OF NOVOSIBIRSK OBLAST**

Consider problems concerning regional economic policy design on the example of Novosibirsk oblast. The main strategic objective of regional economic policy of Novosibirsk oblast is to make it an attractive place to invest, work and live in as well as to help it to maintain and consolidate its position as a scientific and educational center and to ensure its' taking a full advantage of innovative development.

The main objectives of regional economic policy of Novosibirsk oblast include the following ones:

- to make not only Novosibirsk, but the whole territory of Novosibirsk oblast attractive both for living, and for investing;
- to identify the main directions of Novosibirsk oblast economic development reflecting long-term interests of business, local authorities and those of population;
- to create timely prerequisites for ensuring the feasibility of long term objectives of Novosibirsk oblast's development programs that will place the oblast among the regions - leaders of the Russian economy.

In order to overcome the recession and to accelerate the economic growth of small towns and districts of Novosibirsk oblast there is a need to increase levels of production in traditional basic specialized industries (agriculture, industry of construction materials and food industry) and to improve the competitiveness of products through the use of innovative technologies, as well as to foster new activities increasing the attractiveness of the territories (new knowledge-intensive industries, recreation and travel business).

Novosibirsk can develop dynamically as interregional business, commercial and industrial centre with a high concentration of high-tech industries, science and education, market infrastructure, medical and social services. Its priority areas are machine-building, chemical industry, construction, trade and public catering and the non-material services sector.

Scientific and technological park «Novosibirsk» established on the basis of scientific potential and in the integration with the research institutes of the Siberian branch of the Russian Academy of Sciences has become a real tool in solving problems concerning the

commercialization of scientific developments, creation of a competitive economy and promotion regional economic development. The main goal of Technopark is to ensure the accelerated development of high-tech industries and to make them one of the major driving forces facilitating economic development of the City of Novosibirsk as a whole and Novosibirsk City Agglomeration, and in the first place, the development of Academgorodok, the Koltsovo science city and the town of Berdsk.

In developing small towns of Novosibirsk oblast it should be taken into account that only large cities are capable of performing inter-town functions related to providing a full range of personal, cultural and social services. Therefore, the increase in small oblast's towns' population and the development of the second major industrial center on the basis of Kuibyshev and Barabinsk are one of the strategic tasks. Unfortunately, this pressing challenge is still not being solved as there is no strategy to address it, although there are necessary prerequisites for its solving: it is possible to combine these cities into a single agglomeration, they are located in the immediate vicinity of the main railways and highways of federal importance, they possess some industrial potential and relatively well-developed social services sector.

The development of other oblast's towns and districts is aimed at overcoming depression and depopulation of smaller towns and settlements by increasing the competitiveness of traditional sectors of the economy, the development of their market, transport and social infrastructure and non-material services sector development.

The priority areas of the accelerated growth of the cities and districts of Novosibirsk oblast may be the following ones:

1. New «points of growth» in non-material services sector:

- recreation and travel intra-regional business on the basis of the Dovolensky and the Krasnozyorsky health resorts, mineral waters and therapeutic mud and clay of Karachi, health resorts Berdsky, Rassvet, Parus, Sibiryak and Sosnovka in the town of Berdsk and its vicinity;
- ski resort in Maslyanino, the development of historical and ethnographic tours in Zdvinsky, Kolyvansky and Suzunsky districts;
- the development of recreation and travel intra-regional business on the banks of Chany Lake in Barabinsky district;
- the establishment of specialized and vocational education institutions for training workers of required job specializations, reconstruction and renovation of pre-school and general education institutions in districts centers;
- the reconstruction of health care establishments and development of adequate public health service networks so as to give rural population access to better quality health services;
- the establishment of International Centre of Trade with Kazakhstan and Central Asian republics in the town of Karasuk;

2. New «points of industrial growth» in small towns and districts: oil (fuel), oil processing and petrochemical industries, mixed feed industry, machine-building, timber and wood processing industry. With regard to the oil industry, there is no doubt that it has good prospects, since the development of the Verkh-Tarsk oil field in the north of Novosibirsk oblast is gathering pace. One of the strategic objectives of Novosibirsk oblast Administration is attracting investors to oil processing industry that could play an important role in saturation of domestic market with high-grade motor fuel and aviation kerosene which, in turn, should have a positive impact on the prices of the domestic market and, as consequence, promote the development of road transport. Towns located along the Trans-Siberian railway such as Kuibyshev and Barabinsk are the potential sites of industrial construction.

The development of mix feed industry in Novosibirsk oblast will help to establish stable forage reserve for dairy cattle and pig breeding. This industry should be subsidized by the Government, possibly in the framework of a national project for the development of agriculture. Rural areas producing coarse grains (Tatarsky, Chanovsky, Zdvinsky, Kuibyshevsky, Barabinsky) are the potential areas of mix feed industry localization.

The following three developmental areas should be singled out in machine-building spatial development as most important:

- development of service enterprises network for maintenance of agricultural equipment in district centers;
- development of innovative instrument-making sector and science-based machine-building industry in Novosibirsk agglomeration (in the towns of Berdsk and Iskitim);
- power engineering development – the production of energy-efficient steam boilers of light and medium power for district heating plants and autonomous distributed energy supply systems (Cherepanovsky district).

### **CLUSTER APPROACH TO THE REGIONAL ECONOMIC DEVELOPMENT**

The effective spatial policy implementation requires new approaches specific to a market economy that allow constructing regional competitive advantage and solving the tasks of modernization and innovative economic development. This refers mainly to the cluster approach to economic development. The cluster approach to the development and placement of the oblast's productive forces focuses on two directions.

The first direction is the development of territorial and sectoral clusters. An actual example of such a cluster is a «Power electronics» Program. This includes about 20 regional enterprises and organizations and research and educational institutions. More than 20 projects are at various stages of their implementation. This cluster integrates research and development works on material engineering, power semiconductor devices, microprocessor engineering, and information technology. Cluster products are widely used in automotive electronics, modernization of power plants as well as in public utilities.

In Novosibirsk oblast there is a strong economic base and all preconditions for the establishment of a wide range of new territorial and sectoral clusters, among them are the following ones.

1. Biotechnological cluster, the nucleus of which could become:
  - Production Association «Sibbiopharm» is the largest biotechnology company in the Russian Federation. Among the consumers of its products are 54 distilleries, 42 centers of State Sanitary and Epidemiological Surveillance of Russia, 72 oil production enterprises and organizations for environmental protection, 300 agricultural enterprises and livestock farms in Russia and neighboring countries and 8 foreign companies. The company has designed strategic development projects within the framework of which it conducts biotechnology research.
  - Closed Joint-Stock Company «Biomedical Union» is the third largest company in Russia producing Enzyme-Linked Immunoelctrodiffusion Essay (ELISA) test systems demanded nowadays by Russian medical institutions for diagnostics of human diseases and selection of the appropriate treatment course. At present this company is the only Russian producer of test systems meeting national standards for quality control of diagnostic studies. Their production is located in Berdsk.
  - The State Research Center of Virology and Biotechnology VECTOR (SRC VB VECTOR) located in Koltsovo is one of the largest Russian research and produc-

tion biotechnology complexes. VECTOR's scientific interests lie in studying infectious pathogens in order to fight diseases and provide biological security to population. Its basic activity is aimed at fundamental and applied research in molecular biology, virology genetic engineering, biotechnology, epidemiology and ecology. Experimental and scientific facilities of the Centre are unique in Russia and allow advanced investigations to be carried out on any dangerous viral pathogens of man and animals. Nowadays this biotechnology cluster comprises 15 small and medium-sized innovative enterprises including the Research Institute of Molecular Biology, Research and Design Technological Institute of Biologically Active Substances, Pilot Plant, Supplying and Trading Company «Vector-Farm», Pilot Agricultural Enterprise and other companies able to collaborate and compete with each other.

Training of highly qualified specialists with higher education for their further work in the field of biotechnology and in chemical production of a biotechnology cluster may be provided by Novosibirsk universities, among them – Novosibirsk State University, Novosibirsk State Agrarian University and Novosibirsk State Medical University. Engineering and technological training of specialists in the field of «Biotechnology and medical devices and systems» for the their work in Production Association «Sibbiopharm» Ltd and other cluster's enterprises may be conducted in a special group of the Novosibirsk State Technical University. Secondary level specialists in this field are prepared for the entire country in Anjero-Sudzhensk general educational institution. Biotechnology equipment operators, instrumentation mechanics and other workers – specialists in demand – may be prepared in vocational school № 56 in the town of Berdsk.

Novosibirsk Technopark in Akademgorodok will ensure the development of cluster's service structures for promoting innovation and attracting investment.

2. Wood processing and building construction cluster consisting of logging operations, manufactures of technological equipment for wood processing, designing and building construction enterprises and exhibition grounds. The basis for the formation of such a cluster may become Closed Joint Stock Company «Russkaya Usadba» (Berdsk).

3. Cluster «Len», the development of which is one of the possibilities to maintain and generate the sustainable growth of the Russian consumer goods industry. This cluster should be composed of flax stations, flax farms and mills, flax combing factories, textile and knitwear industry enterprises, model house, trade and distribution network, research and design institutes and engineering companies. The boundaries of this cluster extend beyond Novosibirsk oblast; its area in Novosibirsk oblast includes Maslyaninsky, Cherepanovsky, Iskitimsky, Suzunsky and Toguchinsky districts.

4. Transport-and-logistics cluster, the formation of which is predetermined by a range of factors, such as oblast's geographical location at the intersection of transport routes of all kinds, available and emerging modern infrastructure of this cluster. Its effective development will help to streamline commodity flows, passenger flows and strengthen Novosibirsk oblast position in the development of interregional links.

5. Construction cluster. The cluster approach to the development of the construction industry aims to optimize its structure and relationships between elements of the cluster. Construction cluster is composed of design companies, enterprises producing construction materials, low-stored private houses, construction itself, public waste utilities, training institutions and institutional structure that ensure the continuity of the construction process (committees for land resources, financial institutions).

6. Recreation and travel cluster. In Novosibirsk oblast, many of the municipalities plan to develop tourism and recreational business. In Maslyaninsky, Iskitimsky and Toguchinsky districts that have exceptionally favorable conditions for the development of winter sports

the construction of a modern ski resorts («Urmanka» and «Novososedovo») has begun. Over many years «Karachi» resort works on the basis of mineral and curative water springs in Chanovsky district and it has all prerequisites for transformation into a modern resort of state importance. The same applies to Dovolensky and Krasnozyorsky districts. In Kolyvansky district prerequisites for tourism development are related to a large number of its historical monuments, old wooden architecture, a convent and beautiful natural landscapes of this area. The development of recreational and tourist zone is recognized to be one of the priority strategic directions of economic growth of Berdsk due to objective competitive advantages of this territory.

While all federal subjects try to engage their recreational potential in the economic development, the competitiveness of this sphere of Novosibirsk oblast may be ensured only through the innovation development of preventive health care and health rehabilitation and the provision of quality services that may ensure wholesome rest and enjoyable vacation.

Another factor contributing to the development of recreation and tourism industry is the attractiveness of this sphere primarily for the small and medium-sized business entities, supporting the development of which is a part of the national strategic economic policy.

The formation of regional clusters is the second direction of the cluster approach to the development of productive forces. In a «Strategy of Socio-Economic Development of Novosibirsk Oblast until 2025» municipal units are combined into regional clusters based on the following characteristics: location in physical proximity to each other and close to major transportation routes, relative homogeneity of economic specialization, transportation linkages and economic ties between municipal units, economic potential, level and quality of population life.

The need for regional clusters formation is caused by the necessity to create and support viable points of growth throughout the area of Novosibirsk oblast. Market capacity and available resource base of a single municipal unit do not allow it to have a modern cost-effective brick factory, its own meat-preserving factory or a dairy plant but this problem can be easily solved if this municipal unit is combined with several other ones within a regional cluster. Regional agribusiness clusters seek to create a manufacturing and marketing basis for farmers which should ensure an uninterrupted supply of material resources (seeds, fuel and fertilizers), repair and maintenance of equipment and marketing.

Thus, the basis of regional economic policy of Novosibirsk oblast is formed by a system of principles through the prism of which management decisions at regional and municipal levels should be considered.

1. Cluster approach principle. The implementation of this principle involves identifying highly integrated territorial-sectoral and regional structures (clusters) united on the basis of shared interests in achieving common goals under conditions of severe competitive environment. The cluster approach ensures the informal association of regions and their coordinated development, exchange of innovation, identification of specialization of enlarged regions taking into account available resources and the needs of the market.

2. Principle of social development orientation ensuring the employment growth, creation of highly paid jobs, construction of social infrastructure and development of the service sector.

3. Principle of public-private partnership (participation in investment, state guaranteed bank loans). The participation of regional and municipal authorities in economic development will increase the investment attractiveness of the territories and will facilitate the flow of private investment, as investors will receive an objective confirmation of local authorities being interested in providing support to specific sectors of regional economy.

4. Differentiated regional investment policy. The essence of this policy is that in regions with a higher investment grade rating the key objective of economic governance is to find investors and to create comfortable conditions for them, strengthen investment pro-

motion and simplify procedures for investors. In regions with low investment potential required are direct budgetary allocation for the development of social and industrial infrastructure and co-financing of enterprises construction and reconstruction.

5. Region – oriented policy. This principle means supporting local production of quality goods and services, promoting them on the market and local producers participating in executing regional and municipal orders.

The application of these principles is possible only in the case of far-reaching introduction and proactive realization of innovative technologies not only into the economy but also into economic management itself.

### **MECHANISMS ENSURING REGIONAL ECONOMIC POLICY IMPLEMENTATION**

Among the mechanisms ensuring regional economic policy implementation there should be distinguished the following tools providing:

- development and implementation of the projects aimed at addressing the key issues of long-term territorial development;
- development of mechanisms of investment projects initiation, their selection and implementation including their supervising;
- creation of Investment Council of the Governor of Novosibirsk oblast for considering investment projects and evaluating their effectiveness;
- monitoring the implementation of territorial component of the long-term program of development of Novosibirsk oblast productive forces;
- adoption and implementation of a new legislation and improvement of the existing one with regard to the governance of economic development of Novosibirsk oblast and its municipal units.

The legislative framework of Novosibirsk oblast allows the use of a whole range of tested mechanisms to provide a support for the implementation of Novosibirsk Oblast Productive Forces Development and Distribution Program. The main mechanisms include:

- subsidizing of interest rate on bank credits;
- granting public credit at the expense of the oblast budget;
- granting property tax exemptions;
- pledge of Novosibirsk oblast public property;
- formation of authorized capital of enterprises that are being established out of regional budget funds;
- funding of investment projects from the regional budget on a competitive basis;
- bond issues secured by the state guarantees;
- funding of engineering infrastructure development
- the establishment of a fund for small and medium business support;
- exemptions with regard to property tax and profit tax during a project payback period for major priority projects;
- financing of investment projects implemented by enterprises under leasing conditions;
- reimbursement of the cost of equipment and material resources produced in the region;
- creation of special economic zones of regional level aimed at innovative activities development;
- providing organizational support to investors willing to get federal support;

- establishment of foundation to support innovation in the social sphere and its use on a competitive basis;
- non-financial forms of support of investment activity (informational, organizational and legal support);
- development of vocational and technical education system with regard to the implementation of large-scale investment projects.

The active involvement of public and civil society institutions in the implementation of long-term strategic development goals and objectives of Novosibirsk oblast as a whole is a very important direction of regional economic development. Community participation in discussions of the program will help both to prevent the alienation of population from the local authorities and to form new effective forms and mechanisms of civil society.

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# CLUSTERS AS A TOOL FOR IMPROVEMENT OF THE INNOVATION ENVIRONMENT IN THE ECONOMY<sup>1</sup>

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The paper describes the problems and possibilities of forming clusters on the example of the world experience of the revitalization of innovative environment in the economy. The authors analyze the main advantages of clustering as a form of organization of production on the territory. The main factors, by means of which is achieved the strengthening of the competitiveness at the cluster, are describes. Characteristics of cluster policy in the Russian Federation are considered. The main directions of state support for the formation of clusters are considered. Differences between modern clusters and territorial-production complexes (TPC) that have received wide development in the Soviet economy are shown. The main directions of state support for the formation of clusters are considered. The essence of the regional policy in Bulgaria in the context of European policies to support the development of clusters is disclosed and forms of assistance to cluster development in the EU and Bulgaria are characterized. The experience of the implementation of the cluster approach in Bulgaria is shown (for example, the municipality of Sevlievo).

## INTRODUCTION

In recent years in the world of regional development much attention is paid to the functioning of the local production systems (LPS). This was particularly relevant in the context of the global economic crisis, when the survival of the regions at different levels of development and the extent depends on the capabilities of their self-development, good governance and providing a variety of public and private institutions.

Local production systems are widely understood – it can be regions of different types and rank, including municipalities, industrial centers and industrial nodes, territorial-production clusters, free economic zones, a variety of innovative combinations, regions of new development, etc. [1]. In spite of this broad definition of LPS they should have a number of the following essential characteristics.

First, LPS's are territorial-industrial combinations, which are characterized, by the presence of its own economic capacity for self-development of the territory and ensuring its competitiveness. Only in this case, we have the necessary preconditions for the progressive modification of the production and spatial structure of the economy within the limits of the LPS's, for the growth of their level of economic development and creation of conditions for social prosperity.

Secondly, LPS's must have an efficient management system, in which as a control object are considered economic complex of the area, its social services and the natural

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environment. With this as the subject of management can act the public authorities, local governments, and special management bodies for the implementation within the LPS's of any long-term projects and programs. Management of local production systems should be understood as an activity to regulate the processes of socio-economic development of the area in accordance with a pre-designed program and aimed at achieving the goals of improved quality of life. Under conditions of economic crisis, an important task of management bodies is to create tools to encourage the output of the region's economy of the depression and the providing conditions for development. Obviously, the development of regions, surviving depression and their further prosperity should be stimulated by the authorities.

Third, the LPS's are characterized by the existence of various public (government) and private institutions that perform, in particular, the various functions for the provision of educational services and training, research and implementation of innovation, securing funding, and others.

Thus, the formation and functioning of LPS depends on many factors, including:

- economic (economic and geographical situation and the level of infrastructural development of the territory, transport, energy, innovation policy, the investment policy and territorial forms of social organization of production, etc.);
- social (including human capital, labor, employment, social protection of the population, the demographic balance, etc.);
- environmental (natural-resource potential, ecological potential, human impact on the environment, etc.);
- institutional (legal system and rule of law, judicial system, scientific and technical, financial and investment aspects, the system of governance, the system of market infrastructure, including credit and financial and other aspects, the system of education and science, cultural and religious values, etc.).

Among the variety of forms of LPS important place belongs to this, which allow to strengthen innovation and investment sector of the regional economy, providing greater competitiveness of its industries. Among these LPSs are primarily territorial clusters.

## MAIN ADVANTAGES OF CLUSTERS

World practice of regional studies has quite a wide range of different forms of economic organization on the territory. Among these, in recent years the great interest in Russia is shown to introduction in the practice of regional development of free economic zones, industrial parks and technopolises, as well as regional production clusters. All these forms are a special case of local production systems, the formation of which in the world regional development in recent years is received much attention. In this case, the production cluster are considered as one of the most important tools in the areas of resource mobilization for rapid economic growth, improve the competitiveness and diversification of the regional economy.

The cluster approach is one of the relatively new technology of regional development, creating opportunities for the region and the business to survive and grow in the transition to a post-industrial and innovative development model. Considerable importance is attached to the clusters and in conditions of the current economic crisis.

The founder of the cluster approach is a prominent American economists, M. Porter [2, 3, 4, 5], which defines a cluster as a group of localized geographically interconnected companies – suppliers of equipment, components, specialized services, infrastructure, and research and development institutes, universities and other organizations that complement each other and reinforce the competitive advantages of individual companies and the cluster as a whole. According to Michael Porter, in today's economy, especially in the context of globalization,

the traditional division of the economy into sectors or industry loses operationality. Clusters come out on top as a system of interactions of firms and organizations, whose importance as a whole exceeds the sum of its parts. The competitiveness of the country should be viewed through the prism of international competitiveness are not separate her firm, and clusters – clusters of firms of various economic activities, and, of fundamental importance has the ability of these clusters to effectively use internal resources [6].

One of the main conclusions made by M. Porter, is that the more developed clusters in a given country, the higher in the corresponding country living standard of population and competitiveness of the companies. This conclusion has been very attractive to the governments around the world, choosing the cluster approach as an effective instrument of economic policy. Thus, the presence of strong clusters in the economy of the country is able to provide a high level of competitiveness of the national economy as a whole and its individual regions.

Although cluster policy in each country depends on the specifics of state economic policy, while at the same time, you can select a number of characteristic features of the clusters. First of all – this is the territorial localization of the majority of economic entities – members of a cluster system (suppliers, manufacturers, consumers, and the elements of production infrastructure, research institutes, etc.), related to the process of value creation. In this case, the relation of all cluster members should be based on long-term coordination of their interactions within the framework of the production programs, innovative processes, etc. Equally important is the presence of a large company – a leader determines the long-term economic, innovative and different strategy the emerging across its geographically-based production system in the region. It should be emphasized that an important feature of clusters is their innovative focus that defines the priorities for selecting areas and objects to form a cluster.

The contribution of clusters in the creation and strengthening of the competitive advantages of regions of their localization consists, above all, in the possibility to ensure effects caused by the territorial concentration, specialization and cooperation of production. In this case, the cluster approach assumes that the competitiveness of each individual member of the cluster is largely related to the competitiveness of the other participants, members of the same value chain, or providing a more favorable external environment of the process of creating value.

In general, an important feature of the cluster approach is the emphasis on the account of positive synergetic effects of territorial agglomeration, i.e. proximity of consumer and producer, network effects and diffusion of knowledge and skills through the migration of staff and allocation of business. In other words, a common territory and relationships through the production of the end products contribute to the accumulation of «critical mass» of the capital in the region, including the human, scientific, innovation and production capabilities. As a result of this process, the relationship between the cluster members has a stronger impact on the level of productivity than on the scale of each of the participants. Therefore, the organization of clusters usually do not require additional public investment, which in turn is a positive side to the state in the development of priority economic activities through the clustering, combining small, large and medium-sized companies in a single complex.

Strengthening the competitiveness of the cluster is primarily achieved through the ability of the principal objects of the cluster to innovation, which in turn is accompanied by an increase in productivity through increased specialization and outsourcing of non-core production and other functions, increasing employment by attracting new businesses to the region, expansion of the boundaries of the cluster through the involvement of new activities supporting innovation (with emphasis on the development of small and medium-sized businesses). All this, taken together, in a market conditions gives clusters as a form of organization of production flexibility and efficiency.

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The growth of close relationships between economic entities – cluster members can more effectively solve various problems related in particular to the organization of joint research and development and facilitation of access to new technologies and other innovations, the distribution of possible financial and other risks in the various forms of joint economic activities, including joint access to world markets, lower transaction costs in various areas due to increased trust among the cluster sharing of assets and knowledge, training of qualified personnel due to increased contacts with specialists of world level and other.

In recent years, many countries have used cluster approach for the development and regulation of their national innovation development programs, using various forms of incentives, especially actual for small innovative companies: direct funding, provision of loans without interest payments, targeted subsidies for research and development; establishment of funds for innovation taking into account potential commercial risk free record keeping on applications of individual inventors, patent attorneys free services, reduced government fees for individual inventors, etc. [7].

### CLUSTER POLICY IN RUSSIA

Of great interest to the formation of clusters is manifested in Russia, where Concept Cluster Policy in the Russian Federation is developed and approved by the Government of the Russian Federation in 2008, as well as a number of other documents, considering clusters as a tool of regulation at the federal and regional levels, allowing to create the conditions for the modernization of production and strengthening of its competitiveness in global markets [8, 9, 10, 11, 12]<sup>1</sup>. The number of publications are devoted to clustering problems of the Russian economy [7, 13, 15, 16, 17, 18, 19, 20, etc.]. Outline major position of the cluster approach in relation to the conditions of Russia.

Declared in Russian cluster policy has a clearly defined regional the binding and is regarded as one of the conditions for the development of globally competitive regions by creating in them the conditions for industrial upgrading and building an innovative economy. Important role in supporting the development of clusters given to municipal and state governments through the implementation of regulatory and legal support, the use of incentives in investment activity on the territory, the use of fiscal instruments, providing information assistance, etc. Ultimately, the creation of clusters is aimed at improving the competitiveness and innovative capacity of businesses, developing the small and medium-sized businesses and promoting the diversification of the national economy.

The cluster approach is able to provide to strengthen the competitiveness of the economy as a whole by strengthening the position of individual regions on the territory of which have been developing industrial clusters. Clusters, therefore, act as a sort of «points of growth». With the development of formed clusters can expand, become more complex, but they can also be narrowed, coagulate and disintegrate. Such dynamism and flexibility of clusters is another advantage as compared with other forms of organization of production on a territory.

But even more important is the impact of geographic concentration on the improvement of production processes and implementation of innovations within the cluster. All companies of the cluster of related industries make investments in specialized, but related technology, information, infrastructure, human resources, leading to a massive rise of new firms. This is explained by the fact that modern competitive advantage almost

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<sup>1</sup> One of the first attempts to summarize current practice and to identify priorities for the development of cluster policy in the North of Russia are the materials of the «round table» on «Issues of the cluster policy in the Northern regions of the Russian Federation», conducted by the Federation Council Committee on Northern Affairs and National Minorities December 12 2006 Materials published on the official website of the Federation Council Committee on Northern Affairs and National Minorities [www.severcom.ru](http://www.severcom.ru).

entirely provided for by the benefits of the technology of production, management, organization promoting products. Thus, further successful development of the competitiveness of the economic system is possible with the integrated use of cluster mechanism and theories of modern concepts of innovation development. In this case, the cluster form of organization innovation leads to the creation of a special form of innovation – the «gross product innovation». This innovation is a product of several companies or research institutions that can accelerate their spread network of relationships in general regional economic space [7].

Interaction of cluster members gives them certain advantages. So, the benefits gained by regional authorities in the implementation of the cluster approach consist in the fact that the cluster can focus on the problems and benefits of the economy. Management bodies of clusters which may include representatives of government agencies have access to diverse and concentrated information on the activities of enterprises, state of the economy and labor market, which significantly reduces the amount of analytical work carried out by the authorities, increasing the level of confidence. The advantages obtained by business structures associated with a significant decrease in barriers to enter the markets for products and supply of raw materials, labor, lower costs due to economies of scale, which is shown by the cooperation of producers and consumers. The cluster provides entrepreneurs with new opportunities to organize emerging problems, choice of ways to overcome them. Interaction with regional and municipal authorities can find new methods and means of resolving the part of them that are in the area of competence of the region. Using the influence and prestige the cluster, business and regional authorities can jointly seek the most effective ways to promote their initiatives by federal agencies, including the preparation of draft laws and lobbying at the federal level, the passage of the regional and sectoral initiatives [15].

The introduction of clustering technology into the structure of economic policy appears to be an important instrument of regional policy, which provides a range of regional opportunities for economic growth. In particular, they include the following:

- 1) the emergence of effective mechanisms of interaction between government and business;
- 2) intensifying of action of the multiplier effect in the region that consists of the positive impact of the cluster on the competitive environment of the region;
- 3) the emergence of the real possibility of the transition of science and education of subsidized social services in the highly profitable economic sector;
- 4) the gradual integration of the regions into the global economic system;
- 5) strengthening the independence of the region on the economic situation beyond its borders;
- 6) promotion of the development of small and medium-sized businesses in the region;
- 7) increase in the number of companies around the cluster as a result – an increase in employment, wages, contributions to the budgets of different levels;
- 8) the emergence of the economic prerequisites for the transition from the equalization policy of socio-economic development of policies to support the regions – the «engines of growth»;
- 9) economies of scale and agglomeration effect, which create a «locomotives» of growth impulses for the development of other regions.

## **STATE SUPPORT FOR THE FORMATION OF CLUSTERS**

Concrete steps to implement the cluster approach in Russia were made following implementation in 2012 by the Ministry of Economic Development of competitive selection of programs for the development of innovative regional clusters. Applying for a competitive

selection involves the joint participation of the organization and the coordinator of the regional and municipal authorities. The criteria for selecting programs of the clusters were, firstly, scientific and technological potential as well as educational potential of the cluster; secondly, the production potential; thirdly, the quality of life and development of industrial and social infrastructure areas of localization of the cluster and; fourthly, the level of organizational development of the cluster.

For the contest were submitted 94 applications, of which 25 winners were recognized, which, in turn, were divided into two groups, which was supposed to use different mechanisms of state support, especially financial. The first group, comprising 13 clusters could rely on subsidies from the federal budget of the Russian Federation on the territory of which are corresponding clusters. The second group (12 clusters) includes clusters, programs of development which need further elaboration, and that the first phase of support through grants is not provided [13].

The distribution of regional clusters by federal districts, federal entities and cities are shown in Table 1, their specialization – in Table 2. It can be seen that the economic policy of the government is aimed at helping the most prosperous regions that belong to the so-called «points of growth». There is not one the territorial innovation cluster supported in the South and the North Caucasus Federal District, one at a time cluster supported by the Urals and the Far East. Leader in the number of clusters and supported by the percentage of the selected clusters was declared the Privolzhsky Federal District. Behind him is Central, in third position – Siberian Federal District.

Table 1

### The Distribution of Regional Innovation Clusters by Federal Districts of Russia

Federal district	Submitted requests	Clusters are supported by subsidies	Clusters are supported by other measures
Central	26	1. Obninsk in the Kaluga region 2. Zelenograd in Moscow 3. Dubna in the Moscow Region 4. Pushchino of the Moscow Region	1. Troitsk in Moscow 2. Dolgoprudnyi and Khimki in the Moscow region
North-West	11	1. Saint Petersburg	1. Arkhangelsk Region 2. Saint Petersburg
Privolzhsky	22	1. Sarov in the Nizhny Novgorod region 2. the Republic of Mordovia 3. Nizhnekamsk in the Republic of Tatarstan 4. Samara region 5. Dimitrovgrad in the Ulyanovsk region	1. Nizhny Novgorod Oblast 2. Perm Territory 3. Republic of Bashkortostan 4. Ulyanovsk Region
South	9	0	0
North Caucasus	0	0	0
Uralian	6	0	1. Sverdlovsk region
Siberian	18	1. Zheleznogorsk in the Krasnoyarsk territory 2. Novosibirsk region 3. Tomsk region	1. Altai Territory 2. Kemerovo region
Far Eastern	2	0	1. Khabarovsk Territory
Of all	94	13	12

Source: Own composition with using of publications [13, 14].

Table 2

**Specialization of Regional Innovation Clusters**

Clusters	Specialization
1) Obninsk (the Kaluga region)	Medicine, pharmaceuticals, biotechnology and radiation technology
2) Zelenograd (Moscow)	Information and communication technologies
3) Dubna (the Moscow Region)	Nuclear physics and nanotechnology, obtaining new materials
4) Pushchino (the Moscow Region)	Medicine, pharmaceuticals, biotechnology
5) Cluster in Saint Petersburg	It combines 2 cluster: <ul style="list-style-type: none"> <li>• radiation technologies;</li> <li>• pharmaceutical and medical industry</li> </ul>
6) Sarov in the Nizhny Novgorod region	Nuclear, supercomputing and laser technology
7) Cluster in the Republic of Mordovia,	Project «Energy efficient lighting and intelligent lighting control»
8) Nizhnekamsk in the Republic of Tatarstan	Oil and gas processing and oil and gas chemistry, and automobiles
9) Cluster in the Samara region	Aerospace cluster created for the production of aircraft and spacecraft
10) Dimitrovgrad in the Ulyanovsk region)	Nuclear technology, radiation technology, new materials
11) Zheleznogorsk in the Krasnoyarsk territory,	Nuclear technology, production of aircraft and spacecraft
12) Cluster in the Novosibirsk region	It combines two clusters: <ul style="list-style-type: none"> <li>• information and telecommunication technologies «SiBAcademSoft»;</li> <li>• biopharmaceutical cluster (medicine and pharmacy) in naukograd Koltsovo</li> </ul>
13) Cluster in the Tomsk region	It combines two clusters: <ul style="list-style-type: none"> <li>• pharmaceuticals and medical equipment;</li> <li>• information technology and electronics (information communication technology)</li> </ul>

Source: Own composition with using of publications [14].

In addition to these measures of state support for the development of clusters, it is expected to use other tools, such as the following [13]:

- Support the implementation of the programs for the development of pilot clusters in the framework of federal programs and state programs of the Russian Federation;
- involving the implementation of programs of clustering development institutions such as the State Corporation «Vnesheconombank», the Foundation for Assistance to Small Innovative Enterprises in Science and Technology, Open Joint Stock Company (OJSC) «RUSNANO», OJSC «Russian Venture Company» and some others;
- Encourage the participation of large state-owned companies (such as JSC «Russian Railways» JSC «IDGC Holding» («Russian network»)) implementing the program of innovation development in the activities of the pilot clusters;
- distribution in the placement of pilot clusters of tax benefits that are provided by law for the project «Skolkovo».

From the standpoint of resource support for the formation of clusters can be funded through the use of sources such as federal programs and targeted investment programs; R & D; Investment Fund of the Russian Federation and the Regional Development Fund; means the Bank of Development and Foreign Trade; the funds for the establishment of special economic zones and technology parks; venture capital funds; funds allocated for the implementation of national projects; funds programs for the development of small business.

According to opinion of researchers and experts [13, 15, 19], these are just suggestions, and how will be their implementation the future will show. In general, we can note a positive tendency in the economic policy of the country associated with the emergence of a new instrument of state innovative policy in the form of regional innovation clusters.

## CLUSTERS AND TERRITORIAL-PRODUCTION COMPLEXES

The developed by M. Porter cluster theory has much in common with the concept of the territorial-production complexes (TPC), the proposed N.N. Kolosovsky [21, 22] in the middle of the twentieth century and has received further development, particularly in the writings of M.K. Bandman and his School [23, 24, 25, 26, 27, etc.]. The concept of the TPC is based on the justification of the effectiveness of the rational territorial concentration of production and the integrated development of all elements of the economy, population and the natural environment within a limited area. The doctrine of the TPC is regarded as one of the components of the theory of location of the productive forces and the territorial organization of the economy. The essence of the latter is to find ways to ensure the greatest effect due to, first, the rational territorial division of labor, and second, the concentration of effort (investment, various resources, etc.) on the territory within a certain period of time and, thirdly, rational organization of the regional economy.

Widespread implementation in practice of economic development ideas of the TPC and implementation of specific projects of forming TPK as a form of spatial organization of the productive forces began in the USSR in the 50–70s and continued in the 80s to early 90s. During this period, a whole series of large scale TPK in different parts of the country was created. During the Soviet period, TPC were considered the most advanced form of territorial organization of the productive forces. Especially widespread they were in Siberia.

In Russian literature understanding the clusters and the TPC often equated. At the same time, in spite of a certain similarity between them, there are a number of significant differences. Let me show the main differences between these two forms of organization of production in the area (Table 3).

*Table 3*

### Distinctive features of clusters and TPC

Specification	Cluster	TPC
1. Essence and genesis	Cluster – a product of market forces. The basis for the formation of clusters is a business initiative. Cluster – informal voluntary association of companies. A set of interrelated manufacturing and service firms (including the creation of technologies and know-how), market institutions, etc. The main thing – communication for improving the competitiveness and maximizing profits. Clusters – the socio-economic formations.	TPC – the product of a planned economy. A set of interrelated industries (industries of specialization and completing subbranches). The main thing – the production, the criterion - minimization of costs of social labor. TPC – technical and economic formation, a form of organization of the productive forces in solving major regional economic problems of the national level of significance.



Specification	Cluster	TPC
2. Territorial planning	The clusters do not form in advance, they are created by agreement of entrepreneurs when the main production already exists.	TPC planned from the beginning as a complex. They were built in such a way that all are calculated in advance.
3. Destination	Cluster – a method of improving the competition of the regional economy in the market environment. A cluster can only occur where there is a certain business environment. Hence the formation of clusters mainly in long developed regions.	Complexes – is, as a rule, approach to the development of the territory, or method supplements the existing structure of the regional economy. Hence the formation of the TPC mainly in areas of new development.
4. Competitiveness	The presence of internal competitive environment, the significant presence of the cluster in the global economy, in the presence of his strong competitive position in the global market.	The administrative-command system of planning and management. Lack of competition.
5. Basis of the relationships and their character	Economic feasibility. Vertical and horizontal integration.	Technologically – production relationship between enterprises. Vertical and horizontal communications.
6. Scale of facilities and management	The cluster must include, along with large, small and medium-sized enterprises, venture firms, research institutes, universities, etc., as well as the supervisory authority for the development of the cluster as a whole.	At the core – large (often – a vertically integrated enterprise) production facilities, which are usually not susceptible to innovation, inflexible and slow to change. Industry specific management (State Planning Committee, ministries, central administrations).
7. Industry specialization and orientation	High-tech industries, focused the final consumer.	Branches of the mineral resources sector and heavy industry-oriented manufacturer in the framework of solution of major national economic problems at the national level.
8. How it all begins	Modernization of existing structures.	As a rule, with zero. In most cases, TPC advocated as a method of developing new areas.
9. The integrating factor	New knowledge, the various innovations that ensure competitiveness cluster, information and communication networks providing exchange of information, ideas and know-how.	Items of industrial and social infrastructure. The lack of information flows between enterprises.
10. Structure	Network, the horizontal structure of the «core – distribution». As a rule, brightly expressed a separate branch with adjacent services. In the structure of the cluster small and medium-sized high-tech facilities are dominated.	The hierarchical structure of the «industrial center – the complex – region». Large-scale inter-industry complex. that includes, as a rule, enterprises of heavy industry.
11. Competition between enterprises	High	Low (usually completely absent)
12. Factors and constraints limiting the growth of the main production	Skilled, creative thinking frames – carriers of knowledge and skills.	Deficient capital production assets. Manpower – one of the factors of productive forces.

Source: Own composition with using of publications [16, 17, 18, 19, 20, 21]

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Territorial-production complex (TPC) is understood as a combination of plants located on a limited and compact territory, connected geographically and technologically comprehensive, using local labor and natural resources, created for joint solving problems of national importance [27].

More fully TPC can be defined as a combination of interrelated and steadily developing in proportion to the production of various sectors of the economy that:

- 1) are established for the joint solution of one or more of the major economic problems (and therefore stand out clearly the size of the production and specialization in a country and its economic region);
- 2) are concentrated in a limited, be sure to compact area with the necessary set of size and resources to participate in solving the problems involved;
- 3) effective use of local resources;
- 4) have a single production and social infrastructure;
- 5) ensure compliance with the requirements of environmental protection and restoration of natural resources;
- 6) ensure the establishment defined the human condition.

From the above interpretation of the TPC we can see that they are regarded as a form of spatial organization of the productive forces in solving impotent regional cross-cutting issues of national importance. Thus the basic object of study in TPC is the production, viewed within a certain limited area in close relationship with the rest of the economy, social issues and the environment.

In the process of the formation of TPC projects revealed a number of deficiencies caused mainly by the existence of the administrative-command system, in conditions of which was carried out in the practical implementation of the concept of TPK. Among these shortcomings can be identified as key as follows:

- 1) formation of the TPC in most cases carried out in the absence of a unified long-term program and went through individual ministries and agencies in the five-year plans;
- 2) used a sectoral approach to the creation and financing of complex objects;
- 3) was not a mechanism of interaction of components of the WPK, including, first, the relationship between companies from different sectors to each other and, secondly, the relationship between enterprises, on the one hand, and the area in the face of local government – on the other ;
- 4) limited use of the economic mechanism.

In the formation of the TPC was not to provide complexity of the territorial development (primarily through proportionality, infrastructure, environmental and social problems).

Derogation from the principle of territorial development complexity, prevalence of departmental approach led to the emergence of unsustainable forms of accommodation, disproportions in development between sectors of specialization, complex industries and service industries, reduce the efficiency of production in the TPC.

Thus, it can be argued that that the socio-economic system, in which was the development and implementation of projects of formation of the TPC was carried out, was able to create the necessary conditions for the production of large-scale long-term development objectives and the territorial organization of the productive forces, but it was not able to provide the necessary conditions for their effective practical solutions, as no market relations and competition has been kept to a minimum. However, despite the fundamental differences TPC and the clusters (Table 1) the experience of forming the TPC, in our opinion, may be useful in creating regional clusters reflecting economic realities, wider use of economic methods of regulation of regional development and the existing system of governance all levels (Table 1). Methodology of the concept of TPC can be used in market conditions, in particular for the development of new regions.

Each cluster is characterized by its own features of occurrence and development. The logic of the implementation of cluster policy envisages first of all account of the prerequisites of each particular region, on the territory of which a cluster is formed. Among these assumptions we can mention the following ones:

- availability of fundamental for the development of a cluster of owners and companies which potentially are interested in cooperation in the framework of the cluster;
- high level of technological innovation of enterprises and organizations;
- high competitiveness of enterprises and organizations as potential participants in the cluster in the global market;
- the interest of the authorities in a clustered version of the regional economic development and the expansion of cooperation and collaboration;
- availability of a constantly ongoing work to develop and improve the existing business support infrastructure;
- availability of a highly skilled professional education system.

Any cluster in the process of its formation and development goes through a number of stages of the life cycle [16, 20]:

- 1) agglomeration (in the region there are a number of companies and other actors, the combined field of activity or process of technological chain);
- 2) emerging cluster (number of participants, which are localized on a limited territory, start to cooperate around a core business and implementing common possibility through the establishment of partnerships through the establishment of partnership ties);
- 3) developing a cluster (occurrence or involvement of new members of the same related activities in the region, the emergence of new connections between new members);
- 4) mature cluster (forming of a certain critical mass of actors, developed relationships both within and outside the cluster);
- 5) transformation (under the influence of changes in technology, markets, etc. are changing and clusters. Viability of the cluster depends on its ability to generate innovations and to adapt to changing conditions. Cluster can be transformed into one or more new clusters are concentrated around other activities).

In the world practice of state regulation of economic development the cluster strategy at the present time has become essentially one of the most fashion-instruments of state policy to improve competitiveness at the level of individual enterprises, regions and countries in general. At the same time the cluster policy is adopted by many developed and developing countries.

Widespread clustering economy got in the countries of the European Union, where the cluster policy is considered to be an effective tool, which allows not only facilitating the solution of problems of local and regional management of the economy, providing income and employment, but also improving cooperation with the business community using the principle of public-private partnership as well. Ultimately, the formation of regional industrial clusters is aimed at ensuring the sustainable competitive advantages of regions.

## **REGIONAL POLICY IN BULGARIA IN THE CONTEXT OF EUROPEAN POLICIES TO SUPPORT CLUSTER DEVELOPMENT**

With the accession of Bulgaria to the EU since the beginning of 2007, significant changes in the economic, political and international conditions for development of the regions in the country. Started the implementation of EU cohesion policy 2007–2013, which predetermine the framework of regional development in the Member States in the expiring program period. The main objective of the regional policy of the European Union is

to strengthen economic, social and territorial cohesion (cohesion) regions and Member States by reducing disparities between the levels of prosperity and achieve a harmonious, balanced and sustainable development. Cohesion policy of the EU reflects the agenda of Lisbon and Gothenburg and focuses on three priority objectives: convergence, regional competitiveness and employment and territorial cooperation.

Territorial Agenda of the EU (2007) is an EU document which unites PFP countries about implementation of the policy of territorial cohesion and development. Territorial cohesion, the integration of global environmental objectives in the process of regional and urban planning and building the information society are contained in the Territorial Agenda (2009), including priorities, valid not only for the previous programming period, but also for the next (2014–2020) period, namely: strengthening polycentric development and innovation through a network of city-centers of regions and cities; development of new forms of partnership and territorial management based on integrated strategies for the development of urban and rural areas; promoting regional competitiveness clusters and innovation throughout; strengthening and expansion of trans-European networks (transport, information and communication, energy); trans-European risk management, including the impact of climate change; strengthening ecological structures and cultural resources as added value in development. [32]

Table 4

#### Characteristics of the framework for regional development in the EU, including Bulgaria

Cohesion policy for 2007–2013	<p><b>Priority objectives:</b></p> <p><b>Convergence</b> – to support growth and job creation in the least developed Member States and regions;</p> <p><b>Regional competitiveness</b> and employment – anticipating and promoting change;</p> <p><b>Territorial Cooperation</b> – promoting the harmonious and balanced development across the EU.</p>
Strategic objectives of the Community Cohesion Policy in 2007–2013	<p><b>Priorities influencing the formulation and implementation of regional policy:</b></p> <p>«Europe and its regions - a good place for investment and life» to expand and improve the transport infrastructure; balance between environmental protection and economic growth; increasing the share of renewable energy sources;</p> <p><b>Improving knowledge and innovation for growth:</b> increasing investment in R&amp;D; Facilitate innovation and promote taken-neurship; building an information society for all; improving access to finance for innovative solutions;</p> <p><b>More and better jobs, increase employment:</b> modernize the system of social assistance; improving workforce adaptability and mobility in the labor market; increase investment in human capital, improved education and skills; strengthening of administrative capacity. Health;</p> <p><b>Territorial cohesion and cooperation:</b> promoting the role of urban areas to increase growth and employment; support for diversification of economic activities in rural areas; territorial cooperation - cross-border, transnational and interregional.</p>
Medium-term objectives of Bulgaria for the programming period 2007–2013 / strategic priorities	<p><b>Medium-term objectives:</b></p> <p><b>Strengthening the competitiveness of the economy to achieve high and sustainable growth;</b></p> <p><b>Developing human capital to ensure higher employment, income and social integration.</b></p> <p><b>Strategic priorities:</b></p> <ol style="list-style-type: none"> <li>1. Improving basic infrastructure;</li> <li>2. Improving the quality of human capital with focus on employment;</li> <li>3. Fostering entrepreneurship, favorable business environment and good governance;</li> <li>4. Supporting balanced territorial development.</li> </ol>

Main purpose and strategic objectives of regional development in Bulgaria 2007–2015 / Basic indicators for achieving the objectives	<p><b>Main target for the period 2015:</b>  <b>Sustainable and balanced development of regional development.</b>  <b>Strategic objectives:</b></p> <ol style="list-style-type: none"> <li>1. Achieving a breakthrough in the development of Bulgarian regions through investments in physical and human capital and approaching the average levels of development of the regions in the EU.</li> <li>2. Reduction of interregional, regional and the intra-regional disparities by developing the internal potential of the regional and local level.</li> <li>3. Development of Territorial-border cooperation for achieving the territorial cohesion of the EU enlargement and Neighbourhood and Partnership.</li> </ol>
Priorities of the strategy «Europe 2020»	<p><b>Smart growth</b> – developing an economy based on knowledge and innovation;  <b>Sustainable growth</b> – promote a greener and more competitive economy with more efficient use of resources;  <b>Inclusive growth</b> – fostering a high-employment, which can lead to social and territorial cohesion.</p>
Headline targets critical to the success of the EU by 2020	<p><b>Employment</b> for 75% of the population aged 20-64;  <b>Investments</b> in R&amp;D of 3% of EU GDP;  <b>Achieving the objectives 20/20/20</b> climate and sexual energy, including reducing emissions by an additional 30% when possible;  <b>The share of early school leavers</b> below 10% and the share of the younger generation should have a tertiary education (higher) by at least 40%;  <b>Reduction of the risk</b> of poverty by 20 million People.</p>
Main objectives / priorities defined in the strategic part of the National Programme for Development «Bulgaria 2020»	<p><b>Objectives:</b>  <b>Raising living standards through</b> competitive education and training, creation of conditions for quality employment and social inclusion and ensuring access and quality education;  <b>Construction of infrastructure networks</b>, providing optimal conditions for economic development and quality and healthy environment for the population;  <b>Enhancing the competitiveness of the economy</b> by creating a favorable business environment, investment promotion, implementing innovative solutions and increase resource efficiency.</p> <p><b>Priorities:</b>  <b>Improving access</b> and quality of education and training and the quality of the labor force;  <b>Reducing poverty</b> and promoting social inclusion;  <b>Achieving sustainable</b> integrated regional development and utilization of local potential  Development of the agricultural sector to ensure food security and production of products with high added value in the sustainable management of natural resources;  <b>Support innovation</b> and investment activities to enhance the competitiveness of the economy;  <b>Strengthening the institutional environment</b> for higher efficiency of public services for citizens and businesses;  <b>Energy security</b> and increasing resource efficiency;  <b>Improved transport connectivity</b> and market access.</p>

As a result of lessons learned from the crisis, Member States are challenged to look beyond the short term. For the EU's exit from the economic and financial crisis in 2010 was adopted strategy «Europe 2020», which defines priorities, headline targets and initiatives to stimulate progress on priorities. The strategy «Europe 2020» strategy for smart, sustainable and inclusive growth are ambitious but achievable targets that turn and national targets. Strategy requires a new approach and method of planning and programming of regional development to achieve coordination and linking different policies and national strategies with particular emphasis on territorial cohesion. Bulgaria participates actively in the imple-

mentation of EU regional policy to achieve balanced and sustainable development of the regions in the country.

In Table 4, the main characteristics of the comparative framework for regional development in the EU are presented [33].

In world practice of state regulation of economic development the cluster strategy has now grown substantially in one of the hottest instruments of state policy to improve competitiveness at the level of individual enterprises, regions and countries as a whole. In this case, cluster policy has adopted many of both developed and developing countries. This also applies to EU member states. While the European Commission to examine clusters mainly as market phenomena, the EU Council in 2006 rose as a strategic priority clustering to increase the innovativeness of the European economy and regional innovation in particular. For the realization of this priority significant role for institutions that are not only responsible for the development and implementation of cluster policy, but also to create the best possible framework conditions to ensure a unified environment that stimulates innovation and cooperation within the EU [34].

The National Strategy for Regional Development of the Republic of Bulgaria for the period 2005–2015 in Priority 1 «Improving the competitiveness of the regional economy based on knowledge», specific objective 2 «Building business networks and regional and cross-border clusters» play the role of catalyst of the public sector for the development of clusters, of course within the regulations for state aid and assist not only start-up projects and the development of networks and exchange of information, research and education. The public sector should create special infrastructure and flexible instruments to meet the needs of clusters. However, it is highlighted and the very important role played by local authorities to the emergence and development of clusters, which, according to its powers may initiate programs for the development of clusters and participate in their implementation, as well as universities, colleges, research institutes, non-governmental organizations such as agencies and associations for regional and local economic development. In the regional context, an important role in achieving sustainable growth have clusters in tourism, agriculture, forestry [35].

Independently set high goals in both documents at national and regional level to enhance the competitiveness of the regions, based on the knowledge economy and the introduction of high-tech industries in the country during the previous programming period «the share of these sectors in total value added (25.5%) and employment (23.1%) are almost half lower than the EU average (respectively 46.2% and 40.7%). Bulgaria is defined in the study of the European Commission for innovation as one of the «catching-up countries» in innovation. The finding of delay in the economic development of the areas required to include more diverse and wide-ranging priority axes in more operational programs aimed at establishing and supporting the development of innovative clusters and structures in the regions» [35]. Because of this Strategic Objective 1 NSRF 2012–2022, the «Economic convergence in European, national and intra plan by developing their own potential and environmental protection» is placed in line with the new philosophy of regional policy: «accelerated development not only through the reallocation of resources to weaker, and by mobilizing the specificity and their potential» [36]. A Priority 1.1 «Activating the specific potential of regional and local economies through support for increasing the competitiveness of small and medium business». Specific objective 3 «Improving the competitiveness of the regions through the development of new business models for SMEs, introducing new technologies and innovations SMEs in backward, rural areas and areas for targeted support» is an important role for public intervention have proven sustainability and attracting desirable investments, leading to the creation of attractive jobs, retention of human capital and generate regional growth [37].

## FORMS OF ASSISTANCE TO CLUSTER DEVELOPMENT IN THE EU AND BULGARIA

Over the programming period 2007–2014 at EU level are applied various forms of support for the construction, operation and perspective of cluster development. The authors of the publication in the Bulletin of the Ministry of Education and Science, working on the project «Science and Business», financed by the Operational Programme «Human Resources Development», financed by the European Social Fund stand these important forms of support for cluster development: through direct and indirect non-financial instruments [34].

Direct forms of support for cluster development: priority axis «Regions of Knowledge» in the part of subprogramme «Capacities» of the Seventh Framework Programme; Programme «Competitiveness and Innovation» subroutine «Entrepreneurship and Innovation». The main objective of direct forms of support for cluster development are reflected not only in the construction and development of clusters in the exchange of information. More importantly, through this way of financing made possible the integration of the research strategies of the partners in a cluster, the development of common action plans, transfer of knowledge and experience between regions with different levels of development, and the development of initiatives to deepen integration between science and bines.

Indirect non-financial instruments to support cluster development in EU countries apply mainly to improve cluster management practices. On the basis of the information contained in the National Bulletin № 8 Ministry of Education RB information are summarized presented by the author of that in Table 5.

*Table 5*

### Indirect, non-financial instruments to support cluster development in the EU

№	Name of instrument	Services provided
1.	European Cluster Observatory (June 2007), including interactive Internet platform; virtual library functioning in the framework of the «Enterprise» (Europe INNOVA).	<ul style="list-style-type: none"> <li>• Provide The Information services to users of the interactive web platform for the region 404 associated with:               <ul style="list-style-type: none"> <li>➤ cluster policies and organizations in the EU;</li> <li>➤ institutional, scientific and business partners in the EU;</li> <li>➤ cluster mapping by sector, region, focus on the number of employed lysis wage growth rate of associated companies;</li> <li>➤ analysis of the business environment of a region on the basis of the number and type of economic agents with respect to the formation, operation and perspective of clusters;</li> </ul> </li> <li>• Through virtual library provides centralized access to research related to specific cluster policies, initiatives and supporting business infrastructure in EU countries.</li> </ul>
2.	European Union Platform Cluster – Europeen cluster alliance (January 2008)	<ul style="list-style-type: none"> <li>• A coordinating cooperation in the planning and development of new cluster initiatives and its members focus on the following activities:               <ul style="list-style-type: none"> <li>➤ measuring the impact of cluster programs and policies on economic development;</li> <li>➤ identification of financial resources to support cluster policies;</li> <li>➤ improving infrastructure cluster by cluster policies;</li> <li>➤ identification of the main activities in cluster programs with an emphasis on internationalization.</li> </ul> </li> </ul>

№	Name of instrument	Services provided
3.	Transnational Alliance of Clusters Towards Improved Cooperation Support (TACTICS INNO-Net), growing as related and complementary initiative (network group)	<ul style="list-style-type: none"> <li>• To expand the membership of the European Union by attracting cluster responsible for cluster policies governmental and administrative organizations;</li> <li>• To develop a laboratory for developing and testing new cluster and innovative concepts and initiatives at EU level.</li> </ul>
4.	Group to develop cluster policies (European Cluster Policy Group), created by the European Commission in October 2008	<ul style="list-style-type: none"> <li>• Formulation of practical oriented, concrete policy recommendations on the basis of analysis of European and world practice and specific visits to clusters in the final report of the group, which can be divided into the following groups: <ul style="list-style-type: none"> <li>➤ revising priorities in the EU budget to boost competitiveness, improve the related cluster framework and review the profile of the beneficiaries of funds;</li> <li>➤ promoting better cluster programs at national level, unification of administrative procedures when applying for financial support in some European programs, improve coordination of cluster programs initiated by different DGs of the European Commission;</li> <li>➤ institutionalized provision of data and best practices associated with clusters, and strengthening the role of platforms for international cooperation on cluster level.</li> </ul> </li> </ul>
5.	European Initiative Excellence Clusters	<ul style="list-style-type: none"> <li>• Development of documents supporting the systematic assessment of the quality of management of cluster based on reliable and efficient quality indicators and assessment procedures, incl.: <ul style="list-style-type: none"> <li>➤ analysis of the current state of the used qualitative indicators, managerial needs and existing training programs;</li> <li>➤ develop a set of skills much needed to achieve excellent quality of management;</li> <li>➤ Establishment of a European club cluster managers to stimulate highest quality standards;</li> <li>➤ promote the services offered by the club and their spread across Europe.</li> </ul> </li> </ul>
6.	European Innovation Platform for Clusters (European Innovation Platform for Clusters / Cluster-IP) to strengthen the international focus and cooperation of various cluster initiatives	<ul style="list-style-type: none"> <li>• Encouraging productive partnerships established between cluster organizations and innovative SMEs in specific industrial sectors – biotechnology, energy efficiency and eco-innovation by: <ul style="list-style-type: none"> <li>➤ tools supporting internationalization of innovative SMEs;</li> <li>➤ services for innovative SMEs;</li> <li>➤ transnational partnership between cluster organizations and affiliated companies.</li> </ul> </li> </ul>

*Note:* The table is compiled on the basis of information contained in [34]

Financial initiatives supporting the construction, operation and development of clusters in Bulgaria can be divided into two groups: the first – in the Phare program, the US Agency for International Development, and the German organization for technical assistance and the second group – the Operational Programme «development of the Competitiveness of the Bulgarian economy». The first group of financial initiatives aims to analyze the potential for cluster development in selected industrial sectors and sub-sectors, while the second phase – financial incentives for the development of clusters. It should be noted



initiative Phare implemented in two phases: the first phase related to the introduction of the cluster approach and the establishment of a pilot cluster model. Based system developed to assess the potential of the sub-sectors of the Bulgarian economy includes 15 most promising sub-sectors: Processing of fruits and vegetables, ICT, textiles, Wine, General Engineering, Energy, Dairy Products, Tourism, Woodworking and furniture items ferrous metal ores, Parts, High technology, Transport and Logistics, Perfumery and Cosmetics, Creative Industries. Identified 9 clusters with potential for development and supported two of them – the production of furniture in the Troyan region and tourism in the Rhodope region. The second initiative of the PHARE program are planned 2.4 million. Euro, including 0.6 mln Euros from the national budget and 1.8 million. EUR – from Phare. [33] The second group of financial initiatives under the Operational Programme «Development of the Competitiveness of the Bulgarian Economy» for 2011 agreed 400 thousand. Euros, and in 2013 more than 10 million. Euro grants, which cover about 70% of the total value of contracted projects.

### EXPERIENCE IN THE IMPLEMENTATION OF THE CLUSTER APPROACH IN BULGARIA (THE CASE OF COMMUNITY SEVLIEVO)

One of the significant and, in our opinion, effective examples of cluster formation is the experience of Bulgaria for creating two clusters in Sevlievo (community or municipality). This region is located in the central part of northern Bulgaria, near Gabrovo (Figures 1 and 2).

The population of the municipality has 41.5 thousand inhabitants, of which 26.8 thousand people live in Sevlievo and 14.7 thousand people – in rural areas. The structure of the economy is as follows: 76% – industry, 4% – agriculture and 20% – services.

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Fig. 1. Map of Bulgaria

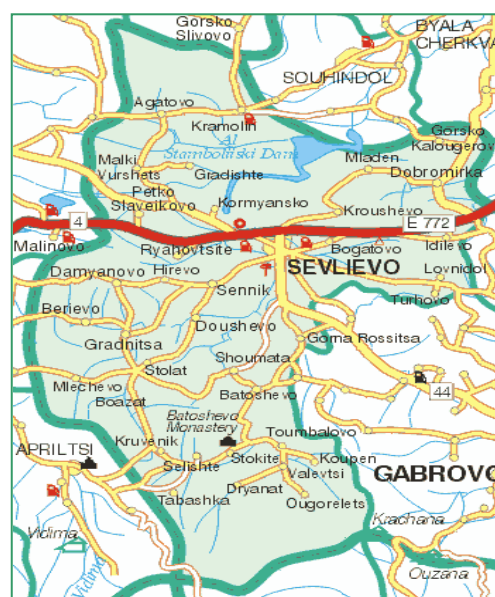


Fig. 2. Arial of the community Sevlievo

There are about 1,200 companies in the municipality of Sevlievo, among them the share of small enterprises (up to 9 employees) have 1045 companies; micro-enterprises (10 to 49 employees) – 123; medium-sized enterprises (50 to 249 persons) – 32; large companies (over 250 employees) – 7 [28].

In the scope of activities of the municipality of Sevlievo are included the enterprises of power engineering, mechanical engineering, trade, hotels and restaurants, food and beverage, transport, construction, agriculture and forestry, manufacturing, metal, plastic and wood products, furniture, bakery, confectionery and other food products, as well as health care, education and services.

Due to substantial investments in the economy of Sevlievo in recent years the town has the working and developing economy. Among large enterprises operating in the town should be called «Ideal Standard – Bulgaria» and «Ideal Standard – Vidima», belonging to the group «American Standard»; the German factory «Hamburger Industry»; the Italian companies «Sibi» and «Mineral and Industrial»; machine-building plant «ABB Avangard», working with the investment of Swedish group «ABB».

Bulgarian companies in the industry of the region determine the place of small and medium businesses and provide jobs for approximately 5 thousand people. The main sphere of activity is timber and furniture production («Borela-C», «Abanos», «Izgrev-90», «Parallel», Krama and others); knitted and textile products («Iveta», «Kubok-5», «Briz AD», «Biptan ET» and others); transportation («Cometa Bus», «Sev. Bus», «Helios», «Dogtrans», «Wait» and others); the food, confectionery and catering (HVK «Nectar», «Milky eks», «AKHAT», «Detelina», «Peace-N», «Apsara», «the Christovi» and others); hotels and restaurants («Sevlievo Plaza», «Odessa», «Iveta», «Helios» and others); design and production («Intellect», «Nintek», «Siana», «Eltronic», «Energy Engineering», «NIKIPLAST-M», «M-Press», and others) [27].

Among companies in the region there are companies with 100% municipal participation (LLC «White», LLC «Municipal market», the newspaper «Iveta», Medical centre and hospital, «Dr. St. Hristov»), which employed about 400 residents of the municipality. Two more companies (in which the municipality owns more than 50% of the shares) are «Sevlievo gas» and OJSC «Regional landfill for municipal solid waste».

At the end of the twentieth century – the beginning of the twenty first century in Sevlievo takes place the development of industry based on the use of foreign investment and the creation of two large clusters. The first one includes plants for the production of sanitary ware and plumbing drain key. The second cluster includes companies in the field of electrical industry and production of wires and cables.

The basis of the first cluster consists of the company Ideal Standard International (a private company with headquarters in Brussels), which operates in Europe, the Middle East, Africa and Latin America. Bulgaria due to its favorable economic-geographical position and especially the availability of good transport infrastructure plays a strategic role in business development in Eastern Europe.

In 1992, the company «Ideal Standard International» jointly with the Bulgarian company «VIDIMA» formed a joint enterprise for the production of sanitary fittings world-class. According to the original plan most part of manufactured products was intended for the market in Western Europe (mainly France). But at the end of 90s the growing demand for quality plumbing in general, as well as from Eastern European consumers forced managers to rethink their approach. In 1998, in Sevlievo was built one of Europe's most modern plants for the production of sanitary ceramics using the latest technology, which was declared the most successful investment project in Bulgaria. Plants of Ideal Standard-VIDIMA AD in Sevlievo employ more than 3.3 thousand people. Production process is fully based on advanced strategies and organizational principles. The use of new technologies of the international level is a guarantee of fast and successful adaptation to rapidly changing market requirements [29].

A number of other enterprises established on the basis of foreign investment work in close cooperation with the industries of Ideal Standard International in Sevlievo. Among them are «Industrial Minerals Bulgaria» and «SIBI» with Italian capital (main activities are, respectively, processing of raw materials and manufacture of components for plumbing); plant of German company Hamberger – «Hamburger Industry – Bulgaria» (founded in 2003 and specializes in the production of plastic toilet seats); the Austrian Hermes factory (production of polishing belt); Spanish company MATEO (flexible hoses for plumbing), as well as machine-building plant «ABB Avangard» working with the investments of Swedish company «ABB» in partnership with Ideal Standard International work-melt Bulgarian enterprises POLIERTECHNIK (production of polishing paste), TECHNOCONSULT (electroplating production line brass for buildings) and others.

An important element of the cluster is established in 2005 by the company «Biomet» large logistics center, designed for the storage of finished products of Ideal Standard International and VIDIMA and efficient service of the goods flows of the companies in the cluster. The creation of such a centre has improved the customer service from Eastern and Western Europe, providing services for storage and distribution of products.

There are also research laboratories for the development of sanitary fittings in Sevlievo. In 2008 a training center was opened, which offers training and introduces with the products brands of VIDIMA and Ideal Standard International.

Coordination of the work of all enterprises that provide Ideal Standard International by their products and services, allows reducing production costs, management costs, purchase and development of innovations, providing positive synergetic effects of territorial agglomeration.

The second cluster in Sevlievo is currently in a stage of active formation and includes industrial plants for the production of electric equipment, cables and wires. Its base is the company «ABB Avangard AD», which is part of the Swedish concern «ABB», having its enterprises in more than 100 countries. ABB Avangard is a leading manufacturer and supplier of electrical equipment in Bulgaria. Major consumers of ABB Avangard products are energy, industry, railway transport and large-scale infrastructure projects.

Plant in Sevlievo became part of ABB Group in 1996. At the present time «ABB Avangard» is specialized in manufacturing of equipment for various energy sources, energy systems, low voltage equipment, automation and related services. The main kinds of products are batteries and accumulators; electric rotary machines, generators, AC and DC converters; electrical and electronic equipment for industrial use and others [30].

Another large cluster member is the company Emka AD-Sevlievo [31], which was constructed in 1936 and has more than 75 years of experience in the manufacture of cables and wires of different purposes. 85% of the company's products are sold abroad, the main foreign-markets – Germany, France and the neighboring country Bulgaria.

The effect of the characterized clusters on socio-economic development of Sevlievo has many aspects and is expressed, first, in the benefits received by companies within the cluster; second, the benefits for the population and territory of the town.

In the first case, it can be noted, in particular, such opportunity for the companies as the use of new technologies, management systems quality products, work safety and environmental protection; increase economic efficiency through integration companies for the implementation of joint projects, including co-financing; the use of potential of rural settlements of the municipality and other.

In the second case, the creation of clusters has led to:

- the improvement of transport infrastructure, ground and underground utilities; the construction of a pipeline to industrial and domestic supply Sevlievo and nearby communities;

- the increase employment by creating new jobs (for more than 4.5 thousand people in Sevlievo and 800 people in the region, including Gabrovo, Lovech, Veliko Tynovo);
- investments in education and training languages (the system of professional training of specialists for the enterprises of the cluster, professional development of graduates with specialist companies is created);
- provision by the modern equipment for medical institutions;
- support the sport and the improvement of conditions for the recreation of residents;
- to encourage the development of hotels and tourism development;
- support community-based initiatives to improve the town and the preservation of cultural heritage.

Due to the good relations between business and the municipality a number of joint initiatives and projects in the humanitarian, social and cultural spheres of activity in the field of education, health and social infrastructure are implemented.

As a result, the city received a diversified local economy, new technologies and European standards of quality management, the ability to use natural gas resources, the implementation of the principle of public-private partnerships and the creation of a favorable business environment, competitive high quality products, effective cooperation with non-governmental organizations; improving agro-ecological conditions for agriculture development and preservation of the best traditions in the field of production and processing of agricultural products; the expansion of agricultural markets.

In general, the experience of Sevlievo suggests that the formation of clusters on its territory helped to ensure the region's economic development, enhance the competitiveness of local industry, to support small and medium businesses, to encourage the development of agricultural sector and rural tourism, and ultimately to improve the living conditions of people by creating and maintaining lines of social and technical infrastructure and protection of the environment.

## CONCLUSIONS

Summarizing the experience of the implementation of the cluster approach both abroad and in Russia, it can be noted that the success of the establishment and functioning of regional clusters and turning them into points of growth in the region depends, at least from the following conditions. First of all, it is possibility to produce products and services that are competitive on the regional, national and global markets. At the same time from members of the cluster requires not only innovative orientation of the new production technologies, but management decisions. Further, all the constituent elements of the cluster, including not only production, but also related and service facilities must be consistent and focused on achieving common goals.

In general, the level of development of the various clusters largely determines national competitiveness, and the formation and functioning of the clusters serves as a real means of self-development of the regions. The cluster model of the economy of the region and the state as a whole may be in Russia as an important tool of regional policy, allowing diversification of the economy, increase of the competitiveness, innovation orientation, and promotion of regional development. To do this, it's necessary first of all to create mechanisms of integration of science, technology and production allowing connecting innovation with the production, provide transformation of new knowledge into competitive products and services, as well as non-market public goods. Important problem is the formation of a system of management of innovation processes, ensuring effective linkages between all cluster members.

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# CLUSTERS AS AN INSTRUMENT OF REGIONAL INDUSTRIAL POLICY IN BULGARIA

*Paskal Zhelev*<sup>1</sup>,  
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Since the popularization of the concept of clusters by M. Porter in 1990 cluster initiatives have proliferated all around the world. Clusters are largely considered to be a major driver of innovation, regional and accordingly national competitive advantages and increased productivity. Therefore they have been assigned a major role in almost any industrial policy and economic development strategy. The main goal of the paper is to present and evaluate the cluster initiatives pursued in Bulgaria in the years of transition to a market economy and full EU membership. It is argued that the cluster approach has not been effectively utilized in the country's industrial policy to foster national industrial competitiveness. An operative national industrial policy would require effective support of export-oriented and innovative clusters with high competitive potential. The paper concludes with some policy recommendations for improving the efficiency of clusters promotion and turning it into a major instrument of industrial policy in Bulgaria.

## INTRODUCTION

Nowadays after the global financial and economic crisis there has been a revival of the interest in industrial policy worldwide. Industrial policies have long been criticized for stimulating rent-seeking and distorting the market. The cluster approach provides a more transparent, inclusive and potentially less trade-distorting framework for efforts to strengthen strategic sectors than the prior policies of supporting selected firms – «picking winners». Clusters are largely considered to be a major driver of innovation, regional and accordingly national competitive advantages and increased productivity. Therefore they have been assigned a major role in almost any industrial policy and economic development strategy in both developed and developing countries.

For years in Bulgaria there is no well-defined industrial policy, though the national economy has suffered from negative deindustrialization and its industrial competitiveness is based on low labour costs and low technological intensity and needs upgrading. Thus it is essential a long-term strategy for reindustrialization<sup>3</sup> to be elaborated with properly defined measures and priorities. A major role in such a strategy is envisioned for the cluster approach and cluster promotion. Industrial clustering is seen as a key development tool in facilitating the development and improving the overall sustainability and competitiveness of key industrial sectors.

The main goal of the paper is to present and evaluate the cluster initiatives pursued in Bulgaria in the years of transition to a market economy and full EU membership and to see to what extent they contribute to the objectives of the national industrial policy.

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<sup>3</sup> see Iliev I. (2014) The Process of Reindustrialisation – A Strategic Challenge to National Economy, *Economic Thought* 6/2014.

## BULGARIA'S INDUSTRIAL POLICY IN THE POST-SOCIALIST PERIOD

Industrial policy is not a well-defined concept. Instead, it comprises a broad range of policies affecting industries. In general, industrial policy includes all government interventions, which (i) are directed towards the supply side of the economy (enterprises, industries, and sectors), and (ii) aim to influence the industrial structure of the economy and its industrial change<sup>1</sup>.

Sharing the idea that economic development goes along with structural transformation that involves an increase in the share of high productivity activities, the largest group of authors uses the term industrial policy to describe government interventions directed at the supply side of the economy and aimed at encouraging structural changes. Krugman and Obstfeld (1991) in their famous textbook in international economics define industrial policy as «an attempt by a government to encourage resources to move into particular sectors that the government views as important to future economic growth». Rodrik (2004) equates industrial policy with «restructuring policies in favour of more dynamic activities generally, regardless of whether those are located within industry or manufacturing per se». More recently Rodrik (2007) also describes industrial policy as a process involving «dialogue» between the state and the private sector to generate information for identifying and removing the binding constraints to development. Taking into consideration the importance of fostering structural change for both developing and developed countries and the usefulness of emphasizing the process and experimentation side of industrial policy, Naude (2010) defines it as «the process whereby governments aim to deliberately affect the structural characteristics of their economies».

We can list the following characteristics of industrial policy:

- It represents one of the areas of public policy and is directly linked and interact (in some cases overlaps) with other types of policies – trade, innovation, regional, environmental, educational, social and others. To work effectively a stable macro-economic environment and close coordination with the other public policies is needed. Often industrial policy is an integral part of overall strategies for socio-economic development of the countries;
- Industrial policy while referring to interventions in the sphere of industry and particularly manufacturing, is not limited to it, but is responsible for the overall modernization of the economy;
- Its objective is to increase the competitiveness, the efficiency and the export potential of the economy and reduce its vulnerability to external shocks and disturbances;
- The result of a successfully conducted industrial policy is a change in the country's place in the international division of labour, restructured economy to a more dynamic and knowledge intensive sectors with high potential for sustainable growth<sup>2</sup>.

According to Zhelev (2014) during the first decade of transition (the 1990s) Bulgaria practically lacked any industrial policy. Policymakers focused on privatization, deregulation and liberalization (the prescriptions of the «Washington consensus») which were considered to be the most important factors to bring the economy on the path to long-term growth. Though the country suffered from a premature deindustrialization no policy was adopted

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<sup>1</sup> Budzinski O., Schmidt C. (2006) European Industrial Policy: Economic Foundations, Concepts and Consequences, Marburg, p. 3

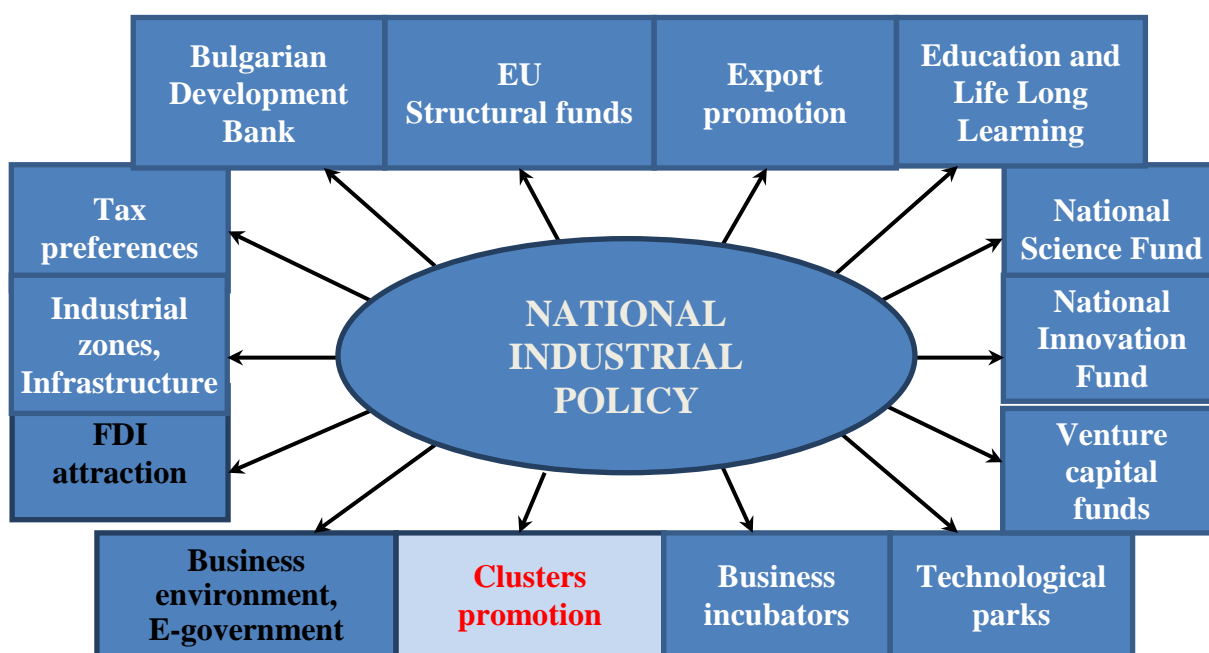
<sup>2</sup> Zhelev P. (2012) Industrial policy under conditions of EU membership – the case of Bulgaria, *Ekonomicheskaya teoriya i hozyaystvennaya praktika: globalnyie vyizovy. Materialy mezhdunarodnoy konferentsii «Evolutsiya mezhdunarodnoy trgovoy sistemy: problemy i perspektivy»*. SPb: Skifiya-print, 2012.



to counter this process. Following the advices of the IMF and the World Bank, it was widely accepted that only free market forces (no matter there were rampant evidences of market failures) have to drive the economy and any policy support would produce suboptimal results. Thus, industrial policy was regarded as a return to the detrimental former practices of the planned economy and entirely rejected.

At the end of the 90s of the 20th century and the beginning of the new millennium, the IMF and WB have given way to the EU as a major source of external influence in shaping economic policy in Bulgaria. Consequently strategic planning approach was introduced for the first time in the years of transition, establishing National Plan for Economic Development (2000–2006), within which a Strategy for Industry Development was elaborated. In line with the EU guidelines at that time, this strategy projected a passive industrial policy based mainly on privatization and restructuring, facilitating investment and improving the business environment. Perhaps one of the major achievements (in terms of industrial policy) during this period was the construction and/or transformation of a number laws and administrative structures (Bulgarian Small and Medium Enterprises Promotion Agency, National Innovation Fund, National Science Fund, Invest Bulgaria Agency) having direct impact on the implementation of industrial policy. Furthermore in 2001 and 2002 several projects with foreign financial assistance were carried out in Bulgaria with the aim of introducing the concept of clusters and explore the possibilities for development of business networks and clusters.

Even after the EU changed its stance towards industrial policy in the context of the revised Lisbon strategy, Bulgaria did not embark on more active industrial policy. Bulgarian governments focused on fulfilment of the EU membership requirements and securing financial and macroeconomic stability. Though the accession of Bulgaria to the EU has significantly limited the available policy space for conducting an independent industrial policy through its internal market framework and common trade policy, there are many instruments still at the disposal of the Bulgarian government. Figure 1 summarizes the available industrial policy instruments.



*Fig. 1.* Possible instruments of industrial policy in Bulgaria

While many of Bulgaria's industrial policy instruments are functioning they are highly uncoordinated and isolated one from another. There is a need of strategic vision, clearly defined goals, monitoring and evaluation system, continuity of the policy initiatives.

A major challenge for Bulgaria's policymaking is that there is no widespread consensus within the country on the priorities of the national industrial policy, which therefore lacks a clear focus and is grossly inefficient. According to Porter (2007) a significant merit of cluster-based policies is that, unlike traditional industrial policies, they do not distort competition by favouring particular type of activity, as there is no need of «picking winners». As the existence of any cluster is good for the economy, governments should not choose among clusters but have to create policies that support upgrading in every cluster present in a location. However, not all clusters can have the same impact on competitiveness and industrial development of a nation. Porter (2003) himself recognizes that export-oriented clusters register higher wages, productivity, and innovation than the non-tradable ones. Moreover, the scarcity of public resources available for support dictates a pursuit of their most efficient utilization. This, in line with the concept of smart specialisation, necessitates setting priorities, i.e. targeting those clusters whose development will be purposefully stimulated. While clusters promotion was one of the first competitiveness support measures purposefully introduced in post-socialist Bulgaria, without the needed differentiation and prioritization, they diluted the resources and proved to contribute extremely little to the national industrial policy goals.

### **CLUSTER PROMOTION IN BULGARIA IN THE LAST DECADE**

The concept of clusters is a modern description of the phenomenon (observed by Marshall (1890) already in the 19th century), of geographical concentration of economic activities, which brings advantages in terms of availability of a qualified workforce and specialisation and is widely believed to be an important factor for economic development. However, it was only after Michael Porter (1990) has examined the industrial agglomeration from the firm perspective that the theme surpassed the restricted circles of economists and geographers. The original definition for clusters provided by M. Porter is: «Clusters are geographic concentrations of interconnected companies, specialized suppliers and service providers, firms in related industries, and associated institutions (for example universities, standards agencies, and trade associations) in particular fields that compete but also cooperate».

Clusters consist of dense networks of interrelated firms that arise in a region because of powerful externalities and spill-overs across firms (and various types of institutions) within a cluster. Clusters drive productivity and innovation. Firms that are located within a cluster can transact more efficiently, share technologies and knowledge more readily, operate more flexibly, start new businesses more easily, and perceive and implement innovations more rapidly. They can also efficiently access «public goods» such as pools of specialized skilled employees, specialized infrastructure, technological knowledge, and others<sup>1</sup>. Clusters create synergies that translate into greater competitiveness at the firm and cluster levels and lead not only to improved export performance in terms of sales, but to improvements in terms of value-retention and value-addition. Thus, given all the benefits that bring and the increased social welfare, financial support allocated to firms and projects in industrial clusters is commonly justified and cluster policies have proliferated around the world being part either of industrial or research and innovation policies.

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<sup>1</sup> Porter M. (2007) Clusters and Economic Policy: Aligning Public Policy with the New Economics of Competition, Harvard Business School, ISC White Paper November 2007, Rev. 10/27/09, p. 3.

Industrial clusters are mostly a market-driven phenomenon evolving spontaneously over decades as a result of natural competitive advantages. However, well-designed and implemented cluster policies can accelerate the process and provide a much-needed initial platform on which to grow in output and maturity. Thus it seems to be important to clearly distinguish between clusters, cluster policies and cluster initiatives. Whereas clusters are a real economic phenomenon that can be economically measured, cluster policies are more an expression of political commitment to support existing clusters or the emergence of new clusters. Cluster initiatives are practical actions to strengthen cluster development, which can, but must not necessarily be, based on a formulated cluster policy.<sup>1</sup>

According to Török A., et. al. (2013), at present there is no well-defined cluster policy in Bulgaria. However, the notion of clusters is well integrated in other related policies such as the promotion of SMEs, national innovation policy, regional policy as well it is present in almost all strategic economic, R&D and other policy documents and all plans for regional development. Thus it is officially recognized that clusters are a major instrument for achieving sustained economic development.

The implementation in 2005 of the PHARE project «Introduction of cluster approach and establishment of a pilot cluster model» resulted in the elaboration of a National Strategy and an Action Plan for Cluster Development. On the basis of a detailed regional economy analysis, potential cluster structures were identified as well as 15 priority sectors, eligible for support from the EU Structural funds for the development of clusters were outlined: processing of fruits and vegetables; information and communication technologies; clothing and textiles; wine production; general mechanical engineering; energy; dairying; tourism; woodworking and furniture production; non-ferrous metal and ores; auto parts and electronics; high technology/science; transport and logistics; perfumery and cosmetics; and creative industries<sup>2</sup>. However, the succeeding cluster policy proved to disregard these priorities.

After the finalization of the pre-accession PHARE programme, cluster policy in Bulgaria is carried out through the Operational programme «Development of the Competitiveness of the Bulgarian Economy 2007–2013» with the financial aid of the European Regional Development Fund. One of the objectives of Priority 2 «Increasing efficiency of enterprises and promoting supportive business environment» is «Promotion of productive capacity and access to markets through the use of clustering and business networks».

The scheme «Support for cluster development in Bulgaria» with a budget of 15 million EUR supports the build-up of clusters' administrative and managerial capacity, the expansion of market positions, as well as investments in new technologies and equipment for carrying-out common cluster-related activities. Beneficiaries under this priority axis are: Bulgarian enterprises, both from the manufacturing and service sectors; public bodies and non-governmental organisations, providing business support services and/or operating business incubators; public bodies and institutions, educational and/or research organizations, NGOs and other entities included in cluster networks. The main priority of the measure is the establishment of clusters in Bulgaria. It does not target any specific sectors and has no specific thematic focus.

The support scheme provides grants to both existing and potential clusters however without differentiation among them. Unlike the other EU countries, where more than 60% of the cluster programmes and initiatives follow a vertical approach, the Bulgarian cluster policy lacks prioritization. The cluster initiatives exist in isolation from support schemes for technology parks; no link has been established with key stakeholders – the regions. Furthermore there is no succession in the policy, each project represents an isolated over

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<sup>1</sup> European Commission (2008) The Concept of Clusters and Cluster Policies and their Role for Competitiveness and Innovation, Commission Staff Working Document SEC (2008) 2637, p. 7.

<sup>2</sup> Vulov G. (2006) Pomosht ot ES za 15 novi klastera (EU support for 15 new clusters), *Kapital*, vol. 29/2006, www.capital.bg

time effort. A major flaw of the Bulgarian cluster policy is that the selection of projects for support is not based on clear and objective criteria.<sup>1</sup>

All of the abovementioned weaknesses led to the following paradoxical results during the last session of the scheme «Support for cluster development in Bulgaria» with a budget of about 10 million EUR, held in 2013, according to the Association of Business Clusters:

- Over 80% of the successful applicant clusters were registered in the period March–April 2013 – right before the deadline for project proposals submission, i.e. most of the supported clusters are designed with the sole goal – «absorption of funds» (rent seeking);
- Some of the clusters selected for funding are in areas such as sports, finance, consulting, etc., which are way too far from the priorities of the OP «Competitiveness» – to enhance the industrial competitiveness;
- The majority of the clusters have completed the requirement for minimum number of members – seven companies, but do not include scientific or non-governmental organizations or local structures, which is a typical condition for the sustainable functioning of the cluster;
- There are cases of «family clusters» approved for support as well as interrelated entities involved in more than one cluster<sup>2</sup>.

Unlike comparable countries like Romania, where clusters are 47, in Slovakia – 20, Croatia – 56, Serbia – 43, Bulgaria currently has 230 registered clusters. Fragmentation and proliferation of cluster initiatives has led to dispersion of forces and financial resources as well as to less cooperation and synergies between them. In fact, according to the Ministry of Economy and energy, only 20 of the clusters are actually functioning and most of them are at early stages of development. However, efficient cluster policies are not about the mere establishment of clusters, but about developing excellent clusters that are internationally competitive and that have an impact on the national economy. Thus they have to focus programs on cluster excellence instead of on number of supported clusters.

In recent years clusters excellence management has become more and more important and European Cluster Excellence Initiative (ECEI) was initiated by the European Commission DG Enterprise and Industry, which developed a quality labelling system for professional cluster management. Only 5 Bulgarian cluster organizations have been awarded with the Bronze Label of the ECEI, meaning that they strive for excellence. These are: Bulgarian Furniture Cluster; Cluster Microelectronics and Embedded Systems; EVIC – Electric vehicles industrial cluster; Mechatronics Cluster Bulgaria; SCIAT – Specialized Cluster Institute for Apparel and Textile. Among them only two (SCIAT and Bulgarian Furniture Cluster) fall within the area of the top regional clusters in Bulgaria, identified by the European Cluster Observatory.

To date, the European Cluster Observatory has identified more than 2000 regional clusters in the EU, assigning one star for each of the following criteria: employment size in a particular industry cluster within a region; degree of specialisation within the region; and cluster focus of employment within a region<sup>3</sup>. Bulgaria has only four 3-star regional clusters all of which are in the sectors of apparel and textiles. Among the top 14 regional clusters in the country as many as 9 are in the sectors of apparel and textiles, 1 – in distribution, 1 – in furniture and 2 in footwear. Thus through the years Bulgaria has established sustained

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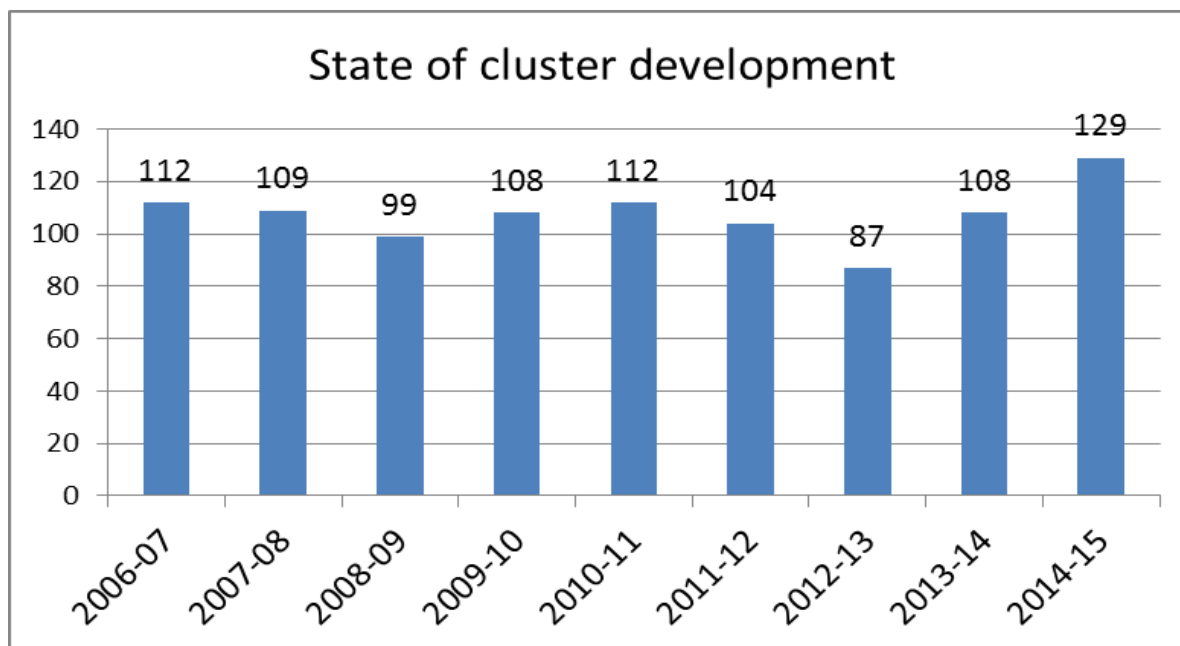
<sup>1</sup> Zhelev, P. (2015) Cluster Policy and Smart Specialization – the Case of Bulgaria, Journal of US-China Public Administration, forthcoming.

<sup>2</sup> Georgieva, M., (2013) Klasteri se obyaviha protiv otsenka za evroproekti (Clusters opposed evaluation of EU projects), *Kapital daily*, 18 September 2013, [www.capital.bg](http://www.capital.bg)

<sup>3</sup> European Commission, (2013) Innovation Clusters in Europe: A statistical analysis and overview of current policy support, available at: [http://www.central2013.eu/fileadmin/user\\_upload/Downloads/Tools\\_Resources/Cluster.pdf](http://www.central2013.eu/fileadmin/user_upload/Downloads/Tools_Resources/Cluster.pdf)

specialisation in low technology, labour-intensive industries. The existence of such well settled clusters in the regions may be a hindrance to the structural goals of the national industrial policy, since there is likely to be a «lock-in effect», impeding the shift towards new, less traditional and potentially more promising specialisation areas.

The cluster initiatives in Bulgaria during the last decade lack a strategic perspective, coherence and focus, which ultimately make them quite inefficient. Data provided by the World Economic Forum (WEF) confirm such a conclusion (Figure 1).



*Fig. 1.* Ranks of Bulgaria on the indicator «State of cluster development» according to the World Economic Forum Global Competitiveness Report 2014–2015 edition

During the period 2007–2014 Bulgaria’s cluster initiatives have not managed to improve the state of cluster development in the country. In the ranking of the WEF Bulgaria occupied the 112th position in 2006–2007 while at end of the period its performance significantly deteriorated collapsing to the 129th position (out of 148) according to the indicator «State of cluster development». This ranking reveals that, at present, clusters are quite poorly developed in Bulgaria and represent a competitive disadvantage for the national economy.

## CONCLUSIONS

While the importance of clusters for innovation, productivity growth and competitiveness of the national economy has long been realized by Bulgarian policymakers, so far Bulgaria has not managed to integrate successfully cluster promotion initiatives in its industrial policy. Cluster initiatives showed a lack of focus, strategic prioritising and clear evaluation criteria which except scattering the resources led to their squandering into non-productive projects. The ensuing poor state of cluster development, and clusters (as real market phenomenon) concentrated extremely in traditional sectors hinders the achievement of the national industrial policy goals of structural transformation to more technologically advanced activities bringing higher value added.

How might cluster initiatives be improved in order to become an efficacious instrument of the national industrial policy?

1) The cluster programs should be embedded in a national cluster policy respectively in a thorough long-term industrial development strategy. It has to complement and be closely interconnected with other policies and measures designed to foster the technological modernization and innovation potential of the economy.

2) Concrete targets and priorities should be set for funded cluster networking activities. Vagueness of stated goals, seeking generally to enhance competitiveness or innovation capacity, makes it difficult to select the right projects for support. Clear evaluation criteria should ensure that only projects that have high innovation potential, large spill-over effects and are primarily export-oriented should get a public support.

3) Successful cluster policy cannot be elaborated in a pure «top-down» way, but industry and service providers have to be actively involved in the process of prioritisation within a «bottom-up» approach. New cluster initiatives should be carefully designed and underpinned by a very clear rationale based on precisely identified business interests, regional strengths, specific competences, knowledge hubs of international excellence and market foresight. Furthermore cluster programmes should be assessed frequently against the expectations of the stakeholders.

4) As cluster development is a long term process, cluster-support should be provided on a long term basis of (at least) five to ten years. This also means that continuous evaluation and monitoring of cluster activities are necessary. Only clusters with a high potential of development and high performance should be supported.

5) A system of accreditation has to be introduced to provide an easier access to clusters which have produced evident results. Cluster groups could voluntarily seek qualification as «Designated Clusters» if they fulfill a number of criteria such as presence of a minimum concentration of firms and economic activity in a relevant region, a broad representation of cluster participants including end product producers, service providers, component suppliers, logistical vendors, distributors, etc., participation of a minimum number of associated institutions such as research institutes, universities, training providers, and others.

6) Clusters have different characteristics depending on their context (e.g. history of origin, emerging vs. traditional industries, mature vs. immature clusters). This requires different support mechanisms depending on the development stage of the cluster. The example of Romania has to be followed, which has two cluster programs each of which specifically dedicates its effort to either the development of new cluster organizations or the further support of the already existing cluster management organizations.

7) It is essential for firms to take part in the global exchange of knowledge and be highly export oriented; therefore the cluster policy should support the internationalisation of cluster organisations and cluster activities. This has to be reflected by program guidelines and evaluation criteria for project proposals.

8) The Bulgarian cluster policy has to be highly integrated in FDI promotion policy aiming to target foreign investors in order to fill in gaps or strengthen the missing links in some priority clusters (Zhelev, 2015).

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# **THE IMPACT OF THE MINING CLUSTER «SREDNOGORIE MED» ON REGIONAL DEVELOPMENT IN BULGARIA: ANALYSIS AND STRATEGIC PERSPECTIVE**

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As a variety of local production systems, clusters receive an increasing amount of attention from the academic community and decision makers; the increasing number of scientific surveys is proving the necessity for clusters and their role in economy and their contribution to the regional development. The main objective of the study is to analyze and assess the impact that the Srednogorie Med mining cluster has on Bulgaria's regional development. The study is focused on the response of the two research questions: First, how does the cluster influence the economic development of its member municipalities, on whose territory the leading companies in mining and processing of copper and gold-containing ores operate? Second, what are the strategic perspectives for the cluster's role in the region's development? Evidence and analysis of mining cluster Srednogorie Med's contribution to the future regional development is being searched for in the political strategic planned documents for regional and local development for the period 2014–2020. The research is based on statistic information; firm information for the mining companies and the cluster; municipal development plans for the period 2014–2020; municipal budgets; regional strategies; articles and interviews.

## **INTRODUCTION**

Clusters are a subject to numerous studies which prove the necessity for their development and outline their role in several directions. Clusters are considered driving forces of competition, innovations and regional development (Garanti, Zvirbule-Berzina 2013); they provide the companies that form a particular cluster with easy access to important resources, reduction of transportation expenses, access to consumers and labor (Marshall 2009; Porter 2000; Krugman 1991). Clusters are defined as a dominant factor nowadays (Dumais et al. 2002) for reducing transaction expenses and access to specialized services (Scott 1988, 1994; Scott, Angel 1987), as well as development of infrastructure and a competitive business environment (Lin et al. 2006), which increases efficiency and productivity.

A number of authors focus their attention on the role of clusters in regional development. According to R. Stimson, R. Stough and B. Roberts (2006), nowadays regional clusters are stimulants for regional economic development and are used in the making of regional development policies (Pachura 2010). In their article «Clusters and Entrepreneurship», E.M. Porter, M. Delgado and S. Stern prove that there exists a positive correlation between strong regional clusters and business growth, new business creation and start-up firm survival. In another publication the same authors present their research on the interaction between regional development and regional clusters in two different dimensions: region-industry and region-cluster (Delgado et al. 2011). They reveal that on a region-industry level the existence of a cluster in a certain industry guarantees the development of the region, which can be measured through indicators such as employment, new business

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creation, wages and capabilities for creating patents. On a region-cluster level their studies substantiate the fact that a cluster develops faster if there are strongly connected and jointly positioned cluster. Thus, regional clusters are an important tool for stimulating regional development.

The following study, according to M. Porter's classification, is made on a region-industry level and aims to show how the industrial cluster (Srednogorie *Med*) affects/influences regional development (the Srednogorie region).

The article is organized as follows. It begins with an introduction to the cluster and its dimensions. After that the main characteristics of the industrial cluster are outlined and the main hypotheses are worked out on that basis. The second section also presents the results of the analysis of the cluster's impact on regional development. And the final part is conclusions.

### **INTRODUCING THE «SREDNOGORIE MED» MINING CLUSTER**

*The emergence of the cluster.* The appearance of a cluster in a certain place can be explained in different ways. The first type of explanation refers to certain advantages of factors such as climate change, soils, ore deposits, forest resources, presence of transport junctions or harbors, etc. Numerous clusters are created on the basis of natural resources and can often be explained through the geography of production factors – wine clusters, tourist clusters, clusters for cellulose and paper production, etc. The second type of explanation pertains to historical «incidents/events» at a certain place, where several successful entrepreneurs start a business and/or concentrate a large amount of scientific and research activity, knowledge and talent in one place. For the growth and prosperity of the cluster many elements are needed, including searching for a factor for modernization and specialization; developing strategies for competition and cooperation; institutional conditions or political actions that benefit innovation and change.

Two vital prerequisites exist for the origin of the Srednogorie Med cluster: firstly, the natural datum – the abundance of mineral resources in the region; and secondly, the entrepreneur initiatives of extractive companies' leaderships. Bulgaria contains huge reserves of mineral resources – the mining of copper, gold and silver on the territory of Central Sredna Gora has the highest relative share of all metal mineral deposits. The copper-porphyry deposits are of major importance from the available resources in Bulgaria, as 91% of the copper in the country is received from them, in harmony with the world practice.<sup>1</sup>

The largest and richest copper-gold-pyrites deposit in Europe is the Chelopech deposits, which is located on the territory of the Chelopech village. On the territory of the Panagyurishte municipality is located a large part of the country's copper ore reserves, including 13 deposits that belong to the Panagyurishte ore zone, including the Asarel deposit. The total reserve of copper ores is 380 844.5 thousand tons of ore.

Copper deposits are different in type and content. At present, extraction operations are performed in the copper-porphyry deposits Elatsite and Assarel, which in the past 2 years have mined a total of about 25 million tons of ore per year with a maximum annual production of (totally) 28.7 million tons in 2006 and 2007. The mining is performed through an open method. Underground mining of copper-gold ores is performed in the Chelopech deposit too. In Bulgaria is probably the largest gold deposit in Europe – Chelopech, where about 50 tons of gold have been mined so far. Trade gold is also mined from the copper-porphyry deposits of Asarel and Elatsite.

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<sup>1</sup> Jubile Annual Newsletter on Mining and Geology in Bulgaria'2010/ 1, Bulgarian Chamber of Mining and Geology, p. 56.

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All production factors that are instrumental to the development of the cluster are present in the Srednogorie region: long-time traditions in ore mining, rich and developed ore deposits, experienced miners, highly educated professionals, access to high-tech processes for the mining and processing of copper.

The second prerequisite for the origin of the Srednogorie Med industrial cluster are the entrepreneur initiatives of the mining companies' leaderships. The cluster was created on the basis of an industrial-regional principle in 2005 on the initiative of the big industrial enterprises from the Central Srednogorie region: Asarel-Medet JSC, Aurubis Bulgaria JSC, Elatsite-Copper JSC and Chelopech Mining Ltd<sup>1</sup>. The cluster is one of the first and successfully functioning ones in Bulgaria.

Numerous studies show that in different states clusters arise in different periods of time. According to a study conducted by the European Observatory for Clusters (Oxford Research, 2008), the policy for clusters in different states begins to materialize in different periods – from 1990–1994; 1995–1999; 2000–2004 and 2005 until now. Most states began to use the term in 1990–1994 and in 2000–2004. Taking into account the fact that about half the states first began to practice cluster policy from 2000 to present day, the policy in this area is still in its early stages in many countries, while it is in a more advanced stage in others.

According to a research done by S. Barsoumian, A. Severin and T. Van Der Spek (2011) in a number of EU countries – Germany, Finland, The Netherlands, Austria, Denmark and Spain – the cluster policies were already made prior to the year 2000. In the 2000–2005 period the Czech Republic, France, Greece, Ireland, Luxembourg, Malta and Slovakia began to build a policy based on clusters, while in Portugal and the new member states of the EU – Latvia, Lithuania, Estonia, Poland, Romania, Bulgaria, etc., such a process was noticed after 2005. The development of clusters in Bulgaria began with some delay compared to other European states. The starting-off point is from mid-2000 to present day. The first cluster («Bulgarian Cluster for Information and Communications Technology») was created in the second half of 2004 (Bankova J., 2011).

It is considered that more than 10–15 years are needed to feel the full impact of the policies and programs for clusters on the economic development; therefore it is still too early to expect a serious evaluation on their economic influence.

*The Profile of the mining cluster «Srednogorie Med».* While different schools underline different factors that determine the growth and functionality of clusters, the concept of clusters usually consists of three important dimensions.

First, it is widely accepted and indisputable to view clusters as a geographical concentration of specialized firms, advanced skills and competencies of labour force, as well as supporting institutions which increase knowledge flows and spill-overs as a result of their proximity. This grouping of different strong sides is often called perspective strategy for maintaining competitiveness on a global scale.

Natural resources/ore deposits determine the geographical concentration of the cluster's member companies for extraction and processing of copper and gold-containing ores: Asarel-Medet JSC, Aurubis Bulgaria JSC, Elatsite-Copper JSC and Dundee Precious Metals Chelopech.

Second, clusters include a network of joint/cooperative enterprises (firms that have official, social and economic interrelations). For the Srednogorie Med cluster there are two characteristic groups of enterprises included in the network. The first group consists of firms related to the mining industry sector, primarily in design, research (geological, engi-

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<sup>1</sup> The Dundee Precious Metals company changed its corporate identity and every one of its filial associations includes the name of its place of operations. The Chelopech Mining JSC company changed its name to Dundee Precious Metals Chelopech.

neering-geological, hydrogeological and drilling); mine consulting and engineering; construction work, scientific research, maintenance of primary machinery and equipment, etc. A large portion of the activities related to extractive industry is performed by the cluster's member companies. Geotechim Ltd (the group includes 21 associations with a total number of over 4200 employees), one of the founders of the cluster, provides designer's and consultant services in the following areas: mining, hydro technical, industrial and urban construction, environmental protection. Among Geotechim Ltd's partners are Assarel Medet JSC, Aurubis Bulgaria. Geotechim Ltd designs buildings, related mainly to the development of Elatsite mine<sup>1</sup> the ore-dressing factory in the village of Mirkovo, hydrotechnical tunnels among them. Several companies of the Geotechmin group, belonging to the business unit Mining, offer a variety of services in the area of mining engineering consulting. Among them are the projects of Helix Ltd for the implementation of geological and hydrogeological drilling of Elatsite mine; Explosivprogress-GTM Ltd is a distributor of the products, manufactured by explosives factory «Elatsite» – waterproof emulsion explosives which since 2007 have had a CE marking, allowing their supply on the international market. Explosivprogress-GTM provides for the mining companies («Elatsite mine») a complete service that includes surveys, design and consulting related to: the drilling and blasting in the mining of ore, etc.

The second group of firms that form the network of cooperative enterprises includes the firms from the high-tech companies that produce optical, opt mechanical and optoelectrical systems and articles, firms that service industrial manufactures. These are Optics JSC (Panagyurishte<sup>2</sup>), Opticoelectron JSC, which are members of the Srednogorie Med cluster.

Third, clusters are characterized by a certain dynamic social and organizational element – the so-called «institutional attachment/fixation» – different interrelated innovative actors are drawn – those are universities, scientific research institutes; governmental and non-governmental organizations, public powers; thus facilitating the intensive interaction and cooperation between them. H. Rocha and R. Sternberg (2005) call the third dimensions of clusters a network of cooperative organizations (not only are the firms interconnected, but so are different GOs and NGOs, including educational institutions).

For the Srednogorie Met cluster the third dimension includes scientific research and educational organizations, as well as representatives of local authority: «The Management and Professional Training Center» JSC, The university of Mining & Geology «St.Ivan Rilski» and the municipalities of Anton, Zlatitsa, Mirkovo, Panagyurishte, Pirdop, Chelopech, Chavdar and Strelcha.

There are different ways in which governmental institutions can cooperate for the development of the cluster. The state plays a key role in the development of a mining industry, considering the fact that it is the exclusive owner of the underground riches and it creates the regulations framework. In the case of the Srednogorie cluster, the Ministry of Energy (ME) has the biggest influence. The amendment to the bill on underground riches from 2010 regulates the establishment of a uniform body to manage and control in the state, and said body is the «Natural Resources and Concessions» Office, ME. A draft of the National Strategy for Mining Industry (in 2012) is developed and pending passage by the government. Specialized state agencies support the cluster through spreading information, regulating policies and overseeing security measures.

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<sup>1</sup> Elatsite are part of the Geoproject Group.

<sup>2</sup> There is another cluster on the territory of the Panagyurishte municipality: the «Lasers and Optics» cluster, which was established in 2004 on the territory of Plovdiv and the Panagyurishte municipality by production firms from the sub-branch, Technical University – Sofia, and five individuals – leading experts and managers in the field.

## MINING CLUSTER SREDNOGORIE MED'S IMPACT ON REGIONAL ECONOMIC DEVELOPMENT

Clusters are considered as important factors to economic development, competitiveness and innovations. The cluster's impact on the region's economic development presently and in the future depends primarily on its characteristics.

Characteristics of Industrial Cluster Srednogorie Med:

- **Industrial Significance**

Among the members of the cluster are mining companies Asarel-Medet JSC, Elatsite Copper JSC, Dundee Precious Metals Ltd – the primary and only enterprises in Bulgaria that mine and process copper and gold-containing ores, which shows Srednogorie Med's leading role in the development of the mining industry, as well as the development of non-ferrous metallurgy (Auburus JSC – one of the leading companies in the cluster is the only processor of copper in Bulgaria). Indicators for the cluster's defining role in the mining industry is the biggest share of metal mineral mining (with a permanent production) in the total worth of the production of mineral-raw material industry for 2011–2013 – about 60%<sup>1</sup>.

Regardless of the decrease in production in 2013, compared to 2012, the mining of copper per capita in Bulgaria remains high – 11 tons per capita (for 2011–2012 it is 12 000–13 000 tons per capita), which gives a place of Bulgaria in the definition of «mining state» with an above-average indicator on a worldwide scale. On the European stage Bulgaria holds third place in copper mining and fourth place in gold mining, which shows out country's leading position in European ore mining. The firms that perform the mining are members of the cluster, which gives us ground to also define the cluster's leading position in Europe.

- **Export orientation – integrated and export-oriented base industries**

The analyses, carried out and based on National Statistical Institute data and reports of the branch organizations – the Bulgarian Chamber of Mining and Geology and the Bulgarian Association of Metallurgical Industry, show that the cluster is predominantly export-oriented and its development is definitely influenced by the market conditions in international markets (mainly the London Metal Exchange).

Bulgaria exports copper raw materials (copper and copper products), the leading export markets for Bulgaria being: Turkey – 21.9% of total exports of copper and copper products; Italy – 16.3%; Germany – 12.6%, Serbia – 10.1%; Belgium – 8.9%<sup>2</sup>. The export of Bulgaria to China is constantly growing. According to the National Statistical Institute data for 2011, 68.4% of Bulgaria's export to China is refined copper and copper alloys. For the period January–September 2012 the share of refined copper and copper alloys is even greater or 73.9% of total export to China. Besides these, 10.1% of the country's export is copper ores and concentrates, another 3.8% is waste and copper scrap and 1.3% is copper matte and cement copper. The total share of copper raw materials in export to China is 89.1%<sup>3</sup>. In previous years the greater part of these copper products were exported to Western Europe. Their main producer is Aurubis Bulgaria, Pirdop.

The biggest copper processing plant in Bulgaria is Auburus JSC Bulgaria in Pirdop, a member of the cluster. The company is also the only producer of anode and cathode copper in Bulgaria, production again being intended mainly for the export market. In 2012 85.3% of the electrolytic copper was directed to exports which grew by 2.3% while domestic sales declined.<sup>4</sup>

<sup>1</sup> Based on data from The Mineral Raw Material Industry in Bulgaria in 2012, Yearly Bulletin, 2013, p. 20–21.

<sup>2</sup> Export profile of Bulgaria, Ministry of Economy, Energy and Tourism, 2011.

<sup>3</sup> National Statistical Institute, 2013.

<sup>4</sup> According to the data of the Bulgarian Association of Metallurgical Industry, 2013.

- Ecological extensiveness – inherited problems for restoring the environment
- Energy intensity – big industrial consumers of fuel and energy
- Economic significance – a key share of the GDP, major employers, investors, tax payers. The members of the cluster generate approximately 8% of the state’s GDP and are among the major corporate employers in the country, providing employment for over 8000 people.
- Urban division – sparsely populated and remote settlements

The cluster’s member municipalities (Table 1) are small municipalities (three towns and five villages) with limited potential for development, poor economic activity, bad demographic characterization (decreasing and aging population). For the majority of municipalities on whose territory copper and gold-containing ores are being mined, members of the cluster have a defining role in their economic development as well as the region’s development.

*Table 1*

**Area, population and population density in municipalities – members of the Srednogorie Med Industrial Cluster on 31.12. 2011**

Municipalities	Area, sq.km.	Population, number	Population density persons/sq.km
Total of Bulgaria	111001.9	7327224	66.0
Anton	76.1	1 564	20.6
Zlatitsa	163.3	5 783	35.4
Mirkovo	207.9	2 486	12.0
Pirdop	152.4	8 242	54.1
Chavdar	70.8	1 262	17.8
Chelopech	44.4	1 473	33.2
Panagyurishte	598.6	25 003	41.7
Strelcha	224.5	4 824	21.5

*Source:* Regions, Districts and Municipalities in the Republic of Bulgaria 2011, National Statistical Institute, Sofia, 2013.

*Research Methodology.* Based on the review of academic research on the interaction between clusters and regional development, the following research questions and their corresponding working hypotheses have been drawn:

First research question: what is the cluster’s economic impact on the development of the member municipalities on whose territory the leading companies in mining and processing of copper and gold-containing ores operate?

Hypothesis: The Srednogorie Med industrial cluster has a beneficial influence on the municipalities in the Srednogorie region.

The main characteristics of the cluster lead to the second research question: what are the strategic perspectives for the cluster’s role in the region’s development?

Hypothesis: the perspectives for the region’s development after the deposits have been depleted are unfavorable – for the majority of municipalities in the Srednogorie region, the cluster’s member companies are the only alternative for their economic development.

The answer to the research questions, as well as the confirmation of the developed hypotheses, is based on the analysis of the indicators through which the cluster's economic impact on the region's development is measured in the present study: employment/unemployment; income; productivity; revenues in local budgets; investments.

In order to outline the cluster's economic influence on the present and future development of the Srednogorie region, the study has used statistic information, officially published in issues of National Statistical Institute (NSI); strategic plans for regional and local development during 2014–2020 (municipal plans for the development of the cluster's member municipalities; strategies for the development of the Sofia district; the Pazardzhik district); municipal budgets; information on the cluster; annual bulletins for branch organizations – the Bulgarian Chamber of Mining and Geology and the Bulgarian Association of the Metallurgical Industry; firms' data on industrial enterprises, members of the cluster; published articles and interviews.

It is important to note that the cluster's economic influence cannot be easily demonstrated in strict statistic terms. The data available on Bulgarian municipalities is extremely limited. NSI gives account on and publishes information for few indicators on municipalities (predominantly demographic) and with data up until 2011. Due to the lack of information the survey does not include dimensions through which the potential influence of the cluster on regional development is proven and measured in numerous empiric studies – for example, the capacity to create patents, etc.

*Analyzing the Srednogorie Med Cluster's Economic Impact on the Region's Development.* The Srednogorie Med cluster is a vital part of the economic reality in the cluster's member municipalities: Anton, Zlatitsa, Mirkovo, Panagyurishte, Pirdop, Chelopech, Chavdar and Strelcha (all located in the Srednogorie region). Its impact on the economic development is measured through the following indicators: employment/unemployment; income; productivity; technological innovations; revenues in local budgets from concessional taxes on ore mining; investments.

*Unemployment rate* (Table 2). The unemployment rate in the cluster's member municipality is lower than the state average, as well as lower than the average for the district in which the municipalities are located. For the Sofia district<sup>1</sup> the unemployment rate is 10.2%, in the member municipalities it is lower compared to the average for the district and the other municipalities from the Sofia district. Panagyurishte and Strelcha are part of the Pazardzhik district, in which the unemployment rate is 13.2%.

Table 2

### Unemployment rate 2009–2012 (%)

Municipalities	2009	2010	2011	2012
Bulgaria	9.1	9.2	11.2	12.3
Zlatitsa	7.1	7.9	7.7	7.8
Anton	7.8	8.6	8.2	8.1
Pirdop	9.4	8.8	9.3	9.0
Mirkovo	6.4	7.7	8.9	8.6
Chavadar	12.3	9.8	7.3	7.4
Chelopech	7.8	3.7	6.0	5.9
Panagyurishte	11.34	11.8	11.6	11.5
Strelcha	9.55	11.59	11.7	13.2

Source: National Employment Agency, Ministry of Labour and Social Policy.

<sup>1</sup> The Sofia district and the Pazardzhik district are administrative-territorial units, within the meaning of the Law on administrative-territorial structure of the Republic of Bulgaria and statistic territorial units from the NUTS 3 level according to the EU's Nomenclature of Units for Territorial Statistics.

The conducted review of the municipal development plans for the period 2014–2020 shows that the enterprises, on whose territory the mining and processing of copper and gold-containing ores are performed, are the main employers of the corresponding municipality, as well as the other settlements in the region. 1300 people work at Asarel-Medet JSC, and over 400 are employed in subsidiaries and joint ventures. At the moment 810 employees and over 1500 workers from outside firms, primarily from the region, work at Aurubis Bulgaria. With a staff of over 1000 people, Dundee Precious Metals Chelopech is the primary employer in the region of Chelopech and the rest of the Srednogorie region. Thanks to the company's activity, the Chelopech municipality has maintained the lowest unemployment rates in the country. Over 1770 employees and workers work at Elatsite-Copper. The company is among the major tax payers and one of the largest investors in Bulgaria<sup>1</sup>.

It is well-known that aside from direct employment, the industrial enterprises for mining and processing of copper and gold-containing ores also create indirect employment. Numerous studies<sup>2</sup> show that every workplace created in mining and petrol industries creates workplaces in other sectors (for example, according to an analysis of the major mining companies in Western Australia every workplace created in mining and petrol industries creates three more workplaces in other sectors in all of Western Australia). For instance, Asarel-Medet JSC provides over 30% of the occupied workplaces in the business sector of the Panagyurishte municipality plus about 6400 other workplaces that service the company in the municipality and the country.

The number of people working in the mining of metal minerals increased by 262 people in 2012 compared to 2011, with a decrease in employment in other sectors of the mining industry<sup>3</sup>. According to the Chamber of Mining and Geology, three new projects for mining of metal ores are expected to start by the end of 2014, which will increase the production and revive the economy of regions with low living standards and open over 1000 workplaces in regions with high unemployment rates.

An increase in the number of employees working in existing companies for mining and processing of copper and gold-containing ores is unlikely in the future because of the noticeable tendency of increasing the labor productivity. For the period 2000–2012 the productivity of human resources in the mineral branch has increased. The labor productivity in said branch (as we already pointed out, the companies from the cluster form primarily this sector) is approximately 2.5 times higher than the average level for the industrial sector – over 68 000 BGN per employee<sup>4</sup>. The high and increasing productivity is due to technological renovation in the past 12 years as well as investments in staff development, training, improvement in working conditions and companies' social responsibility.

*Technological innovations.* Developing and introducing technological innovations by the cluster's member companies creates the know-how and the professional potential that develops and remains within the boundaries of the region and the country. This benefits the formation of an environment for developing new mining and metallurgical technology in experimental and industrial conditions. That way the production factors are improved. Through its investment activity and purchase of machines and equipment and installing new powers, the extractive companies help form capital in the economy. This leads to a higher factor productivity of resources (labor and capital), which increases the real growth of the economy and region.

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<sup>1</sup> Company information.

<sup>2</sup> Studies in different countries define a different multipliers. According to different research and studies made in countries that are global leaders in the area of mineral ore production such as Canada, Chile, Ghana, Tanzania, Peru, etch, the stimulated work load is between 165% and 250% of directly and indirectly employed people. In developed countries the multipliers for the stimulated work load is about 100%.

<sup>3</sup> The Mineral Raw Material Industry in Bulgaria in 2013 , Yearly Bulletin, 2014, p.15.

<sup>4</sup> The Mineral Raw Material Industry in Bulgaria in 2013 , Yearly Bulletin, 2014, p.23.

«Introducing the next generation of highly productive equipment is our priority because it is the path to maximum and effective utilization of the resources available and to the strategically important for the entire region prolonging of the mine's existence», emphasized Asarel-Medet's executive manager, Ph.D., engineer Lachezar Tsotsorkov. Every year the company develops investment programs for steady development in seven directions: «Quality, productivity, cost price», «Development of the mineral base», «Energy efficiency», «Ecology», «Safety and health», «Human resource development» and «Corporate development». On their basis, investments measuring 83 million BGN were made in 2013, while in 2012 the execution of the steady development programs measured 50 million BGN<sup>1</sup>.

In the period of 1999–2012, Asarel-Medet JSC invested over 600 million BGN in projects for a wide-range modernization of the entire technological cycle, ecology, better working conditions, energy efficiency, human capital development and corporate development. The investments in ecological projects alone measure over 60 million BGN.

An investment program by Aurubis Bulgaria for 2014 foresees 44.2 million euro, with 60% of this sum including environment protection measures with a total capital expense of over 26 million euro. The project, which will be realized over the next three years, includes two primary objectives –increasing the productivity and improving the ecological indicators in the factory in order to prepare the company to meet EU's future requirements.

*Wages and salaries.* The cluster has a beneficial effect on the economic development in the region through the *higher incomes* which it provides for the local population (Table 3). This is indicated by the average annual amount of wages and salaries. Because of the limited economic activity in the majority of municipalities (excluding Panagyurishte), we can accept that the cluster's member companies for mining and processing of copper and gold-containing ores (in all the municipalities they are the largest enterprises, and in some they are the only ones) provide the majority of the local population's employment and form its income (71% of the employees in the municipalities in the Sofia district work and live in the same municipality<sup>2</sup>).

Table 3

**Average salaries of the employees under labour contract by municipalities  
in 2009–2011 (BGN)**

Municipalities	2009	2010	2011
Bulgaria	<b>7309</b>	<b>7777</b>	<b>8230</b>
Mining Industry	11254	12214	13681
Zlatitsa	5298	5022	5884
Anton	5016	5111	5056
Pirdop	11534	12118	12743
Mirkovo	13504	14648	16530
Chavdar	6032	6332	6430
Chelopech	15247	17131	23 756
Panagyurishte	8 480	10 878	11 396

*Source:* Municipal development plans for period 2014-2020, the municipalities - members of the cluster; National statistical Institute

<sup>1</sup> Shared Values, magazine for industry, clusters and competitiveness, Srednogorie Med Industrial Cluster, august, 2013, p.9.

<sup>2</sup> Municipal strategy for the Sofia district's development for period 2014–2020, p. 45.



The data presented in table 3 show that the average annual wage /salary for the country and the most of the municipalities of Srednogorie cluster members increases. The residents of the municipalities on whose territory they are mining and processing of copper and gold-containing ore (Pirdop, Mirkovo and Chelopech, Panagyurishte) receive the highest salaries compared to the average salary in Sofia-district (8360 BGN in 2011); mining industry (13 804 BGN) and average of Bulgaria (8,230 BGN). In the municipalities of Anton, Chavdar, Zlatitsa the average wage is lower than the national average.

The study shows endurance and increase in the income for the employees working in the mineral-raw industry. The average annual wage for the branch's employees in 2012 was 14 860 BGN, which is a medium increase of 22% compared to 2011. The wage for workers and employees in the companies that mine metal minerals (the cluster's mining companies) is also the highest this year.

*Revenue in local budgets.* The cluster's mining firms have a beneficial effect on the development of the cluster's member municipalities as a source of revenues in their local budgets – concession fee. The study showed that the revenues in their local budgets from concessions on the mining of copper and gold-containing ores paid by mining companies, are significant. Beneficial in that direction is the amendment of the bill for underground riches from 2010. The amendment in the division of the concession royalties between the republican and the local budget – 50:50 (with a previous ratio of 70% for the state budget and 30% for the municipalities) with the amendment of the law for underground riches from 2010 significantly increases the revenues in the municipalities.

For the majority of municipalities the revenues from concessions form the main part of the budget – for example, in the Chelopech municipality the share of revenue from concession in the municipal revenues of the local budget is about 80% for the past three years; in the Mirkovo municipality it is approximately 75 % in 2013 and over 90% in 2014.

Table 4

#### Revenues from concession fees in municipalities' local budgets

Municipalities	2012	2013	2014
1. Zlatitsa			
Total municipal revenue (BGN)	2 103 425	1 751 195	2 057 620
Revenue from concession BGN	210 000	176 365	210 000
Share of revenues from concession in total revenue (%)	9.98	10,07	10, 21
2. Mirkovo			
Total municipal revenue (BGN)	1 073 151	1 405 328	1 368 859
Revenue from concession (BGN)	709 957	1 054 820	1 300 000
Share of revenues from concession in total revenue (%)	66.15	75.05	94.96
3. Chelopech			
Total municipal revenue (BGN)	6 333 101	6 270 524	6 100 300
Revenue from concession (BGN)	5 699 408	4 890 000	5 200 000
Share of revenues from concession in total revenue (%)	89.9	77.98	85.24
4. Panagyurishte			
Total municipal revenues (BGN)	7 165 340	6 946 000	6 787 600
Revenue from concession (BGN)	3 738 340	3 489 000	2 919 000
Share of revenues from concession in total revenue%	52. 21	50.20	43. 00

Source: The municipal budgets of the corresponding municipalities, personal calculation

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*Investment in the development of local communities* – supporting the building of local infrastructure – transport, social, communication, etc.

Aside from the fees from concessions, the cluster's leading companies also provide investments for the development of the municipalities and the Srednogie region. More investments are made in order to create a better and sustainable infrastructure that will support the industry. Mining companies contribute to the building of the technical and social infrastructure in cooperation with local authorities. It has a significant impact on the country's future economic growth, regional development and the development of the small municipalities on whose territories copper and gold-containing ores are mined.

Dundee Precious Metals Chelopech realizes a number of initiatives that benefit the local public and the improvement of the quality of life in Chelopech in the Srednogie region. With investments of over 1 million BGN per year in municipality development programs, better infrastructure and attractive business conditions have been ensured, and social, cultural and educational projects are being realized.

There is a formal process in Chelopech that includes an initial demand for finance from the municipalities in the Srednogie region, namely Chelopech, Chavdar, Zlatitsa and Pirdop, for activities that have to be realized the coming year. The demands are examined by the higher authorities and after discussions with each municipality and the corresponding mayors, a yearly contract is signed that describes the activities which have to be realized throughout the year. An organization of an official tendering procedure follows, after which contracts are signed with qualified sub-executives before any kind of work is started. There is an employee in Dundee Precious Metals Chelopech who is in charge of managing and overseeing this process.

Aurubis Bulgaria defines its role in the development of the region and the country primarily as economical – it generates GDP and creates a different image for the business in regards to means of living, employment with high payment and investments. This is the second largest company in the country, a major corporate contributor and one of the biggest investors in the Srednogie region. «Here we contribute to the high living standards in comparison with other parts of the country – we have 810 employees working for us and more than 1500 workers from outside firms, primarily from the region» said the executive Director of Aurubis Bulgaria Tim Kurt<sup>1</sup>.

Regardless of the positive impact that the Srednogie Med cluster has on the economic development in the region, the municipalities of Pirdop, Zlatitsa, Mirkovo, Chelopech, Anton and Chavdar fall into the group of areas for targeted support. In accordance with the Regional Development Act, areas for targeted support are the municipalities with limited potential and small population size, which have serious difficulties with social-economic development. They are defined through evaluation based on 8 types of criteria and indicators specified by the Regional Development Act. The municipalities that fulfill most of the criteria are the most slowly developing and they are expected to become subject to special care by the country's regional policy in order to improve their social-economic status.

The analysis shows that the cluster's member municipalities on whose territory the mining firms are operating, show better economic results compared to the other municipalities in the Sofia district. They fall into the areas for targeted support on one or two out of a total of eight indicators and those are first and foremost demographic indicators. The municipalities of Chelopech and Pirdop fulfill only one of the eight indicators – population density of under 70 people per square kilometer; the Mirkovo municipality fulfills tree indicators (age dependence coefficient of over 120% of the average value for the state for the

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<sup>1</sup> Shared Values, magazine for industry, clusters and competitiveness, Srednogie Med Industrial Cluster, august, 2013, p. 18.

past three years; population density of under 70 people per square kilometer; over 30% of the populated areas do not have a sewer system built). The municipalities of Chavdar, Zlatitsa and Anton fall into the areas for targeted support by four of a total of eight indicators (including average wage). The unemployment rate in all municipalities is lower than the state's average.

The results of the research indicate that at the current stage for the majority of the cluster's municipalities the large companies operating on their territory are the main and only alternative for their economic development (especially for the smaller municipalities – Chelopech, Mirkovo, Chavdar, Anton). The Srednogie region's strong dependence on the large companies in the mining and processing of copper and gold-containing ores creates unfavorable perspectives for its future development.

Realizing the risks for the region's economic and social development, the «Srednogie Med Industrial Cluster» association is carrying joint activities by all stakeholders in the development of the «Srednogie 2020 – A Real Vision of the Future» strategy and the Strategy for Employment in the Srednogie Region by 2030 – according to Pencho Gerov, the mayor of the Chavdar municipality (the smallest in Bulgaria), it will answer a lot of questions: demographic status, health care, education and employment.

Education is a priority related to the cluster's activity and the development of the region. There is a long-time partnership between business and education within the boundaries of the Srednogie region – numerous joint projects of the cluster's member municipalities with the high schools in Chelopech, Zlatitsa, Pirdop, Panagyurishte. Forthcoming is the preparation of an investment strategy for creating an educational institution in the Srednogie region – «The Srednogie College». The college's main purpose is to help overcome the shortage of professional staff for the industry; developing technical experts of classic and new professions; attracting teachers and young people to the region – branding and marketing the regional college in the country and abroad; expanding the partnership with educational institutions – integration with the University of Mining and Geology, the University of Chemistry and Technology, and the Technical University.

## CONCLUSIONS

We can make the following main conclusion on the grounds of the conducted research:

The Srednogie Med Industrial Cluster's potential for creating a sustainable regional development is limited; firstly, because the resources are non-renewable and limited to deposit depletion; and secondly, the products created in the cluster have low added value, ores/raw materials are being exported, and no products with higher added value are created. The risks lying before the future development of the cluster's leading enterprises are tied to the market's conjuncture and the EU's eco standards.

In the long run, the production and export of raw materials cannot be a driving force for a higher living standard in the municipalities on whose territory copper and gold-containing ores are mined and processed and for the Srednogie region's development.

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# TERRITORIAL PARTNERSHIPS AND THE DEVELOPMENT OF REGIONAL TOURISM CLUSTERS IN POLAND

*Piotr Rzeńca*<sup>1</sup>

## INTRODUCTION

Current environmental and socio-economic transformations, that are both the cause and effect of the opposing globalization and territorialisation processes, issue difficult to meet challenges of an ever-increasing competition to territorial units, institutions and organisations, including territorial partnerships representing local societies. The necessity of building an information society and economy based on knowledge, which is legitimized by the European Union in the Lisbon strategy at the level of Member States and regions, and the need for the development of network cooperation in local and regional terms, contributes to the development of programmes and institutional support systems. An important element is organizational solutions that serve stimulation of the development of socio-economic processes – clusters and territorial partnerships. Clustering processes constitute a key attribute of the socio-economic development strategy on a global, European Union, state and regional scale, and they are identified as a basic and priority activity (Malina 2014). Regardless of the defining way and scope of spatial impact, clusters give to objects (places), companies and local societies a competitive advantage through the possibility of the improvement of service quality. On the other hand, territorial partnerships understood as local coalitions of the entities and persons cooperating for the sake of the development of certain sub-regions, are a tool for the accomplishment of the public – private partnership idea in the management of resources at a local level (Wasielowski 2009). Clusters and territorial partnerships are considered to be effective tools of activation of the social and economic development and dynamization and inspiration for local societies, they provide favourable conditions for specialization in activities, support innovations and investments. They balance the oscillation of the economic sinusoid that accompanies the stagnation after a financial crisis at the beginning of the nineteenth century. The impact of clusters on a regional and local development to a great extent is conditioned by the specific conditions of the environment within which they function. Favourable conditions for developing and activity of clusters include those environments which developed the foundations of cooperation networks in the form of active territorial partnerships.

Clusters are initiatives that can bring profits both to the institutions creating them and to the society of a region. They are present in all economic sectors, traditional sectors and high technology sectors. Clustering is very important and it has possibilities to develop also in the tourism branch – especially in regions that do not have distinctive tourist values and are forced to practise sophisticated and innovative methods of promotion and organisation of their own sales of a non-standard tourist offer.

The essence of the present tourist product, which consists of complementary services usually provided by various specialized entities, extorts cooperation within the value chain (Kusa 2008). Integration of the activities of the institutions focused on territorial partnerships and cluster structures may contribute to the development of local environments and regional economies.

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## THE DESCRIPTION OF CLUSTERS PHENOMENON AND THEIR ROLE IN THE PERSPECTIVE OF REGIONAL DEVELOPMENT

The majority of the cluster's definitions as a major indicator highlight the focus on a specific area of co-dependent enterprises functioning in the same or related industrial sectors or services, interactions and functional connections between companies and also a cross-sector dimension of a cluster that covers with its scope horizontal and vertical connections. In a maze of various approaches, two main and most popular among researchers' trends of discussions concerning cluster phenomenon, their definition and character can be indicated. The first view clearly focuses on Porter's works and it highlights mostly the relations of competition and cooperation and the location problem. The second trend, which is a consequence of the approach applied by OECD, emphasizes the network concept of a cluster (Nowakowska, 2011).

According to Porter's definition (2001), a cluster is «a geographical agglomeration of interrelated companies, specialized suppliers, service providers, companies functioning in related sectors and institutions (e.g. universities, trade associations) connected with them in particular fields, competing but also cooperating». In reference books, there is a plethora of other definitions of a cluster.<sup>1</sup> A significant feature of the relations between entities in a cluster is co-competition – a situation which appears when a cooperation network consisting of current competitors is developed on purpose, where:

- a community of interests and willingness to confront bring about the need for making formal agreements,
- participants cooperate in order to achieve common benefits, however, they continue to be competitors,
- the competitive part of the competitive relation is unformalized (Cygler, 2007)

Formation and development of clusters in a region influences positively the competitiveness and innovation of the economy through the formation of a market of specialized production factors, stimulation of knowledge transfer, learning processes, and innovation absorption and generation. Spatial proximity, interaction between different entities and including into cluster structures small and medium enterprises, due to the indirect accomplishment of the benefit scale, leads to their higher specialization and effective functioning. Significant is also the positive impact on natural environment through the investments made by cooperating entities and initiatives for the sake of nature conservation and developing and implementing ecological innovations (*Kierunki rozwoju klastrów...*, 2013).

Clusters because of the advanced cooperation between the participants may ensure the synergy effect and competitive advantage to regions through the activity in different fields (infrastructure, knowledge transfer, scientific research). When on a given area, among related entities, the competition increases, increases also the probability of strengthening the bonds between these entities. This leads to an increase in the effectiveness, as due to effective cooperation, the possessed production means are used, investment possibilities increase, common marketing and lobbying which is extremely significant in creating regional policy, develop. Formal and informal relations result in an increased trust between trade partners and contribute to a faster transfer of new technologies and more effective diffusion of knowledge and innovation. Thus, according to Rzewuski (2007), resource of the essential specialized knowledge, available for all the entities with-

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<sup>1</sup> In the context of the cluster theory, to the group of terms semantically similar belong: circles, industrial bundles and local production systems (Fr. *systemes productifs locaux*) and cluster initiatives (considered sometimes a synonym for clusters). Moreover, this theory is connected with interpretations of regional innovation systems, innovative networks, industrial district etc. (Rzewuski 2007).

in a cluster, increases. The multiplicity of cooperative entities within a branch allows for simultaneous activity in the same development directions with the independence of the units and diversification of their activity.

During the last decade, in Poland, a constant increase in the number of clusters and cluster initiatives has been observed. Most frequently, they have been initiated by enterprises, which prove their level of self-organization and cooperation of the business environment. Organizations functioning in the business environment (e.g. regional development agencies, associations, foundations) and research and development units, and entities from the knowledge sector are very active (*Benchmarking klastrów...*, 2012). Until 2012, over 200 cluster initiatives have been formed altogether. The analysis of the branch structure of Polish cluster initiatives shows that they function both in branches that are considered to be innovative and in those which are more traditional. Tourism sector with its 27 initiatives has been ranked as a challenger just after the ICT branch (28 initiatives) (*Klustry w Polsce...*, 2012).

### **TERRITORIAL PARTNERSHIP AS A DEVELOPMENT TOOL IN THE LOCAL VIEW**

In the references concerning regional and local development the term «partnership» is usually used with reference to the cooperation of different entities and people for the sake of the commonly defined aims, usually connected with a social or (and) economic development and also in the context of commissioning (co-funding) services and public investments to entities outside the public sector (Pastuszka, 2005). According to Woźniak (2002), a partnership is the highest form of social participation, which begins with a common analysis and hierarchization of social needs and common planning of the way to meet these needs or solve the appearing problems. Woźniak mentions the evolution of cooperation from the short-term cooperation, through the long-term cooperation and finally the most advanced partnership. Partnership defines the process of developing permanent connections between entities and a group way of undertaking decisions in order to reach a *consensus*, beginning with the analysis and hierarchization of local society needs, through planning the way to meet these needs and a solution of the appearing problems. These activities should be a consequence of negotiations and the voluntarily mutual agreement of the parties taking part in this process (Furmankiewicz, Królikowska, 2010). These terms imply the importance of self-organization processes of a group which in this way reaches new development structures that influence a more effective way of meeting the local society needs.

If the cooperation concerns entities and activities on a particular, geographically dense area, it is called a territorial partnership<sup>1</sup>. The scope of territorial partnership may include a part or the entire commune, several communes or a powiat (local partnership) or regional (activities concerning a region). In the references, international partnerships including e.g. international and borderland cooperation of the administrative units and local societies (e.g. partner cities) are also mentioned (Furmankiewicz, 2006). In the main programmes supporting this kind of cooperation (a Pilot Programme LEADER+) the territorial scope of a partnership has usually been designated by the borders of the participating communes (Furmankiewicz, Królikowska, 2010).

Partners can be entities that represent different economic sectors: public authorities, non-governmental organizations or enterprises (Hadyński, 2006). In case of cooperation of the entities that represent different economic sectors, it is an intersectoral partnership, how-

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<sup>1</sup> In English references appears a term «area-based partnership».

ever, it is indicated that the most convenient, for the development processes, is «three-sectoral» partnership (OECD, 1990). Territorial partnership can be then defined as a voluntary open agreement of at least three autonomous partners representing at least two sectors (out of three: public, private, non-governmental) that together accomplish long-term activities for the sake of a certain territory (Hadyński, 2006), usually designated by the borders of the participating local governments, improving them and monitoring and retaining the equality principle in sharing the resources, responsibilities, risk and benefits (Biderman i in., 2004; Furmankiewicz, Królikowska, 2010).

### **THE ROLE OF TERRITORIAL PARTNERSHIP IN THE LOCAL DEVELOPMENT**

In the references, the advantages of the concept of organized intersectoral cooperation in the management of local resources and local development are indicated, at the same time the threats that may bring the distortion of the partnership idea are enumerated (Duriasz-Bułhak, Milewski, 2003; Kamiński, 2006). To the benefits connected with an increase in effectiveness, considered particularly in the economic sciences, belong phenomena resulting mainly from general advantages of functioning within a group, among others the synergy effect, scale effect, critical mass effect, reduction of transactional costs of the enterprises, particularly those connected with the duplicating activities, supporting the development of the economic «value added» in a certain sub-region, increase in the competitiveness of a region due to the strategic activities of a group (Kozarowicz, Panasiewicz, 1998). Partnership features connected with the «integration» allow connecting the fragmented organizational landscape, and thus concern the support for cooperation of various contractors. Moreover, the benefits may include:

- the development of new connections between local institutions which increase the exchange of information and coordination of activities;
- facilitation of the development of coordinated operational strategies for specific areas within the partnership influence, which is beneficial for the accomplishment of long-term purposes;
- reduction of conflicts between local entities through the development of mutual trust;
- strengthening local identification (regional identity) of inhabitants with a region;
- connecting different resources in order to achieve common aims.

Due to the cooperation in a partnership, local entities begin to accomplish not only their own goals, but their activities are included in strategic purposes of a partnership and thus they take part of the responsibility for the accomplishment of the commonly established long-term plans. Theoretically, partnerships are to support the balance of influence of different interest groups e.g. through the implementation of democratic processes of making decisions (concerning strategic actions within the partnership's territory) with the participation of local organizations. Furthermore, emphasized is the role of partnerships in an increase of social participation in the management of local resources, stimulating the activity and enterprise of local societies, sensitizing the authorities and public entities to social needs, supporting the innovation of activities by taking up risk of the accomplishment of local ideas and untypical projects.

One of the threats resulting from the activity of territorial partnerships is the so-called «municipalization», when local authorities have the main impact on the decisions and activities of a group, they can use partnerships for obtaining funds on their own tasks (connected with the needs of the ruling elite) and put aside the inhabitants' needs. One of the main aims of territorial partnerships, i.e. an increase of social participation, is not achieved (Halamska 2005). Another threat in partnerships functioning is their tendency to



accomplish short-term aims (Shucksmith, 2000), which do not always agree with local strategies, which among others results from scarce own resources and the necessity to adapt to aims appointed by grant funds.

### **THE DEVELOPMENT OF TERRITORIAL PARTNERSHIPS IN POLAND. DESCRIPTION OF LOCAL ACTION GROUPS AS THE BASIC FORMS OF A TERRITORIAL PARTNERSHIP IN POLAND**

First programmes supporting the development of territorial intersectoral cooperation were accomplished in the eighties of the twentieth century in New Zealand, Canada and the USA (OECD, 1990). In Poland first forms of partnerships were formed between 1994 and 1998 as a part of the Local Initiatives Programme. Local Committees that were founded at that time were not formal organizations and were advisory. They gathered representatives of local elites and a greater participation of the society in their activities was not possible. In that case, it was just «partnership cooperation» (Gorzela, 2001). As the first expression of classical forms of territorial partnerships, different from the contemporary canon, was considered one of the oldest over-commune organizations that was using the cooperation of representatives of different sectors in Poland and which was set up in 1994 – the Regional Agri-Industrial Association «Dolina Strugu», at first with a headquarters in Tyczyn. This organization developed a formalized form of cooperation between the local activists, representatives of local authorities and local non-governmental organizations in the area of four communes, following the experiences of local action groups from the Western Europe.

A basis for the further development of territorial partnerships in Poland was an increase in the number of non-governmental organizations, which took place between 1995 and 2000. Local tourism organizations were also a significant factor for the initiation of intersectoral cooperation, however, their role in the development of rural areas was scarce, and the scope of the activity was restricted to one subject – tourism. With some exceptions, later they were not entities that would be significantly involved in the development of typical territorial partnerships (Table 1).

*Table 1*

#### **Selected programmes supporting the development of territorial partnerships**

<b>Years</b>	<b>Programme</b>	<b>Substantive and spatial scope of the programme</b>
1998–2000	Local Partnership Model	Support for intersectoral cooperation for the sake of labour market by US Department of Labor and implemented in śląskie and małopolskie voivodeships.
2001–2002	British Know-How Fund Project	a project teaching the development of territorial partnerships in rural environment and working out effective structures of the representation of local society, accomplished in świętokrzyskie voivodeship
2002–2003	Programme for implementing a local partnership model in Poland 2002–2003	A programme coordinated by the Institute of Cooperation and Local Partnership in Katowice on the basis of the agreement of the Ministry of Labour and Social Policy with US Department of Labor – it assumed an implementation of the so-called local partnership model in three voivodeships: małopolskie, pomorskie and lubelskie. The main guidelines: the development of intersectoral partnership and local cooperation due to the activation of local institutions and societies for the sake of the solution, at a local level, of problems connected with socio-economic changes
2003	Pilot programme «Local partners»	A Project of the Association of the School for Leaders and Friedrich Ebert Foundation that assumed promotion of the partnership idea as a way to support local development. Scope – poviats: łomżyński and zambrowski (podlaskie voivodeship) and poviats: krośnieński and jasielski (podkarpackie voivodeship)

Years	Programme	Substantive and spatial scope of the programme
2002–2004	Phare 2000 programme – Social and Economic Cohesion	A component of the Human Resources Development Project, implemented on the request of the Ministry of Labour and Social Policy by the Polish Agency for Enterprise Development. Within the programme, among others, the process of local agreement development for the sake of employment at a poviats level was supported. The activity included the following voivodeships: lubelskie, podkarpackie, podlaskie and warmińsko-mazurskie.
	«Intersectoral partnership development in nature conservation planning»	A project within other Phare sub-programmes focused on nature conservation needs. The acquired contacts had a great significance in the development of trust and relations between local entities and resulted in the development e.g. Kaczawski Partnership

Source: own work based on: Foeller 2003, Furmankiewicz i Foryś 2006, Furmankiewicz, Królikowska 2010.

The greatest impact on the development and promotion of intersectoral local cooperation in the management of resources, strategic planning and the accomplishment of certain projects in the rural areas had three consecutive stages of the Community Initiative LEADER<sup>1</sup> of the European Commission, implemented since 1991. It had a key meaning for the development of this type of cooperation forms, not only in the EU member states, but in consequence, also for the progressing European integration. In this initiative, a new approach to the solution of countryside problems has been applied. In this approach, the compilation of a strategy and making decisions concerning the accomplished activities was handed over to local societies and entities. It has been stated that this group has the greatest knowledge about the uniqueness of a certain sub-region, resources and own needs, not the central or regional authorities. Actions of the formed local coalitions called in the programme «Local Action Groups» (LAG) were based on an intersectoral cooperation of the entities and persons representing different economic sectors.

The philosophy of the LEADER approach was based on a promotion of public-private partnership in planning and accomplishing the activities at a local level. Stimulation of the local cooperation for the sake of the development of designated areas was a result of abandoning the hierarchical top-down and redistributive political system for a system based on a stimulation of endogenic processes and cooperative structures, with an increasing role of social participation in making decisions and the role of local resources in socio-economic development (Kamiński, Kwatera, 2005; Furmankiewicz, 2006).

As a part of the Community Initiative LEADER and the programmes following it<sup>2</sup>, the so-called Local Action Groups (LAG) have been created, they were local intersectoral coalitions for the sake of the development of a certain territory (of rural areas), which due to preparing their own development strategies are aid beneficiaries and institutions responsible for expending the donation for local projects (Halamska, 2005).

Local Action Groups are local coalitions (groups) of entities and persons cooperating for the sake of socio-economic development of certain sub-regions (taking up an area of at least one commune but most often from a few to a dozen or so communes). The majority of territorial partnerships in Poland are located in typical rural areas, which is a direct effect of three consecutive Community Initiatives LEADER (1991–2006) mentioned above. Their aim was to support the multifunctional development of rural areas and activation of local societies<sup>3</sup>. According to the programme's criteria, in the management structure of a founded organisation, representatives of the private sector and non-governmental sector were to

<sup>1</sup> From French: Liaison Entre Actions de Développement de l'Economie Rurale.

<sup>2</sup> Polish Pilot Programme LEADER+ was officially an independent programme.

<sup>3</sup> In the European Union, Local Action Groups in the so-called programming period 2007–2013 obtained a considerable financial support from the so-called Axis 4 of the Rural Development Programme (Furmankiewicz, Królikowska 2010).

outnumber, on the other hand, a partnership area designated according to the administrative scope of the associated communes should be characterized by a historical, cultural, economic and natural coherence. It was to be inhabited by between 10 000 and 100 000 people, and the population density could not exceed 150 persons per km<sup>2</sup> (the Ministry of Agricultural and Rural Development 2004).

In Poland in 2007 in the rural areas there were about 200 Local Action Groups and two years later in the report of the Ministry of Agricultural and Rural Development, already 338 partnerships of this type were mentioned, they included over 90% of the rural and urban-rural communes in Poland. In years 2012–2014, the number of LAG amounted to 336 partnerships (*Katalog LGD...*, 2012).

### **REGIONAL AND LOCAL TOURISM ORGANISATIONS AND LOCAL ACTION GROUPS AS AN EXAMPLE OF THE MEETING POINT OF REGIONAL CLUSTER INITIATIVES AND TERRITORIAL PARTNERSHIPS IN THE LOCAL VIEW**

The tourism branch is mainly predisposed to cooperation because of its heterogenic character and market requirements of developing a complex tourist product. The specificity of the local tourism market causes that within the activity of tourist enterprises one can identify both the phenomenon of competition and cooperation. The development processes and final features of a tourist product as a package of services and facilities aimed at tourists result in the fact that, in order to obtain profits, entertainment facilities and institutions, recreation, information and insurance institutions that usually compete, start to cooperate. An essential element of cooperation is a constant flow of knowledge and information. Their availability for the entities of tourism economy is a condition for an appropriate development and non diverging from the level of quality offered by other entities of a certain production chain (Rzewuski, 2007).

Present tourism, in a plethora of local government units, becomes a significant area of the accomplishment of economic development. Due to competitive relations it may be, and in many areas it is, an effective tool that increases the competitiveness and innovation of regional and local economies that want to reach a global level in the scope of the quality of tourist service, the scope of services and the scope of tourist product innovation.

In Poland a gradual increase in the number of tourism clusters can be observed. At the national level in 2009 there were 11 tourism clusters, two years later almost twice as many of them were identified (21 tourism clusters), and in 2012 six more (Sikora, 2012). Clusters can be developed at grass-roots level, at the initiative of potential cluster members, or top-down as a system element of regional policy. In Poland, generally grass-roots cluster initiatives dominate, however, according to Staszewska (2009), every tourism cluster existing in 2009 was developed as a result of a top-down initiative which may imply poor prognosis for their further activity. To tourism clusters join in mainly micro and small traditional businesses that are characterized by a high level of mistrust to usually top-down cluster initiatives (Sikora, 2012).

In Poland since the beginning of 2000, there has been a three-stage system of tourism organizations. It is based on an activity of Polish Tourist Organisation (PTO) at a central level and regional and local tourism organizations (RTO and LTO). Regional tourism organizations take up cooperation with public administration institutions, local government bodies, business entities operating in the scope of tourism, tourist associations and entities accomplishing the aims and tasks in the scope of promotion and tourism development. Their main tasks are: creating and making public the tourist image of the voivodeships, popularization and development of tourism in voivodeships, stimulating of the creation and development and raising the

quality level of the tourist product, developing a coherent system of tourism and voivodeship promotion within the country and abroad by the publishing activity, participation in fairs, organization of workshops and development of the accessibility to tourist information. Due to the need for networking the regional tourism economy, a crucial task is to stimulate the development of local structures for promotion and tourist product development, applying and conducting courses, industry trainings and studio events with an active participation of various entities, including those that are non-members of the organization. Regional tourism organizations do not participate directly in the development of tourist products, they focus on the final elements of the process that is on their promotion and advertising.

Local and regional tourism organisations are not equipped with tools that would enable them skilful and effective functioning. These organizations have a limited budget and their existence to a large extent depends on the number and entrepreneurship of the members. The scope and effectiveness of the activities of RTO and LTO depends mainly on the activity, creativity and competence of the members, but also on their willingness of cooperation and involvement in e.g. financial structures that serve raising EU funds or searching for access paths to sponsors (Table 2).

Table 2

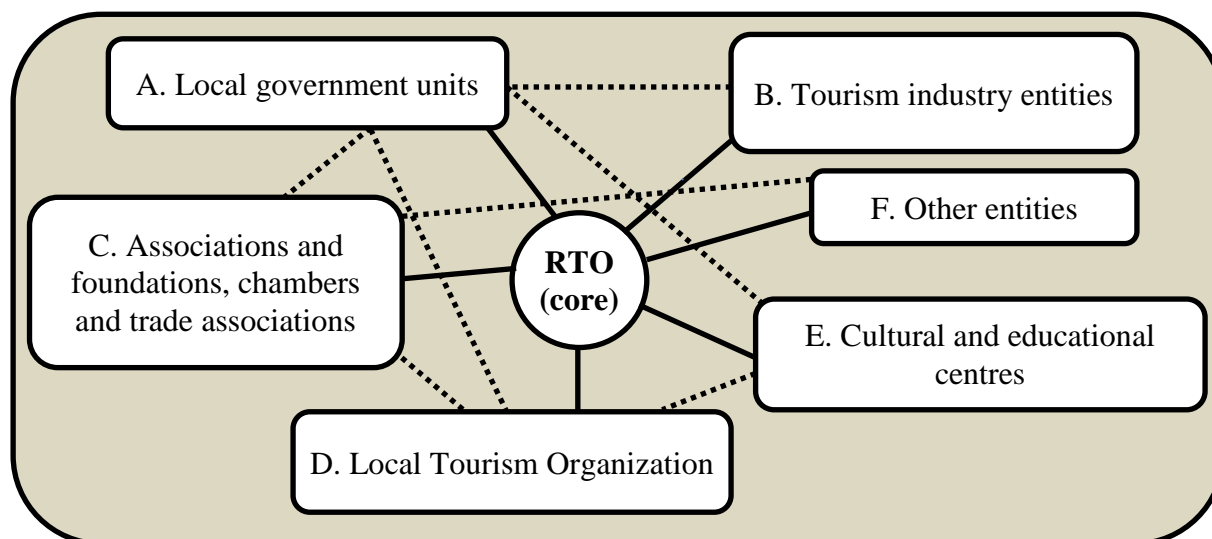
### The members' structure of the selected regional tourism organisations in 2014

	Kind of entity	RTO ŁV		MTO		RTO Świętokrzyskie	
		Number	%	Number	%	Number	%
A.	Local government units	21	26,9	41	34,2	54	34,4
B.	Tourism industry entities	22	28,2	36	30,0	43	27,4
C.	Associations and foundations, chambers and trade associations	21	26,9	28	23,3	32	20,4
D.	Local tourism organisations	3	3,8	6	5,0	6	3,8
E.	Cultural and educational centres	6	7,7	1	0,8	10	6,4
F.	Other entities	5	6,4	8	6,7	12	7,6

Source: own work based on annual reports from the activities of: RTO in Łódź Voivodeship, Małopolska Tourism Organisation (małopolskie voivodeship) i Świętokrzyskie Regional Tourism Organisation (świętokrzyskie voivodeship).

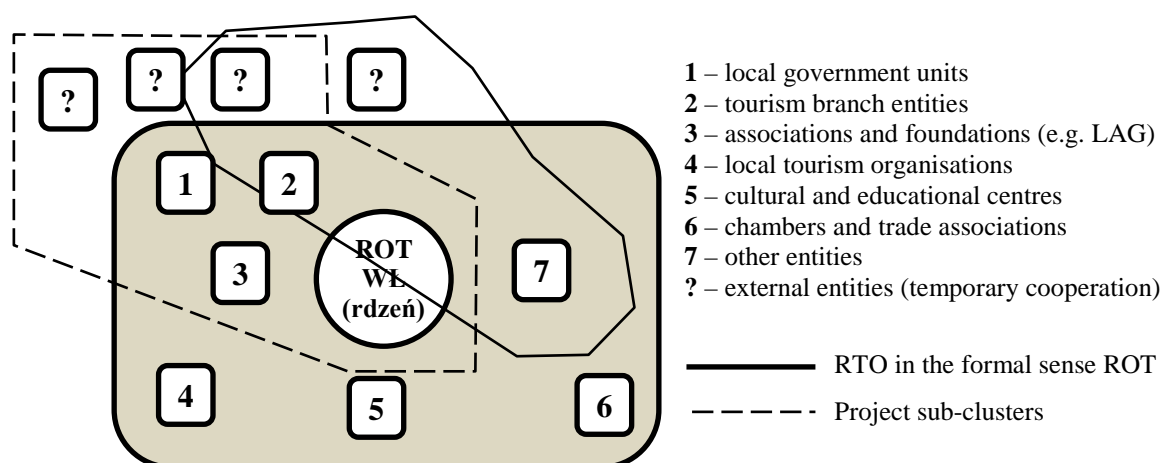
A characteristic feature of regional tourism organizations is a great variety of industries represented by the members with a parallel stability of the number of entities and a similar interregional organization structure. It may suggest that the focus of associations is on an inter-branch cooperation, rather than on intraregional competition. These organizations, especially at the regional level, can be treated as cluster-creating entities and at the same time as cluster germs (cluster core) (Figure1).

Regional tourism organizations as cluster initiatives seem to be more flexible formations in their forms than clusters in other economical sectors, because of the cooperation of the entities of many different branches and because of more casual connections and relations of the competition between entities. At the same time, according to the representatives of the Regional Tourism Organisation in Lodz Voivodeship (RTO ŁV), termination of the direct formalized cooperation, in case of resignation or excluding from the membership of regional or local tourism organization, does not degrade the already formed inter-entity connections. Further cooperation has an informal character; it does not exclude further cooperation of the former RTO ŁV members within certain projects. Due to a non-formalized status of RTO ŁV as a cluster, an appropriate term seems to be a cluster initiative or a quasi-cluster structure.



Source: own work

**Fig. 1.** Network of the main and marginal connections within Regional Tourism Organizations



Source: own work

**Fig. 2.** An exemplary project «sub-cluster» in comparison with RTO structure

RTOs as a core of cluster initiatives, depending on present needs, together form smaller clusters which in a more flexible way raise their potential (Figure 2). In order to apply for project competition, mainly for EU funds, they form special teams which include also the institutions that are not their members but in a particular time they may contribute to a positive outcome of the competition. Structures developed at that time may be defined as «sub-clusters» and after a completion of project works they are dissolved. As positive effects one can assume an increase in the public awareness of the role of regional tourism organization and more permanent RTOs relations, which result in further applications of some entities to organizations.

In case of RTOs, two opposing, seemingly independent, trajectories of the development of regional cooperation can be indicated. On one hand, by the means of formal and legal appeals, a leader (core) of the system has been appointed. It holds together the activities of individual permanent members of the organizations and institutions that are sporadic

cally included in the projects of the tourism branch, on the other hand, there are diversified entities that join the system completely voluntarily and support it mainly by their expertise and practice. Legal and organizational status of RTO creates favourable conditions for the stability of the developed network initiative. Even if some points of a network undergo destruction or liquidation because of resignation or discontinuation of the activity or conflicts of interest, they can be exchanged or substituted by another system of network connections. «Sub-clusters» developed for specific activities are characterized by a kind of ephemerality, which could be described as «project».

A number of LAG cooperating with RTO is still quite moderate. The presence of LAG<sup>1</sup> among the members of RTO entities expands the spatial (territorial) scope of the activities of this body and builds a kind of a critical mass due to which it could become a formal tourism cluster. Local Action Groups focus their activities mainly on thematic areas included in Local Development Strategies such as: farm tourism and rural tourism, cultural heritage conservation, culinary heritage conservation, use of natural resources, ecology and environment protection, use of renewable energy resources, enterprise development and local product promotion (Table 3).

Table 3

### Comparison of the features of regional tourism organisations and territorial partnerships

Organisation features	RTO	LAG
Freedom of becoming a member	yes	yes
Intersectoral character	yes	to a small extent
Duration of activities	long-term- and medium term	medium- and short-term
Activity for the sake of socio-economic development of a certain territory	yes	yes
Self-organisation level of a group	average	high
Coopetition phenomenon	yes	no
Interregional and international projects	occasionally	occasionally
Local government participation	average	high

Source: own work

In Łódź voivodeship, Local Action Group «River Grabi Valley» introduces into the RTO ŁV structure nine communes<sup>2</sup> (Buczek, Dłutów, Dobroń, Drużbice, Łask, Sędziejowice, Widawa, Wodzierady, Zelów), PRYM Foundation – five communes (Dalików, Łęczyca, Parzęczew, Wartkowice, Zgierz), LAG «Turystyczna Podkowa» – five communes (Dobczyce, Pcim, Raciechowice, Siepraw, Wiśniowa, małopolskie voivodeship). In three voivodeships (małopolskie, łódzkie, świętokrzyskie), in regional tourism organisations, there are two LAG in every voivodeship (altogether 6), which additionally, in the scope of their activity undertake interregional and international projects (together with LAG from Austria, Belgium, Sweden, Germany).

<sup>1</sup> When compared, LAG are rated among the group of «Associations and foundations, chambers and trade associations».

<sup>2</sup> Commune – in Poland, it is the smallest unit of the territorial division of the country.

## CONCLUSIONS

A system of cooperation in the scope of tourism organisations in Poland creates favourable conditions for the development of networks and cooperative sub-clusters at a local and regional level. RTO activities, which are a kind of a cooperative platform between partners for the sake of tourism promotion, are a good example. These organizations initiate activities for the sake of tourism development at a local and regional level by networking cooperation between branch entities as well as they contribute to the development of «project sub-clusters».

Connection of territorial partnerships with clusters or cluster-like institutions may have positive effects in the socio-economic revival processes both for small territories with small population as well as territorial units and arbitrarily designated regions. Cooperation between action groups that know the area and its problems inside out and local and regional tourism organization brings positive synergy effects. It is not without significance for the local action groups. The majority of them, with the activity for the sake of the tourism development as one of their main aims, can more easily justify their efforts to get EU funds. Taking into consideration the year 2014, it has to be stated that a little number of local action groups (territorial partnerships) has been involved in cooperation with regional and local tourism organizations, which is justified by other, outdated configurations of cooperation forms within particular territories. A detailed analysis of a territorial-cluster cooperation network formed at the meeting point of RTO and LAG is very complex because of indirect connections between individual institutions grouped in RTO and the same and other entities connected in territorial partnerships. Undeniable value and strength of such networks is alternativeness, duplication and diversity of cooperation networks, which is favourable for the durability of a certain system, even in a situation when some elements fall out. Cooperation does not disappear, only the configuration of the cooperating entities and institutions changes.

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# **TOURISM LOCAL PRODUCTION SYSTEMS IN THE SLOVAK REPUBLIC**

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Tourism is an important part of national and regional economy. This sector and its importance have been increasing in the Slovak Republic. Tourism industry employs a lot of people, creates a part of GDP and helps to develop regions and the whole country. Effective way of tourism development is cooperation among tourism entrepreneurs and local or regional self-governments. There are many forms how is possible to cooperate within tourism development. Our paper is aimed on tourism local production systems in the Slovak Republic. First part of the paper is theoretically oriented; it defines the basic terms of LPS. Second part of the paper contains analysis of tourism oriented local production systems in Slovakia. Third part of the paper explains importance of tourism local production systems (LPS) in Slovakia.

## **INTRODUCTION**

The importance of tourism is still highlighted by the official reports of UWTO (World Tourism Organization), national tourism agencies but also by the official statements of the European Union. The development of competitive sustainable, responsible and high – quality tourism is even the aim of the European tourism policy; especially because of its significant share on the GDP. According to UNWTO world tourism currently contributes to 30% of the world services export, creates 9% of GDP and creates over 8% of the jobs. In the most well developed countries, tourism development brings significant economic benefits. The tourism sector has an ability to create conditions for development of other related sectors of the national economy. There exists a positive relationship among the tourism sector and labor market because the tourism is a sector with significant absorption capacity of the unneeded excess labor from primary and secondary sector. In Slovakia, there are a lot of possibilities for development of tourism which are not fully exploited. However, the positive influence of tourism on the development of national and regional economies is clear and indisputable.

## **TOURISM LOCAL PRODUCTION SYSTEMS AND THEIR IMPORTANCE FOR THE ECONOMIC AND SOCIAL DEVELOPMENT**

Tourism as a part of the economy in the Europe has a strong position. It generates over 10% of EU GDP (directly or indirectly) employing 9.7 million citizens in 1.8 million businesses (European Union, 2013). In 2013, the tourism sector has developed differently in sub-regions of Europe. The highest growth in international tourist arrivals was recorded in Central and Eastern Europe, with 7% more arrivals (average growth in Europe – 5%, 7% – Ukraine, 10% – Russia, 15% – Belarus, Georgia) (UNWTO, 2014).

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The role of tourism for less developed countries is even more important because it can bring the new opportunities for the further economic and social development of the country. It includes mainly the building necessary infrastructure, net of services and strong network of collaborated stakeholders.

The tourism is closely connected with the destination (territory) which composes of various entities as natural sources, cultural and historical sources, entrepreneurs and organizations of public and private sector provided services and goods consuming in the tourism industry (Patúš, 2012). To develop the tourism, it is necessary to create the product of the destination. If this process is effective, it involves all relevant actors from the public, private and also non-profit sector. All their activities should be controlled and managed from the quality, time and content point of view.

The developed cooperation of all mentioned stakeholders can culminate to establishing the tourism local production system or cluster as a dominant orientation of all activities within the territory. Tourism production system includes all economic activities that contribute to production and distribution of tourism products and services, i.e. products and services that generate tourist experiences; the social groups, cultural features, and physical elements that are incorporated into tourism products and services; and agencies for regulating the commercial behavior and social externalities associated with such production and distribution (Britton, 1991, p. 455–456). The tourism production system characterizes a high concentration of small and medium sized companies and their specialization in the tourism industry. These features are very common with the theory of clusters and industrial districts from Porter (1980, 1985).

The topic of tourism cluster is researched by many experts; e.g. Montfort (2000), Jackson, Murhpy (2002), Beni (2003), Ferreira (2003), Capone (2004), Costa (2005) etc. All authors agree that the tourism cluster is associated with the limited geographical area with interconnected active partners (e.g. companies, institutions, service's providers, suppliers, policy makers, universities, competitors etc.) interconnected in tourism activities. The cooperation among partners, excellent management of the network, and the coordination of the production chain can generate the original product – a touristic destination as a competitive advantage (Beni, 2003, Ferreira, 2003). The role of tourism cluster is to connect SMEs in mutual cooperation resulted in establishing the unique tourism offer. By Soteriades (2012) it can be one of the best available tools in fostering tourism development. Clusters are vital for development of regional economy, increasing the productivity, performance, innovative capacity and local businesses' critical mass (Novelli et al., 2006).

Base on the type of relations between enterprises and institutions a tourism cluster can be established as a horizontal or a vertical one. The horizontal tourism cluster consists of strategic alliances, where agreements can be in the form of agreements between enterprises that have the same principal activity (i.e. among enterprises in field of entertainment, transport and catering) and in the form of agreements between enterprises working with the same group of customer satisfaction, but offering different product components to the customers. The vertical tourism cluster is created as a strategic net with a unilateral supplier-customer relation among the partners in such a way that the object activities of the agreement are fulfilled by one of the parts, which gives its output to the other in exchange for a payment (Rodrigues, 2001, p. 307).

The most important preposition is collaboration as a cluster's main element. However, the natural competition and rivalry is inevitable for the future cluster development especially the innovation process, which bring the higher added value not only for the customer but also for the involved actors (Kindl da Cunha, S., da Cunha, J. C., 2005).

## TOURISM LOCAL PRODUCTION SYSTEMS IN THE SLOVAK REPUBLIC

Several researches (Borseková, 2012; Ministry of Transport, Development and Regional Development of Slovak Republic, 2013; Pompurová, 2011; etc.) have showed that Slovakia and its regions have huge potential for development of tourism and have a potential to become a strong tourism destination. This was confirmed by one of the world tourist guide leaders Lonely Planet that ranked Slovakia in the top 10 countries for travelling in the year 2013. The other very important advantage is that the second biggest city in Slovakia – Košice was the European Capital of Culture for 2013 together with French city Marseille. These two aspects help Slovakia to promote itself and to attract more domestic and especially foreign tourists to Slovakia. Even if there is a really huge tourism potential in Slovak regions we would like to underline that unique tourism potential is not being used efficiently and there are gaps which need to be filled.

In the next part of the paper we analyse tourism potential in Slovak regions. Table 1 shows tourist destinations and UNESCO sites in 8 Slovak NUTS 3 regions.

*Table 1*

### Tourist destinations in the Slovak regions

Administrative Slovak regions	Cultural UNESCO sites	Nature UNESCO sites	No. of identified tourist destinations in form of tourist's regions
Bratislava region	0	0	1
Trnava region	0	0	2
Nitra region	0	0	2
Trenčín region	0	0	2
Žilina region	1+2/8	0	4
Banská Bystrica region	1+1/8	0	4
Prešov region	2+4/8	1	4
Košice region	1+1/8	1	2

*Source:* own workmanship

Slovakia has 7 sites enlisted in the World Heritage List – 5 cultural and 2 natural sites. Among the cultural sites belong following Slovak locations:

1. Historic Town of Banská Štiavnica and the Technical Monuments in its Vicinity – entered to UNESCO World heritage list in 1993. Over the centuries, the town of Banská Štiavnica was visited by many outstanding engineers and scientists who contributed to its fame. The old medieval mining centre grew into a town with Renaissance palaces, 16th-century churches, elegant squares and castles. The urban centre blends into the surrounding landscape, which contains vital relics of the mining and metallurgical activities of the past (<http://whc.unesco.org/en/list/618> ).
2. Levoča, Spišský Hrad and the Associated Cultural Monuments listed in 1993. Spišský Hrad has one of the largest ensembles of 13th and 14th century military, political and religious buildings in Eastern Europe, and its Romanesque and Gothic architecture has remained remarkably intact. The extended site features the addition of the historic town-centre of Levoča founded in the 13th and 14th centuries within fortifications. Most of the site has been preserved and it includes

the 14th century church of St James with its ten alters of the 15th and 16th centuries, a remarkable collection of polychrome works in the Late Gothic style, including an 18.6 metre high alterpiece by completed around 1510 by Master Paul (<http://whc.unesco.org/en/list/620>).

3. Vlkolínec – from 1993 part of UNESCO World heritage. Vlkolínec, situated in the centre of Slovakia, is a remarkably intact settlement of 45 buildings with the traditional features of a central European village. It is the region's most complete group of these kinds of traditional log houses, often found in mountainous areas (<http://whc.unesco.org/en/list/622>).
4. Bardejov Town Conservation Reserve – date of inscription is 2000. Bardejov is a small but exceptionally complete and well-preserved example of a fortified medieval town, which typifies the urbanisation in this region. Among other remarkable features, it also contains a small Jewish quarter around a fine 18th-century synagogue (<http://whc.unesco.org/en/list/973>).
5. Wooden Churches of the Slovak part of the Carpathian Mountain Area – 8 wooden churches are part of UNESCO world heritage from 2008. The Wooden Churches of the Slovak part of Carpathian Mountain Area inscribed on the World Heritage List consist of two Roman Catholic, three Protestant and three Greek Orthodox churches built between the 16th and 18th centuries. The property presents good examples of a rich local tradition of religious architecture, marked by the meeting of Latin and Byzantine cultures. The edifices exhibit some typological variations in their floor plans, interior spaces and external appearance due to their respective religious practices. They bear testimony to the development of major architectural and artistic trends during the period of construction and to their interpretation and adaptation to a specific geographical and cultural context. Interiors are decorated with paintings on the walls and ceilings and other works of art that enrich the cultural significance of the properties (<http://whc.unesco.org/en/list/1273>).

Among natural UNESCO World heritage belong following 2 sites:

6. Caves of Aggtelek Karst and Slovak Karst – date of first inscription was in year 1995, first extension was in 2000 and second in 2008. The variety of formations and the fact that they are concentrated in a restricted area means that the 712 caves currently identified make up a typical temperate-zone karstic system. Because they display an extremely rare combination of tropical and glacial climatic effects, they make it possible to study geological history over tens of millions of years (<http://whc.unesco.org/en/list/725>).
7. Primeval Beech Forests of the Carpathians and the Ancient Beech Forests of Germany – date of inscription was year 2007 and extended in 2011. The Ancient Beech Forests of Germany represent examples of on-going post-glacial biological and ecological evolution of terrestrial ecosystems and are indispensable to understanding the spread of the beech in the Northern Hemisphere across a variety of environments. The new inscription represents the addition of five forests totaling 4,391 hectares that are added to the 29,278 hectares of Slovakian and Ukrainian beech forests inscribed on the World Heritage List in 2007. The tri-national property is now to be known as the Primeval Beech Forests of the Carpathians and the Ancient Beech Forests of Germany (Slovakia, Ukraine, Germany) (<http://whc.unesco.org/en/list/1133>).

In addition to these cultural monuments on the list of intangible heritage by UNESCO – List of Oral and Intangible Heritage of Humanity by UNESCO, is inscribed the typical Slovak musical instrument shepherd's pipe. In addition to these cultural monuments in Slovakia are 127 castles and chateaus. In many regularly held various events and activities.

Slovakia is incredibly diverse taking into regard its compact size. Nature, people and especially historical development gradually brought a breakdown of the territory into regions, each acquiring a specific name. The best known regions include Liptov, Spiš or Orava; however, you can find unique untouched nature together with breath-taking traditions, specialities and culture also in the Gemer or Horehronie regions (slovakia.travel/en/places-to-go/tourist-regions/). In Slovakia there are 21 tourist destinations. Only one of these destinations is in the region of the capital city Bratislava. The region of Bratislava is situated in the south-west of Slovakia and its southern part stretches along the Danube, follows the Slovak-Hungarian border while its western extreme traces the Morava River and simultaneously the Slovak-Austrian border. Four of Slovak regions have two tourist destinations each – Trnava, Nitra, Trenčín and Košice region. In Košice region are located UNESCO sites. Bratislava, Trnava, Nitra and Trenčín region don't have any UNESCO site on their territory. Three Slovak regions – Banská Bystrica, Prešov and Žilina region have four tourist destinations each and also the biggest number of UNESCO places. These 3 regions have also the highest number of tourists in Slovakia. Table 2 shows the overview of tourists' indicators in all Slovak regions.

Table 2

### Statistics of regional tourism in the Slovak Republic

Indicator	Number of overnights in the accommodation premises			Number of accommodation premises			Number of visitors in the accommodation premises			Visitors / number of overnights	Overnights / accommodation premises
	2011	2012	2013	2011	2012	2013	2011	2012	2013	2013	2013
Bratislava Region	1743196	1961389	2184586	203	243	233	879878	939328	1073854	2,03	9375,91
Trnava Region	985625	1083888	1076726	195	281	276	238110	266216	263709	4,08	3901,18
Trenčín Region	928461	964664	972493	249	259	246	240652	244033	238336	4,08	3953,22
Nitra Region	631572	576406	612661	262	322	307	220525	217952	238440	2,57	1995,64
Žilina Region	2227731	2270966	2397984	781	930	882	717041	756621	819016	2,93	2718,80
Banská Bystrica Region	1360168	1341786	1335415	424	527	494	366982	401869	400251	3,34	2703,27
Prešov Region	2027582	2112644	2256759	551	724	701	618470	664863	700248	3,22	3219,34
Košice Region	620403	596457	649947	346	357	346	289435	283180	314651	2,07	1878,46

Source: Slovak Statistical Office, 2014.

As we can see in Table 2, the highest number of visitors has a region with capital city – Bratislava region. Although this region contains only one tourist destination and has smallest size, it has special position because of location capital city. On the other hand as we can see this region has the lowest number of visitors' overnights. The highest number of overnights in the accommodation premises and highest number of accommodation premises have Žilina region, Banská Bystrica region and Prešov region. Žilina region is a leader on the Slovak tourist market.

The issue of the conceptual tourism development in the form of clusters is a very current topic in Slovakia. The Ministry of Transport, Construction and Regional Development of the Slovak Republic sets the strategic aim for tourism development in Slovak Republic

for this decade as «a need of increasing competitiveness of tourism by better exploitation of its potential with intent to balance regional disparities and create new jobs». From the new election period, the Slovak government promised in its program for 2012–2016 to support the institutionalization of stakeholders responsible for the tourism development at national, regional and local level (Program of the Government of the Slovak Republic, 2012) and by this way also to contribute decreasing the regional differences in the economic and social development. However, the first steps were made in 2010, by the Act no. 91/2010 on the promotion of tourism. To the main reasons for the act adoption were the organizational inadequacies and also the lack of financial sources for supporting tourism development. The Act initiated an establishment and operation of local and regional tourism organizations. The organization's tasks are oriented at the development and creations of products, attracting the domestic and foreign customers, marketing and promotion activities, destination branding, planning and coordination's tasks, selling the destination, development of tourism infrastructure (Kuhn, Tomášová, 2011). The financial support which is guaranteed by the act should motivate the tourism stakeholders to cooperate and coordinate their activities in the form of destination management organizations.

The organization of destination management interconnects the entities from the all economic sectors in the field of tourism, or the actors that can influence the tourism development in the territory. It plays a role of coordinator and manager of tourism development based on the partnerships and the participation of the members involved in the organization of destination management (actors in tourism in the territory). The main tasks of the organization is to elaborate the conceptual documents for the tourism development and its implementation; promote the destination, realize marketing activities; to create, promote and manage the tourism products; to create, sustain the integrated information system and to prepare and submit the project of tourism development. The organizations are responsible to declare their activities to the Ministry of Transport, Construction and Regional Development of Slovak Republic (Act no. 91/2010 on the promotion of tourism).

Nowadays, there are established 34 local organizations of destination management, 3 regional organizations of destination management and 9 tourism clusters. Figure 1 shows their location in Slovak regions.



Source: Strategy of Tourism Development to 2020 in the Slovak Republic, 2013.

**Fig. 1.** Map of tourism clusters, district and regional destination management organizations in the Slovak Republic to 31. 12. 2012

At the moment in Slovakia there are 9 tourism clusters. The first efforts to establish the tourism cluster appeared in 2008, in Liptov region. The formation of cluster was initiated from the bottom (from the clustered subjects). It is the oldest and the best operating tourism cluster in Slovakia and has the same name as natural Slovak region – Liptov. This cluster associates public and private sector to uniform promotion of Liptov as a unique green region for active leisure time spending. The main ambition is to get cluster Liptov with its activities on the map of popular European tourist destinations, to promote cluster Liptov with its own brand home and abroad, to create competitive products of tourism and to initiate active cooperation in the region. This cluster is working already more than 6 years and is a good example of effective cooperation in the area of tourism. Later was this idea development also in other parts of Slovakia (e.g. Orava, Turiec, Vysoké Tatry) with suitable preconditions to develop tourism conceptually. The first clusters were aimed at the marketing activities, promotion of destinations, preparing strategic development plans in the field of tourism, developing the regional products and creating the product packages for the guests. The clusters interconnected the entities from the private sector (e.g. aqua-parks, hotels, ski-parks, thermal parks, etc.), the local municipalities that represents the largest cities in the regions where the cluster is situated and later also the non-profit organizations were joint. The tourism clusters also cooperate with the research institutions and universities, so they have become the important holders of innovations.

Žilina region, has except cluster Liptov, 2 others tourism clusters – Orava and Turiec. All these clusters are based in traditional Slovak regions and carry their names. 2 Slovak regions – Banská Bystrica and Trnava have 2 tourism clusters. In Banská Bystrica region one cluster – Horehronie, is orientated on mountain and rural tourism development. Second cluster – Balnea cluster is aimed on development of balnea and spa tourism. Two tourism clusters in Trnava region and one in Nitra region are focused on development of wine tourism and building joint tourism products, for example wine routes. Last tourism cluster is located in Prešov region and is focused on support and development of tourism in High Tatras.

Last years, cluster initiatives are very trendy in the Slovakia. However, according our mind in many cases the clusters were established just because of financial government support of clusters and local production systems guaranteed by law described in the paper. The most effective and well working clusters are clusters created by bottom-up approach as a cluster Liptov and already proved its positive impacts on the development of tourism in the region (development of new and additions services, increasing of employment of local work force, building new accommodation and restaurant facilities, etc.) through conceptual tourism development.

## CONCLUSIONS

The development of tourism requires new approaches and appropriate measures at all levels. The globalization trends need to be respected also by countries of middle Europe which have to be a part of globalization. The main role of tourism is and will be a preservation of national identity in Slovakia as one of the essential elements of competitive advantage (The New Strategy of Tourism Development in Slovak Republic until 2020). We absolutely agree with this statement and to our opinion the tourism in Slovak regions have to be built on unique regional competitive advantages based on internal resources, as natural potential, history, culture and traditions supported by the high quality of human resources.

According to UNWTO in 2020 in the regions of Central and South-Eastern Europe there will be the fastest growing tourism. This is also a chance for the Slovak Republic to stand out of the shadow and become a real unique tourist destination. Even there is a really

huge tourism potential in Slovak regions we would like to underline that unique tourism potential is not used sufficient and there are gaps which need to be filled. (Borseková, Petriková, Vaňová, 2013). Good way how to achieve all these goals is an effective cooperation of stakeholders in the tourism industry.

There are several forms of cooperation; in the paper we paid attention on different kinds of tourism local production systems. As the most suitable form of tourism LPS we assume LPS created by bottom up approach, by respecting needs and specifics of the territory where is located. In Slovakia there are several tourism LPS in form of district destination management organizations, regional destination management organizations and tourism clusters. District destination management organizations, regional destination management organizations are a lower form of stakeholder's cooperation in tourism industry and usually created by top-down approach with aim to gain financial support. Tourism clusters operating in Slovakia are not very well developed yet, the best example is Liptov tourism cluster. This cluster was created by bottom-up approach and networking subjects from public and private sector. Aim of the cluster is to develop tourism in the region, develop entrepreneur's activities in tourism industry, and increase employment of local people. Synergy of all these aspects contributes to overall development of the locality or the whole region.

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# INNOVATIVE DEVELOPMENT OF KUZBASS: FROM REGIONAL CLUSTER TO THREE-LEVEL MODEL OF TRANSFORMATION OF COAL INDUSTRY<sup>1</sup>

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This paper proposes a fundamentally new approach to the elaboration of a concept of the innovative development of a region as a whole and its individual sectors and enterprises. It is concluded that a concept of regional cluster development in Kuzbass should be revised. It is necessary to abandon the idea of anchor companies. The basis of a new concept should be based on the idea of competition between three types of raw materials: coal, methane gas and oil. Suggested is a strategy of attracting investment into Kemerovskaya oblast for the period up to 2030. It is concluded that a «road map» for transformation of basic technological platforms should be developed for each company. As a basis of such a «road map» for the coal industry may serve a three-level model of innovative transformation.

Our study of competitive advantages of Kemerovo region (Kuzbass) [1, 2 et al.] shows that over the last decade the region has made a significant progress in creating conditions for sustainable economic development.

However, many experts wonder why, with such a competitive position, the region failed to reach the level of GRP annual growth rates of 5–7%.

Some authors [3, 4 et al.] answering this question refer to the immense pressure of «the former structure of the economy», its strong export orientation and the low level of small and medium business development.

Without disputing most of the mentioned above factors hindering the high growth rates of the region we'd like to note that the main factor, in our opinion, is a wrong choice of development paradigm and, as a consequence, the inefficiency of the model of regional development.

We would like to remind that over the last decade, the views on the system of drivers of regional economic development permanently changed [5–7 et al.] Now the main drivers were declared to be trade, catering and public services, then the high rates of domestic

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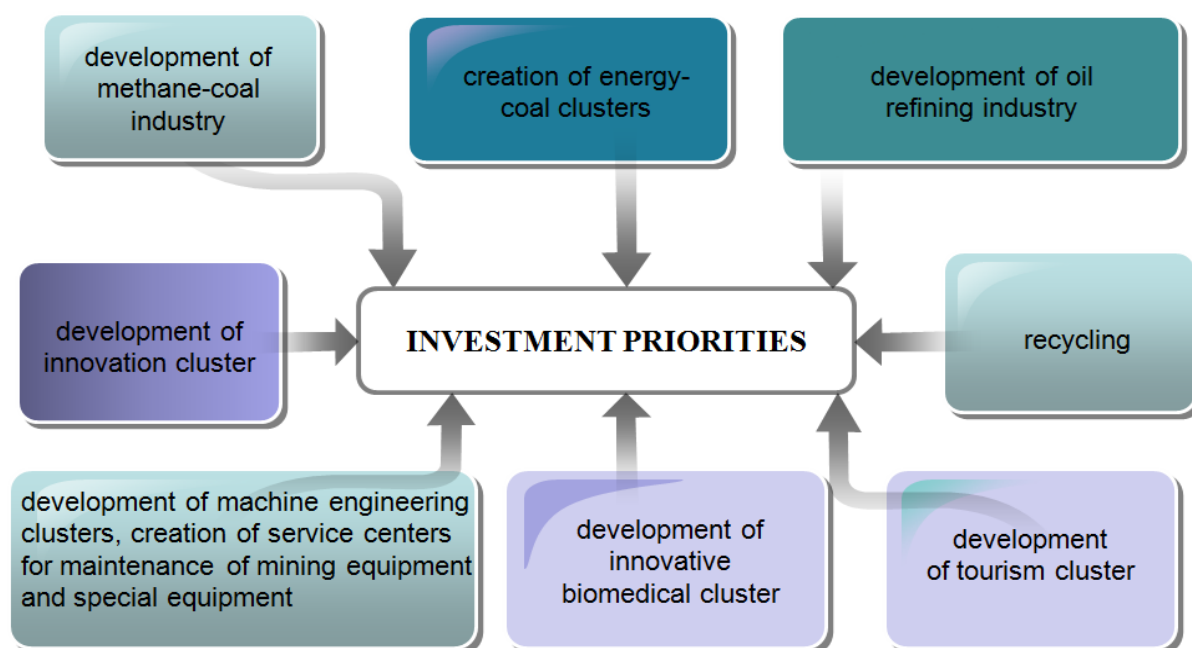
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consumption or the expected huge foreign investments. At the same time Kuzbass «resource-based economy» was declared to be the main problem of regional development.

And what is most important, the models and created (developed) institutions and instruments of regional development were «adapted» to the declared drivers [8]. As a result, on the one hand there was a «conflict» between the working and the declared drivers of economic development, and on the other – there was a «failure» in management of regional economic potential.

The model of Kuzbass development (elaborated in the 2000s) allowed the region to strengthen the role it plays in the economic security of the Russian Federation and to find new markets for its products. However, in the modern context, new approaches to regional development, new points of growth and new drivers of innovation development are required, primarily in the commodity sector of Kuzbass economy (Figure 1).



Source: The strategy of attracting investment into Kemerovskaya Oblast for the period up to 2030 (New edition): was approved by the College of Administration of the Kemerovo region from August 1, 2014, № 520-p.  
URL: <http://www.ako.ru/ZAKON/default.asp>

**Fig. 1.** Growth drivers of the Kemerovo region

In our opinion, the organization of a regional cluster for the extraction, processing and use of three types of raw materials: coal, oil and gas (methane) produced from coal seams is the most preferable for Kuzbass scenario. «Innovative transformation» should be a fundamental principle of creating the cluster and its functioning.

The institutional foundations of innovative development of different economic sectors have been formed in Kemerovo region<sup>1</sup> by now. But this work should continue. The analysis of the largest innovative projects in the region shows that their implementation faces the following challenges:

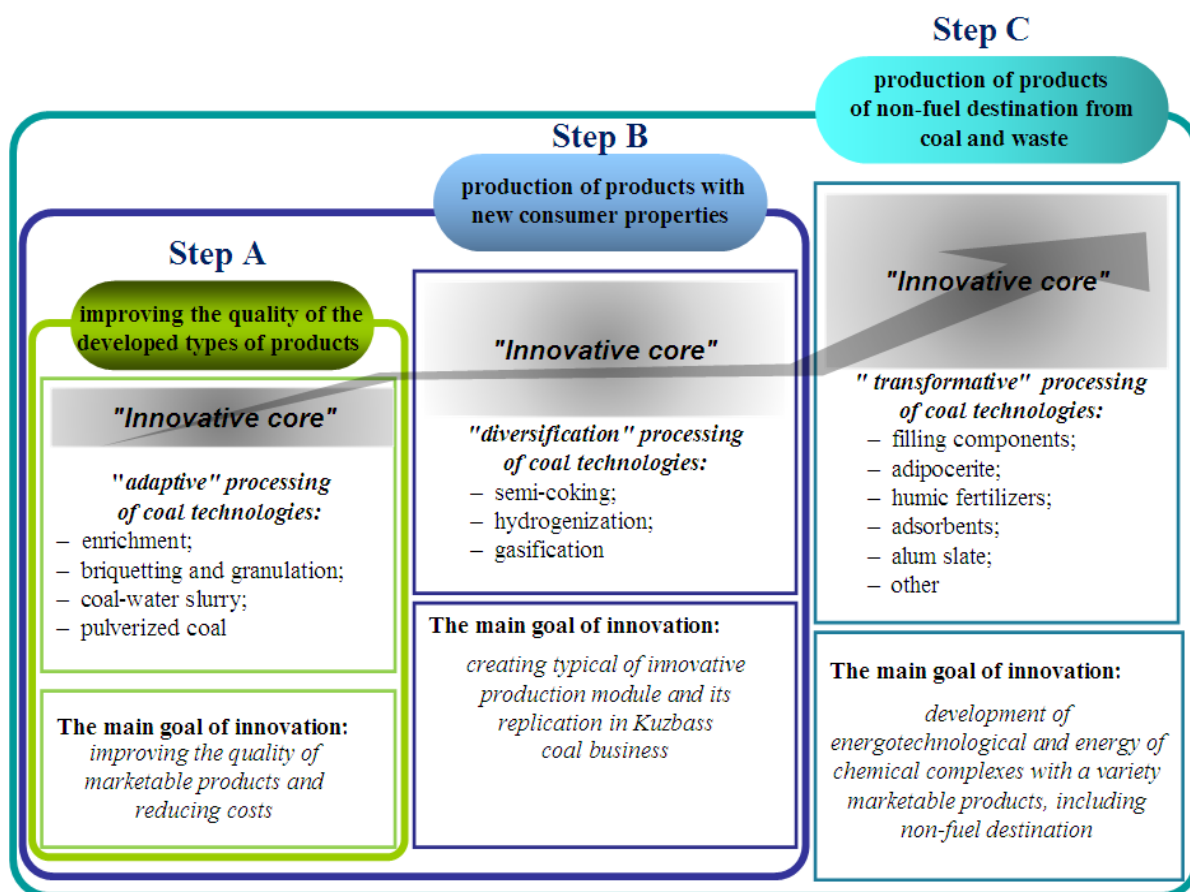
- insufficient consideration of possible innovation risks related to both immaturity of innovative technologies and with the uncertainties regarding market conditions for new products;

<sup>1</sup> See more: [8]

- lack of development of alternatives of innovative projects realization in the absence of the domestic innovation market or its insufficient development;
- low willingness of investors to take high risks associated with innovative projects, under conditions of underdeveloped mechanisms of insurance of such kind of risks;
- insufficient flexibility of tools and mechanisms of state support.

In our opinion, regional clusters and industrial clusters may indeed be perspective «points of growth» of the economy of the region. However, along with this, it is necessary to introduce innovations at the main phases of production and in business processes of each company. Only in this way the «innovative transformation» of the region as a whole can be achieved.

In our opinion, the creation of a «road map» of innovation development of the region with the active participation of business and the state support is necessary. An example of such a «road map» can be the model of three-level innovative transformation for the coal industry (Figure 2). It assumes the phased change of its basic technological platforms.



**Fig. 2.** Model of the three-level innovative transformation Kuzbass coal industry

The first level (the current level, step A – basis of the three-level model of innovative transformation of the coal industry) is based on the «adaptive» technologies for coal processing with improving the quality of the developed types of coal products. It is a base for the second level (step B). Step B is the transition to the production of coal products with new consumer properties through «diversification» technologies. Further development of the coal industry is carried out on the third level (step C). The main objective of innovation on step C is the progressive development of power engineering and power and chemical

complexes with a variety of marketable products. The «transformative» technologies of coal processing are the innovative core of this stage of development. We'd like to note that the technological base of each subsequent level of the model of coal industry transformation does not exclude the technological base of the previous one but rather complement it.

## CONCLUSIONS

- The concept of a regional cluster in Kuzbass requires revision. It is necessary to abandon the idea of anchor companies. The basis of a new concept should be based on the idea of competition between three types of raw materials: coal, methane gas and oil.
- The «road map» for the basic technological platforms transformation should be developed for each company.
- As the basis of such a «road map» for the coal industry can serve a three-level model of innovative transformation.

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**MODELLING OF IMPACT OF  
REGIONAL ECONOMY ON THE STATE  
OF THE WATER BODIES<sup>1</sup>**

*Olga P. Burmatova<sup>2</sup>*

This article analyzes the possible negative anthropogenic impact on the state of surface waters in the region and the choice of ways to prevent it. For this purpose an attempt is made to include the general problem of optimization of spatial structure of the economy of the region block of conditions for protection of water resources. The author gives the economic and mathematical notation of appropriate conditions. The interpretation of these conditions is given and the possibility of their use for the analysis of influence of anthropogenic activities on water environment is evaluated. Special attention is paid to the Lower Angara region. The paper describes the specific features of the Lower Angara region from the standpoint of the impact of the prospects for the development of production on water environment. The characteristic of the present stage of its development is given and the strategic aspects of its further formation are considered. Shown are the basic shortcomings of the investment project «Integrated Development of the Lower Angara» with an emphasis on environmental matters. It is concluded that the development of the region under conditions of observance of the environmental requirements is possible only if using the advanced technology.

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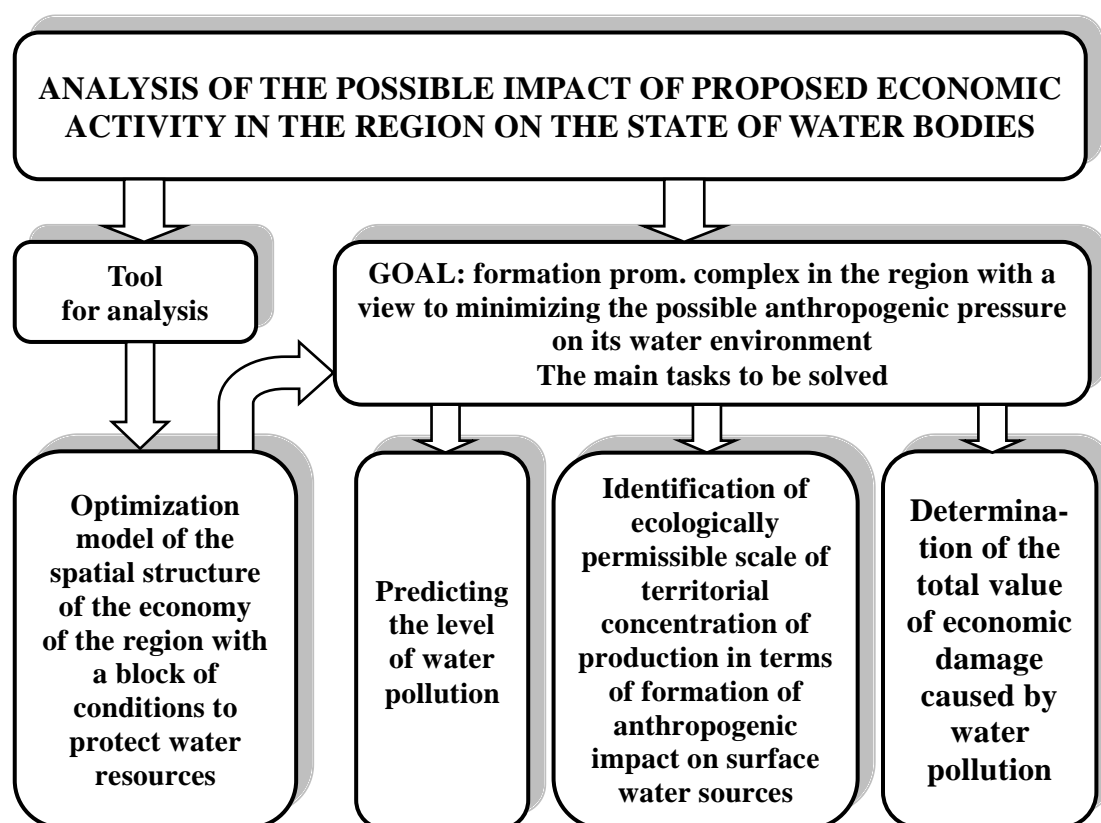
<sup>1</sup> This article was prepared as part of the 7th Framework Program FP7-PEOPLE-2011 IRSES Project No. 295050 FOLPSEC – Functioning of the local production systems in the conditions of economic crisis (comparative analysis and benchmarking for the EU and beyond).

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**PROTECTION OF WATER RESOURCES  
AS ONE OF THE IMPORTANT DIRECTIONS  
OF ENVIRONMENTAL ACTIVITIES IN THE DEVELOPMENT  
OF A REGIONAL ENVIRONMENTAL STRATEGY**

The growth of limitation of water resources, deterioration of their quality make necessary inclusion problems of rational use and protection of water resources in a number of strategic priorities for regional environmental policy. This problem is of particular relevance in regions which are experiencing shortage of surface water resources and undergoing significant anthropogenic pressures on water bodies. Thus, the use and protection of water resources serves as one of the important directions of environmental activities in the development of a regional conservation strategy.

In order to identify the possible negative anthropogenic impact on state of surface waters in the region and the choice of ways to prevent it we have attempted to include in the model of choice of economic decisions in the region taking into account their environmental effects the block of conditions for the protection of water resources [1, 3]. The goals, objectives and tools of analysis the impact of human activities on the water environment are shown in Figure 1.



*Fig. 1.* The goals, objectives and tools of analysis of the impact of human activities on the water environment

Block diagram of the initial model is shown in Figure 2. It lists the basic conditions of the model and the study objects under consideration, presents the nature of constraints and objective function coefficients, nonzero elements of communication are shown. For simplicity, the block diagram model reflects the conditions corresponding to the same areal (or industrial node) and one time period.

Conditions	Objects						Pollution of				Norming indicators on pollution of		Economic damage by pollution of		Pollution charges	Losses for				Sign of conditions	Restrictions
	enterprises		power plant		water bodies		atmosphere		water bodies	atmosphere	water bodies	atmosphere	agriculture	fisheries		forestry	population				
	1 2		1 2		1 2		1 2														
	op-tions		op-tions		op-tions		total	above permitted	total	above permitted											
	1	2	1	2	1	2															
Choice of one technology option																				=	↘
Task for the production output																				=	↘
Restrictions on capital expenditure limit																				↘	↘
Formation of the level of pollution of	water bodies																			=	↘
	atmosphere																			=	↘
Above permitted standard output of pollution in	water bodies																			↘	0
	atmosphere																			=	0
Formation of economic damage from pollution of	water bodies																			=	0
	atmosphere																			=	0
Formation of fee for excess pollution output																				=	0
Formation associated with the construction of power plant losses to	agri-culture																			=	0
	fisheries																			=	0
	forestry																			=	0
	popula-tion																			→	min

Note: shaded blocks containing nonzero elements

Fig. 2. Block diagram of the model of choice of variants of economic decisions based on their environmental impact

The main problem to be solved by using this block for the protection of water resources, provide for:

- predicting the level of water pollution;
- identification of ecologically acceptable scale territorial concentration of production from the standpoint of the formation of anthropogenic load on surface water sources;
- determining the total value of economic damage caused by pollution of water bodies and others.



Such a block is designed specifically for the conditions of the Lower Angara region and western part of Kansk-Achinsk fuel and energy complex (KAFEC) [1, 2, 3].

Conditions of water block are united into the following groups (Figure 3):

1. Conditions of formation of water pollution balances for certain types of hazardous substances in each of the areas (or industrial centers) in a given period of time.
2. Restrictions on the discharge of pollutants into surface water sources.
3. Conditions of non-worsening environmental situation (quality of the aquatic environment) in each area over time, taking into account the possible accumulation of harmful substances in water and transport of pollution along the rivers.
4. The requirement to minimize economic damage caused by water pollution.

Conditions	Time period	Kind of pollution	Sources of pollution					Discharge of the contaminants in water environment								Sign of conditions	Restrictions	
			po-pulation		industrial facilities			within the norms				beyond acceptable norms						
								I		II		I		II				
			1	2	x1	x2	x	1	2	1	2	1	2	1	2			
Formation of the balance of water pollution	1	I	X		X		X					X				=	X	
		II	X		X		X			X			X					
	2	I		X		X			X				X					
		II		X		X				X				X				=
Restrictions on dumping contaminants	1	I	X		X		X				X					≠	X	
		II	X		X		X			X								
	2	I		X		X			X									
		II		X		X				X								
Requirements non-worsening environmental situation	1	I										X			≠	X		
		II											X					
	2	I									X	X					≠	0
		II										X	X					
Functional			X	X	X	X					X	X	X	X	→	min		


 – nonzero elements of the matrix

Fig. 3. Block conditions for the protection of water resources

Figure 3 shows a block diagram of a model fragment with block conditions for the protection of water resources. For example, a block diagram is constructed for one area, the two time periods and for the two types of pollution in the wastewater. Let us dwell on the characteristics of the economic-mathematical notation selected conditions and consider what range of issues can be resolved with their use.

Economic-mathematical notation above conditions has the following form [1, 3].

## ECONOMIC-MATHEMATICAL NOTATION OF CONDITIONS OF THE WATER BLOCK

1) *Formation of the balance of water pollution:*

$$P_{qk}^t + \Delta P_{qk}^t = \Phi_{qk}^{t(t-1)} + \Phi_{qk'k}^t - \Phi_{qkk''}^t + \sum_j E_{qj}^t x_{jk} + \sum_j E_{qj} x_{jk}^t + E_q z_k^t \quad \forall q, k, k'', t, \quad (1)$$

where

$P_{qk}^t$  – volume of discharge with sewage within the permissible limits of the substances  $q$  into the aquatic environment of the area (or industrial node)  $k$  in the period  $t$ ;

$\Delta P_{qk}^t$  – volume of discharge with sewage beyond acceptable norms substances into the aquatic environment  $q$  of the area  $k$  in period  $t$ ;

$\Phi_{qk}^{t(t-1)}$  – volume of the accumulation of the contamination by the time  $t$  pollution type  $q$ , released to the water environment of the area of  $k$  in period  $t-1$ ;

$$\Phi_{qk}^{t(t-1)} = (1 - \beta_{qk})^{\tau_t} \Delta P_{qk}^t. \quad (2)$$

Here  $\beta_{qk}$  – the rate of natural decomposition of the pollution of kind  $q$   $p$  in aqueous medium of the area  $k$  during the year;  $\tau_t$  – the length of time  $t$ ;

$\Phi_{qk'k}^t$  ( $\Phi_{qkk''}^t$ ) – the amount of income (removal) of pollution  $q$  in the area  $k$  (from the area  $k$ ) from the area  $k'$  (to the area  $k''$ ) as a result of the natural transfer of substances.

Volumes of pollutant transport between neighboring industrial nodes determined in accordance with the model of Phelps–Streeter:

$$\Phi_{qk'k}^t = \alpha_{qk'k} (P_{qk'}^t + \Delta P_{qk'}^t) \quad \Phi_{qkk''}^t = \alpha_{qkk''} (P_{qk}^t + \Delta P_{qk}^t), \quad (3)$$

where  $\alpha_{qk'k}$  ( $\alpha_{qkk''}$ ) – the degree of decomposition of the substance  $q$  as a result of transit on the section of the river from the area  $k'$  to  $k$  (from  $k$  to  $k''$ ).

Thus:  $\alpha_{qk'k} = 10^{-k_q \rho_{k'k}}$ . Here  $k_q$  – rate constant of the oxidizing substances  $q$  ( $k_q > 0$  – for non-conservative organic substances);  $\rho_{k'k}$  – oxidation time of a substance in the area from  $k'$  up to  $k$  (or the movement of river water from the from the section  $k'$  of the river to the section  $k$ );  $\rho_{k'k} = R_{k'k} / V$ , where  $R_{k'k}$  – distance between  $k'$  and  $k$ ;  $V$  – average velocity of flow of the river.

Further, in the condition (1):

$x_{jk}$  – the intensity of the variant of operation of the facility  $j$  in the area  $k$ ;

$x_{jk}^t$  – capacity of the facility  $j$  in the area  $k$  at end of period  $t$ ;

$E_q$  – the volume of output of pollution  $q$  form domestic wastewater;

$z_k^t$  – population of the area  $k$  at end of period  $t$ ;

$E_{qj}^t$  ( $E_{qj}$ ) – the amount of pollution type  $q$ , discharged into the waters with sewage generated at facilities  $j$  with a fixed (unreserved) intensity at the end of period  $t$ .

Volumes of output of harmful substances from industrial and municipal wastewater are defined as:  $E_{qj}^t = e_{qj} v_j^t$ ;  $E_{qj} = e_{qj} v_j$ ;  $E_q = e_q v$ ,

where  $e_{qj}$  ( $e_q$ ) – the final concentration of the substance  $q$  in the effluent of the object  $j$  (in household wastewater);

In this case:  $e_{qj} = c_{qj}^{naq} - c_{qj}$ ;  $e_q = c_q^{naq} - c_q$ .

Here  $c_{qj}^{naq}$  ( $c_q^{naq}$ ) – initial concentration of the substance  $q$  in the effluent of the object  $j$  (in household wastewater);

$c_{qj}$  ( $c_q$ ) – the amount on which the concentration of the substance  $q$  are reduced in the effluent of the object  $j$  (household effluent) as a result of neutralization in wastewater treatment plants;

$v_j^t$  – volume of wastewater of the object  $j$  at the end of period  $t$ ;

$v_j$  – specific volume of wastewater of the object  $j$  with the desired intensity;

$v$  – specific volume of waste water (for 1 thousand people).

Substituting equalities (2) and (3) in condition (1), we obtain:

$$(1 - \alpha_{qkk}) (P_{qk}^t + \Delta P_{qk}^t) - \sum_k \alpha_{qk'k} (P_{qk}^t + \Delta P_{qk}^t) - (1 - \beta_{qk}) \Delta P_{qk}^{t-1} - \sum_j E_{qj}^t x_{jk} - \sum_j E_{qj} x_{qk}^t - E_q z_k^t = 0 \quad (\forall q, k, k', t) \quad (1a)$$

Thus, according to condition (1a) forming the level of water pollution by this or that ingredient in every industrial node is performed for each time period with taking into account the following factors:

- discharge of harmful substances with industrial and domestic waste waters;
- the degree of neutralization of contaminants in wastewater treatment plants depending on the cleaning methods;
- magnitude of accumulation of pollution over time taking into account the background contamination;
- volumes of natural transfer of harmful substances between neighboring industrial hubs.

As a result of such representation of the volume of harmful substances in waste water pollution dynamics in each period reflected by the amount of pollution released to the aquatic environment in the previous period, in view of its possible accumulation during this period, and in accordance with the dynamics of the development and production of household activity in every industrial junction.

2) *Restrictions on dumping contaminants in surface water sources:*

$$P_{qk}^t \leq \frac{G_q^l}{K^l} (R_k^t - \sum_j d_j^t x_{jk} - \sum_j d_j x_{jk}^t - dz_k^t) \quad (\forall q, l, k, t) \quad (4)$$

where  $G_q^l$  – the maximum permissible concentration (MPC) of the substance  $q$ , belonging to a limiting attribute of hazards (LAH)  $l$ ;

$K^l$  – the number of harmful substances belonging to one LAH  $l$ ;

$R_k^t$  – the water flow at the source on a plot  $k$  during the period  $t$ .

$$R_k^t = R_k - W_k - \sum_k W_k^t \quad (5)$$

$R_k$  – the average multiyear water flow in the source on the plot  $k$ ;

$W_k$  – volumes of water consumption by existing industrial units in the area  $k$ ;

$W_k^t$  – water withdrawals at the end of period  $t$  by consumers in areas  $k'$ , which are located up the river;

$d_j^t, d_j, d$  – volume of withdrawal of flow for irrevocable water consumption and dilution of the wastewater of the objects  $j$  and for domestic water supply and domestic sewage dilution.

$$d_j^t = (\kappa_j - 1)v_j^t + w_j^t; d_j = (\kappa_j - 1)v_j + w_j; d = (\kappa_j - 1)v + w \quad (6)$$

Here  $\kappa_j$  ( $\kappa$ ) – the multiplicity of dilution of the wastewater discharged by the object  $j$  (domestic waste water);

$w_j^t$  – volumes of water consumption the object  $j$  in period  $t$ ;

$w_j$  – specific volume of water consumption the object  $j$  with the sought intensity;

$w$  – specific volume of water consumption by the population (for 1000 people).

Condition (4) taking into account of the conditions (5) and (6) can be rewritten as follows (a more convenient for inclusion in a model of the task):

$$\frac{\kappa^l}{G_q^l} P_{qk}^t + \sum_j d_j^t x_{jk} + \sum_j d_j x_{jk}^t + dz_k^t \leq R_k^t \quad (\forall q, l, k, t) \quad (4a)$$

Thus, in the described water block the restrictions on wastewater discharges of contaminants in the aquatic environment – the conditions (4) or (4a) – are built taking into account:

- MPC indicators of harmful substances in water reservoirs;
- summation effect of action of various substances belonging to one of LAH;
- water flow at the source;
- irrevocable water consumption volumes;
- desired degree of dilution discharged into surface water bodies treated wastewater.

3) *Conditions of non-worsening environmental situation in each industrial nodes over time:*

$$\Delta P_{qk}^t < \Delta P_{qk}^{t-1} \quad (\forall q, k, t) \quad (7)$$

Condition (7) means that the amount of pollution, released into the aquatic environment of a particular industrial nodes in a given period of time in excess of allowable limits, shall not exceed the corresponding pollution released to the aquatic environment at the end of the previous period, i.e. qualitative state of the aquatic environment in each area over time should not deteriorate. Specifying the conditions (7), we are able to manipulate in certain limits with pollution, allocated beyond acceptable norms, limiting its output with period  $t=1$  or later periods, when as the formation of regional economy and enhance its production capacity increases and discharge of harmful substances from sewage.

All above conditions of the introduced block, are constructed, firstly, for all considered in the task of pollutants contained in industrial and domestic wastewater; secondly, for each of the selected within the limits of a region the territorial units, which are accepted as industrial nodes; and, thirdly, for each of the calculated time intervals into which the whole analyzed in the task period of forecasting is partitioned.

As follows from condition (1), the entire volume of the produced pollution is divided into two parts – the pollution generated within the limits of the acceptable health standards, and pollution from the resulting sewage over the permissible level. This division allows the discharge of pollutants in water bodies over environmental standards adopted in the absence of technical capacity to provide the desired degree of neutralization of wastewater. In this

case the discharge of harmful substances into the water environment of the region (beyond acceptable limits) will be accompanied by damage to the natural environment. This fact is reflected in the formation of the objective function, which represents the minimum, firstly, calculated expenditures for establishment and functioning of all elements of the regional economy (including of the discounting), and secondly, the magnitude of the economic damage caused by water pollution.

The last element is calculated as the sum of products of specific damages from water pollution under consideration ingredients wastewater volumes and pollution coming into the aquatic environment beyond accepted norms (see below).

4) *The requirement to minimize economic damage from water pollution:*

$$\sum_k \sum_t U_k^t \rightarrow \min, \text{ where } U_k^t = \sum_q \sum_k \sum_t g^t u_{qk} \Delta P_{qk}^t \quad (\forall t) \quad (8)$$

Here  $U_k^t$  – the value of the total economic damage from water pollution in the area  $k$  at the end of period  $t$ ;

$g^t$  – the discount factor;

$u_{qk}$  – Indicators of specific economic damages from water pollution in the area  $k$  of substance  $q$ <sup>1</sup>.

Dividing the volume of pollution into two parts (of pollutants discharged into water bodies within the limits of standards and beyond permissible limits) allows:

- to determine the limiting capabilities defined by conditions of the task systems of wastewater treatment;
- to determine the amount of economic damage from water pollution and minimize this value in the process of solving the problem, depending on the current production and the spatial structure of economic complex;
- to implement the accounting of the accumulation of pollution entering the water environment beyond the limits;
- to provide for the possibility of solving the problem in case of impossibility of exit onto set environmental standards.

If as a result decision generated pollution does not keep within the specified restrictions, it can serve as an alarming signal that the economic activity in a particular industrial junction goes beyond environmentally acceptable limits and to avoid this, you need to take some additional measures, such as:

- to introduce new conditions of the task (more environmentally friendly) technologies of the main productions at production facilities;
- to introduce into the conditions of the task (more environmentally friendly) technologies of the main productions at production facilities;
- supplement or replace by a more advanced by predetermined wastewater treatment systems;
- to propose other variants of production location for the purpose of the deconcentration of production over the territory to make better use of adaptive mechanisms of the aquatic environment;
- to abandon the creation of certain objects in the industrial hubs with the most intense environmental situation, or go the way outs of production on the individual enterprises to environmentally acceptable scale, etc.

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<sup>1</sup> Indicators of specific economic damages from pollution of surface water sources in the discharge of hazardous substances in excess of the permissible limits, calculated in accordance with the «Temporary technique for determining of prevented environmental damage» (approved by Goskomekologiya 09.03.1999).

In general, the inclusion of characterized conditions in the model of the task allows us to solve the following issues:

- to identify environmentally acceptable in terms of impact on the aquatic environment scale of the development of economic activities in the region;
- to identify opportunities of the defined by conditions of the task systems of neutralization of industrial and domestic waste water;
- to analyze the impact factors of the accumulation and natural transport of hazardous substances by the rivers on the formation of the overall level of pollution in water bodies within the considered territory;
- to estimate the economic damage that may be caused the region's economy and public health by water pollution in case the discharge of harmful substances in excess of the permissible norms;
- to verify to what changes in the choice of allocation scheme the investigated production in the region could cause accounting requirements of protection of water resources.

By using characterized block model, we have made calculations, in particular, on the materials of the Lower Angara region in the Krasnoyarsk krai. Before proceeding to the presentation of some results of realization of described model with the inclusion of water block, let us consider in more detail the characteristics of specific conditions of the Lower Angara region, influencing the development of the environmental situation of the water basin.

### **LOWER ANGARA REGION AS EXAMPLE OF THE AREA OF THE NEW ECONOMIC DEVELOPMENT: PROBLEMS AND PROSPECTS**

The Lower Angara Region<sup>1</sup> in the Krasnoyarsk krai is a typical example of the region of the new economic development, which has become the subject of a major investment in Russia in the post-Soviet period. At present there the investment project «Integrated Development of the Lower Angara area» [4, 5] is being realized, investment project «Angara-Yenisei cluster» was proposed [6, 7]. In the region as a result of implementation of the 1st stage of the investment project «Integrated Development of the Lower Angara area» (IP IDLA) is established supporting basis for further intensive and large-scale economic development. The main reason for the investment attractiveness of the region is the presence on its territory of diverse and often unique in quality and scale of energy and raw materials, including ferrous, non-ferrous and precious metals, hydrocarbon feedstock varied nonmetallic raw materials, forest, and water and hydropower resources. An important role is played by the Boguchan power plant, which is currently being constructed (close to being operational), as well as some infrastructural developments. In particular, two railway connections to the region (Achinsk–Lesosibirsk and Reshoty–Karabula); the Karabula–Yarki railroad, an automobile bridge across the Angara River and several highways, including the Kansk–Kodinsk highway, are being built. One can also name other ongoing projects, such as the connection of Ust-Ilimsk to Lesosibirsk as part of the North Siberian railway.

No doubt, the creation of large infrastructure facilities has a great potential for the development of the region at the initial stage. If at the first stage production gravitates

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<sup>1</sup> Lower Angara region is generally understood as a region located in the basin of the lower course of the Angara and the middle course of the Yenisei River and covering the five areas in the Krasnoyarsk krai (Boguchansky, Kezhemsky, Motyginsky, Yeniseisky, North Yeniseisky). Total area  $\approx 260 \text{ km}^2$ , population – about 230 thousand people.

mainly to Boguchany industrial node (Boguchany power plant, aluminum plant and pulp and paper mill), then in the longer term (by the year 2020), it is foreseen to build new enterprises in the Kodinsk (the Tagara mining and dressing plant and a cement plant) and Boguchany (gas processing and gas chemical plants) industrial hubs. New production is also envisaged in the Motygin'sk area (the Gorev'sky mining and dressing plant and the Motygin'sk hydro power plant). The second phase of the development of the Lower Angara region is mainly associated with the development of oil and gas deposits for the East Siberian oil and gas industry (the southern part of Evenkia). Therefore, in addition to the construction of several industrial facilities, as well as transport and energy infrastructure, the second phase of development goes beyond the Lower Angara region in terms of its territorial coverage. The financial needs of the second phase are estimated at 540 billion rubles. One should note that the current state of the region is characterized by a low pace of economic development, the economy's orientation towards the forest industry, a high share of the grey economy, as well as a stable population outflow and unemployment.

The investment project «Integrated Development of the Lower Angara» is the largest Russian project implemented in the post Soviet period. Its implementation is based on the principle of public-private partnership. Public financial support is allocated on the basis of cofinancing from the Investment Fund of the Russian Federation and is aimed at creating major transport and energy infrastructure facilities that can propel the industrial development of the region. At the same time, 55.2% of the funds required for the project are provided by Vneshekonombank [8].

In spite of the exerted attention to the region and all the pluses of the mentioned projects the last are characterized in general by lack of comprehensive and balanced development of the territory, mainly focusing on the development of the lower of energy production cycles, ignoring the environmental and social problems. This is manifested, in particular, in the absence of:

- complex approach to the development of the area in terms of the development and operation of basic sectors of the economy in relation to social issues and the environment;
- coordinating the establishment and operation of all facilities on the territory, including infrastructure;
- the intention to build an innovative model of development in view of the continuous adaptation to the requirements of the scientific and technological progress;
- formation of the infrastructure of local importance;
- consideration of the requirements of environmental protection and restoration of natural resources;
- approaches to solving a complicated tangle of social problems, ultimately aimed at improving living standards of people;
- the ability to use the available natural resources in the interests of the entire population living in the region rather than a number of large companies (and, generally, in the context of sustainable development, i.e., in the interest of the present and future generations), and so on.

Let us briefly discuss the problems of possible impact of the planned economic activity in the study region on the state of its water bodies.

Issues of water pollution in the lower reaches of the Angara River can not be considered without a comprehensive analysis of all the Angara river basin. This is due to the fact that even now the state of water quality in the Lower Angara region, where the existing anthropogenic pressures are still very insignificant, to a large extent determined by the effect of pollution, which is formed in the upper and middle current of the river. Therefore, solution to the problem of improving and maintaining the required water quality in the lower

reaches of the Angara largely depends not only on the current and future scope of economic activity within the Lower Angara region and most of the corresponding system of environmental and other events, but also on the environmental situation in the upper and middle sections of the Angara river.

Taking into account quite a high level of background contamination of the upper and middle current of the river, Angara has a negative impact on the modern quality condition of the lower portion of the river. It seems necessary to implement water conservation measures first of all in the upper and middle part of the Angara River, receiving a significant amount of polluted industrial and domestic wastewater from industrial facilities and settlements within the Irkutsk region (primarily the cities of Irkutsk, Angarsk, Usolye-Siberian, Bratsk, Ust-Ilimsk). To regulate the problems of control and transit of pollution throughout the river Angara would be useful to have a special administrative body.

If we consider the Angara River basin as a whole, then, it is estimated that almost all of the wastewater entering the Angara and its tributaries, is reset to the territory of the Irkutsk region (over 98%), while the share of the Krasnoyarsk Krai in total contamination is negligible (less than 2%) [9]. At the same time decisive influence on pollution of the Angara River within the Lower Angara region have wastewater of industrial enterprises of Bratsk and Ust-Ilimsk. So, below of discharges of the Ust-Ilimsk timber industry complex the concentration of phenols in Angara reaches 25 MPC (maximum permissible concentration), oil – 10 MPC, the magnitude of the BOD (biological oxygen demand) is about 5 mg O<sub>2</sub> / liter.

In the context of the branches main part of contaminated wastewater entering the Angara-Yenisei basin from industrial enterprises is accounted for objects of pulp and paper industry and hydrolysis (31.1%), as well as petrochemical and chemical industry (27.6%).

An important role is played the problem of forecasting quality of water resources of the Angara River in conditions of possible hydropower construction. Operating experience of existing water reservoirs of the Angara cascade and water quality analysis in them enables (let us) to suggest that the envisaged new reservoirs on the lower Angara will (by analogy with the existing water reservoirs) serve as the sedimentation tanks of pollution. In the case of the continuation of wastewater discharge in the middle and upper reaches of the Angara River it is probably the sharp deterioration of water quality in the reservoirs in the Low Angara and at the outputs of them. Also, necessary to consider that reservoir in the lower reaches of the Angara will be trailing in the cascade for which the general trend is consistent deterioration of water quality in reservoirs from the top down. Thus, the forecasting of economic activity within the Lower Angara region should be carried out first of all taking into account the quite a high background of water pollution.

Considering the Lower Angara region through the prism is currently implemented investment project «Integrated Development of the Lower Angara area», it should be noted that this region, first, is being developed predominantly on the resource scenario and, second, the territorial concentration of production within it is uneven: the development is limited only two industrial nodes – Boguchany and in the longer term – Kodinsk. This means that the question of the uniform development of its territory is not put, production expected to focus in large individual nodes. It will entail and increase of the territorial concentration of production within these nodes and, consequently, increase of the load on the environment at the corresponding nodes and possibly in connection with this the complication in this environmental situation.

In the future, the water environment in the Lower Angara region will be determined, at least the following factors:

- features of local natural and climatic conditions of the region (unfavorable adaptable possibilities of the environment) and low stability of natural systems in relation to anthropogenic impact;



- choice of options for possible technological solutions on prospective production facilities of the region;
- low quality water conditions in the upper and middle reaches of the Angara River and the need to conduct an appropriate system of protection measures for existing industrial enterprises of the Irkutsk region in the Angara River basin;
- impact on the status of water bodies in the region of the reservoir Boguchanskaya HPP, as well as possible future water reservoirs, intended to establish in connection with the construction of new power plants in the lower reaches of the Angara River;
- choice of possible allocation scheme for future productions in the region and as a whole character of the production structure of the individual areas and the scale of concentration of production in them.

Specificity of local conditions affecting the development of the environmental situation of the water bodies in the Lower Angara region necessitates access to the region with technologically advanced industries. So, the Lower Angara region is characterized by a low assimilative capacity, which is due, firstly, to its high potential for atmospheric contamination (the worst conditions can be observed in the settlements of Lesosibirsk and Kodinsk) and, secondly, to a low self-purification capacity of surface water and, thus, unfavorable conditions for the oxidation of organic matter, as well as levels of water pollution (by suspended materials, phenols, oil, and other organic substances). The quality of water does not satisfy the adopted standards, which in turn puts forward special requirements for basic and nature conservation technologies applied by industrial facilities that are being set up in the region.

This is compounded by the building of reservoirs and the violation of the natural hydrological regime of the river. The self-cleaning ability of the Angara River has thus far largely been exhausted and for a number of pollutants (such as suspended solids, phenols, petroleum products, etc.), the water quality does not meet the required standards which in turn imposes special requirements for basic and environmental technology planned in the region of production. In addition, one should note a fairly high level of background contamination of the aquatic environment in the settlements of Boguchany and Kodinsk, which will bear the major anthropogenic burden following the implementation of the investment project [1, 10, 11].

The choice of capacities for future industrial facilities in the region is equally important. Thus, the planned annual capacity of the Boguchany aluminum plant is 600 thousand tons, which does not comply with international standards: the ultimate power of aluminum smelters worldwide is 200–250 thousand tons per year. At present, it is close to 190 thousand tons per year [12, 13]. Furthermore, the environmental incompatibility of aluminum production with the processes of pulp and paper production entails the risk that Boguchany can repeat the sad fate of Bratsk, where the creation of similar super industries resulted in the extinction of coniferous forests and more frequent occurrence of cancer among children.

Crisis situations in the state of the environment in the Lower Angara can be avoided by preventing adverse changes in ecological character, adherence to the accepted environmental requirements, obligatory environmental impact assessments of any of new economic projects, the application of advanced technical and technological solutions. It is necessary to create conditions, not only to guarantee the protection of the environment, but also to stimulate environmental measures and to involve in economic circulation of natural resources in the region.

In general, the lower regeneration capacity of the natural environment of Lower Angara underpins the need for stringent requirements for production technology, including both technological (core production technology) and environmental (environmental protection measures, etc.) innovation. One can only consider the establishment of complex economic facilities in the region in general and, more specifically, the foreseen combination of plants

and their respective capacities, if the above conditions are met. At the same time, it is not only necessary to give a priority to advanced low-waste technologies for the core production of the planned facilities but also to implement a range of environmental activities, which comprehensively cover all aspects of the anthropogenic impact on the environment, including the possibilities of rational placement and territorial organization of productive forces, waste disposal, selection of various technological options providing a response to the disposal of pollutants and their combinations, etc.

### **LOWER ANGARA REGION AS OBJECT OF THE APPLICATION OF THE PROPOSED APPARATUS OF ANALYSIS OF ENVIRONMENTAL AND ECONOMIC INTERACTION AND FEATURES**

In IEIE SB RAS some experience has been accumulated in the field of research on account of influence of environmental factors on the formation of the spatial structure of the economy in the Lower Angara region [1, 2, 3, 10, 11]. One of the directions of this research is to analyze the impact of the p forecasted economic activity within the region on the environment, including water basin, as well as the possibility of the creation of reservoirs on the Angara River and their contribution to the change processes of accumulation of pollution in surface waters and natural transfer of pollutants<sup>1</sup>.

As already mentioned, using conditions of characterized block of the model, a series of experimental calculations on materials of the Lower Angara Region in Krasnoyarsk Krai was carried out. Analysis performed calculations allowed us to determine the influence of the factors included in the task on the choice of the environmentally friendly solutions taking into account possible negative consequences of the environmental pollution and putting into exploitation large-scale Boguchanskaya hydro power plant (BoHPP) in the lower reaches of the river Angara.

For calculations with using the supposed model was used software package LP-system, which allows solving optimization tasks of linear programming based on a modified simplex method. As a result of solution was clarified possible production structure considered industrial nodes in the Lower Angara region, within which is planned the main concentration of the objects of timber and metallurgical complexes.

According to the task conditions on the territory of the Lower Angara region were considered:

1) 5 industrial nodes: Kodinsk (as part of the administrative district Kezhma), Boguchany, Motyginino and – on the Angara River, and Abalakovo and Lesosibirsk (as part of the administrative district of the Yeniseisk) – on the Yenisei River (Figure 4).

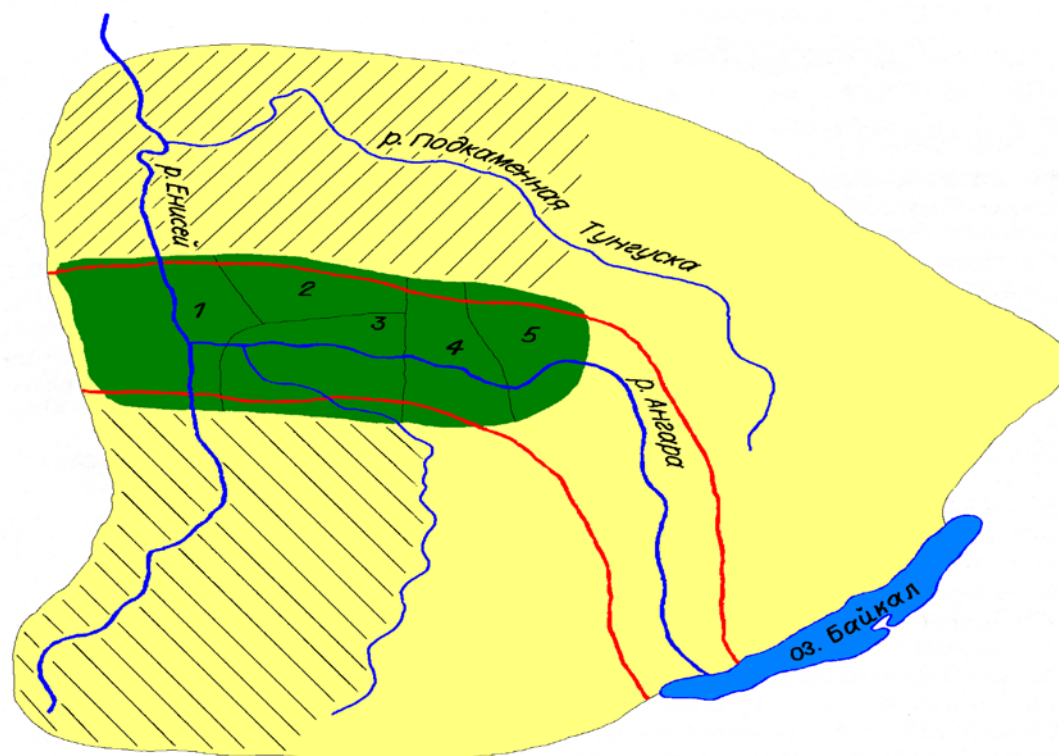
2) about 20 industrial objects, including timber industry (4 Pulp and paper mills (PPM), 2 Hydrolysis Yeast Plants (HYP), 4 Timber processing complexes (TPC)), mining and metallurgical combines (Tagara Iron Ore and Gorevsky Lead-Zinc Mining and Processing Plant), metallurgical plants (aluminum, lead, zinc, etc.), enterprises of chemical industry and energy (Table 1).

3) 5 types of pollution: suspended solids, phenols and chlorides, oil and Biological oxygen demand in full (BOD<sub>f</sub>).

4) 3 time periods, each of 5 years.

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<sup>1</sup> In general, studies on optimization of the formation of the Lower Angara region aimed at identifying possible location scheme of the supposed for the creation of the study area of new industrial enterprises, industrial production structure nodes, scale and pace of development of the main elements of the production and social infrastructure, options for the use of local natural resources, the scope of possible contamination of water and air, the magnitude economic damage from water pollution and atmospheric under conditions of fulfillment of a given production program and providing the required living conditions of the population.



- the Angara-Yenisei region
- the Angara-Tunguska area
- the Krasnoyarsk area
- the boundary of Angara area
- the Lower Angara area

**1-5 – Administrative regions of the Lower Angara Region:**

- 1 – Yeniseisk
- 2 – North-Yeniseisk
- 3 – Motyginno
- 4 – Boguchany
- 5 – Kezhma

*Fig. 4.* The areals of research

*Table 1*

**Possible variants of distribution of the objects in the Lower Angara region on areals  
(under the terms of the problem)**

Objects	Areal (industrial nodes)				
	Kodinsk	Boguchany	Motyginno	Lesosibirsk	Abalakovo
Pulp and paper mill – PPM 1:	X		X		
PPM 2		X			
PPM 3				X	X
PPM 4				X	X
Hydrolysis Yeast Plant – HYP 1:				X	
HYP 2	X				
Timber processing complex – TPC 1:				X	
TPC 2	X				
TPC 3		X			
TPC 4				X	

Objects	Areal (industrial nodes)				
	Kodinsk	Boguchany	Motygino	Lesosibirsk	Abalakovo
Tagara Iron Ore Mining and Processing Plant (MPP)	X				
Gorevsky Lead-Zinc MPP			X		
Ferroalloy Plant (FP)	X	X		X	X
Lead-Zinc Plant (LZP)	X	X	X		X
Alumina Refinery (AR)		X	X		
Aluminum Plant (AP)	X	X			
Copper-Chemical Plant (CCP)	X	X			
Petrochemical combine (PCC)	X	X		X	X
Plant for the production of synthetic liquid fuels (SLF)		X			X

The time factor is taken into account first of all when determining the possible level of discharges and emissions of contaminants in the environment of Kodinsk and Boguchany industrial nodes. Formation of such level for every ingredient in each reporting period shall be based on taking into account of the following three factors:

- discharges and emissions of harmful substances with industrial and household waste;
- the level of emissions purification depending on the technology used on the object-pollutant;
- accumulation of contamination over time, taking into account background pollution.

Thus, the dynamics of contaminants in each of the periods is reflected through the output of harmful substances in the previous period of time, taking into account its possible accumulation during this period, and furthermore also the dynamics of economic and domestic activities is taken into account.

Information on emissions and discharges of pollutants has been taken, particularly, from industry handbooks on best available techniques (BAT Reference Documents (BREFs)) [14, 15].<sup>1</sup>

Let us consider characterize the results obtained solutions.

### **FORMATION OF THE PRODUCTION STRUCTURE OF THE REGION TAKING INTO ACCOUNT THE POTENTIAL IMPACT ON THE WATER ENVIRONMENT**

During the research was carried out a series of the variant calculations; the main content of the individual variants are shown in Table. 2.

The choice of possible schemes of locating productions being considered on the territory the Lower Angara region, is characterized by following features for the different variants of the calculations.

<sup>1</sup> Development of handbooks is carried by the European Bureau on Complex Pollution Prevention and Control at the Institute for Prospective Technological Studies (Seville, Spain). All the reference books are publicly available on the website of the Bureau at the address: <http://eippcb.jrc.es/reference/>. At present there are 26 sectoral («vertical») and 7 «horizontal» (revealing common to several branches of questions) reference documents, 18 of them were approved by the European Commission [14, 15].

Table 2

## Variants of solutions of the task

Variants of the solutions	Content of the Variants of the solutions
I	Without taking into account conditions to protect water bodies
II	Conditions of variant I plus block of conditions to protect water bodies
III	Conditions of variant II plus account of requirements of non-worsening environmental situation in each areal with a certain time period
IV	Conditions of variant III plus: <ul style="list-style-type: none"> <li>• decreasing dynamics of water flow in the springs located on the Angara River,</li> <li>• the conditions of a possible deterioration of the initial conditions of wastewater discharged into surface water sources</li> </ul>
V	Conditions of variant IV plus the requirements of the non-worsening environmental situation
VI	Conditions of variant V plus taking into account of possibilities to reduce the flow of water on four of the five reviewed sections of the river (near Boguchany, Motyginovo, Lesosibirsk and Abalakovo)

From the point of view of the formation prescribed by the conditions of the task possible production structure of the selected areas (industrial nodes) in the region and created by them a corresponding pressure on water bodies according to the results solving the most stressful situation develops in Lesosibirsk and Motyginovo industrial nodes. In that case production structure of the Lesosibirsk industrial hub from the standpoint of the possibility of pollution discharge with sewage into surface water sources on the results of solutions is limited by considered here objects of timber industry, including pulp and paper mills, hydrolysis yeast plants and some timber processing complexes. Along with this under defined by the task conditions of the location variants of the objects in Lesosibirsk industrial hub, their facilities and wastewater treatment systems it requires further unloading of this industrial hub to get closer to the permissible levels of pollutants discharge into the aquatic environment.

The same applies to Motyginovo industrial node, where on the results of calculations situation with the water pollution is primarily determined by the choice here PPM. This enterprise is the largest of all the considered in the task pulp and paper mills and its contribution to the total water pollution is much greater than the contribution of other of enterprises that are included on the results of the solutions in the Motyginovo node (including Gorevsky mining and processing plant, alumina and lead-zinc plants).

Within the framework of the proposed formulation of the task (in addition to these options in Table 1) was carried out a series of solutions of variant calculations, aimed at investigation of the influence on the formation of the spatial structure of the Lower Angara region of possible changes in the individual conditions of the task and given the levels of several indicators. In compressed form characteristics implemented in the calculations directions of variations of conditions of the model and the level of the values of individual indicators, as well as a short description of the results of variant calculations are summarized in Table 3.

Table 3

## Characteristics of variant calculations

Conditions of model	Indicators to be subjected to variation	The obtained results
I. The formation of a balance of pollution of water bodies	1. Indicators of output of finite pollution in wastewater of the individual enterprises: PPM, HYP, PCC and SLF (variation was carried out in the direction of deterioration of initial conditions wastewater)	There are changes in an allocation scheme of the production envisaged, related to the increase of the content of pollutants in discharged wastewater. These changes can be considered negligible, mainly because of the limited set of location options for investigated enterprises. Increase in the discharge of pollution from sewage accompanied by an increase the total amount of economic damage caused by pollution of water bodies.
	2. Indicators of the degree of decomposition of nonconservative organic matters	Reducing the degree of decomposition of pollutants (in particular Kodinsk areal) associated with the construction of the reservoir of the Boguchanskaya HPP causes, on the one hand, the reduction in the removal of contaminants from this areal and, on the other hand, the strengthening of the processes of accumulation of harmful substances into the aquatic environment of the corresponding area. The ratio of these two processes, as well as the initial pollution in areals, between which there is transit of pollutants (eg. from Kodinsk to Boguchany), and determines the final level of contamination in each of the areals. In the Kodinsky areal pollution discharge into the water increases slightly.  The same is true for the other pairs of neighboring areas, among which may be created by water reservoir (Boguchany and Motygin).
	3. Calculations taking into account (and without taking into account) the factor of the accumulation pollution	There is a slight increase in the overall level of water pollution in the area of Kodinsk and Boguchany in connection with the creation of Buguchany reservoir and in the future – Nizhneangarsk HPP reservoir.
	4. Calculations taking into account (and without taking into account) the factor of the natural pollution transport	Ecological situation with water pollution in the Lessibirsk industrial node escalates and, accordingly, increases the value of economic damage in the site water pollution. In other areals significant increase in the overall level of water pollution does not occur.
II. Restrictions on the discharge of pollutants to surface waters	Variation of any indication was not carried out	
III. Conditions non-worsening environmental situation in each of the industrial nodes over time	1. Calculations without the inclusion of these conditions in the model of the task	During the optimization of the spatial structure of the economy of the Lower Angara region actively participate indicators of economic damage from water pollution, affecting:  a) the choice of the location variants of the objects (the result is strengthening of deconcentration of production on the territory of the region) and  b) the choice of their variants construction (preference have options with later start dates for construction and operation of individual businesses).

Conditions of model	Indicators to be subjected to variation	The obtained results
	2. Inclusion of appropriate parameters from the first period of time ( $t=1$ )	In this case, the above permitted standard of pollutants discharge must not exceed the level of initial background contamination. It is impossible requirement (under the conditions of the task), because produced amount of pollution does not keep within the specified standards.
	3. Inclusion of appropriate indicators from the period of time when major objects-polluters shall enter into operation	There is a choice of options for the construction of a number of objects (ferroalloy, lead and zinc plants, Gorevsky MPP and plant for the production of synthetic liquid fuels, for which the establishment and functioning of the relevant objects begins as early as possible. This provides by the second half of the forecast period the maximum possible discharge of pollution. Thus there is almost a twofold increase in the amount of economic damage caused by water pollution.
IV. Objective function	Calculations based on indicators of economic damage caused by water pollution separately for each kind of using water bodies (household-drinking and fishery purposes, as well as in the aggregate)	There are changes in the choice of options for the timing of construction of individual objects (ferroalloy, alumina and aluminum plants, Gorevsky Lead-Zinc MPP, Plant for the production of synthetic liquid fuels) in the direction of displacement of the beginning their construction near the end of the forecast period

### RECOMMENDATIONS AND CONCLUSIONS BASED ON ANALYSIS OF THE PERFORMED CALCULATIONS

Analysis of the conducted calculations using the proposed model allows to draw the following conclusions and to make some recommendations.

1. Decision showed the need for the deconcentration of production in the region (by refusing to the creation of large industrial nodes and super-large objects, by considering the deconcentration of production in the territory for a better using the adaptive mechanisms of the aquatic environment). In this case, the predicted environmental situation in the selected part of the Lower Angara region is characterized by a satisfactory level of water pollution, although there is some excess of established norms, which is accompanied by the appropriate application of economic damage.

2. In perspective the main load in the aquatic environment of the Lower Angara region should expect first of all from the objects of timber industry complex (pulp and paper, and hydrolysis of yeast plants). Share of these objects in the total wastewater pollution for all considered enterprises in the region is the predominant: more than 90% of suspended solids and about 98% – phenols and chlorides.

3. Under given conditions of the task (first of all production technologies) joint solution of the issues of aquatic environmental protection and placing objects-giants is problematic, due to which reduction in individual production capacities of a number of enterprises under consideration, first of all pulp and paper mills is required. According to our calculations, the optimum size of the unit capacity of PPM in the Lower Angara region in order to maintain the specified quality of water resources must not exceed 300–400 thousand tons. This is confirmed by data from the world practice the establishment and operation of such facilities (despite the existence of certain exceptions).

4. Results of the solution showed that even in such rivers as the Angara and Yenisei, which are characterized by high rates of water flow, this factor does not provide by dilu-

tion of conditions bringing the initial sewage discharged to the established standards (for given conditions of the problem scale, composition, production technologies and options for placement of the objects). That is the possibility of using water resources in the region to dilute wastewater as additional steps to make the initial condition up to established standards are limited.

In conditions of high background levels of water pollution its qualitative state is currently for a number of indicators (oil products, phenols, suspended solids, copper, etc.) does not satisfy the sanitary standards. This in turn leads to increased demands on technologies for the production and technologies for wastewater treatment facilities of placed in the region and requires the implementation of environmental measures in the cities located in the upper and middle reaches of the Angara River to reduce effluent discharge existing enterprises.

5. Taking into account of accumulation of pollution, implemented in Kodinsky industrial node due to the creation of the reservoir of Boguchanskaya HPP and Boguchany industrial node in connection with the possible construction of HPP Motyginino (after 2020), showed that the contribution of accumulation of dirt in the formation of the overall level of water pollution in the relevant habitats while insignificant. This is explained by the fact that according to the task conditions the basic tasks objects-pollutants (PPM, etc.) come into operation at full capacity by the end of the 2nd and 3rd periods. As a result of the accumulation of pollution occurs substantially within just the last period of time and its share in the total pollution is negligible.

6. Taking into account of natural pollution transfer between the neighboring industrial nodes testifies to its influence on the formation of balances of water pollution in the industrial node Lesosibirsk where to pollution from upstream and Abalakovo and Motyginino nodes are tolerated. Since in the Lesosibirsk industrial node already develops stressful environmental situation (especially with pollution of chlorides and phenols contamination) the additional flow of pollution from natural migration exacerbates the situation that due to the limited capacity of unloading Lesosibirsk node leads to an increase in value caused by this pollution economic damage. In other industrial sites factor natural transfer of harmful substances has no appreciable effect on the overall level of water pollution, as because of the high speed of movement of water pollutants largely transit the downstream considered rivers.

Factors accumulation and transfer of pollution are of particular importance in predicting water quality in the lower reaches of the Angara River. At present the load on the aquatic environment in the Kodinsk and Boguchany areals is negligible. It is formed mainly due to the discharge of untreated sewage in small volumes, as well as navigation and timber floating and to a greater extent falls on the upper and middle reaches of the river. However, creating a reservoir accompanied by stagnation of river water, resulting in contamination transferred from higher situated areas, together with pollution, formed directly in the Kodinsk industrial node will accumulate, and this will lead to a significant reduction in water quality.

7. Implementation of the production program, given conditions of the problem, accompanied by pollution of surface water bodies in the region beyond acceptable norms. This fact makes application of certain economic damage, the value of which is estimated on the options solutions from 3.6 to 22.0 billion rubles per year (depending on the options for placing objects-polluters, production structure of selected areals and other factors). In this case the requirement under the terms of the task is minimizing the damage works as one of the main tools of choice layout of objects location. Under the influence of this requirement, there are some changes in the choice of options for the timing of construction of individual objects-polluters (there is a shift the start of their construction ahead).



.....

In general, the formation of the economy in the Lower Angara area provided strict compliance with applicable environmental standards makes it necessary:

- a) entering new ecological oriented production technology;
- b) revision of the scale of being placed and future facilities towards decrease the unit capacities of individual enterprises taking into account the nature and extent of their impact on the environment;
- c) more thorough substantiation of the number anticipated for placement within the region of industrial enterprises and their possible concentration to the Industrial sites.

The development of the Low Angara requires a thoughtful approach based on the interlinked economic, social, and environmental priorities of development by means of high-tech production and creation of energy-efficient and environmentally friendly enterprises. The long-term development of the area will depend on whether it will be mostly based on resource extraction (limited to the lower levels of the energy-production cycle) or whether an emphasis will be put both on the integrated development of the territory according to the logic of «a hydro power plant – aluminium plant» or «forest, water – pulp, and a paper mill» and the economy's diversification in general which will create preconditions for long-term sustainable development in the region. In this case, the focus should not be on mining. Rather, the emphasis should be on the development of processing industries, building the upper levels of the energy production cycle, high added value production, and the competitiveness in the domestic and global markets. One should locate such production facilities in more southern parts of Krasnoyarsk Krai rather than in Lower Angara. From the above perspective, the Lower Angara region could become a model region for testing the approach to innovation-based exploration and development.

Therefore, the specific situation in the region dictates the need for the development of an adequate innovation policy for exploration, as well as the development of production and a spatial structure of the economy. Such a policy should be both bottom-up (initiated at the level of individual facilities) and top-down (initiated at the level of the federal government and the government of Krasnoyarsk Krai) [16, 17]. In the first case, one can refer among environmental innovations to the creation and use of environmentally friendly technologies (including the organization of waste management), the introduction of environmental management systems at industrial plants, environmental certification, environmental marketing, etc.

In the second case, it involves the consideration of long-term structural interests and opportunities of the regional economy (which requires the abandoning of the exclusive natural resources development scenario); the elaboration of tools for environmentally innovative activity, encouraging the introduction of environmentally friendly technologies, the creation of environmental requirements for the development and continuous improvement of technology; development of licensing systems for all types of activities negatively affecting the environmental situation; the restoration of the practice of environmental expertise; the implementation of environmental audits, etc. The transformation of the investment project into a federal target program could provide a solution to many of these problems.

Question about this transformation naturally put on the basis of long-term interests of the region, since it is the state regional programs (as one of the most effective tools to control the formation and organization of production on site) allow purposefully linked into a single system all implemented and planned activities in the region in cooperation with the requirements of building an innovative model of development, as well as the maintenance of environmental security and achieving desired social goals. In our opinion, the Investment Project «Integrated Development of the Lower Angara region», transformed into a regional program would fit in well with the methodology and structure of

the existing system of government strategic planning and management in Russia, under which regional programs are recognized as the primary (spanning the country's interests and region) strategic planning tool. This does not contradict the established order and the funding of regional projects from the Investment Fund. Seem possible, at least two ways to transform the investment project in the regional program. First, it can be considered an appropriate adjustment of investment projects under the Strategy for socio-economic development of the Krasnoyarsk Krai. Secondly, it is possible to initiate the authorities of Krasnoyarsk Krai to development of a specific target program with the federal status.

In any case, the Program on the Lower Angara region, in our view, should consist of at least two interconnected basic blocks:

- 1) investment projects (this is what we have at present);
- 2) the objectives and priorities of socio-economic development of the region in the long term (more than 20 years, preferably 30), including environmental and social spheres.

It is known that to obtain the status of the Federal target program is not easy. There are strict criteria and defined procedure for the selection of territories to get this status. Also a serious justification of the corresponding claims is required. In this case the initiative must come from the regional authorities and from them in this regard significant efforts are required. At the same time it's worth it, because the program allows us to pose the problem more broadly than the investment project. So, if the investment project is being developed with the aim of attracting investments into separate objects, on condition of subsequent getting profit (usually developed at the first stage of the project lifecycle, providing for concept development), then the regional program is coordinated by the resources, time, implementing a set of measures to ensure the achievement of goals and objectives, and from the standpoint of the interests of the country and the region, rather than individual objects.

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# ESTABLISHING A NEW TECHNOLOGY TRANSFER SYSTEM USING FABLAB PROTOTYPING AND SUSTAINABLE BUSINESS MODEL INNOVATIONS

*Zbigniew Gontar*<sup>1</sup>

This paper discusses selected aspects of practical implications of sustainable business model innovations tools and the Massachusetts Institute of Technology FabLab concept on the design of the university's technology transfer system. The MIT's project: FabLab is the example of trend rising in the industry, that trying to find new way of reindustrialization on the base of microfactories. From the point of view of the aim of the paper, FabLabs are digital fabrication environment for start-ups which allows getting the experience in the new technology transfer system, and business model innovations are the base of services related to technology transfer activities. We discuss the design of these initiatives in terms of the mechanism, and the vision of new technology transfer system on the base of microfactories. In particular, the problem of establishing the FabLab facilities' structure is addressed using association analysis.

## INTRODUCTION

This paper discusses the design of FabLab projects and sustainable business model innovation tools in the context of initiatives for the improvement of the university's technology transfer system efficiency. FabLab – MIT advanced educational programme becoming a worldwide community of higher education institutions and associated organizations is focused on education workshops dedicated to state of the art manufacturing technologies, and is providing access to advanced manufacturing environment in the sense of 3D printing, vinyl plotter, CNC milling, circuit production, laser cutting/engraving, and precision milling, encouraging to perform research and development projects for the new industrial revolution focusing on personal manufacturing, and offering skills needed in this new environment.

Technology transfer is organized at universities in Poland around technology transfer centres (TTC). TTC is like technology transfer hub at the university, connecting business ecosystem with innovation brokers, academic innovation incubators, and special purpose vehicles (SPV). In Novosibirsk, technology transfer system is based also on the activities of Technology Transfer Center, and Technopark. In both cases there is the gap where university start-ups don't have the well-defined channels at the universities to grow into fabrication. There is lack of rapid prototyping facilities, and business model innovation support tools.

Among the great number of technology transfer models, the model of MIT is the most valuable from the point of view of the aims of the paper, i.e. to propose a new approach on developing technology transfer system on the way to manufacturing. The MIT model is based on the activities of Technology Licensing Office, established in 1986, and encompasses the following steps: research, pre-disclosure, invention disclosure, assessment, protection, marketing to find or form a licence for existing business or for established start-up business, licensing, commercialization, revenue, and reinvest in research and education. Prototyping for manufacturability, durability and integrity is part of commercialization step.

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## FABLABS AND BUSINESS ANALYTICAL CENTERS IN THE NEW TECHNOLOGY TRANSFER SYSTEM

This section summarizes the concept of the MIT FabLab and its consequence and opportunity for technology transfer. The first FabLabs were created at the MIT in 2002, enabling personal digital manufacturing<sup>1</sup>, as a new form of manufacturing based on the idea of pooled manufacturing resources<sup>2</sup>. In that context, the bottom-up design of reindustrialization activities is focused on learning to build, and testifying these new smart concepts. Personal Manufacturing main artifacts includes: open-source hardware, including open-source 3D printers, product customization through websites offering free designs that direct 3D printers, small-scale manufacturing, rapid prototyping, distributed manufacturing, additive manufacturing, and mechatronics education<sup>3</sup>.

FabLabs give the access to the tools for all stages of technology transfer: concept design, prototyping, development, small series production of a product. The crucial step is prototyping, when prototypes are being manufactured in order to get an approval before the production process starts. Rapid prototyping means that the prototype is made quickly. It is a relatively new group of techniques – started in the 1980's – using specialized instruments to quickly fabricate a scale model of a physical part or assembly. FabLabs offer 3D printers and other facilities for rapid prototyping, fostering growth in the technology transfer environment at the universities.

The second gap – apart from FabLab prototyping environment – in technology transfer system at the universities is business analytics center. Business model innovations are integral part of technology transfer concept. Morris, Schindehutte, and Allen stated that the business model refers to the business strategy, resource-based view of the firm, transaction costs economics, strategic network theory, and cooperative strategies<sup>4</sup>. Lopez, et al. added to that perspective: enterprise architecture, economics of innovation, and marketing studies. Bocken et al.<sup>5</sup> refer to the concept of Osterwalder and Pigneur<sup>6</sup>. According to them, business model is a series of the following elements:

- the value proposition (product/service offering, customer segments, customer relationships);
- activities;
- resources;
- partners;
- distribution channels (i.e. value creation and delivery);
- cost structure;
- revenue model (i.e. value capture).

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<sup>1</sup> Gershenfeld N. (2005). *Fab: The Coming Revolution on Your Desktop – from Personal Computers To Personal Fabrication*. New York, NY. Basic Books; Gershenfeld, N. (2012). *How to Make Almost Anything: The Digital Fabrication Revolution*. *Foreign Affairs* (91), pp. 43-57.

<sup>2</sup> Anderson C. (2012), *Makers: The New Industrial Revolution*. Random House Business.

<sup>3</sup> Wittbrodt B.T., Glover A.G., Laureto J., Anzalone G.C., Oppliger D., Irwin J.L., Pearce J.M. (2013), Life-cycle economic analysis of distributed manufacturing with open-source 3-D printers. *Mechatronics* 23 (2013), pp. 713–726.

<sup>4</sup> Morris M., Schindehutte M. and Allen J. (2005), «The entrepreneur's business model: toward a unified perspective», *Journal of Business Research*, 58 (6), 726–35.

<sup>5</sup> Bocken N., Short S., Rana P., Evans S. 2014. A literature and practice review to develop Sustainable Business Model Archetypes. *Journal of Cleaner Production*, 65, 42–56

<sup>6</sup> Osterwalder A., Pigneur Y., Tucci C.L. (2005): *Clarifying Business Models: Origins, Present, and Future of the Concept*. *Communications of the Association for Information Systems* 15, pp. 1–25; Osterwalder A.; Pigneur Y. (2010): *Business Model Generation: A Handbook for Visionaries, Game Changers, and Challengers*. Hoboken NJ: John Wiley & Sons.

Richardson<sup>1</sup> proposes the following consolidated view, adding technology to the value creation, absorbed by Bocken et al.:

- the value proposition (i.e. the offer and the target customer segment): product/service offering, customer segments, customer relationships;
- the value creation and delivery system: activities, resources, partners, distribution channels (i.e. value creation and delivery), technology;
- the value capture system: cost structure, revenue model (i.e. value capture).

Let's take an example of Bocken et al. proposition. i.e. maximization of material and energy efficiency archetype, so as to understand its linkage with technology transfer system.

Definition: The maximize material and energy efficiency business model archetype refers to manufacturing organization and is defined as technological, i.e. based on technological process innovation<sup>2</sup> or technological product innovation<sup>3</sup> or significant technological improvements in products and processes. New/improved production methods, identified as technological process innovation include: low carbon manufacturing/solutions, lean manufacturing and additive manufacturing. New/improved product, identified as technological product innovation include: dematerialization of products/packaging, increased functionality to reduce total number of product required. The connection between technology product and process innovation should be close, because a sustainable product cannot be produced by an unsustainable industry.

The maximize material and energy efficiency business model archetype could be regarded also as resource efficient business model category.

The presented example follows the innovation planning process, as described in Trias de Bes & Kotler<sup>4</sup>. The elements of innovation planning are as follows: corporate business diagnostics, fit with company mission, goals, and overall strategy, innovation goals, and defining the innovation strategy. Corporate business diagnostics aims to identify factors that decided about company's successes in the past and items requiring modification or adaptation so as to the company could operate successfully in the future, through the use of tools as strategy maps, or Porter five forces analysis, etc. In the framework of sustainable business model innovation, the assumption is that corporate business diagnostics indicates sustainability as these factors/items.

*The fit with company mission, goals, and overall strategy.* Example: the presented case study is an example of a car manufacturing organization. The starting point is that the manufacturer has the following product – the car. The management consider several possible sustainable business models innovations, which should meet the following product (car) characteristics:

A car: it is designed to meet obligatory CO2 emission limits, increasing gasoline (petrol) prices, and pressures to produce more efficient, greener vehicles aimed at substantially reducing the overall air pollution in the world emitted from cars.

<sup>1</sup> Richardson J. (2008). The business model: an integrative framework for strategy execution. Strategic chance, Vol. 17, pp. 133–144

<sup>2</sup> The adoption of technologically new or significantly improved production methods, including methods of product delivery. These methods may involve changes in equipment, or production organization, or a combination of these changes, and may be derived from the use of new knowledge. The methods may be intended to produce or deliver technologically new or improved products, which cannot be produced or delivered using conventional production methods, or essentially to increase the production or delivery efficiency of existing products (European Commission Eurostat).

<sup>3</sup> Technological product innovation can take two broad forms: technologically new products (a product whose technological characteristics or intended uses differ significantly from those of previously produced products. Such innovations can involve radically new technologies, can be based on combining existing technologies in new uses, or can be derived from the use of new knowledge), and technologically improved products (an existing product whose performance has been significantly enhanced or upgraded. A simple product may be improved (in terms of better performance or lower cost) through use of higher-performance components or materials, or a complex product which consists of a number of integrated technical sub-systems may be improved by partial changes to one of the sub-systems) (European Commission Eurostat)

<sup>4</sup> Trias de Bes F., & Kotler P. (2011). Winning at Innovation. The A-to-F Model. Palgrave Macmillan.

The mission of the example company is to provide safe journey through the production and sale of cars. The goals of the company:

- be the preferred company for anyone who wants to buy a car
- achieve a domestic market share of 40 percent over five years
- increase of turnover from \$ 35 million to \$ 50 million over five years at an average rate of return of 10%
- to be present in all cities with a minimum of two points of sales / customer service in a city of more than 75 thousand inhabitants

*The strategy: radical technological unification of future cars*

*The innovation goals:*

- new car models have constitute 5 percent of the total turnover;
- process improvements intended to improve cost structures and reduce per member by 7 percent;
- business model innovations are to attract 20,000 new customers;
- creation of a new business unit has at least bring a \$ 1 million profit in three years;
- maximum budget on innovation will be \$ 1,000,000.

*The innovation strategy:*

- create for ten innovative projects, 8 of which will be marginal, and 2 radical;
- adopt a proactive strategy in new areas of business and reactive in the existing;
- create the following projects:
  - business model referring to product innovation: radical innovation involving the creation of a new business unit. Two projects with budgets the \$ 300,000 each. This will be implemented which will receive higher marks in the assessment process.
  - business model referring to product innovation: four projects with budgets the \$ 30,000 each.
- areas of innovation are:
  - savings through reduction in waiting time for delivery of components;
  - savings through reduction in component costs;
  - savings through energy savings;
  - savings through reduction of the overall amount of materials required.

Implementation of Innovation Strategy approach shall involve implementation of the projects delivering sustainability as environmental or social benefits, and efficiency for manufacturer's product.

Change the value embedded in the product (car) offered to customers: introduction of the new product (cars) in the sense of green or greener product<sup>1</sup>, or introduction green changes in small-scale for existing products including dematerialization<sup>2</sup>.

One of possible breakthrough technology innovation in the defined area is battery-powered electrical propulsion concepts.

Change in key activities and key resources and the structure and management of relationships with suppliers. Chiarini<sup>3</sup> gives examples of lean production in automotive manufacturing, with implemented of the five following tools: Value Stream Mapping (VSM), 5S, cellular manufacturing, Single Minute Exchange of Die (SMED) and Total Productive Maintenance (TPM).

<sup>1</sup> i.e. low emission cars, electric cars, hybrid cars or material substitution for green with extremal example of biodegradable car: Coca-Cola's new biodegradable PlantBottle Technology material has been put to use in a car by the Ford Motor Company Fusion Energy plug-in hybrid vehicle as an alternative to petroleum-based substances. The material is used for the vehicle's interior fabric surfaces, covering seat cushions, seat backs, head restraints, door panel inserts and headliners.

<sup>2</sup> dematerialization is the reduction of material used per unit quality of life.

<sup>3</sup> Chiarini A. (2015). Sustainable manufacturing-greening processes using specific Lean Production tools: an empirical observation from European motorcycle component manufacturers. Journal of Cleaner Production.

The stakeholders: the stakeholders were divided on the following groups: environment, society, customers, investors and shareholders, employees, suppliers and partners according to Donaldson & Preston<sup>1</sup>. The stakeholders are uncertain which sustainable business model innovations are effective referring to profitability.

In the area of electric cars, Lerch, Kley, & Dallinger<sup>2</sup> noticed, that there is observable process of integration new stakeholders, who have not been part of the value chain for combustion vehicles so far, including – apart from – car and battery makers, energy utilities and new mobility service providers.

*The stakeholders' interests:*

Jing & Jiang<sup>3</sup> defined sustainable business model in the framework of four components, sustainability value in terms of triple bottom line, one core logic (value creation and value appropriation) and two levels of transformation (business strategy and operational management). Boons & Lüdeke-Freund<sup>4</sup> added component of innovation in the sense of sustainable innovation and identification of possibilities to create sustainable value, considering sustainable business model innovation.

*The sustainable business model innovation metrics:*

Lopez et al.<sup>5</sup> distinguished the following four distinctive clusters of resource efficiency measures:

- Delivering green(er) products and product-service combinations: green(er) products (GP), green services (GS), services instead of products (SP) and functional sales (FS);
- Greener production within own company: pollution control (PC), cleaner production (CP) and eco-efficiency (EE);
- Greener production and closing the loop along the supply chain: green supply chain management (GSCM) and industrial symbiosis (IS), and take-back management (TBM);
- Focus on life-cycle re-design: cradle-to-cradle (C2C).

Trias de Bes & Kotler defined 25 metrics classified into 4 groups<sup>6</sup>:

*Economic metrics:*

- Sales from new products;
- Profit from new products;
- Sales from innovations other than new products;
- Profit from innovations other than new products;
- Cost savings from innovations;
- ROI for innovations;

*Intensity:*

- number of patents
- number of innovations in the sense of products, services, clients satisfaction, business models, processes;

<sup>1</sup> Donaldson T., & Preston L. (1995). The Stakeholder theory of the Corporation: Concepts, Evidence, and Implications. *The Academy of Management Review*, 20 (1), pp. 65–91.

<sup>2</sup> Lerch C., Kley F. & Dallinger D. (2010). New business models for electric cars – a holistic approach. Working Paper Sustainability and Innovation, Fraunhofer Institute for Systems and Innovation Research (Fraunhofer ISI), Competence Center Energy Policy and Energy Systems, Karlsruhe.

<sup>3</sup> Jing H. & Jiang B.S. (2013). The Framework of Green Business Model for Eco-Innovation. *Journal of Supply Chain and Operations Management*, pp. 33–46.

<sup>4</sup> Boons F. & Lüdeke-Freund F. (2013). Business models for sustainable innovation: state-of-the-art and steps towards a research agenda. *Journal of Cleaner Production*, pp. 9–19.

<sup>5</sup> Lopez F. J., Becke J., Berkens F., Eris B., Koer W., van Vliet H. i inni. (2014). New business models that support resource efficiency. *Policy Options for a Resource-Efficient Economy (POLFREE)*.

<sup>6</sup> Trias de Bes F. & Kotler P. (2011). *Winning at Innovation. The A-to-F Model*. Palgrave Macmillan.



- Number of new brands (models);
- Number of innovation ideas per year;
- Number of projects in initial stage;
- Number of planned innovation projects;
- Investment in R+D.

*Effectiveness:*

- Success rate for new products;
- Time to introduction to market;
- Average expenditure per project;
- Efficiency of expenditure on innovation;
- Average expenditure on rejected projects and ideas;
- Maintaining a leadership position in the industry in the years.

*Culture:*

- % of employees that produce ideas;
- % of employees that assess ideas;
- Rate of ideas per employee per year;
- % of time spent on innovation;
- Number of department that innovate on an ongoing basis;
- Propensity for risk taking.

In the sense of sustainability, it is popular statement, that business involves more than the narrowly determinist pursuit of profit maximisation and instrumentalist rationality<sup>1</sup>, and should be substitute by concepts such as corporate social responsibility, business ethics, and product stewardship<sup>2</sup>. In the industrial ecology, it is possible to use tools such as Life Cycle Analysis and mass balances, which quantify the environmental burden of existing practices or compare different ways of making the same product but has not been widely used to re-design the industrial ecology of entire product supply chains or to offer alternative business models. Tajbakhsh & Hassini<sup>3</sup> gives the example of the evaluation of supply chain operations that maximize economic returns, minimize environment impacts, and meet social expectations on the base of DEA method.

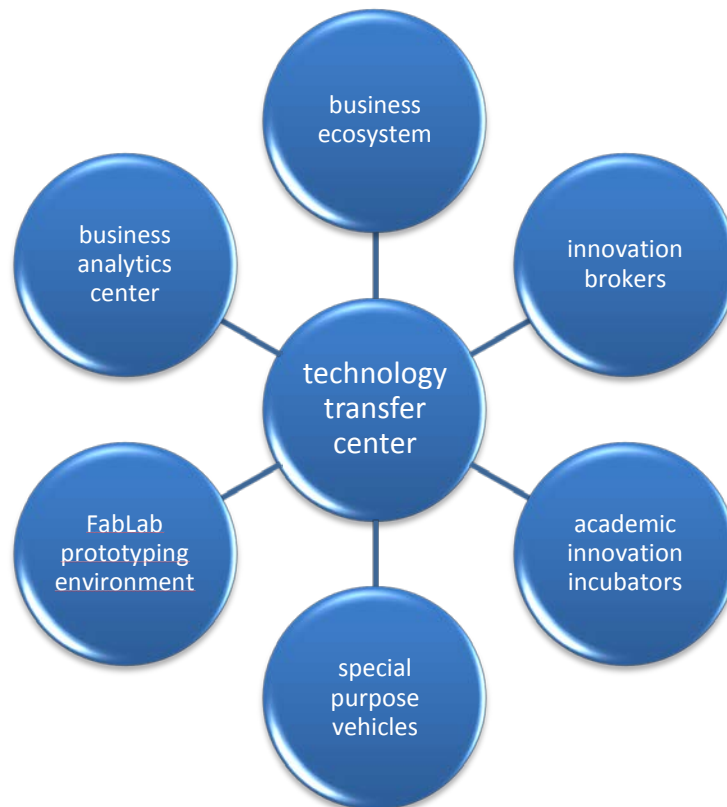
Business model innovations are especially important in the area of sustainability. Sustainable development has been the goal of the international community since the UN Conference on Environment and Development (UNCED) in 1992, when governments were called to develop national strategies for sustainable development, incorporating policy measures outlined in the Rio Declaration and Agenda 21. EU development strategy document Europe2020 defines one of the priorities referring to the innovation, and sustainable growth. Sustainable growth means – among other – building EU-scale networks, and reinforcing the competitive advantages of EU businesses. To achieve the change, the technology transfer centers at the universities could develop business analytic centers fostering non-technological innovation, developing database of [sustainable] business model innovation benchmarks, and on the base of these benchmarks – developing services, as for example: assessment tool enabling prioritization of sustainable business model innovation initiatives.

Modifying organization of the technology transfer at universities in Poland, in the light of the propositions described above is as follows (Figure 1).

<sup>1</sup> Elkington J. (2000). *Cannibals with forks: The tripple botto line of 21th century business*. Stony Creek: New Society Publishers.

<sup>2</sup> Wells P. (2013). Sustainable business models and the automotive industry: A commentary. *IIMB Management Review*, 25, pp. 228–239.

<sup>3</sup> Tajbakhsh A. & Hassini E. (2014). A data envelopment analysis approach to evaluate sustainability in supply chain networks. *Journal of Cleaner Production*, pp. 1–12.



Source: own research on the base of technology transfer system in Poland

**Fig. 1.** The proposed technology transfer model at the universities

## CASE STUDY

In the following section, the problem of identification the typical FabLab facility structure is considered. In particular, the problem can be reduced to the associations between FabLab's facilities (artifacts). Association analysis has its roots in Rakesh Agrawal et al. publication from 1993<sup>1</sup>, and is aimed at finding association rules as the following implication:  $X \Rightarrow Y, X \cap Y = \emptyset$ , where  $X$  and  $Y$  are sets of binary attributes called items. Database as a set of transactions, where each transaction has a unique transaction ID and contains a subset of the items has been collected over the data from the Fab Foundation<sup>2</sup>. The Fab Foundation was emerged from MIT's Center for Bits & Atoms FabLab Program in 2009 and supports the growth of the FabLab network in the sense of: education (.edu), organizational capacity building and services (.org), and business opportunity (.com). According the data of the Fab Foundation, the majority of FabLabs are situated on the European continent, and in the United States of America, while in Siberian and Polish universities it is almost non-existent. Establishing new initiatives, such as rapid prototyping environment for technology transfer at the universities on the base of FabLab concept, address the problem of competitive facilities, such as 3D Printing, Vinyl Plotter, CNC Milling, Circuit Production, Laser Cutting Engraving, Precision Milling, etc. Association analysis can be used in this context to determine what facilities are frequently installed together in FabLabs.

Let  $I = \{i_1, i_2, \dots, i_n\}$  be a set of FabLab's artifacts (items). Let  $T$  be a set of FabLabs (transactions), where each FabLab  $t$  is a set of FabLab's artifacts (items) such that  $t \subseteq I$ .

<sup>1</sup> Agrawal R., Imieliński T., Swami A. (1993). Mining association rules between sets of items in large databases. Proceedings of the 1993 ACM SIGMOD international conference on Management of data – SIGMOD'93. p. 207.

<sup>2</sup> Access: [www.fabfoundation.org](http://www.fabfoundation.org)

Each FabLab  $t$  has a unique identifier ( $tID$ ), and contains a set of some artifacts ( $X$ ) in  $I$ , i.e.  $X \subseteq t$ . The problem is to find association rules in the form  $X \Rightarrow Y$ , with the confidence  $c$ , where confidence is the fraction of FabLabs that when contain  $X$ , also contain  $Y$ , with support  $s$ , where support is the fraction of the FabLabs that contain  $X \cup Y$ , and where  $X \subset I$ ,  $Y \subset I$ ,  $X \cap Y = \emptyset$ .

Let's consider the following transactions, which refers to FabLabs investments, and the items refer to their facilities. So, a set of items (means a set of facilities referring to the concrete FabLabs) is as follows (Table 1).

Table 1

A set of items

Item ID	Item Name
A	3D Printing
B	Vinyl Plotter
C	CNC Milling
D	Circuit Production
E	Laser Cutting/Engraving
F	Precision Milling

Source: own research

A database (a set of items related to the FabLabs) is shown on the following table (Table 2). The data was selected randomly as the training set.

Table 2

A set of items related to the FabLabs

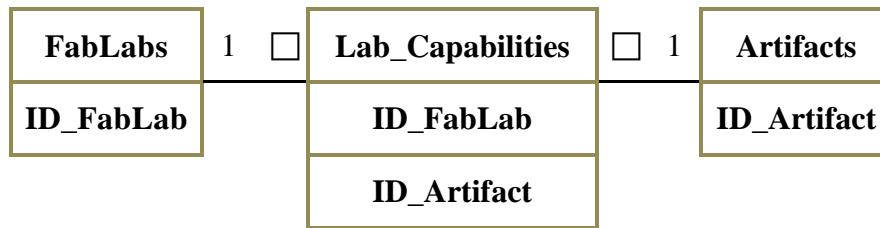
	3D Printing	Vinyl Plotter	CNC Milling	Circuit Production	Laser Cutting	Precision Milling
3dlab-fabcafe	1	1	0	0	0	0
8 FabLab Drôme	1	1	1	1	1	1
Aalto FabLab	1	1	1	1	1	1
ACoLab	1	1	0	1	0	0
Antibes NavLab	1	1	1	1	0	1
Artilect Toulouse	1	1	1	1	1	1
BEC FabLab	1	1	1	1	1	1
Bio-Fab	1	0	0	0	0	1
Brasília FabLab	1	1	1	0	1	0
BUDA::lab	1	1	1	0	1	0
Carbon FabLab	1	0	1	1	1	1
Champaign-Urbana	1	1	1	1	1	1
Chantier Libre	1	0	1	0	0	0
Cherokee Trail	1	1	1	1	1	1
CITC FabLab	1	1	1	1	1	1
CMIT «Druzhba»	1	1	1	1	1	1

	3D Printing	Vinyl Plotter	CNC Milling	Circuit Production	Laser Cutting	Precision Milling
Copenhagen Fablab	1	1	0	1	1	1
Creaticity FabLab	1	0	1	1	0	1
Defaral Sa Labo	1	1	1	0	0	0
De`mosLab	1	0	0	1	0	0
DenokInn Basque	1	1	1	1	1	1
Deusto FabLab	1	1	1	1	1	1
District3	1	0	1	1	0	1
échoFab	1	0	1	1	0	0
Ecodesign FabLab	1	0	0	0	0	0
Ekurhuleni fablabs	1	1	1	1	1	1
El Reactor	1	0	0	1	1	0
Esiaulab	1	0	0	0	0	0
Experimentarium1502	1	1	1	0	1	0
Fabcafe Bangkok	1	1	1	1	1	1
FabCafe Taipei	1	0	0	0	1	0
FabCafe Tokyo	1	1	0	0	1	0
Fab Ed Carolina	1	1	1	1	1	1
FaberLab Varese	1	0	0	0	1	0
fablab013	1	1	1	1	1	1
Fablab013 XL	1	1	1	0	1	0
RWTH Aachen	1	0	1	1	1	0
FabLab Adelaide	1	1	0	1	1	1
Aldeias do Xisto	1	1	1	1	1	1
FabLab Alessandria	1	0	1	0	1	1
FabLab Alicante	0	0	1	0	1	0
FabLab Amersfoort	1	1	1	0	1	1
Fablab Amiens	1	1	1	1	0	1
Fablab Amsterdam	1	1	1	1	1	1
FabLab Antofagasta	1	1	1	1	1	1
FabLab Arabia	1	1	1	1	1	1
FabLab Argentina	1	0	1	0	1	0
fabLAB Asturias	1	1	1	1	1	1
FabLab at PHCC	1	1	1	1	1	1
FabLab Baltimore	1	1	1	1	1	1
FabLab-Bayreuth	1	1	1	0	0	0
FabLab BCN	1	1	1	1	1	1
FabLab Belém	1	0	0	1	0	1
FabLab Belfast	1	1	1	1	1	1
FabLab Bergen	1	1	1	1	1	1

Source: own research

In the paper, association rules will be gained by apriori algorithm, and used for establishing characteristics of effective FabLab facilities for future FabLab projects at Polish and Siberian universities. Analysis of associations is the study of interrelationships of attributes of objects remaining in the relationship many-to-many.

Let's consider two objects, FabLab and Artifact of FabLab. One FabLab can have many installed types of facilities (3D Printing, Vinyl Plotter, CNC Milling, Circuit Production, Laser Cutting Engraving, Precision Milling, etc.), and one type of facility can be installed in many concrete FabLabs. In the sense of many-to-many relationship, it is possible to define FabLabs, and Artifact tables, with additional join table LabCapabilities. FabLabs table will characterise the concrete FabLabs, Artifact table will characterise concrete facilities that can be installed in the FabLabs, and LabCapabilities table will show which FabLabs have installed which facilities (Figure 2).



Source: own research

**Fig. 2.** The source data

Association analysis means identification of associations between objects on the base of object-values data tables, expressed in the form of association rules (if-then statements), and support-confidence-lift framework.

Having a set of FabLabs, the problem is to generate all association rules that have support (and confidence) no less than a specified minimum (in the paper, the value of support is given as 0.6). The first step is to define the set of FabLab's artifacts: 3D Printing, Vinyl Plotter, CNC Milling, Circuit Production, Laser Cutting Engraving, and Precision Milling. The second step is to find frequent sets of artifacts, i.e. these sets of artifacts that have support no less than a specified minimum, where support of the set of items is the fraction of FabLabs that contain this set of items. Apriori algorithm uses breadth-first search (BFS) strategy to find frequent sets of artifacts making multiple passes over the data, where itemsets are sorted in lexicographic order within a transaction. In the first pass, support of one-item sets is counted and these one-item sets that have support no less than a specified minimum are constructed as nodes in a hash-tree. Because when a one-item set is not frequent, any of its superset is also not frequent, all not frequent one-item sets are excluded from the further search. In subsequent pass, support of two-items sets – created on the base of frequent one-item sets – is counted and these two-item sets that have support no less than a specified minimum, are constructed as nodes of the second level in the hash-tree. This process is repeated until no new frequent itemsets are found (Table 3 – the itemID was used instead of ItemName). Figure 3 shows the results of association analysis.

## CONCLUSIONS

In the paper, the enhancement of the technology transfer system at the universities is proposed in the sense of FabLab rapid prototyping system, and business analytical centers fostering sustainable business model innovations tools and services. There is the gap in the technology transfer system both in Poland, and Siberia. The FabLab initiatives are not associated with technology transfer system, and there are no researches on the databases of good practices referring to the business model innovations.

Table 3

**Apriori algarythm min support=60%**

1-Itemsets



Itemsets	Support
{A}	0,945455
{B}	0,690909
{C}	0,763636
{D}	0,654545
{E}	0,727273
{F}	0,672727

Itemsets	Support
{A}	0,945455
{B}	0,690909
{C}	0,763636
{D}	0,654545
{E}	0,727273
{F}	0,672727

2-Itemsets



Itemsets	Support
{A B}	0,690909
{A C}	0,745455
{A D}	0,672727
{A E}	0,709091
{A F}	0,672727
{B C}	0,6
{B D}	0,527273
{B E}	0,581818
{B F}	0,527273
{C D}	0,563636
{C E}	0,618182
{C F}	0,6
{D E}	0,527273
{D F}	0,618182
{E F}	0,581818

Itemsets	Support
{A B}	0,690909
{A C}	0,745455
{A D}	0,672727
{A E}	0,709091
{A F}	0,672727
{B C}	0,6
{C E}	0,618182
{C F}	0,6
{D F}	0,618182

3-Itemsets



Itemsets	Support
{A B C}	0,6
{A C E}	0,6
{A C F}	0,6
{A D F}	0,6
{B C E}	0,545455
{B C F}	0,509091

Itemsets	Support
{A B C}	0,6
{A C E}	0,6
{A C F}	0,6
{A D F}	0,6

Source: own research



Source: own research

Fig. 3. The results of association analysis

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# **CONTRIBUTION OF BIOMASS LPS TOWARDS USING INTELLIGENT RENEWABLE ENERGY – KEY STUDY**

*Stanislav Kološta<sup>1</sup>,  
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## **INTRODUCTION**

Cities and villages that have good natural potential of biomass or other renewable resources can reduce their energy consumption and intelligently and effectively utilize local renewable energy sources. They have good assumptions to get rid of the «so-called position of hostage of monopoly energy suppliers» which final price they cannot influence. The usage of intelligent energy saves resources and prevents its outflow from the region, develops the local economy and brings new jobs. If regions start to eliminate dependence from energy suppliers from non-renewable fossil resources, the more stable they will be at the moment of rapidly growth of prices due to depletion of fossil resources or its high market demand ([www.priateliazeme.sk/](http://www.priateliazeme.sk/) / cEPA / ePortal).

Banska Bystrica region belongs to the overall lagging regions of Slovakia with the potential for more efficient use of its natural potential. Its efficient use in field of biomass could raise the local economy; alleviate visible social problems in region and direct regional development in a sustainable direction. Study, done by Friends of the Earth-CEPA in 2010, discovered that from micro-regions is escaping through the import of fossil fuels and electricity from 380 to 820 Euro per year per capita, even though there are good conditions for the development of so-called intelligent energy which entire production cycle is friendly to environment, is effective, strengthens the local economy, contributes to social justice, security and respects the order of priorities such as savings (i.e. reduction of the total annual energy consumption); efficiency (effective and efficient use of energy and fuels); sustainability – the use of local renewables for local consumption by using of special technology for this purpose.

Biomass LPS Bioenergia Bystricko located in Banska Bystrica region is good practical example of reaching mentioned ideas.

## **BIOMASS LPS BIOENERGIA BYSTRICKO – KEY STUDY**

In 2003 some project activities focused on biomass has been performed together with the follow-up surveys in concerned villages in Banska Bystrica region. In 2004 the preliminary analysis and energy audits continued, and in 2005 municipality association called Bioenergia Bystricko rose under the auspices of Friends of the Earth-CEPA. Eight municipalities involved in this association are Balog Ľubietová, Poniky, Kordíky, Králiky, Riečka, Tajov and Hiadel'. These villages instead of competition for EU funds created association based on mutual cooperation.

In 2006 this association of municipalities asked for the first contribution from the European Regional Development Fund (ERDF) but despite the fact that an application has

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been approved, the funds have not been provided. Willingness for cooperation of municipalities was so strong that in 2008 association re-applied project with a request for financial contribution from the ERDF, this time successfully. Public procurement has begun together with first steps of large biomass project that resulted to the real formation of biomass local production system (LPS) in Banska Bystrica region (basic data in Table 1).

The main idea of the association was self-sufficient villages in energy production and usage of local wood waste for heating of municipal objects. Instead of buying electric and heating power from private suppliers outside the micro region they are purchasing these energies from village association owned by Bioenergia Bystricko, quasi they pay themselves. Therefore it is a closed circle composed of private businesses, municipal enterprises and municipalities in the administrative area of Banská Bystrica region. These reasons allow calling this a local production system with a focus on biomass (Figure 1).

Table 1

Basic project evidence

Number of municipalities:	8
Reconstructed heating plants:	15
Number of heating objects:	32
Total capacity of all heating plants:	3 170 kW
Annual consumption of firing:	1 980 tons wood chips and 143 tons fire-wood
Annual heat energy production:	19 817 GJ

Source: Own processing according to [www.priateliazeme.sk/cepa](http://www.priateliazeme.sk/cepa).

The heating plants are using waste from local sawmills and municipal forest enterprises, thus there is no increase in forest harvest. Thus, municipal or private sawmill in villages and forest owners sell and supply waste wood for village association Bioenergia Bystricko which grind this raw wood material in their machines and stores wood chips in four warehouses where checking the quality of wood chips and usage of technology is performing.

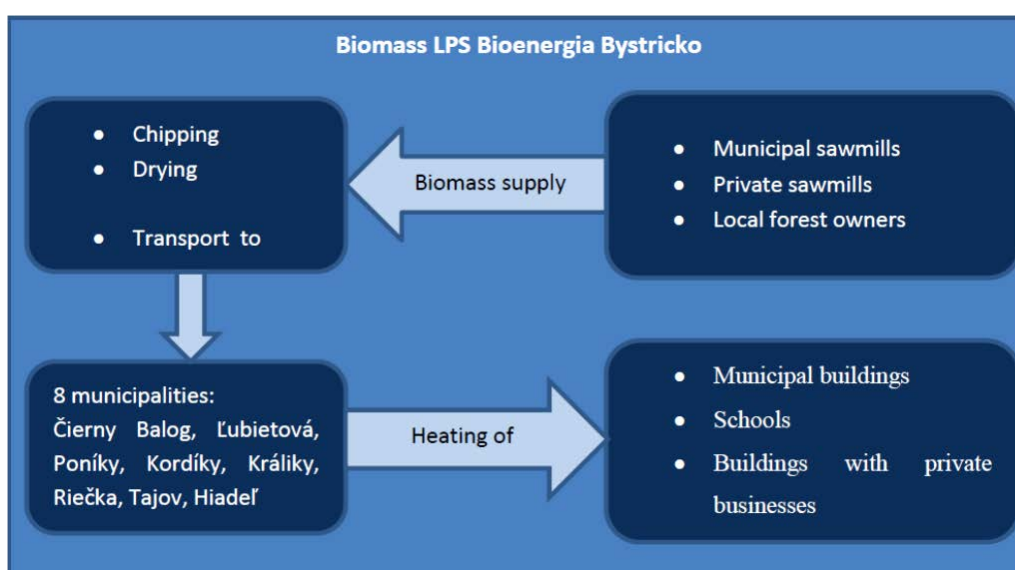


Fig. 1. Functioning of biomass LPS Bioenergia Bystricko

Wood chips in storage are redried usually 3–4 months and then are distributed according to the requirements and needs of each heating plant to the stores that are part of the reconstructed heating plants or in their vicinity. Municipalities must pay monthly advance payments which are accounted at the end of the heating season according real consumption of each municipality. Overpayments are returning back, stubs are back paid. All operating expenses which cover the purchase of wood waste, chipping and subsequent distribution, storage and costs on personnel employed by the biomass LPS Bioenergia Bystricko are summarized after heating season. These costs are then divided among municipalities according to the real consumption of wood chips of each municipality.

None of the 8 aforementioned municipalities was gas supplied. Before reconstruction all municipal heating plants provided heat mainly from coal. Heating plants were in disrepair, so the organization Friends of the Earth-CEPA gave municipalities above mentioned free information service and assistance in preparing the project proposal dealing with reconstruction of all heating plants. Biomass LPS Bioenergia Bystricko has rented heating plants from villages and each was individually reconstructed. In this way 15 heating plants have been reconstructed for biomass usage. If the heating plants are now heating more objects, internal and external heat distribution has been developed and the regulation of heating systems from additional sources was arranged. 4 independent warehouses for wood chip and fire-wood were built; technology and equipment such as mobile chipper and transport truck with a trailer, 2 loaders, containers and tractor that delivers material to the heating plants were purchased. Project management makes representatives of 8 villages who are in the role of managers in biomass LPS Bioenergia Bystricko.

All assets (Table 2) is owned by LPS Biomass Bioenergia Bystricko that was financed from own resources gained from each municipality, the European Union structural funds (ERDF) and state budget in the ratio 5:85:10. This project has supported employment directly in the region through creation of 21 new jobs.

Table 2

### Budget and project financing in Euro

Complete heating plants reconstruction	4 247 463
Central warehouses	1 760 405
Machinery, truckers, saw-mills	799 832
Supporting activities, management, publicity	91 004
Project documentation	153 263
Total	7 051 967

Source: Own processing according to [www.priateliazeme.sk/cepa](http://www.priateliazeme.sk/cepa).

The association has set the expected benefits of the overall project, which is divided into the following areas ([www.priateliazeme.sk/cepa](http://www.priateliazeme.sk/cepa)):

1. Environment: all the energy needs relating to public objects are covered by local resources (wood waste), reduction of CO<sub>2</sub> emissions by 2,643 tons per year, reduction of basic pollutants by 52 tons per year.
2. Economy: a very positive example how to regenerate the rural economy –payments for energy remains in the villages, annual heating costs reduction of 32 public objects by 20%, the creation of 21 new jobs, all year usage of all objects (some cannot be used in winter during the heating season due to missing heating distribution system).
3. Innovation and investment: modernizing the 15 heating plants and guaranteeing of its safe and quality running, alternative for mountain villages in energy sector based on renewables.

## ACTIVATION OF BIOMASS LPS BIOENERGIA BYSTRICKO

In February and March 2012 were bought equipment for the production, transport and distribution of wood chips for each heating plant. For economic reasons (large transportation distances) heating plants in village Čierny Balog are supplied with wood chips from the local saws Rosík which meets the needs of quality of wood chips for heating plants in this village.

Total costs were in 2012 represented by: 34% fixed costs (including salaries, contracts, payments, meal tickets and staff travel orders); 25% purchase of wood, services that are associated with insurance, service and revision of machines and equipment; 25% service of company cars, accounting, legal advice, staff training and public procurement; 8% fuels; 6% other charges; 2% material.

In 2012 association Bioenergia Bystricko was in loss which was covered by a loan from the bank. This has been predicted. The start of all activities was not simple operation. It has been needed some time for smooth running of whole biomass LPS and positive financial balance of each subject involved in this biomass LPS.

Since 2013, biomass LPS Bioenergia Bystricko shows a profit the amount of which is influenced by climatic conditions (warmer winter means lower energy consumption compared to heating options which means lower income and vice versa).

## CONCLUSIONS

The year 2012 was the very start of functioning of biomass LPS Bioenergia Bystricko. The long-term running of this project is conditioned by five-year monitoring period. This means that each year (for the first 5 years of operation) based on annual monitoring reports biomass LPS Bioenergia Bystricko must demonstrate to the ERDF that financial support from EU funds and State budget of Slovak republic was justified and has a long-term perspective. The project may inspire other municipalities in mountain regions and foothill areas that are not connected to gas lines and have sufficient natural potential to form similar association which could lead to creation of similar type of biomass LPS.

Despite the weak winter heating season in 2013 biomass LPS Bioenergia Bystricko achieved a profit. Revenue from the advance payments of 8 villages constantly covers existing operating costs and currently there are no major problems with the functioning of LPS. Due to percentage ownership stake of each village it is not possible to associate more municipalities into this LPS. The only option would be to bring a new project which will cover also other locations.

It is difficult to evaluate the project which has been in activity for only two years. Better view on the development of this project and investigated biomass LPS will be just after the first 5-year monitoring period. For the region are important local heating sources and systems including close local circle of all needed processes for heating in villages. This means supporting the local economy. The money spends for the heating remain in the micro region.

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# RESOURCE BASE AND ENERGY PRODUCTION CIRCLE IN BIOMASS LPS

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The paper deals with specific tasks of bioenergy projects creators in the context of sustainable development. It provides overview of useful knowledge acquired from functioning projects in Germany, Austria, Norway and Slovakia. The main objective of this paper was to summarize main points for smooth running of biomass LPS projects aimed on resource base, method of obtaining energy from biomass, energy production cycle and dialogue with inhabitants of municipality where biomass LPS is going to be located. The paper deals with technical information that cannot be missed out because they affect the economic and social aspects. Therefore access to information, experiences from other countries and the development of appropriate formal and informal linkages are necessary for knowledge transfer and play an important role in biomass LPS managing.

## INTRODUCTION

The importance of renewable energy sources in the EU is actual topic. Decisions taken in the energy sector of national economies in the coming years (Bolcárová, Kološta, 2015, p. 704) will have long-term consequences for investment, the society and the global climate. According to the directive on renewables, their average share on consumption in 2020 in the EU climbs to 20%. Slovakia aims to achieve by 2020 a 14% share of energy from renewable sources in total energy consumption which is considered with the 20% goal of the EU as modest goal (Directive 2009/28/EC). The largest proportion of technically usable potential of all renewable energy sources in Slovakia (44%) has biomass (Akčný plan 2008–2013). Many especially rural areas of Slovakia dispose of good conditions for functioning of biomass local production systems (LPS). In this paper we focus on some principles necessary for smooth running of biomass LPS projects.

## RESOURCE BASE, ENERGY FROM BIOMASS AND ENERGY PRODUCTION CIRCLE IN BIOMASS LPS

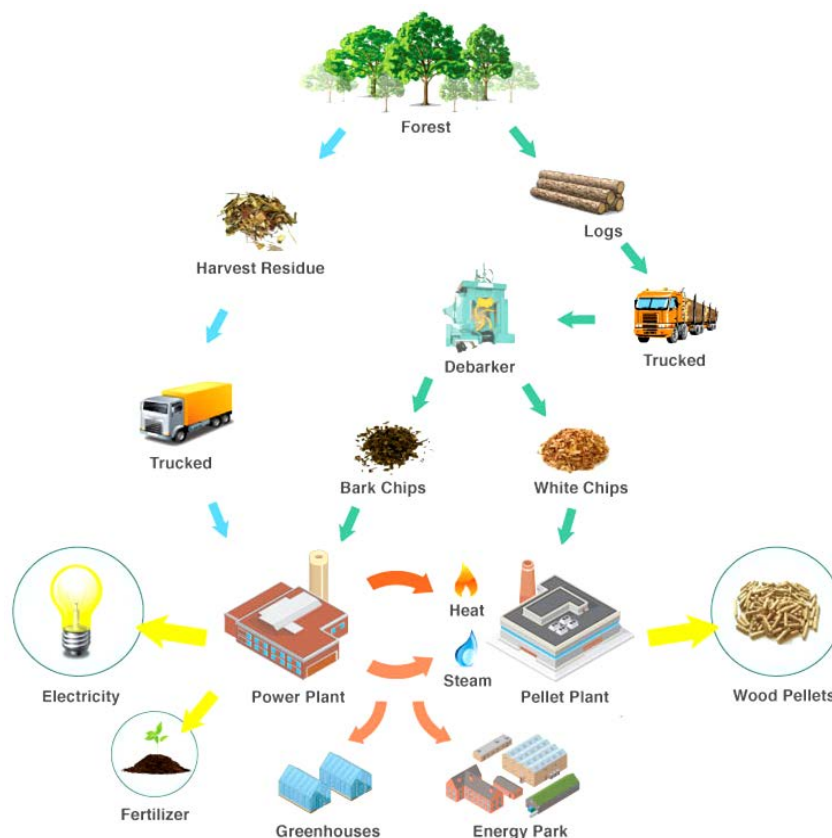
Primarily the project of biomass LPS should be aimed on analysis of the resource base, method of obtaining energy from biomass and energy production cycle (Figure1). Other important parts are mainly: management of the project, feasibility study, business plan and other technical and economic studies, which we will not describe in this paper.

When choosing a method of energy production from biomass, it is necessary to analyze the resource base. If we want to achieve local economic, social and environmental benefits at the same time, we should focus on primary raw materials available in the region. The creators of the project must determine: what the annual needs of biomass are, what will be its monthly fluctuations, the possibility logistics of biomass and connection to infrastructure (transport, electricity and heat).

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Source: <http://beaverwoodenergy.com/process/>

**Fig. 1.** Energy production circle

If biomass LPS is built near the plant such as woodworking, we can use the residuals in the form of wood remains. If demand is sufficient and operators will see the chance for further processing of waste materials (e.g. production of pellets from sawdust) they can get raw material base in the nearby area. Imports of biomass from larger distances are not a problem nowadays, but it significantly affects the cost of primary raw materials and it does not lead to reduction of greenhouse gas emissions.

Choosing of suitable technology for energy would be significantly affected by the nearest raw material base. In areas with higher animal production as well as in urban areas with a shortage of primary raw materials and high potential use of bio-waste for LPS it is preferable to produce biogas and then install cogeneration units which will combine production of electricity and heat. Mountainous areas and areas close to the timber industry should focus on production of heat from wood products (pellets, chips, briquettes) burning in boilers. Similar scenario is possible even in regions with high agricultural production where straw is the main residual material. The decision about combined production of electricity and heat in LPS always needs to check service connectivity to power line and the cost of technology. In combine production of heat and electricity the gasification technology is appropriate to use.

We can apply the reverse procedure and adapt country to our needs of raw materials. It means a change in land use and change in land appearance excluding impact on the ecosystem. These aspects may be perceived negatively. On the other hand, adapting surroundings of LPS towards its more efficient operation contribute to lower energy prices and the increased competitiveness in the market (e.g. planting of energy crops in the vicinity, thus reducing the costs of transport). Deprecation of the country also occurs when the solar collectors are built on marginal land which revitalization is much more difficult than after

planting of energy crops. Visual site of a biomass crops production is a particular problem when planting crops on unused land. Similarly, farmed and regularly planting forest does not seem like climax forest but still fulfills its functions. Difficulties with the location are possible to eliminate by re-using of brownfields and derelict industrial sites (for example within the closed factories producing cement, etc.). This does not take up space and new production will remain in the area chosen for that purpose.

The selection of the mode of production of energy from biomass is followed by analysis of the chain of collection – transport – storage. These factors affect the economic and technical factors of the project. Subsidy from EU funds for hardware operation can cover up to 95% of eligible costs, but it is a one-time affair. Ensuring quality and affordable materials is important long-term task. According to Sims (2002) transport costs are the most variable part of the costs of primary raw materials. Ideal case is an integrated collection of biomass. Biomass is often a secondary product, but if you collect it with using one machine, you will save the cost of machinery reuse. The second case is biomass collection and conveying in one place. Collection affects the amount of water contained in the biomass and thus greatly increases the cost of transport. If the creators of the biomass LPS are not going to produce their own raw material, they should always personally inspect the place where the biomass originated.

Transport of biomass plays an important role in the energy production cycle. With the intensification of the use of bioenergy the local and possibly regional raw materials may not be enough. Given case is also reflected in bio-cluster in Barnim-Uckermark where parts of raw materials are imported by ship from greater distances (Plieninger T., Thiel A., Bens O., Hüttl R.F., 2008). Transport may include the hidden costs of wear of road infrastructure, higher emissions from vehicles and so on. If taxes in the territory be increased, it could cause adverse reactions in the use of new energy sources. Therefore creators must always demonstrate the contributions of new source together with all costs that might arise in the future.

Reducing humidity of primary raw material is considered as an important part of logistics. The water content in the solid mass is different for different types of wood and organic crops and reducing moisture always bring high added value. Optimum is the process carried out at the place of biomass collection to avoid increased costs of transport. If this is not possible, the problem can be solved similarly as in Slovak city Detva where larger storage space and overlay roof allow to dry freshly imported biomass. In Hadeland (micro-region in Norway) they are trying to use residual heat in the summer months for drying of wood chips for future use (Lunnan, 2003). If in LPS area starts to grow plants to produce biomass, it will mean regular collection of certain land that will cause depletion of soil nutrients and minerals. To support sustainability, it is necessary to return nutrients to the soil (for example through ash). Each combustion process creates a certain amount of ash which differs from the type of the biomass.

Selling ash production to companies dealing with fertilizing and building of materials seems to be another perspective source of income. Due to the lack of knowledge about the use of different types of ash from biomass and hence its low use, one can consider this sector as very promising. In this sector we see significant opportunities for development of innovation as well as in agro-sector through using of scrap heat for planting in green-houses.

Another role of the creators of LPS projects focused on biomass should be also informing and involving all stakeholders (engaged actors) in the development of the project. In this case, national and regional information strategies play an important role. They should present pluses and minuses of technological, economic and social aspects which will greatly facilitate the work of the initiators. If people are well informed, they can ask questions and avoid unexpected resistance or problems during implementation. General

information should be provided by state and regional agencies (Ministry of Economy, Slovak Innovation and Energy Agency and regional energy centers), while the specific features and benefits of the project are presented by project makers.

Creators of the project should be ready to provide information and answer questions concerning the construction of LPS focused on biomass (method, time, use of technology) for example working hours of companies, how and in which way the biomass will be transported, what is the level of noise produced by traffic and transport mechanisms, what are changes in the appearance of the country, the final price for consumers, security of energy supply, employment opportunity or other economic benefits, impacts on local environment.

It is appropriate that the creators of such a project introduce a simplified model for calculating the price for the end consumer together with a comparison with other variants or current energy supply possibilities. Ordinary citizen is usually not aware of all costs and legal norms affecting the final price or the price formation process. By that measure, project creators shall avoid possible fast-made decisions as happened for example in the project carried out in Slovakia where some users decided the distribution of heat from biomass to discontinue. Information about noise and the time of light pollution (when operating at night) are important not only for the people living in the area but also for localized firms whose employees productivity can be affected.

Surely there are questions about the appearance of biomass LPS and its impact on the landscape. The initiators should always be ready to visualize the impact of this LPS on the environment. For example in Slovakia due to underdeveloped road infrastructure often witness the resistance of citizens due to the passage of heavy traffic around their place of living.

To clarify the supply of biomass and its frequency it is a necessary to prevent misunderstandings. The strongest argument will be creating or retaining of jobs and increasing incomes in the territory and its surroundings what contribute to better standard of living conditions of citizens.

Many of the questions can be easily answered, if at least some people who are recognizable in the community will visit functioning similar bioenergy project and see the real state. Projects using renewable energy sources for a longer time can be found not only in Austria (bio-energetic town Güssing) or Germany (Barnim-Uckermark). Their creators have a lot of experience that can be useful for bioenergy projects and functioning of biomass LPS worldwide.

## CONCLUSIONS

Bioenergy should be seen as a tool of regional development and can be used for intensification of the use of the internal potential of the area and thus ensure sustainable development of communities, cities and regions. In Slovakia, there is increasing number of projects in field of bioenergy. The role of bioenergy projects makers is also to inform and involve all stakeholders in the development of the project. In this case, national and regional information strategy plays an important role. Then the pros and cons of technical, technological, economic and social aspects should be presented. This will greatly facilitate the work of the initiators. Lack of experience in implementing similar projects brings problems in their creation and implementation. Therefore access to learning and development of appropriate formal and informal linkages is necessary for transfer of knowledge. Activities of initiators of biomass LPS should focus systematically on strengthening local awareness and mentality and cooperation between various entities due to successful implementation of sustainable bioenergy projects.



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# BENCHMARKING – A METHOD OF IMPROVING ORGANIZATIONAL COMPETITIVENESS

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Methods of creating, developing and disseminating relations of mutual assistance in the conditions of modern competition have been elaborated in this paper. The essence of benchmarking and its historical roots have been revealed. The authors have shown the significance of benchmarking in the post-socialist countries, the economies of which are at the stage of creating their own model of a «catching-up leap». The authors develop a standpoint that in order to overcome the traditional ideology of competition, it is necessary to go beyond the purely economic relations and step into the field of ethics. Significant attention is paid to using the excellence model in the system of international standards. The authors believe that benchmarking activity should not be limited to analyzing processes and results; it should encompass the study of the thinking mode of individuals, teams or nations as an element of the motivational mechanism. Benchmarking calls for creation of a system, which would satisfy the interests of both the leaders and the followers, that is, mutual gains. To a large extent, this task can be solved within the frames of collaborative benchmarking which is especially effective in the conditions of creating innovative cooperation networks and clusters. High level of trust between the partners should lay the basis for the relations of rivalry and mutual assistance.

## **BENCHMARKING: THE HISTORY OF FORMATION**

Benchmarking is a direction of scientific research and area of practical activity gained broad recognition in the world economy during the last decades of the 20th and early 21st century. Experts working in this field of knowledge define the essence of the term based on its etymology: the English word «benchmark» is translated into Ukrainian as «a notch» or «a starting point». In fact, this term was used to determine the process that started in 1972 in the USA. It was introduced by the Cambridge Institute of Strategic Planning and Prims research and Development Company. These institutions revealed that effective managerial decisions under conditions of competition can and should be developed on the basis of experience of other companies that successfully operate in affiliate branches. This in turn calls for elaboration of a system which would allow to study and use best-practice experience regardless of competition.

Benchmarking appeared in marketing and management textbooks after 1979 thanks to successful realization of the Competitiveness Benchmarking project by Xerox. It consisted in performing a comparative systemic analysis of the company's costs and products against those of the Japanese companies and entailed elaborating effective measures for implementation of their experience. The study of competitors' business practice was induced by the intensified competitive pressure on the global market thanks to the activity

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of Japanese companies which started to crowd Xerox out of the market. This helped to detect and solve a number of bottlenecks related to product warehousing, shipping, etc<sup>1</sup>. The study was based on the company's subsidiary Fuji Xerox operating on the Japanese market. For comparison the data on copying machinery market prices was used, which allowed to make an indirect assessment of the operational costs of competitors and to single out the areas in which they performed better financially. Assessment of the gap between Xerox and its competitors and determination of its causes and their subsequent liquidation were the findings of the study. It nevertheless took a lot of time to catch up with the leaders. According to publications, only in 1987 Xerox has overtaken its competitors in those areas, which were earlier determined to have obvious drawbacks<sup>2</sup>. All in all, the success of Xerox attracted attention of economists from different areas to benchmarking. Since then, businessmen have started to treat it with trust, while scientists activated their research in the field.

Another experience, which has also set a standard, is that of Southwest Airlines, which managed to increase its competitiveness significantly thanks to comparative testing of order processing, transport operations, business organization and finance. At that, the company did not stop at studying the practice of its competitors, and focused on studying business methods in other industries as well. Thus, having revealed that technical maintenance and refill of airplanes requires no more time than do similar operations in the automobile industry, the managers of Southwest Airlines took into account the experience of «Formula-1» mechanics and reduced the duration of this procedure from 45 to 15 minutes, which allowed to increase the number of flights<sup>3</sup>.

### **STUDY AND DISSEMINATION OF BEST PRACTICES IN THE COMMAND ADMINISTRATIVE (SOCIALIST) ECONOMY**

Extensive experience in the study and dissemination of best practices accumulated from the former socialist countries within the practice of organization of socialist competition. In the Soviet Union, it began to develop on a large scale with the proclamation of the course of industrialization in 1926 and has become a form of mass labor movement for increase productivity and achievement high production indexes. This tendency originated on the basis of creation the production propaganda bureau, as well as percussion groups of communists, members of factory committees of trade unions and advanced workers. They had to show the masses with their own example models of productivity.

In 30th of the past century mutual assistance in borrowing of best practices was named «a social tug», which reflected a sociable support of backward workers by advanced employees in the areas of performance and over-norms, reducing production costs and quality improvement.

In 1932, there was a widely promoted by a communist party nomenclature «Izotov movement», which is associated with the name of the miner of the mine number 1 «Kocheharka» (Gorlovka, Donetsk (at that time – Stalin) region of Nikita Izotov. He achieved high productivity exceeding output norms 3–4 times through careful study of the coal seam, the ability to make coal mines quickly, coherent labor organizing and the proper tools maintenance. However, in Izotov movement the new was assuming by a front-rank worker the obligation to help the backward workers and supervise their work.

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<sup>1</sup> See Терещенко О.О. Фінансова діяльність суб'єктів господарювання / О.О. Терещенко // [Electronic document]. – Available at: <http://fingal.com.ua/content/view/319/54/1/1/>.

<sup>2</sup> Watson G.H. Benchmarking v primerah / Gregori H. Watson // Delovoe sovershenstvo. – 2006. – № 8. – S. 29.

<sup>3</sup> Fukolova Yu. Vsyo luchshee – sebe. Benchmarking / Yuliya Fukolova, Igor Sheluhin, Artyom Belov/ [Electronic resource] // Available at: <http://www.finansy.ru/publ/mark/001.htm>.

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The highest stage in the development of socialist competition and dissemination of best practices was the «Stakhanov movement». Its beginning was laid in August 31, 1935 by the miner of the mine «Tsentralne-Irmino» (Kadiyivka, Luhansk region) Alexei Stakhanov. He extracted during his alternation over 102 tons of coal at a rate of 7 tons. In September 1935 A. Stakhanov updated his achievement, having extracted 175 tons, and in a few days later he extracted 227 tons. Eventually, his achievements have been used by the ruling party leaders for a broad movement to improve performance, which was transformed into a stirring «record-mania». Only mine «Tsentralne-Irmino» which was renamed as the mine after Stalin, where just for incomplete 1937 one thousand different records of all types of coal works is reached, while the mine fulfilled only 70% of the state plan. The Stakhanov movement was propagated by administrative methods in all sectors. However, as a rule, for future advanced worker performance all necessary conditions were created, and when that was not enough, fraud and violations of technical specifications were allowed. So, well-known in Ukraine Stakhanov record-holder M. Mazai as a founder of movement for speed steel production reduced the duration of steel melting by 1.5 times, although the open-hearth furnace, according to experts, wore out twice as fast.

It should be noted that the identification and dissemination of best practices within the organization of socialist competition was the focus of the party and state apparatus of the Soviet Union throughout its non-military history. It was about finding an alternative to competition, in which the adversary has to be complemented by openness and accessibility of the best practices under non-market economy levers. Herewith, in the theoretical sense were used the works of Vladimir Lenin, who, particularly in his work «Immediate Tasks of the Soviets» wrote that «all that remains for us now is to organize the competition, that is to ensure transparency, which would give an opportunity for all communities in the state to acquaint about how just out development in various areas – to provide, secondly, the comparability of results of the movement toward socialism in one commune within a country – to ensure, thirdly, the possibility of practical repetition of best practices, made by one community, by other communities – to provide exchange opportunities those material forces, which showed themselves in the best way in the relevant area of the economy or government management<sup>1</sup>». During the time of the Soviet Union a continuous search for different forms of competition and repetition the best practices was going on, but in a command economy, they do not produce the desired result – ensuring the successful economic development. However, can be considered that the worked out methods of analysis, distinguishing the best practices of business entities, individual units of enterprises and employees, and they can be definitely used in the benchmarking system.

### **BENCHMARKING AS A NEW SCIENTIFIC DIRECTION**

Taking into consideration the history of benchmarking appearance and development, the extensive set of its definitions, does not bear significant differences. As a rule, benchmarking is defined as a study of another company's experience, as well as assessment of its value for one's own company, organization, industry, or country, and its adoption in own business conditions. In its broadest sense, benchmarking is a reference comparison and tuning of one's own organization and its business processes by using other companies' experience. Today, benchmarking, together with management and marketing, is one of the three most popular methods of business management, which is rightly treated as a new direction in the development of economic science.

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<sup>1</sup> Lenin V.I. Pervonachalnyy variant stati «Ocherednyie zadachi Sovetskoy vlasti» / Lenin Vladimir Ilich // V.I. Lenin. Poln. sobr. Soch., t. 36.

When determining the place of benchmarking in the modern science, it would be incorrect to present it as an absolutely new and unknown phenomenon. It cannot be considered by analogy with newly appearing illnesses, like bird or swine flues or global warming. Business espionage always existed in the market economies, competitive and economic intelligence, the goal of which was to study the secrets that lay the basis for other companies' or countries' achievements and success. It is owing to this that the inventors of fire-making, silk-making, porcelain production, and alchemist discoveries were deprived of their monopoly<sup>1</sup>.

In history benchmarking experts single out various forms and methods of attracting foreign experience for commercial success. Such a practice was extremely popular in the countries of the former socialist camp. Worth recalling is the experience of socialist contest organizing, which was widely used in post-communist countries under the planned economy. Since it was based on comradely rivalry and mutual assistance, the participants of the socialist contest were obliged to share the leading experience. This was the subject of agreements, bilateral visits and traineeships, as well as an instrument used for motivational methods development. Unfortunately, the system of socialist contest could not play a decisive role in economic development because the goals of economic activity were limited by the state plan, and administrative levers of its fulfillment dominated in the economic mechanism. Owing to this, experience sharing more often than not was superficial in nature and reduced to mutual visits and honoring.

It cannot be stated that today the development of market relations in the world, even in the leading countries, has reached such a level that benchmarking has become a functional element of each company's activity. This is mostly true for small and middle-sized companies, 90% of which – according to the European Commission – do not use it in their practice. It is implemented only in big companies with more than 1000 employees. As for the post-Soviet countries, they are considerably lagging behind the European countries in terms of benchmarking use. Today only Russia participates in the European Benchmarking forum (EBF) and prepares official reports for this organization, even though the latter was established back in 1997. This happens regardless of the fact that EBF aims to transform Europe into the world benchmarking leader in order to use it as an instrument of continuous business development and increased their effectiveness in the conditions of intensified international competition. In addition, special attention within the frames of the forum is paid to small and middle-sized business.

It might seem that the most active users of benchmarking ought to be the post-communist countries since they are hugely lagging behind the leaders. It might seem that there is no need in persuading that the task of catching up to a large extent can be solved by adopting achievements of the leaders. Unfortunately, this doesn't work so far, the reasons to which being the inadequacy of personnel providing with respect to tasks of effective application of benchmarking to solving the problem of competitiveness, as well as management's prejudice against the expensiveness and complexity of its realization. At that, it should be noted that similar factors took place in the developed countries as well. However, in the post-communist countries, their influence is much more powerful.

Today benchmarking grows in significance in Ukraine, the economy of which is at the initial stage of creating its own model of a «catching-up leap». In view of this, it should be kept in mind that similar tasks have already been and are being solved to some extent by many national economies, which obtain both positive and negative results.

Ukraine can learn a lot from the experience of both developed and newly industrialized countries. In fact, the «lessons» taught by the latter in many aspects are no less important, especially in those aspects that their reformers started with public recognition of the

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<sup>1</sup> Єгоров В. 3 історії розвитку промислового шпигунства // Дзеркало тижня. – 1994. – 31 грудня. – № 13. – С. 14.

backwardness and resolute rejection of the previous models and superposition, which appeared to be incapable of ensuring development in the new conditions. The fanfaronade of claims to «imperial greatness» and ambitions of separate population layers were set off with sharp criticism of what had to be «left behind».

The Prime-Minister of Malaysia Mahathir bin Mohamad who held the office for 22 years, can be a great example. In his book «The Malay Dilemma», which was written during a temporary retrenchment from active political activity, the author critically evaluated the individual character features of Malay people. In particular, he openly wrote about their laziness, sluggishness, a habit of relying on fate, restraint and unwillingness to study, everything that prevented them from being modern. Based on this, he concluded that the Malays had to change themselves. This method is evidence in support of the fact that those who lead the reforms must be willing to move against the currents that impede modernization.

At its very core, Ukrainian modernization faces the Hamletian dilemma of «to be or not to be». Regardless of the fact that the country has spent the last twenty years of its independence building a national version of oligarchic state regime on the ruins of planned economy, it is time to admit that it did not become a foundation for the «Ukrainian miracle». In its functioning, this model hampers the instruments of competition, and the country never reaches the level of global leaders. By controlling entire industries, the oligarchs find no interest in inter-industry movement of capital or structural changes; instead, they accumulate personal wealth through channels of political rent by taking control over public institutions and amalgamating with them. The essential feature of the oligarchic economy is dominance of corruption based on close, partner relations between the economic and administrative-political «elites». At that, both the population of the country and foreign capital are removed from the privatization processes. Such a situation cannot be improved without the study and brave implementation of international experience adjusted to national peculiarities. Of special importance in this aspect can be the experience of developing national doctrines of settling economic, social and ecological problems at the level of globally recognized standard indicators.

A barrier to benchmarking development is the fact that no one in the market economy has managed to remove competition, whereas leaders in technical progress maintain a limited interest in it at most. Thence, the methods of benchmarking are based mostly on using reports as a source for information. A direct study of best practice, a search for mechanisms of engaging the leaders in the process of studying their experience by the lagging companies do not gain sufficient recognition even where the propagation of successful business is performed at a high level. Thus, in Great Britain, the Ministry of Trade and Industry's list of companies, which accept visitors within the framework of the Inside UK Enterprise (IUKE) program, includes 180 companies<sup>1</sup>.

It is beyond doubt that with such a range of best-practice enterprises selected by the government, free advertising and official representation assure their long-term advantages and increased customer loyalty, even though their competitors can be their equals in business excellence. In any case, they promote certain progress, especially on the basis of forming the motivation for improvement. It is no coincidence that IUKE, the largest program of this kind in the world, is popular among entrepreneurs, and dozens of one-day visits to companies for experience-sharing purposes are a proof of that.

Overcoming the traditional ideology of competition is an important aspect of successful benchmarking implementation. This problem exceeds the limits of purely economic relations and calls for discussion in the sphere of ethics. Thus, in the USA and the EU, special

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<sup>1</sup> Pilcher T. Benchmarking kak sredstvo povyisheniya konkurentosposobnosti kompanii / Terri Pilcher // Evropeyskoe kachestvo. Dayzhest. – 2004. – № 1. – S. 44.

rules of conduct are being developed, the aim of which is promoting mutual understanding among potential partners. For example, Ameritech company, a member of the benchmarking council at the US Institute of Strategic Planning, elaborated and approved a code of conduct, which includes nine positions: observe the laws; be willing to provide information analogous to what you want to obtain; respect each others secrets; do not disseminate received information beyond your company; initiate the contact only with those who are in charge of benchmarking; do not make references without permission; be well prepared already for the first contact; study benchmarking well and follow the procedure; determine the object of benchmarking analysis; perform thorough self-assessment<sup>1</sup>.

By analogy with the USA, the European Foundation for Quality Management (EFQM) developed the European Benchmarking Code of Conduct<sup>2</sup>. It contains ten clauses, which set the foundations of the whole benchmarking process: principle of preparation; principle of contact with consideration for the partners' corporate culture; principle of information exchange; principle of confidentiality; principle of using the obtained information; principle of legality; principle of completion of the assigned responsibilities; principle of understanding and agreement; benchmarking with competitors; and benchmarking protocol<sup>3</sup>.

Experts in the practice of benchmarking often stumble across the problem of adopting the revealed experience. Generally speaking, it cannot be cloned at another enterprise. Moreover, the leaders do not stop in their development, they progress continuously. That is why the concept of benchmarking is not limited to procedures of its realization. Both the leaders and the followers should be equally committed to building all their business activity towards increased performance. The only qualitative difference between them is that leaders are destined to search for new, previously unused methods of business; they are supposed to improve the level of business performance which is currently perceived as the limit of excellence. The followers should be solving a double task: to use the leader achievements and to search for opportunities of higher performance by producing their own ideas and methods of business activity. At that, the former will focus on self-assessment, whereas the latter ones will focus on competitor evaluations.

The reference model developed by the International Standards Organization (ISO) and included in the ISO 9004:2009 offers a considerable support for the growth of national economies in general and separate economic agents in particular<sup>4</sup>. The significance of this standard consists in the fact that for the first time it offers a set of analytical self-assessment methods for organization's maturity identification based on techniques of ISO 10014:2006<sup>5</sup> combined with traditional auditing of the quality management systems<sup>6</sup>.

Economic literature shares a standpoint that the EFQM models do not comply with the individual needs and should be replaced with the individualized models. «Ever more organizations refuse to use EFQM due to its generality and non-compliance with individual needs, and move on to creation of their own, individualized models of self-evaluation, which are continuously being improved along with improvement of the organization»<sup>7</sup>, acknowledges V. Novikov. We can agree with such an approach only in the sense that individual methods of evaluation are really necessary. However, they cannot replace the old ones, they should supplement them. The individualized methods can turn especially feasible

<sup>1</sup> Dzhordzh S., Vaymerskirh A. Vseobschee upravlenie kachestvom. Strategii i tehnologii, primenyaemye v samyih uspeshnyih kompaniyah. – S.-Pb.: Victory, 2002.

<sup>2</sup> European benchmarking code of conduct // EFQM [Електронний ресурс]. Режим доступу: <http://www.efqm.org/en/PdfResources/Benchmarking%20Code%20of%20Conduct%202009.pdf>.

<sup>3</sup> The principles of the European Benchmarking Code were not officially translated to Ukrainian.

<sup>4</sup> ISO 9004:2009. Managing for the sustained success of an organization – A quality management approach.

<sup>5</sup> ISO 10014:2006. Quality management – Guidelines for realizing financial and economic benefits.

<sup>6</sup> ISO 10014:2006. Quality management – Guidelines for realizing financial and economic benefits.

<sup>7</sup> Новіков В. Діагностичне оцінювання як невід'ємний елемент сучасної системи управління / В. Новіков // Стандартизація, сертифікація, якість. – 2011. – № 2. – С. 40.

and effective when searching for innovative managerial decisions regarding leaping development (for those who lag behind) or preserving the leadership positions (for leaders).

In view of the tendencies in the development of benchmarking methods, it is worth admitting that the analysis of best practice is usually concentrated on two aspects: the process and the results. In the methodological sense, they are defined by T. Conti as «left to right» (from systemic factors through processes to results) and «right to left» (from results through processes to systemic factors)<sup>1</sup>. However, from both of these approaches misses an element which accompanies and assures their transformation into a quantitatively and qualitatively superior result – the mechanism of motivating all participants of the process towards best performance. Its absence or deficiency turns benchmarking into an instrument, which cannot always be a sufficient method of achieving the most desired effect – the leadership. Without leadership no excellence is ever gained, even though it is only natural for companies to wish «to play a better game». In this respect, it would be an opportune moment to recall an aphorism attributed to B. Napoleon: «He is a bad soldier who doesn't dream of becoming a general»<sup>2</sup>.

Thus, leadership and ambition are essential or even decisive elements in achieving high results. However, they should be regarded in a broader context, proceeding from the fact that they are elements of the mode of thinking of individuals, teams, nations, which are predetermined by the motivational mechanism. In our opinion, this layer of activity has almost disappeared from the benchmarking systems; due to this, not all attempts to accumulate and use best practice produce desired results. This is especially noticeable when there is no understanding of the goal and methods of its achievement in the management system.

Understanding of the need to include the study of the thinking modes in the methodology of systems benchmarking is maturing and shaping among scientists. Thus, J. Pfeffer and R.I. Sutton from Harvard Business School conclude that «instead of copying what others do, we ought to copy how they think»<sup>3</sup> especially as experience is always in the past which cannot be blindly copied. The past had its own business conditions, client environment, international situation, etc.

Finally, there is also a factor of human exclusiveness. It can be easily noticeable in companies producing highly creative products and services. However, it is much more complicated to study the role of the leader, principles of team selection, employee motivation, and interpersonal relations at industrial enterprises. However, complexity should not lead to abandoning the study of their resource potential. In preparing for a benchmarking study, it is necessary to elaborate and approve with the partner the methodology of researching the corporate mode of thinking in general and with respect to separate employees and their groups. This element can partly be performed in the aspects of analyzing the volume of knowledge possessed by the organization. The knowledge is scattered within databases, document storages, e-mails, and reports. In addition, a significant volume of knowledge and experience is concentrated in the heads of employees, which can be accessed during individual contacts.

Knowledge benchmarking should include systems of knowledge management. This will allow going beyond simple reviews of separate data sets. It will help to single out a comprehensive business strategy, as well as a system for its realization based on all available information, experience, and employee qualifications. Along with that, reducing the time of adjustment to changes in market conditions, achieving competitive advantages in processing the accumulated knowledge, information updating, and new knowledge generation acquire particular significance.

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<sup>1</sup> Conti T. Samootsenka v organizatsiyah. – M.: SMTs «Prioritet», 1999. – 337 c.

<sup>2</sup> The saying is attributed to General A.V. Suvorov in Russia.

<sup>3</sup> Pfeffer J. Three Myths of Management / Jeffrey Pfeffer and Robert I. Sutton // HBS. – Working Knowledge. – 2006.



Finally, knowledge benchmarking is a study of competitive advantages of an enterprise in the knowledge sphere, which calls for the development of special methods and skilled employees. More than that, selection of employees should be performed in such a way that they don't cede to competitor's employees in terms of qualifications and creative potential in order to be able to analytically compare the knowledge management systems at both enterprises. A good example in this respect are Japanese who traditionally possess the mode of thinking based on reference models, which allows them to adopt the new knowledge brought from abroad. A popular urban legend says that many ideas published in the Soviet magazine «Yunyi Technik» translated into English as «a Young Technician» were used by Japanese businessmen, whereas domestic experts treated them only as popular information for professional orientation of children and young people.

In revealing the essence of benchmarking, researchers often neglect creative learning (studying) as its element. Meanwhile, globalization and modern practice require constant mastery of the new advances in science and technology. Creative learning in the system of benchmarking should be understood as a need to restrain from direct, mechanic copying of the knowledge accumulated by competitors according to the principle «think as I do; do as I do». Experts in benchmarking should assimilate and develop the achievements of competitors together with the tasks of corporate development in the conditions of scientific and technological progress. Comparing one's own company with an industry leader (standard) should be the basis for development of a new idea or a set of ideas and encourage to innovation. If such activity is performed not occasionally, but on a regular basis, it develops creative skills of employees and shapes the creative work towards building a new image of one's own company. Thanks to this, benchmarking gradually achieves the potential which (if creative learning was successful) will pave the way to leadership.

It should be noted that the benchmarking literature sometimes uses the term «a learning organization». It usually has a double meaning: the study of someone else's experience and its creative adoption in one's own business conditions. Unfortunately, such an interpretation reduces the creative element of developing original technological, organizational, financial-economic, social, and ecological solutions. This process can happen only if the study and research are integrated. If not, the essence of benchmarking reduces to the notion that a learning organization has only one «teacher» – the competitor, whose experience it is creatively copying. We believe that creative learning of the «learning organization» should be more precisely defined by the conception of «being one's own teacher», meaning that all previous knowledge is studied mostly to form one's own face in business, market awareness, or one's own alter ego.

### **COOPERATION AND MUTUAL ASSISTANCE IN THE BENCHMARKING SYSTEM**

In the system of competition, benchmarking revives the attributes, which should be inherent in every contest – relations of *cooperation and mutual assistance*. According to the logic of market relations, economic leaders are not interested in having competitors reproduce their results, or even outperform them. This is an element of rivalry. It is a driver of economic progress because it motivates business people to continuously search for, create and realize growth potential. In addition to rivalry in human life and economics, another fundamental law of human evolution is active – the law of cooperation and mutual assistance. Its essence was thoroughly studied by P.A. Kropotkin. In his theoretical concept, cooperation and mutual assistance are defined as a law of nature similar to mutual combat, although combat is more important for development<sup>1</sup>. To a large extent we can agree with D. Maslov that «common work for the good of the company has a much larger potential

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<sup>1</sup> Kropotkin P.A. Vzaimnaya pomoshch sredi zhivotnykh i lyudey kak dvigatel progressa [Electronic document] Kropotkin P.A. – Available at: <http://aitrus.info/node/767>.

than the work which is based on conflict, ranging and contest». The ideas that form the basis for benchmarking never better correspond to the principle «we'll all win together», and thus fit into the paradigm of modern management. In addition, the mechanism of benchmarking methods contains restrictive elements regulated by the benchmarking code of behaviour»<sup>1</sup>.

The specific of cooperation and mutual assistance relations consists in the fact that from the outside they look as if the interests of the lagging partners dominate. However, a deeper analysis shows that, given the responsible attitude of partner towards one another, both sides win and the weaker side does not necessarily gain more. Thus, the leader, by providing the opportunity of studying his experience, is actually «selling» his second-hand solution. The side which receives it will never be able to automatically reach the level of the leader. More often than not, the experience of others is only an information base for the creative search of one's own concept of development and its realization.

Above, we have already mentioned the interests of leaders towards cooperation and mutual assistance in the aspects of advertising. Another, no less important interest can be expressed by means of a Latin aphorism «docento discimo» – «we learn by teaching». Unfortunately, this side is the least described in the economic literature, and it is rarely covered by mass media. The Russian engineer D. Maslov after his visit to Japan made a conclusion about the belief of the Japanese that if a company teaches someone, it educates itself. He puts forward an example of the Russian delegation's visit to a Masashino cleaning company employing 360 employees, which is a winner of the Japanese quality award. Having earned reputation in a relatively unpopular business, the company has opened a new business direction – consulting. Every day it offers paid tours for 5 to 7 delegations and sells its best practice publications<sup>2</sup>.

However, it should be noted that the advantages of such cooperation do not always find proper recognition among business people. According to Japanese experience, only 50 to 75% of the companies agree to participate in partner benchmarking. When the matter in question is recognised service quality leaders, the winners of Boldridge National quality award, engulfed by that sort of proposals, usually reject all offers except for their affiliate suppliers and customers<sup>3</sup>. At that, assessing the most famous global quality awards shows that only the Japanese Deming award system is oriented towards industry and wide dissemination of standardization methods. With the European quality award, the accent is made on customer protection and environment, whereas the Boldridge award is targeted towards popularization of strategic planning<sup>4</sup>.

Cooperation and mutual assistance in the modern world are global phenomena. Creative adoption of national achievements in socio-economic development is a new and actively spreading trend. Although in the second half of the 20th century, most interest was concentrated on the American, European and Japanese models, the modern reformers in different countries are thoroughly studying the systems of more or less successful countries. The Chinese, Indian, Singaporean, and Turkish models are popular in emerging economies. Many African countries, such as Ghana, Kenya, Mozambique, Nigeria, Senegal, Rwanda, Tansania, and Madagascar, are successful to various degrees in adopting the Indian model in information technology sphere. The World Bank popularizes the Brazilian system of conditional cash transfers, which appeared to be innovative in boosting school enrolment,

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<sup>1</sup> Maslov D. Benchmarking – novoe slagaemoe uspehnoy strategii biznesa v Rossii / Dmitriy Maslov // Delovoe sovershenstvo. – 2006. – № 1. – S. 18–19.

<sup>2</sup> Maslov D. Benchmarking – novoe slagaemoe uspehnoy strategii biznesa v Rossii / Dmitriy Maslov // Delovoe sovershenstvo. – 2006. – № 1. – S. 18.

<sup>3</sup> Dzhordzh S., Vaymerskirh A. Vseobschee upravlenie kachestvom. Strategii, tehnologii, primenyaemye segodnya v samyih uspehnyih kopaniyah. – SPb.: Victory, 2002.

<sup>4</sup> See report «Natsionalnaya premiya kachestva L. Boldridzha» (MBNQA). – Electronic document / Available at: <http://bibliofond.ru/view.aspx?id=538198>.

reducing child and mother death rates, and reducing poverty without material budget losses<sup>1</sup>. In this system, the conditions for welfare transfers are not only low household incomes, but also getting regular check-ups at the doctor's office and vaccinating children, enrolling them at school. Welfare transfers can take the form of grants awarded to talented offspring's of poor families for study at prestigious federal and private universities. The Columbian system of public transport TransMilenio is very popular in large cities of many countries, providing high-speed bus lines, and bicycle lanes, large-scale construction of libraries, schools, and sports areas. In recognition of the significance of this system, the Mayor of Bogota was granted «The Golden Lion», the highest award of Venice architectural Biennale. He also presented his achievements in Moscow and Kyiv.

As the forms of mutual assistance and cooperation we can identify membership in special funds and cooperation with organizations, which offer best-practice information dissemination services. In this respect, significant benefits offer membership in the European Foundation for Quality Management (EFQM), which accumulates best-practice experience in the field of management. Members of the fund, having interactive access to its information base, can freely receive a range of benchmarking options. Similar services can be offered to companies which are not members of the fund, but on less beneficial terms.

Considerable popularity have gained the services of the best practice department at the Department of Trade and Industry of the UK and a set of intermediaries (Training and Enterprise Councils, Business Links, etc), also known as Connect, Benchmark Index I Inside UK Enterprise. A radically simplified procedure for providing consulting services offers the Connect scheme which uses a series of interactive modules on CD-ROM. The task of comparative assessment of key business indicators is solved by means of Benchmark Index, which covers 80 areas of high quality information on the state of finance, management and business excellence. The Inside UK Enterprise program is targeted at direct cooperation; it has already organized dozens of thousands of one-day visits to selected best-practice enterprises with the aim of sharing the experience and carrying out open discussions in a close circle of colleagues. The focus is made on questions of flexible automated production implementation, teamwork organization, and supplier relations.

The relations of cooperation and mutual assistance are based on trust. It is the essential resource for experience sharing and promotion of the leader's achievements. The development of productive relations among economic agents in the conditions of mutual trust and belief in sincere help develops cooperation in such a way that in the end, it brings a synergy effect for all partners. The basis for the philosophy of trust relations is mutual understanding of the fact that each of the partners should mutually share everything that is needed for the benefit of both sides. This mode of behaviour will ensure that each partner can expect to obtain what he wants, and even more than that. Under such conditions develops a sense of confidence in the feasibility of partnership. If not, then, according to J. Keynes, arise chaos, uncertainty, irresponsibility, breach of cooperation, etc. According to research of V. Kurylyak, the lower the level of trust in the market, the more restrained become its agents even if decisive action is required, thus leading to decreased rates of economic growth or even a crisis when the level of distrust increases<sup>2</sup>.

In its historical aspect, cooperation and mutual assistance are represented as an evolutionary process, typical of the whole natural world and human society in particular. P.A. Kropotkin wrote: «Thus, the moral progress of the human kind in its broad sense seems to be a process of gradual widening of the foundations for mutual assistance, from the primal family to the nation to the commonwealth of nations; in other words, groups of tribes

<sup>1</sup> See Vasilev S. Modernizatsiya Brazili: epoha dvuh prezidentov. – Electronic document/ Available at: (<http://www.polit.ru/article/2010/11/15/brasil>).

<sup>2</sup> Куриляк В.С. Цивілізаційні і міжкультурні виміри міжнародного менеджменту / Віталіна Євгенівна Куриляк // Тернопіль: Автореферат ... д-р економ. наук, 2011. – 17 с.

and peoples become larger and larger until finally these foundations cover all of the humanity, regardless of religious, language and racial differences»<sup>1</sup>. This conclusion becomes ever more actual in the era of globalization, when global economy turns into an organic integrated system of national economies and becomes a complex mono-organism with classical systemic attributes, among which the ability of self-development, management of internal organizations, and interrelations take on an essential importance.

P.A. Kropotkin, the prince and progeny of Zaporizhye Cossacks, was not destined to implement his theories of anarchism. He also didn't live to see the «life and death» of real socialism and transformation of capitalism. Looking back in time, we can conclude that the relationship between rivalry in the form of economic contest or competition, and cooperation of economic subjects develops in different ways. At certain stages of human history, the factor of mutual assistance plays a more important role. This is typical of primal, archaic, even savage forms of human existence. It is thanks to mutual assistance, that humans paved the way to progress. Further development passed through increasing role of contest and its transformation into competition. It is just the competition that made it possible to speed up technical progress, discover steam engine, gain exceptional achievements in electronics and chemistry, and create computers. From the standpoint of overall human development, the apogee for competition was reached in 18<sup>th</sup>–20<sup>th</sup> centuries, notable for industrial and science and technology revolutions.

Globalization enhances the factor of mutual assistance and cooperation. At first, this tendency appeared mostly at the global and international regional levels in the geopolitical and geo-economic dimensions. First of all, after the World War II a network of global governance institutions was established, including UN, IMF, World Bank, WTO, etc. Later, regional associations started to emerge, the EU being one of the most developed ones. In modern times, this tendency develops in the direction of expanding the functions and authorities of the existing bodies and unions, and establishing the new ones. At that, the institutions that were established earlier focused mainly on the tasks of peaceful coexistence and economic development, whereas the new ones tend to work towards increasing cooperation in the field of ecology, development of natural resources and global ocean, space research, and global climate change.

Further global development consolidates the tendencies of mutual assistance and cooperation not only horizontally at the level of international and inter-country communications. They diffuse deeply at the level of enterprises, local authorities, clusters, etc. This is a manifestation of the Hegel's dialectic law of negating the negation. It should be interpreted as an idea that globalization does not interrupt development, but becomes an heir to the past, replicating its certain features at a new stage in an improved form. For economists, it is associated with the concept of «creative destruction» introduced for the first time by the German economist W. Sombart and popularized by the Austrian and American economist and sociologist J. Schumpeter. The matter in question is that in the process of development, old relationships are destroyed, and the new ones are being formed. However, the later ones recover the values which have been abandoned in the past, but can generate new stimuli for the development in the new conditions. This process, by its nature, is a double negation, according to which everything that hampers development is removed, whereas new opportunities for future progress are created by taking all the useful attributes from the previous stages.

For the development of cooperation and mutual assistance relations at the level of competitive enterprises, it is essential that they are organically included in the economic system. At that, the element of rivalry should not be excluded or weakened. The new eco-

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<sup>1</sup> Kropotkin P.A. Vzaimnaya pomoshch sredi zhivotnykh i lyudey kak dvigatel progressa [Electronic document] Kropotkin P.A. – Available at: <http://aitrus.info/node/767>.

nomy needs both intense competition and effective cooperation. This is such an important problem that the effectiveness of the economic system which is being formed in the 21st century depends on its solution. Without including the relations of cooperation and mutual assistance into the economic mechanism, it is impossible to assure the successful and balanced development. A weighty argument in favour of this statement is the fact that the breakdown of socialism was decisively driven by the removal of cooperation and mutual assistance relations from the economic system. Finally, socialism was devoid of the innovative and dynamic essence, and destined to apply imitation in development and production of new products.

Table 1

**New technology diffusion: steel industry, continuous casting (%)**

Country	Continuous casting to total output ratio		
	1970	1980	1987
Socialist countries			
Bulgaria	0	0	10
Czechoslovakia	0	2	8
GDR	0	14	38
Hungary	0	36	56
Poland	0	4	11
Romania	0	18	32*
USSR	4	11	16
Capitalist countries			
France	1	41	93
Italy	4	50	90
Japan	6	59	93
Spain	12	49	67
UK	2	27	65
USA	4	20	58
Federal Republic of Germany	8	46	88

**Note:** \*1986

*Source:* USSR and Foreign Countries in 1987. – M: Finance and Statistics, 1988. – P. 109.

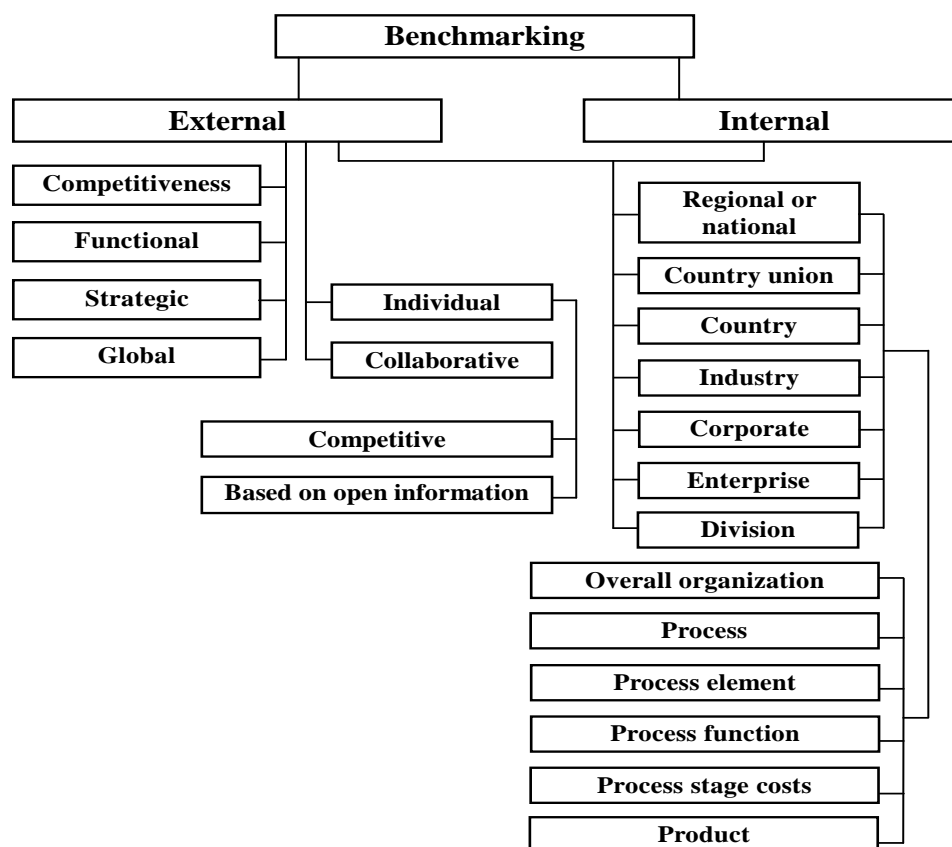
Y. Kornai admits: «Within the frames of the socialist system, we can speak of its inability to create revolutionary new products, as well as underperformance of many technical progress indicators in comparison with the capitalist system. These features are not a result of political mistakes, but represent deeply rooted attributes of socialism as a system. Unfortunately, this obvious advantage of capitalism has not earned critical acclaim. It is totally ignored by the majority of people and even those who studies alternative systems»<sup>1</sup>.

<sup>1</sup> Kornai Ya. Innovatsii i dinamizm: vzaimosvyaz sistem i tehnikeskogo progressa / Kornei Ya. // Voprosyi ekonomiki. – 2012. – S. 4. (Earlier report was presented at the conference UNU-WIDER «Reflections on Transition: Twenty Years after the Fall of the Berlin Wall», Helsinki, September 18–19, 2009).

Y. Kornai mentions 87 revolutionary innovations implemented worldwide after 1917 (the year of socialist revolution in Russia), and innovative companies. It is noticeable that the development of new innovative products took place exclusively in capitalist countries. The countries of the socialist camp at best managed to use innovations created in capitalist countries, engaging instead in alternative solutions or imitating, which is much easier to do. The data in Table 1 proves that it occurred with lengthy delays.

### **COLLABORATIVE BENCHMARKING: COOPERATION AND MUTUAL ASSISTANCE**

Economic literature contains more or less acceptable classifications of benchmarking. Among them, we can single out internal and external benchmarking, which are also divided into separate subcategories: competitiveness benchmarking; functional benchmarking; strategic benchmarking; global benchmarking; individual benchmarking; collaborative benchmarking; regional or national benchmarking; country union benchmarking; country or industry benchmarking; corporate benchmarking; enterprise benchmarking; corporate subdivision benchmarking; overall organization benchmarking; process benchmarking; process element benchmarking; process function benchmarking; processing cost benchmarking; product benchmarking (Figure 1)<sup>1</sup>. Decomposition of the forms and types of benchmarking can be further performed with respect to managerial, financial, social, ecological, and other aspects. However, the common attribute is that all the above forms can either be realized individually or together with a partner.



*Fig. 1.* Benchmarking classification

<sup>1</sup> See: Kane M.M. Sistemyi, metodyi i instrumentyi menedzhmenta kachestva: Uchebnoe posobie / M.M. Kane, B.V. Ivanov, P.V. Koreshkov, A.G. Shirladze. – M., SPb.: Piter, 2008. – S. 460.

Individual benchmarking is not, in fact, an utterly new business technique. It reflects traditional methods of data collection used by companies in the process of competition. It is a sort of salient industry intelligence realized by accumulating and analyzing open information and occasional «mining» for insider materials. In analyzing individual benchmarking, the authors of «Systems, Methods and Quality Management Tools» acknowledge that it is «on the verge of industrial espionage, which is denounced by the society and, if revealed, can lead to substantial material and image losses»<sup>1</sup>. Dismissing the illegal methods of data collection, individual benchmarking should be regarded as an element of collaborative benchmarking, providing a possibility for an unburden some study of the leading experience for the partners. At that, new scientific achievements are used in information processing.

Collaborative benchmarking is a modern form of cooperation and mutual assistance for various types of organizations, primarily economic agents. It requires a partner agreement based on mutual interest of the parties. Collaborative benchmarking involves the conclusion of agreement on performing common comparative studies of own enterprise activities or other organizations and unions. The goal of collaborative benchmarking is to reveal and disseminate leading experience among business partners and to provide mutual assistance for further development. Along with that, it can be carried out by enterprises operating in different industries, as well as enterprises operating in one industry, that is competitor companies. The later form of benchmarking is a direction that should be disseminated in the new global economy in order to reduce the negative effects of competition and encourage common activity in the interests of overall economic development. In any way, collaborative benchmarking is a certain retreat from rivalry for the benefit of cooperation, as is demonstrated by the Japanese experience<sup>2</sup>.

An important motive for cooperation in the frames of collaborative benchmarking is the fact that neither company is or can be absolutely successful in all directions of its activity. That is why joint analytical work, search for better sides of each company's activity, mutual assistance in sharing revealed advantages is a condition for each company's gains from cooperation. At that, partners agree that benchmarking results will not be used to harm parties to an agreement.

Collaborative tendencies in benchmarking development are not limited to enterprise level. Today they diffuse to various spheres of activity and can include regional (in national and international aspects), national and international levels. Benchmarking is also starting to be actively used in cooperation network and cluster development.

Demonstrative is the cooperation between Germany and Korea in comparative analysis of innovative cooperation networks<sup>3</sup> and clusters. This benchmarking study was initiated by the German Federal Ministry for Education and Research and performed in continuation of its twenty-year long cooperation program with Korean Ministry of Education and Science and Ministry of Knowledge Economy. Realization of the study was delegated to Berlin Institute for Innovation and Technology. It should be admitted that the German side did not act only on its own initiative, but represented the European Union.

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<sup>1</sup> Kane M.M. Sistemyi, metodyi i instrumentyi menedzhmenta kachestva: Uchebnoe posobie / M.M. Kane, B.V. Ivanov, P.V. Koreshkov, A.G. Shirladze. – M., SPb.: Piter, 2008. – S. 463.

<sup>2</sup> Isikava K. Yaponskie metodyi upravleniya kachestvom. – M.: Ekonomika, 1988; Mihaylova R. M. Benchmarking – universalnyiy instrument upravleniya kachestvom / R.M. Mihaylova [Electronic document] // Available at: <http://quality.eup.ru/MATERIALY5/benchmark.html>.

<sup>3</sup> It should be noted that starting from 1990s, Germany has been trying to develop innovative economy by means of harnessing industry concentration at the regional level. With this aim regional conglomerates are being created, also known as «competence networks» (Kompetenznetze). An important task of these networks is to perform research which goes beyond traditional industry limits. For that, integration of the most successful innovative groups and complexes of the country is encouraged. The organisation of such networks is realised in nine categories: biotechnology; micro-nano-optical technology; production and processing; transport and mobility; healthcare and medicine; energy and environment; new materials and chemistry; information and communications; aviation and space technology. The practice of creating competence networks is becoming popular in the EU, although it is much less known in Ukraine and CIS countries.

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The applied significance of benchmarking study fulfilled by the Institute for Innovation and Technology in the case German and Korean clusters consisted in assuring the development of international regional cooperation of cooperation networks and clusters in the area of research and innovative development with further expansion of cooperation to small and medium enterprises. It was also expected to generate positive effect in questions of increasing the competitiveness of German business in Asia. This work satisfied the interests of Korea regarding closer cooperation with the EU in the field of education, science and R&D. Research findings were fully published in the Internet<sup>1</sup> and translated into languages of the EU countries<sup>2</sup>.

The realization of collaborative benchmarking in the area of cooperation networks and clusters, which integrates research and development initiatives acquires new features compared with benchmarking in other areas. Within the frames of this form, much significance is attached to comparative analysis of priority goals; assessment of the experience and openness with a view to prospects of international cooperation development; forming recommendations for the funds and state authorities decision-making, aimed at financial support of the processes of including national science and technology and business organizations into foreign cluster and network arrangements.

Thus, the Institute for Development and Innovations, together with its Korean partners, has initially studied the existing cooperation networks and clusters focusing mainly on determining the national peculiarities of this form of organization. The researchers studied different aspects of cooperation networks and clusters activity by analyzing primary and secondary documents and interviewing Korean experts and managers. Later, it became possible to determine similarities and differences of network and cluster organization in Germany and Korea. Finally, mutual interests in the area of research and development cooperation were established.

Finally, it should be noted that collaborative benchmarking does not entail public disclosure of the research materials. As a rule, the parties agree to conditions of nondisclosure. For example, the German Institute for Innovations and Development does not publicize the names of the clusters under study and does not publish key figures in the fields of technology, energy and natural environment, pharmacy and biotechnology, microsystems and nanotechnology in their reports.

Discussing issues of collaborative benchmarking, it can not be helped noticing is that its release as a single species can challenge doubts because in itself benchmarking should always be accompanied by the interaction. In the absence of contacts based on consent to provide opportunities to inform and apply collaborative experience, benchmarking takes the form of industrial espionage, intellectual property infringements, or at least borders on these forms of competition. Therefore, organization of collaborative benchmarking should always have a legal component, primarily contractual. Partners must clearly stipulate the order of benchmarking study, the form and terms of participation rates for each partner, the working group composition, the working methods with information sources and use of its results, ensuring the confidentiality, training procedures and so on.

Unlike industrial tourism, the organization of benchmarking do not need building «Potemkin villages», fraud and pretentious. Benchmarking is able to benefit each partner in terms the study of the real situation and acquiring of the external evaluation. It creates a new trend in the development of market relations that corresponds to the principle of competition in favour of cooperation, which is characteristic for the E. Deming concept of

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<sup>1</sup> Meier zu Köcker G. Cluster als Instrumente zur Initiierung von FuE-Aktivitäten zwischen Deutschland und Korea / Gerd Meier zu Köcker, Liane Garnatz. – [Electronic document] // Available at: <http://www.vdivde-it.de/publikationen/studien/cluster-als-instrumente-zur-initiierung-von-fue-aktivitaeten-zwischen-deutschland-und-korea>.

<sup>2</sup> Thus, in Poland, the publications in Polish were realised by the Polish Agency for Business Development under the auspices of the Minister of Economy and with financial support of the EU.



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solving the crisis<sup>1</sup>, and which compliance most definitely can be traced in the activities of Japanese firms<sup>2</sup>. In practice, for the successful use of benchmarking to increase production efficiency working groups with employees of partner companies, experts and consultants were created.

Significant recommendations of benchmarking workgroups developed in terms matching of analysis results and conclusions of each workgroup, especially when considering the various discrepancies. Except, when guidance has not sufficient justification, and therefore not «fit» into general system of innovation of specific groups, contradictions in the result of collaborative benchmarking are explained by the laws of cognition. So, they may arise from the use of different methods of investigation; the accumulation of lack of facts which involve casual ones; the shortfall of material to identify relationships and sources of ignorance the conditions of partners' activities. Joint work on removing inconsistencies provides deepening of analytical research and bringing the results to the real needs of economic practices of each partner.

Significant opportunities for collaborative benchmarking using are created in the result of a merger because here are very favourable terms for borrowing the best practices. Although, the primary motivation of decision-making regarding the merger is financial reasons, in particular feasibility of maximization profits through expansion of the owning with production and marketing process or acceleration the growth of revenues compared to cost-ly, in practice, often most benefits derived from the distribution of experience in the new company. Thus, at the merger of car companies Daimler-Benz and Chrysler the major effect was obtained from exchanges of visits of engineering and manufacturing personnel, rather than combining marketing networks and unification components. Experts penetrated into in technical and technological components (for example, methods for applying glue on sealing of the doors), implementation of which gave million profits<sup>3</sup>.

In modern conditions, collaborative benchmarking is an effective tool in the implementation of national scientific and technological policies across concentration of individual entrepreneurial efforts in the form of technoparks and business incubators. Successful research of improvement the efficiency of business support infrastructures was carried out by the European Commission in 2002 and the network Entrepreneurship Research and Education Network of Central European Universities in 2006. This enabled to identify effective tools of strategic and operational management for new organizational structures by innovative development.

The dynamic development of technoparks in the European Union led to a wider study of best practices in their operation. Noteworthy the experience of Poland, where, due to receiving support from EU structural funds under operational programs, since 2004 the tendency of dynamic development of technoparks was started. Due to heterogeneity and ambiguity of these processes, the study of groups of technoparks was carried out by the consortium of companies F5 Konsalting Sp.z.o.o. commissioned by the Polish Agency for Enterprise Development on the subject and the Polish Chamber of Commerce of high technologies (Polska Izba Gospodarcza Zaawansowanych Technologii) «Organization and benchmarking of technoparks in Poland»<sup>4</sup>. For benchmarking realization the approval was received by 18 technoparks, one of which after reviewing the design information frameworks, refused to participate in the study.

Thank to the research, it became possible to formulate recommendations of the basic character. Polish experience indicates the need to improve the efficiency and productivity of existing assets by increasing the number and quality of services and streamlining costs. The scope of technoparks contacts allows increasing cooperation with enterprises, research insti-

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<sup>1</sup> Deming E.U. Vyhod iz krizisa. – Tver: Alba, 1994.

<sup>2</sup> Isikava K. Yaponskie metody upravleniya kachestvom. – M.: Ekonomika, 1988.

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<sup>4</sup> Benchmarking technoparkov v Polshe. Obschiy otchyot [Electronic document ]. Available at: [http://www.pi.gov.pl/PARPFfiles/file/OIB/Benchmarking\\_parkow/Benchmarking\\_of\\_TP\\_Report\\_vRussian.pdf](http://www.pi.gov.pl/PARPFfiles/file/OIB/Benchmarking_parkow/Benchmarking_of_TP_Report_vRussian.pdf).

tutions and financial institutions, and on this basis to receive the additional quantity of patents and innovative implementations, as well as to develop tangible and intangible resources. Benchmarking has shown the feasibility of decisive increase of spin-off companies («separated» firms – new companies formed in the course of gaining independence by employee/employees of the parent company or research organization) and start-up (just academic enterprise formed by students or graduates). According to researchers, residents insufficiently attract investments such as venture and seed capital in their development. Herewith, the «bottleneck» of the Polish economy is a small number of patents and trademarks which are protected by the law.

Development of affiliate marketing has great prospects in view of the formation of the knowledge economy. The European Union took the initiative to create a unified educational and scientific space in Europe. In 1995, the European Commission established a network of Innovation Relay Centres (IRC), whose purpose is to create a European platform for promoting international technology transfer and services in the field of innovation. Organizations of this type already exist in Ukraine. In particular, several centers for technology transfer are created, including a group «Science» and at the national technical universities. Apart from that, the Ukrainian Technology Transfer Network and the National Technology Transfer Network are functioning, which are built according to the methodology and models of the European network «relay centers»<sup>1</sup>. Currently, there is a need of the benchmarking analyses of the centers for technology transfer functioning, and development of recommendations aimed at promoting the development and use of innovations.

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# FUNCTIONING OF LOCAL PRODUCTION SYSTEMS IN THE CONTEXT OF THE NEW ECONOMIC ORDER: BENCHMARKING ANALYSIS OF POLAND AND PROSPECTS OF UKRAINE

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In the article the basic principles of operation of local production systems in the context of the formation of a new economic order, including organized Benchmarking analysis experience of the clusters in the EU and proposes an alternative model of cluster cooperation for Ukraine through innovative development of these countries. The purpose of this article is to identify problems and trends of cluster forms of Ukraine and Poland on the basis of comparative analysis of innovation development countries.

## INTRODUCTION

In modern terms a major source of economic growth is innovation and technology development. Therefore stimulate latent potential innovation systems in Europe and Central Asia is seen as a possible catalyst for economic recovery after the upheavals caused by the recent global financial and economic crisis. An innovative way of development is a priority for any state. Without the expansion and development of innovation can not achieve a high level of competitiveness and national security.

The essence of innovative economic development is promotion of innovative activities for development, implementation and dissemination of new products, services and processes as a factor in quality growth in output, employment, investment and foreign trade. In particular this applies to areas of high-tech and knowledge-intensive industries are engines of economic development. Innovative economy makes the country's competitiveness, including competitiveness of enterprises and their products. Development Innovation is impossible without a developed innovation infrastructure.

The effectiveness of innovations proven in the historical development of countries. Over the past several centuries the fastest developing countries in Europe, subsequently joined by several countries, primarily the United States. Theoretical and practical aspects of increasing innovation and support innovative development in modern conditions many are paying attention both domestic and foreign scientists: I. Ansoff (1), P. Drucker (5), M. Kondratiev (10), R. Foster, J. Forester and Schumpeter (7), A. Amosha (18), I. Bul'yeyev (8), V. Geets (20), S. Il'yashenko (9), L. Fedulova (6) et al. However, today there is no consensus on the development of an effective mechanism to provide innovative development of countries.

Thus, a number of issues of this complex problem requires further theoretical and practical grounds. In scientific studies have not developed a systematic approach to solving problems of innovative development.

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## FUNCTIONING OF LOCAL PRODUCTION SYSTEMS IN THE CONTEXT OF THE NEW ECONOMIC ORDER

Large-scale expansion of the European Union to the east in the early twenty-first century and the emergence of the border between Ukraine and the EU create a direct impact on the formation of a new system of relations between both countries and their border regions in western Ukraine. In a complex interaction of processes of globalization, regionalization is necessary to develop and implement modern principles, forms, methods, mechanisms euroregional integration policy of Ukraine and its neighboring countries of the EU.

As progress in the economic development of Europe based on innovation, associated with the industrial revolution that began in the XVIII century [1]. The second half of the XIX century causes more dynamic development in relation to other European countries were not caused by the development of science. Technology that provided the initial advantage of European countries, developed almost independently of Sciences [2] Poland is one of the most important investment markets in Central and Eastern Europe. It is considered as a market economy and is among the countries with favorable economic climate and a high degree of economic freedom.

Despite significant differences in the economies of Ukraine and Poland, these countries have similar basic industries and are important general problems of innovative development.

So, having twice the area, and hence the possibility, Ukraine's GDP has a much smaller amount (175 billion. Dollars.) compared with Poland (514,503 billion Dollars.). However, in order to get the most objective view on the innovative development of the two countries, it is proposed to conduct a comparative analysis with the help of the European Innovation Index European Innovation Scoreboard (YEIYEIT).

According innovative index Ukraine and Poland are the last group on the level of innovation of the fourth group – «countries that are catching up» with the index value of 0.23 and 0.2 respectively. This group consists of: Hungary – 0.24, Russia – 0.23, Ukraine – 0.23, Latvia – 0.22, Poland – 0.2, Croatia – 0.2, Greece, Bulgaria – 0,19, Romania – 0.16, Turkey – 0.08. In comparison with other EU countries Ukraine and Poland behind «the leaders» about 3 times (Sweden – 0.68), the «EU followers» (UK – 0.48) – 2 times, and the countries' moderate innovators – 1.6 times (Norway – 0.35) [4].

Global Innovation Index is composed of 80 different variables that characterize in detail the innovative development of countries at different levels of economic development. The study authors believe that the success of the economy is associated with the presence of both innovation capacity and the conditions for its implementation. index is calculated as the weighted sum of the scores of the two groups of indicators:

1. Available resources and conditions for innovation (Innovation Input).
2. Practical results of innovation (Innovation Output).

Thus, the final index is the ratio of costs and the resulting effect can objectively evaluate the effectiveness of efforts to promote innovation in a country.

This year, the list of parameters that are estimated country development grew into two groups: the creativity of people on the Internet (Online Creativity) and environmental sustainability (Environmental Sustainability) [5].

In 2012 Ukraine ranked 63 in the overall ranking, Moldova, Russia and Romania – have taken to ranking 50 51 and 52 places. Poland has risen to 44th.

Strengths Ukraine related to the development of knowledge (30), quality human capital (48 seats), Business Development (51), preventing the development of innovations imperfect institutions (117 seats), infrastructure (98), values of the internal market (68) and the results of creative activity (83) [6], the instability of social, economic and political nature.

Poland, unlike Ukraine ranked 44th. Thanks indices contribution to innovation development (40), institutions (45), the complexity of market (42), but its weakness is considered an indicator of efficiency innovations (80) [6].

In addition, it should be noted that the list of most innovative countries in the world that was created by Bloomberg, Ukraine was 42, and Poland in the 30th position out of 50 possible. Level innovative development was measured according to seven criteria.

Among them are:

- the intensity of research and development activities (R&D);
- high level of technology;
- the number of researchers;
- productivity and education, industry and the effectiveness of patent activity.

In terms of research intensity Ukraine got 37 seats, productivity – 69, the concentration of high-tech – 47, number of scientists – 39 performance industry – 34 level Education – 6, and patent activity – 17.

Another important indicator is the development of innovative Innovation and the number of active enterprises. Level of innovation activity of Polish enterprises and companies are now one of the lowest in the EU. According to the latest report of the European Commission Poland ranks 23 among the 27 EU countries in the ranking of innovation development.

It should be noted that in the present conditions among countries having two clusters. First – Central and Eastern Europe (with 2013-EU) – characterized unidirectional pro-European orientation, hence incurring transformation adapted to the conditions of the European Communities. Second – CIS – the heterogeneity of different geopolitical and geo-economic position, therefore, the results of the transformation are significantly different at similar facilities. As a result, a common set of transition countries having variations transformation of the national economic system. Thus, in clusters formed of different models of business institutions in innovation [7]:

- Model CEE countries (Poland, Slovenia, Czech Republic and others.) – Development innovation sector from foreign direct investment and knowledge, the development of micro-institutions is carried out in accordance with European standards and EU facilities. The development of innovative environment based on supporting supranational EU system, the general socio-economic transformation of existing scientific and technological potential.

- Model the CIS (Russia, Ukraine, Belarus, etc..) – Development innovation sector is constrained by inefficient mechanisms foreign direct investment and of national financial resources, lack of a systematic approach to the world-class NTP, microeconomic development institutions asymmetrically in different areas, rapidly developing low-tech spheres of the national economy. As for the innovation activities of Ukrainian enterprises, it is characterized by structural deformation, institutional incompleteness, inconsistency and imbalance of technological, economic and social aspects. Unlike the developed countries in the Ukraine to the national innovation system is under development.

The economic logic and political situation led to Poland is not very long complex transition – so-called «leap to the market» through emergency stabilization and price liberalization, international trade and finance. The goal was defined – to end the financial chaos and introduce competition. Polish reform program supported by financial assistance from the white West – in the form of loans from the IMF to \$700 million. Loan Bank for International Settlements (Switzerland) \$215 million and the stabilization fund of \$1 billion governments of a number of OECD countries.

During 2013 innovation activities engaged in 16.2% of the total number of industrial enterprises (in 2012 – 18%), a implemented innovations – 12.8% (in 2011 – 14.8%). It should be noted that after a significant drop in 2008–2009. these figures in the last two years have slightly improved. Those businesses that were engaged in innovation activity in

Ukraine, dominated the field of lower technological structures. In Poland the share of innovation active enterprises is 16% in the EU – an average of 60%. Low innovation activity of businesses Ukraine, in turn, causes a small share of innovative products in total production (only 3.8% of industrial production in 2011 was innovative in 2011 – 6.7% in 2012 – 5.9% in 2013 – 4.8%). As for Poland, the share of innovation active enterprises in 2009 was 23.9%, while the share of innovative products 13.1%, significantly higher than in Ukraine.

In Poland, a million accounts in 1598 people engaged in R&D. The same rate in Ukraine is at 1353 researcher at one million people, in addition there is a negative trend in this indicator.

Structural changes suggest enhancing fragmentation of the innovation process in Ukraine. The main source of financing innovation in the industry, as in previous years, in 2013, had their own means of economic entities – UAH 7 585 million. Representing 52.9% of total funding. Innovation financing from the state budget in recent years is about 1%, although the absolute amount of expenditure has increased from UAH 87 million. In 2012 till the 1.492 UAH billion in 2013. Simultaneously, the share of foreign investment in 2012 reached 30% in 2013 fell sharply to 0.4%. Innovation financing in Poland as well as in Ukraine is mainly due to the personal funds of enterprises (70%) but significant difference from Ukraine is to help EU programs (17.3 billion Euros). In 2013 State budget expenditures on R&D financing amounted to 0.29% of GDP (in the crisis in 2011, the figure was 0.45%). The current situation in science, many scientists called catastrophic. Never in the history of independent Ukraine expenditures on research and development did not reach 1.7% of GDP. As confirmed by international experience, the exponent science funding below 0.5% of GDP in the country science can perform only the cultural function, across this line, it can give some scientific results and perform in the community is also an educational function, and only when expenses exceed 1.0% of GDP begins to show its economic function.

With funding of 1.5% of GDP in science is potentially self-supporting, that is manifested innovative feature of science. In the leading countries science funding may reach 3% of GDP or more in which case there is a proactive economic development of these countries.

In Ukraine in 2012 the figure for all funding sources was 0.73% of GDP, one of the lowest budget reached a low level in recent years – 0.3% of GDP.

As for Poland, it is like many other EU member states, aims to achieve higher spending on R&D. Under the new strategy, in 2020 R&D costs should be 3% of GDP. European fund programs provide many tools, not only to encourage R&D activities, but also to the financial performance of this activity. As of the 2013 R&D expenditures in Poland amounted to 0.7% of GDP, well below the EU average of 2%. Opportunistic R&D are only a small part of the value of 0.2% of GDP, and the government are part of research and development.

Development of business activity in Poland in the new century was quite difficult because of the diversity of phenomena and new institutions that affect this activity. Organizations active in support of the Polish business, working at local, regional and national levels.

Recently, there is a rapid change in profile of the business organizations as having lost the function of representation, they began work on a commercial basis, focusing on the implementation of the cluster approach to economic development. Interest in the implementation of cluster initiatives and cluster formation in Poland constantly growing rapidly. Thus, from 2005 to 2013 more than 50 cluster initiatives were developed and implemented in Poland. Today, some of them are recognized as innovative industrial clusters formed. The activities of both employers and governments at various levels felt and there are clear marks that clustering processes occur in almost all regions of Poland. Sectors which are already identified clusters that are closely linked with regional features and characteristics. For example, clusters that arose and were formed in rural Lublin region, operating in the field of

gardening, growing vegetables, hops, vehicle servicing farmers, cattle, dairy products. Within Lublin clusters merged agricultural producers, for the production of food products, certification agencies, universities, freight forwarders, agricultural consulting centers and others.

In these recent years, significant efforts in Poland invested in the development of competitive cluster associations (both traditional and hi-tech sector) and their internationalization. In modern Polish industrial policy formed a comprehensive integrated approach: cluster policy has become an important element as innovation policy (knowledge-based economy), and regional (bottom-up approach) and Industrial Policy (horizontal approach).

Naturally, the Polish experience of the crisis, the formation of regional innovation cluster organizations, and in addition, and joint training of Poland and Ukraine for Euro – 2012, increase the interest of Ukrainian organizations to positive developments neighboring country. Following the 2009 Poland was the largest trading partner of Ukraine among the countries of CEE. Analyzing the commodity structure of trade relations between Ukraine and Poland in recent years, it should be noted that the first position on Ukrainian exports to the Republic of Poland, on the structure of imports from the Republic of Poland to Ukraine, there is a steady increase in finished goods (equipment, finished products). Despite the economic crisis in both countries, Ukrainian-Polish investment cooperation in 2009 was characterized by positive values.

Traditionally Polish investments in Ukraine directed in manufacturing (60%) in the financial sector (20%), in wholesale and retail trade (12%). In most regions, the investment goes to the western regions of Ukraine and the city Kyiv. Because clusters today considered as a major catalyst for economic growth and the formation of a qualitatively new stage of development cooperation in the context of the new economic order, you can be assured that Ukrainian–Polish economic relations will be more oriented to the synergistic effect of the interaction between the Polish and Ukrainian clusters and in the formation of joint cross-border clusters.

## CONCLUSIONS

Despite the significant difference in terms of GDP and Ukraine and Poland in accordance with the index EIT are the last group in terms of innovative development - the fourth group of «countries that are catching up» behind the leading countries about 3 times. However, according to a global index of innovation Poland was able to build a greater innovation capacity through investments in EU development programs. Innovation activity of enterprises in Poland at present one of the lowest in the EU, but this figure in turn is almost 50% higher than in Ukraine. Innovation financing in Poland as well as in Ukraine is mainly set own funds (about 70%). It should be noted that while many European countries were fighting the global financial crisis, Poland was able to show an amazing resilience. It was the only state of the European Union (EU), which showed growth with an increase of 1.7% in 2009 compared with a decrease of 4.3% in countries outside the EU-15. But this growth occurred largely due to capital accumulation and higher productivity, which is based on the development of new technologies rather than research situation and development (R&D), which is a key element of future growth.

Thus, the typical problems of innovation and economic development in Poland and Ukraine, as well as the formation of a new economic order is a lack of investment and financial resources, lack of direct promotion of innovation, lack of innovation infrastructure, low incomes, high inflation and unemployment change sectoral structure of industry aimed at developing low-tech industries, changes in the structure and parameters of the trade (import high-tech products, exports of low-grade processing and commodities), the lack of competitiveness of industries.

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# **SECURITY OF THE GLOBAL ECONOMIC DEVELOPMENT IN THE ENVIRONMENT OF INTERNATIONAL FINANCIAL CENTRES**

*Roman Y. Zvarych*<sup>1</sup>

The paper studies the development of international financial centers, their role in the world economy and prospects of their establishment in CIS. Elaborated is the theoretical basis of international financial centers activities. Analyzed is the economic environment of international financial centers. Elaborated are the prospects of international financial centers in the CIS.

## **INTRODUCTION**

One of the components of economy globalization and the highest stages of globalization is the globalization of world financial space. Therefore, financial transactions are a kind of quintessential reflection the processes occurring in the real economy, so level of integration into the global economic system primarily determined by its integration into the international financial markets and participation in financial globalization. According to the countries seeking fast integration into the global economic complex, it is necessary to study and analyze the features of modern financial market conditions, i.e. in the context of globalization – general economic and financial, in particular. The general analysis of challenges of financial globalization and development of financial markets is displayed in the works of both foreign and domestic scholars: V. Bashkirov, S. Hoffmann, W. Dorofeeva, G. Kolodko, A. Suetina, J. Hanson, P. Honohan, N. Stukalo, P. Hirst, L. Mower, E. Rose, G. Thompson, S. Shiratsuka and others.

## **THEORETICAL PRINCIPLES OF INTERNATIONAL FINANCIAL CENTERS**

So, globalization is a process of universalization, the establishment of structures common for the whole planet Earth, connections and relationships in different spheres of life. This process means homogenization of life: prices, products, quality health care, income, bank interest rates have a tendency to alignment on the world market. Modern processes of globalization generated by economic factors: the social division of labor, technological progress in a market economy, interstate integration processes, international public associations and international NGOs, various forms of international cultural exchange and communication. The basis of the process of economic globalization are internationalization of industrial relations in high-tech industries based on foreign direct investment, creating markets global in scale and relentless by operation mode, primarily – financial. Since 1980 the system of financial markets constantly operates globally. There was a global financial network that connect together financial centers around New York and Chicago in America;

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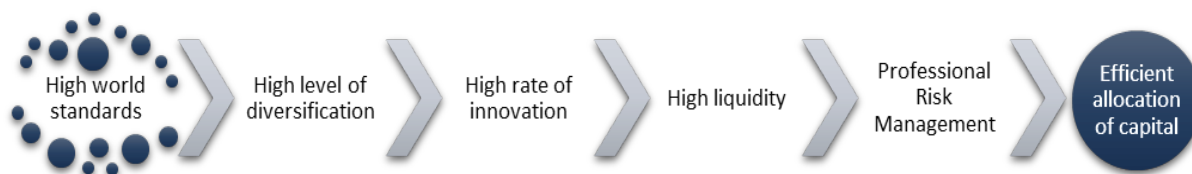
London, Zurich, Frankfurt, Paris, Amsterdam in Europe; Hong Kong, Tokyo, the Bahamas and the Cayman Islands, Singapore, Bahrain in Asia. Strengthening connections between these centers, in fact, meant financial revolution that has three key aspects [1]:

- global presence of international financial institutions;
- international financial integration;
- rapid development of financial innovation.

Financial Markets Analysts note that the globalization of the financial system is the interaction of these phenomena [2]:

- technological progress, which allows to provide international financial transactions in real time and significantly reduce the cost of transport and communication;
- increasing competition, between credit and financial institutions on financial markets and among financial markets due to significant development of information technology and telecommunications;
- restructuring of credit and financial institutions through their mergers and acquisitions as a consequence of increasing competition between them;
- extensive business internationalization by strengthening transnational nature of corporations;
- consolidation of regional integration organizations (in Europe – Economic and Monetary Union);
- weakening of strict control on the implementation of international agreements related to the movement of capital stock exchanges;
- macroeconomic stabilization and reform in a number of developing countries and emerging economies, which created a favorable climate for foreign investors;
- extensive use of «the lever principle» (significant borrowing for their investment) and development processes of securitization assets in industrialized countries.

Let's identify the most important opportunities and requirements of global financial markets and their participants (Figure 1) [3].



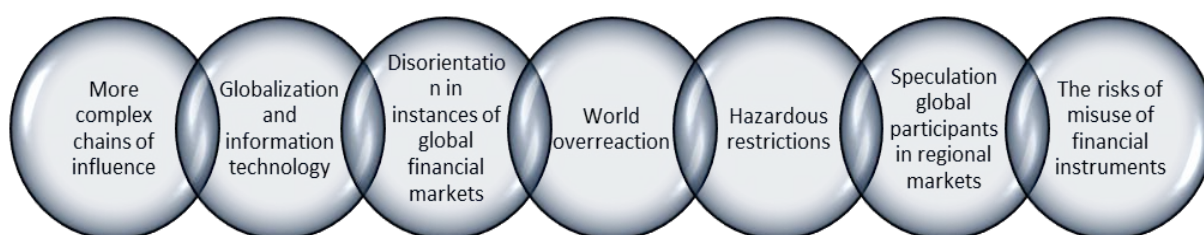
Source: made by the author.

**Fig. 1.** Perspectives and requirements of global financial markets

The participants in global financial markets that want to be competitive within the global financial markets allocated in the comparative sectoral analysis of the by high standards for quality of products, market positioning, know-how, information and reports. The so-called orientation benchmarking (comparing with better) on any other market does not show as much as globally. The pressure of competition and production costs while improving product quality is very high. The global price of global product is in most cases very favorable price. International investors and borrowers choose between markets, financial products, currency, risks and more. Global corporations allocate on global financial markets of new investors. Active members receive an additional review of markets, products, capital flows and competitive situation. A global competitive pressure makes real innovation to maintain rate higher than market protected by national protectionist policies. Due to the number of participants in the global financial markets and products are characterized

in most cases by improved liquidity. It is primarily concerned with officially organized financial markets. Globalization, information technology, financial innovation and modern theories of portfolios assets management allowed for a short time to develop a special risk management system and their optimization: risks are divided, evaluated, re-arranged, eliminated and is limited. Globalization and information technology have provided more efficient allocation of investment capital, at least in the medium term. Globalization encourages the understanding of the investor and the borrower. Financial globalization means markets as free from emotion distributors of capital towards the most effective investment opportunities in other specified conditions worldwide.

The requirements should not be evaluated as negative aspects. This concept emphasizes the particular importance these issues for participants in global financial markets, which should be able to take advantage of prospects or manage risks. The above prospects / requirements resist following disadvantages and risks (Figure 2) [4]:



Source: made by the author.

**Fig. 2.** Risks of global financial markets

The globalization of financial markets creates new, especially foreign chains: the facts of world politics, economy, science, demography, etc. pull because of their emotional perception of people most unexpected reactions that immediately affect the course of national and international events. Globalization and information technology raises the problem of «painful choice». Globalization, information technology, securitization and modern possibilities to conclude agreements weaken the relationship between the investor and the borrower. Investors can immediately «blame» borrowers of capital in case the last actions not meet the expectations of the market. Financial globalization is inherently involves free movement of capital and free trade in goods. The globalization of financial markets often leads to the difference between global and domestic market oriented parties. The globalization of financial markets increases the potential for misuse of many different financial instruments [5; 6].

In recent years, was proposed the concept of «innovation and investment nature» of globalization, in which is claimed the following: sharply increased rates of scientific and technological progress (increased twice every five years) that generates the need for innovation and related large-scale investment in the development of high-tech industries; to provide profitability of investments in innovation – need to increase sales, expanding the boundaries of market, transformation of the market with local category into the category of regional and global; exacerbated by the global nature of competition in the possibility of mobilization, resource ownership and access to global markets; uncertainty of the outcome and the uneven development of the innovation process are the main risk factors associated with the acceleration of structural reforms in the national economy, the increasing number of mergers and acquisitions [7].

International financial market is a huge financial center that mobilizes and redistributes the large amounts of financial resources. The term «international financial center» began to use recently. First, the term «the international cities» used P. Geddes. Then the concept developed P. Hall – in his book «International Cities» (1966). In 1915 P. Geddes called

them «world cities». The successors of P. Hall became F. Braudel, G. Reed, J. Friedman (co-authored with G. Wolf), S. Sassegn, M. Castells, P. Taylor and group GaWC (complex of scientific works since mid 1990s to our time), P. Marcuse, P. van Kempen. Special review of MFC, also known as the «capitals of capital», regularly published in the journal «The Economics» [9]. The financial center – a center of organizations (banks, stock exchanges, financial and insurance companies, etc.) that are provide financial services, or have themselves in need, here are proposed global services and can be arranged global financial transaction. There are many approaches to determining what is MFC. Following are some definitions [1]:

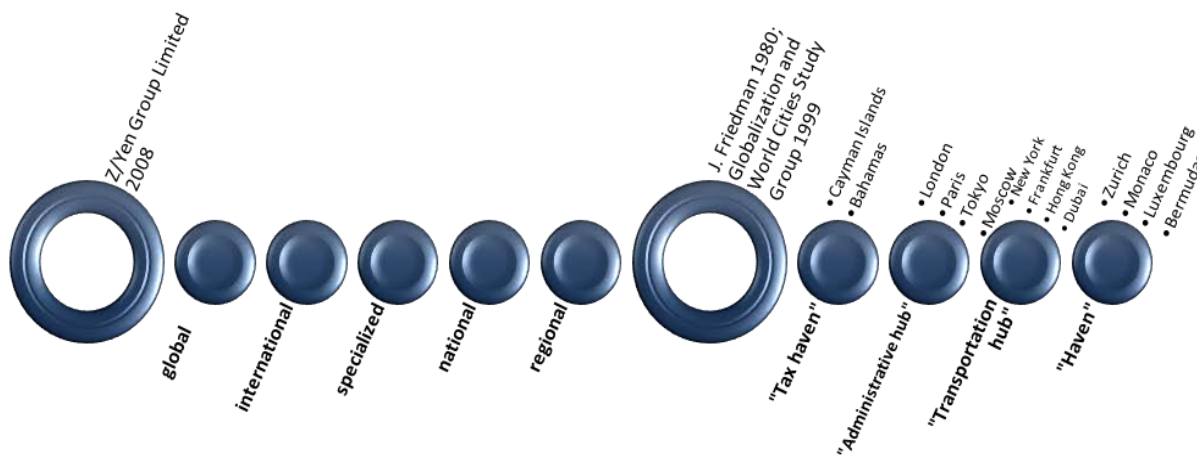
- ✓ center of concentration the specialized credit and financial institutions and banks that provide international transactions in monetary, financial and credit sector, deals with gold and securities;
- ✓ place where various financial institutions agree to implement the financial intermediary that have an international dimension;
- ✓ city as a great participant in transactions with assets in the global market;
- ✓ current international market mechanism that serves as a way of managing international financial flows.

International Financial Centre performs the following functions (Figure 3):



Source: made by the author.

Fig. 3. Functions of international financial center



Source: made by the author.

Fig. 4. Classification of international financial centers

In the international financial markets takes place the concentration of banks and specialized credit and financial institutions that provide the international financial transactions with currency, credits, securities and gold. Currently, there are several types of classification cities in the degree of participation in the international financial sector. One of the first classifications proposed by American economist J. Friedman in the 1980-s., was made by constructing a hierarchy of world centers. In 2008 the Company Z/Yen Group Limited worked out the classification of financial centers, taking into account the importance of cities in global financial markets (Figure 4) [8].

In recent years, one of the main functions of financial institutions, of global financial centers is to develop and implement long-term strategy of strengthening and expanding the global financial system in cooperation with international financial institutions and leading Western countries. Developed «rules» of the financial markets; modified institutional and legal system of financial institutions for providing maximum free access to financial markets. Financial institutions involved in the management of international debt and conduct international debt restructuring so as to provide prospects for future payments and receipts with maximum possible amount of current payments. However, experts believe that if the globalization of the world financial system will continue growing by such rate – in 10–15 years the weak national financial markets can be merged by more powerful regional and global financial markets. This will affect the country's competitiveness on a global scale, and may threaten its national economic security.

### **ANALYSIS OF THE ECONOMIC ENVIRONMENT OF INTERNATIONAL FINANCIAL CENTERS**

There are different groups of financial centers of world importance. London Company Z/Yen Group, creator of the most popular index of global financial centers, distinguishes international, transnational and regional financial centers. As noted, G. Trift identifies global (New York, London, Tokyo), zonal (Singapore, Hong Kong, Paris, Los Angeles) and regional (Sydney, Chicago, San Francisco, Dallas, Miami, Honolulu) centers. A. Novikov and I. Novikova selected (based on surveys/research of journal «Expert») global (London and New York), regional (Hong Kong, Singapore, Frankfurt-am-Main, Sydney, Tokyo and Chicago, and recently also: Johannesburg, Dubai and Shanghai), local, niche (offshore zones) and specialized (Zurich and Geneva) financial centers. By appointment, S. Pakhomov identified three types of financial centers: 1) the «gate» to capacious national capital markets (New York), 2) «geographical location» for cross-border operations of clients from around the world (London), 3) «financial ghetto» (offshore centers) [9].

Trends of development financial centers in recent years are [10]:

- consolidation of financial centers. Among experts there is a perception that New York, London and Hong Kong translate into a single global player with the general rules of regulation;
- strengthening of the role of regional centers in Asia, Latin America, Middle East and Africa seeking to redistribution the spheres of influence;
- development of informational, analytical and advisory functions. In the major financial centers placed famous management consultants – company McKinsey, Ernst and Young Global Limited, Deloitte Touche Tohmatsu, etc.;
- emergence of new functions with international debt management and restructuring.

The indicators of development the financial system in a particular region that allow identifying them as global financial centers are indicators of the stock market, banking market, insurance market, investment activity in general, the degree of development of

new tools managing financial resources and the involvement of the region in global financial flows [11].

The undisputed leader in market capitalization and trading volume is the union of the New York Stock Exchange (NYSE) and the pan-European stock exchange Euronext. The second largest one is NASDAQ OMX by both indexes (association American Exchange NASDAQ high-tech companies and 8 European exchanges and the Scandinavian and Baltic business units OMX). Third place was occupied Tokyo Stock Exchange by market capitalization and Shanghai stock exchange by the trading volume. The main stock turnover accounted for equity and debt securities. The largest number of joint stock companies listed on BSE (5034 at the end of 2012) but all of them the national. Similarly things in Shanghai, Shenzhen stock exchanges in China, Moscow Interbank Currency Exchange in Russia, Kyiv International Stock Exchange in Ukraine and most of the exchanges of emerging economies: trade foreign securities on them missing. The leader of the absolute number of foreign companies whose shares are traded on the stock exchange, today is London Stock Exchange (604 Listing of 2012, representing a fifth of all listed companies). Next is the union of NYSE Euronext (603 companies), which gave way to the championship in 2012 the London. 2 times less foreign companies included in the listing Stock Exchange of Singapore (317) and NASDAQ (300). The high proportion of foreign companies listed shares on the Mexican Stock Exchange (69.6%), but their common number and trading volume is markedly inferior the leaders. At the same time, the NYSE Euronext and NASDAQ accounts for 4/5 of the total turnover of shares of foreign companies, while the share of 7.2% in London, Frankfurt – 4.4%, other exchanges – small or zero [11].

As the number of registered bonds first place in the world is Luxembourgish, Frankfurt and Irish (Dublin) exchanges, they have the same high proportion of foreign issuers listed, but the market value of securities quotation on them is negligible. National leader in the sale of debt instruments in 2012 was the Spanish exchange BME Spanish Exchanges (Madrid), which accounted for over 2/3 of world trade corporate bonds domestic issuers and almost 38% of global domestic bonds outstanding national public sector. In trade foreign bonds 65% of the total in 2012 fell on two exchanges – the London and Zurich. The high volume of trading in foreign bonds and the stock exchange in Istanbul, Turkey (in 2011 it took 3rd place in the world), which is not typical of developing countries. Exchange in New York, Chicago and trading platforms developed European countries have leading positions in derivatives trading, but some markets in developing countries also actively exploring these tools [12].

In options of trading are: the Chicago Board Options Exchange (about 807 million contracts in 2012), 2nd place is the BM & BOVESPA, Brazil (802.2 million contracts), 3rd – ISE (International Security Exchange), located in New York and owned by European exchange Eurex (733.6 mln contracts), 4th – NASDAQ OMX PHLX (554.1 mln contracts), 5th – exchange Eurex, located in Zurich and owned by stock exchanges Deutsche Börse and six – Swiss Exchange (283,3 mln contracts). The largest increase in contracts in 2012 was observed in the Brazilian exchange BOVESPA, but for the price, it is second contract exchanges of New York and Chicago. Maximum number of transactions with conventional futures in 2012 was concluded on the stock exchange NYSE Liffe Europe (291.3 mln), but the total value of contracts ahead of the National Stock Exchange of India (1.2 trillion US Dollars, 175.7 million contracts). In Moscow's RTS exchange was concluded 266.5 million of futures contracts, but the cost them a little (84.5 bln US Dollars). Big deal traditionally consisted in exchange Eurex, yet a large number of futures contracts concluded also on exchanges in Johannesburg and Sydney [12].

The market index options leading South Korean stock exchange (70.2% of all contracts, 2012), a significant market share accounted for also Chicago Board Options Exchange. The market of index futures main player – CME Group (Chicago Mercantile Exchange and Chicago Board of Trade) and New York (New York Mercantile Exchange), its share in the num-

ber of transactions with instrument was 30.6% in 2012. Another 19.1% of the market accounted for Eurex. Options for index funds sold mainly on Chicago Board Options Exchange and the ISE. Options and futures on short- and long-term interest rates traded within the US CME Group and European NYSE Liffe (these two associations account for over 90% of trading instruments). In options, trading and futures in foreign currency should be note in addition to CME Group, São Paulo Stock Exchange BM & FBOVESPA, also the Indian National Stock Exchange. Trading in futures and options traded actively CME Group (agricultural products, energy and metals), ICE Futures US (agricultural products), London Metal Exchange (metals), Shanghai Futures Exchange (agricultural products, energy and metals), Australian Securities Exchange (energy) and others. Exotic indexes (market volatility, weather forecasts) are sold mainly on the exchange Chicago Board of Trade, although the amount is insignificant share of the total stock turnover [11; 12].

The largest stock exchanges to attract investment through primary (IPO – Initial Public Offering) and secondary offering of shares (Secondary Market Issues) in 2012 were:

- 1) NYSE Evronext (US & Europe) – 287.2 billion USD;
- 2) Hong Kong Exchanges (109.5);
- 3) BM & FBOVESPA (100.5);
- 4) Shanghai Stock Exchange (83.5);
- 5) London Stock Exchange Group (60.7);
- 6) Shenzhen Stock Exchange (60.3);
- 7) Australian Securities Exchange (53.8);
- 8) Tokyo Stock Exchange Group (50.2);
- 9) BME Spanish Exchanges (36.6).

Moreover, the greatest increase compared to the year 2011 was observed in São Paulo Exchange and Shenzhen, and largest decline – in London Stock Exchange. According to the company McKinsey, in 2011–2012 more than half the IPO took place on the stock markets of developing countries. The stock exchange of Hong Kong and China had 125 billion US Dollars (44.6%) of 280 billion the world total IPO in 2012, other emerging markets – 40 billion, New York – 35 billion, London – 13 billion, other developed countries – 68 billion dollars USA. According to the same institute, the fastest pace in years 2000-2011 rising India's stock markets (23% on average per year) and Chinese (20.8%). In the US, the average annual growth of the stock market in the I-st decade of the XXI century was 5.2%, in Japan – 2.4%. As a result, the share of emerging market countries in the global stock market from 2000 to 2012 increased in 3 times and reached to the end of 2012 to 18% (including the share of China and Hong Kong – 7.6%). Thus, the stock market reflects the most dynamic changes taking place in world financial centers [13].

Another indicator of this is the banking services. As is shown in Table 1, the largest banks by assets are allocated in international financial markets. Dynamics rate grows after the crisis assets of Chinese banks, whose headquarters are in Beijing. This puts Beijing in the category of the largest financial centers in the world. Chinese banks characterized by high capitalization. In terms of «equity» in early 2012, 4 banks in Beijing held a leading position in the world, even Europe's largest bank BNP Paribas (France) inferior to them. At the same time, European banks in some countries, including the UK, are losing their positions [11].

The general level financial development of individual regions is estimated using various integrated indicators (indexes). These indexes reveal the location of countries and cities in the global financial system, their relative importance as a global financial center. The best-known indicator is the «financial development index» (FDI) of World Economic Forum, first calculated in 2008 and has since published annually. FDI estimated 57 countries with developed financial systems and capital markets. According to Table 2, the first four leaders with GFCI (Global Financial Centres Index) for the duration was constant (in certain periods of New York at its rated approached close to London, and Singapore – to Hong Kong) [14].

Table 1

## World's biggest bank by total assets, 2012

Place		Bank	Assets, \$ mln	Change nat. currency	Capital, \$ mln	Balance
2012	2011					
1	1	Deutsche Bank AG, Frankfurt, Germany	2,655,839	-7.01%	3,141.08	31.12.12
2	2	BNP Paribas SA, Paris, France	2,517,210	-2.95%	35,256.70	31.12.12
3	3	Industrial & Commercial Bank of China Limited, Beijing, China	2,458,597	15.00%	55,454.17	31.12.11
4	6	Crédit Agricole SA, Montrouge, France	2,431,518	6.89%	9,890.46	31.12.12
5	4	Barclays Bank PLC, London, Great Britain	2,420,044	-4.65%	23,529.22	31.12.12
6	5	JAPAN POST BANK Co Ltd, Tokyo, Japan	2,362,977	1.23%	42,234.83	31.03.12
7	8	China Construction Bank Corporation, Beijing, China	2,242,254	13.77%	40,119.87	31.12.12
8	11	Agricultural Bank of China Limited, Beijing, China	2,125.352	13.42%	52,120.48	31.12.12
9	7	The Royal Bank of Scotland plc, Edinburgh, Great Britain.	2,084,860	-10.36%	44,795.40	31.12.12
10	10	Bank of China Limited, Beijing, China	*2,034,889	7.19%	44,795.40	31.12.12

Source: composed author by: <http://www.bankersaccuity.com/resources/bank-rankings/>.

Table 2

## Global Financial Centers Index, 2012

Center	GFCI 2012		GFCI 2011		Change	
	Place	Rating	Place	Rating	Place	Rating
London	1	785	1	781	–	▲ 4
New York	2	765	2	772	–	▼ 7
Hong Kong	3	733	3	754	–	▼ 21
Singapore	4	725	4	729	–	▼ 4
Zurich	5	691	6	689	▲ 1	▲ 2
Seoul	6	685	9	686	▲ 3	▼ 1
Tokyo	7	684	5	693	▼ 2	▼ 9
Chicago	8	683	7	688	▼ 1	▼ 5
Geneva	9	682	14	679	▲ 5	▲ 3
Toronto	10	681	10	685	–	▼ 4
Boston	11	680	11	684	–	▼ 4
San Francisco	12	678	12	683	–	▼ 5
Frankfurt	13	677	13	681	–	▼ 4
Washington	14	672	15	677	▲ 1	▼ 5
Sydney	15	670	16	674	▲ 1	▼ 4

Source: composed author by: <http://www.longfinance.net/Publications/GFCI%2012.pdf>.



Comparison of Index for several years can also identify upward growth of Asian financial centers. Thus, 4.5 years Shanghai and Beijing rose by 18.5 positions up, South Korean Seoul – 27 positions (including 25 – in the last six months). Of course, one should consider expanding the list of cities participating in the ranking. In the first ranking (2007) in the top 20 included only three Asian cities, the ranking of 2012 – are seven cities. However, the position of the Chinese Shenzhen has deteriorated markedly. According to the survey respondents, five Asian cities (Shanghai, Singapore, Seoul, Hong Kong and Beijing) are most likely in the years to strengthen their power. The index also indicates the rapid growth of the Brazilian Rio de Janeiro, which will lead to the decrease of the other Brazilian center – Sao Paulo.

### **PERSPECTIVE OF INTERNATIONAL FINANCIAL CENTERS IN THE CIS**

With the fall of the unitary communist state political system in the USSR and Eastern Europe and their transition to market economy, create the possibility to alternative of existing the international financial center. Its sphere of influence may extend to a region that brings together the CIS, Baltic States, Eastern Europe and the Black Sea; the population of over 400 million people who have great intellectual, technical and natural potential and provide the necessary shield for their strategic economic interests. An independent of the International Monetary Fund (IMF) and World Bank financial policy will give them a quick entry into the global financial market; will significantly advance the issue of credit and investment finance their national economies. As noted, today almost no CIS country integrated into the global financial system. Only the ones that will be able to integrate in Global Custody will get a chance to build on its territory a new international financial center, which will serve quite extensive region. However, to say that a number of reasons real chance that, at least in the short term, with only Russia, Ukraine and Kazakhstan, which have the necessary resources for this.

Despite the economic power and potential of Russia, which claims to be the real leader of the former Soviet Union and is actively working on the problem of integration in Global Custody, Ukraine has significant advantages over it and other countries of the region due to the establishment on its territory a new international financial center which will provide its integration in Global Custody.

- First, Ukraine has sufficient resources and potential for the formation of such a center.
- Second, Ukraine is geographically well located and has the highest rate of transit in Europe and in the considered region.
- Third, there are democratic processes in the country, despite some temporary difficulties perceived positively in Europe and elsewhere in the region.

In our view, the post-Soviet space (CIS) will be the first step of the international status of hryvnia through leading economic and political position of Ukraine in communities. It will provide favorable conditions for the establishment of a regional currency hryvnia at first – the CIS, and then other countries currency serving mutual trade and used to accumulate official reserves and private cross-border investment. In the future, the hryvnia could become a major reserve currency and estimated GUAM, and it will give impetus to the development of integration processes in the countries of the group. In addition, regional monetary integration can be as collective way of taking advantage of globalization, but also as a method to counter its negative trends.

This indicates, on the one hand, global problems, and the other – the need to improve the status of Ukrainian cities (Kyiv, Odessa, Lvov, Dnepropetrovsk) as MFC because of increased competition between the world's largest financial centers against a background

strengthening of globalization currency and the financial system, increasing internationalization of stock markets and the limited financial resources of the world. Therefore, in the next decade or Kyiv will become one of the leading global or even regional financial centers, or enter the zone of influence of the existing global centers that actually lose financial sovereignty. In our view, this largely depends on the preferences of institutional investors – professional community, financial institutions and businesses, because most initiatives designed primarily for professional environment.

## CONCLUSIONS

So, considering this fact it is necessary to provide liberalization of national financial markets against the background of lower tax rates. Financial liberalization will provide inflow of cheap capital, and liberal tax policies create favorable conditions for the development of industrial production, increased economic transactions and reinvestment of profits in the economy, which in turn will increase tax revenue. Also pay attention to the international experience, which shows that the solution of some social and economic problems that arise in the process of financial liberalization in the country, contributes significantly to the development and the role of non-governmental organizations. Ukraine will implement a new financial policy by creating a financial center in Odessa like the most effective of the existing and developing modern market infrastructure. The new concept development of cities in Ukraine, aimed at creating a financial center in their territory, if its implementation will build a post-industrial model of economy the city as the most effective and promising to create thousands of jobs, significantly improve the welfare of its inhabitants and discover each new opportunities to realize their potential.

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# FORMATION OF THE REGION BUDGETARY SYSTEM IN CONDITIONS OF THE ECONOMIC CRISIS

*Tatyana V. Sums kaya*<sup>1</sup>

The global financial and economic crisis has particularly significant implications for the Russian financial system, as accompanied by, in particular, the fall in prices for energy and raw materials, the export of which provides the main source of revenues of the federal budget. Not accidentally the economic crisis touched in the first place of the fuel and energy and commodity sector and related industries primary processing (mainly ferrous and nonferrous metallurgy). Accordingly, the strongest effects of the economic crisis began in the regions of the placement and operation of such industries.

This happened yet in the summer of 2008. Then, almost all regions of the country faced with similar problems, except in the most depressed in which the crisis has not stopped since the 90ies, and the revenue side of the budgets was formed largely through federal grants. In the remaining regions, the nominal revenues of the budget in the IV quarter of 2008 were in line with or even lower than those of 2007. In the short term, other threats to the socio-economic development of the Russian regions and municipalities will arise, as together with the revision of revenues downwards there is a clear tendency to maximize expenditure's savings of budgets of all levels [1].

Moreover, the negative effects of the crisis are manifested in the reduction of profitability, declining real incomes of the population as a result of the decline in employment and high inflation; payments crisis and the use of surrogates in the repayment are also possible. All of this leads, as shown by international experience and national practice, to a significant acceleration of inflation and the multiplicity of prices. The deepening of the crisis leads to an increase of spatial differentiation of socio-economic development and the expansion of depressive habitats, as well as the emergence of new [1].

In general, the modern financial and economic crisis, coupled with the all-Russian systemic crisis that started in the 80 years of the twentieth century, imposes significant imprints on the functioning of the entire budget system of the country, its regions and municipalities, causing first need to optimize budget expenditures. This, in particular, directed the federal government's anti-crisis measures, the regional anti-crisis measures of the Government of the Russian Federation, the anti-crisis proposals and own initiatives of subjects of the Russian Federation.

In the summer of 2008 the Russian government started to develop some anti-crisis measures; in a systematic way they have been reduced to a published on March 20, 2009 «The Program of Anti-Crisis Measures of the Government of the Russian Federation for 2009». In Section 8 of the «Anti-Crisis Program» the Russian government has defined the requirements for the implementation of these measures in the subjects of the Russian Federation, to the leadership of which were given two tasks crisis. [2]

*First:* Maintenance of regional fiscal-budget system balance for fulfillment of obligations to citizens, payment of wages to public sector employees, payment of immediate expenses.

*Second:* Promotion of employment, preservation and creation of jobs.

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It was assumed that the first solution would be provided as giving support to budgets of subjects of Russian Federation from the federal budget as the holding of a «responsible (!) policy» at the regional level, including:

- the optimization of budget expenses and restructuring of the budget network;
- the review of the parameters of the budget, including refusing from «non-binding» capital investments;
- the preventing the growth of accounts receivable on the priority commitments;
- the refusal to replenish the revenue base of the subject of the Russian Federation due to lower revenue base of local budgets.

In this case, the Government of the Russian Federation determines that support of regional budgets will be carried out at lower levels of co-financing of expenditure obligations of subjects of the Russian Federation (which are subsidized), and that this will be offset by the simultaneous increase in the volume of the remaining subsidies and their concentration on three or four of the most important tasks for the regions.

The decision of the second task set by the Government of the Russian Federation to the regional authorities implied the implementation of programs to promote employment and social support measures for the unemployed through grants from the federal budget in order to [2]:

- provide advanced professional training in the event of a threat of mass layoffs;
- organize public works, temporary employment, placement of unemployed job seekers (including graduates of educational institutions), as well as employees in the event of a threat of mass layoffs;
- provide targeted support to citizens, including the organization of their moving to another area to fill jobs, including established in the framework of the federal target programs and investment projects;
- promote the development of small businesses and self-unemployed. Section 8 of the Program also notes that additional support will be provided to the subjects of the Russian Federation, which have the most urgent crisis on the regional labor market.

Among the specific measures in the areas of tax and budget policy, aimed at overcoming the consequences of the financial and economic crisis and implemented within the framework of the anti-crisis policy of the Government of the country can be noticed, in particular, a decrease of 4 percentage points of corporate income tax, an increase of the property deduction for personal income tax for the citizens of the acquisition of housing, lower tax rates on small businesses, etc. This is especially important because the effects of the crisis were reflected primarily on the state of regional and local budgets, causing reduction in revenues from corporate income tax and the increase in unemployment has led to a reduction in revenue from the personal income tax, which is the main component of the revenues of the regional and local budgets.

Subjects of the Russian Federation were not passive witnesses of the crisis. In all regions and major cities own anti-crisis measures have started to develop at the same time with the federal center, the validity and the targeting of these measures (their objects are municipalities, industrial and agricultural enterprises, social organizations, governments, etc.) were exceptionally high. In Russia there is no region, hoping only to decisions of the Centre, as there is no one in the leadership of the subject of the Russian Federation who would bind the latest crisis only with the global and would not consider it a major cause of failures in the economic, fiscal and social policies of all previous years. It is not surprising, therefore, that the subjects of the Russian Federation propose to mitigate the effects of the latest crisis, often develop or simply repeat what has been a long time ago (and more often without results) recommended by them to the Centre to ensure better functioning of the self-sufficiency of regions, municipalities and enterprises – the best «safety cushion» in critical situations [2].

It should be noted, however, that all anti-crisis measures taken by the federal center, regions and municipalities are only trying to smooth out the peaks of potential social unrest and protests, without changing anything in the nature of the Russian economic system. The worst that could threaten to Russia – reinstatement in the same shape of the economy, that was powerless in the transition to a market more than twenty years ago and unable to overcome neither post-Soviet crisis nor the latest phase of its strengthening by global crisis. But the country, its regions, cities and villages need above all a market economy, able to produce globally competitive products, primarily for its wide domestic consumption on the basis of intra- and inter-regional co-operation and to involve high employment. To stimulate the creation of this basically new (and not innovation interpreted technocratically) economy should be a top priority of the state policy, but its implementation require different conceptual approaches to the organization of life in the country, we need other legal grounds, a different format of federal relations and other administrative and resource potential of the bodies of state power of subjects of the Russian Federation and local self-government [2].

One important aspect of anti-crisis measures of the Government of the Russian Federation is to promote the development of small businesses, largely determines the conditions for sustainable development of municipalities.

This sector of the economy, including on January 1, 2009 more than 4.5 million subjects, is characterized by a maximum adaptation to a crisis situation and can respond quickly to changes in consumer demand. In addition, given the ongoing staff reduction of large and medium-sized enterprises, the active involvement of the population in the small business and self-employed has a great social importance, promoting the growth of employment. Over the last 2 years a number of legislative measures aimed at the development of small and medium-sized businesses, creating new jobs were carried out. Among them – the establishment of the right for region to reduce the tax rate from 15 to 5%, if the object of taxation is income minus expenses, for certain categories of taxpayers, and since 2010 – an increase in the threshold for the application of the simplified tax system («simplified taxation») from 30 million rubles of annual revenues up to 60 million rubles. These solutions may initially lead to a reduction in revenues in the budgets the regions, which can be compensated only by the development of small and medium-sized businesses. To solve this problem it is important to increase the interest of the local authorities. It is the «simplified tax» – which the tax on the expansion of the base of which may actually affect local self-government bodies, increasing not only financial support, but also promptly addressing issues of renting premises, land, etc., thus creating conditions for the development of small entrepreneurship [3].

In a crisis, especially acute is the problem of filling the regional and local budgets. For this, in May 2009 the Government of the Russian Federation approved the «Rules for the Distribution of Grants to Budgets of Subjects of the Russian Federation to Support the Measures to Balance the Budgets of Subjects of the Russian Federation for 2009». Using this methodology, the selection of subjects of the Russian Federation to provide grants is based on indicators of the balance of the consolidated budgets of the Russian Federation subject on which the balance of local budgets depends. In this case, subjects of the Russian Federation have the right to receive grants, in which the performance of the consolidated budgets forms lack of revenues for financing expenditure commitments. Regions, which have the level of actual fiscal capacity 10% higher than the Russian average, are excluded from the distribution. As a condition of these grants is the lack of overdue debt on socially significant expenditure responsibilities of subjects of the Russian Federation [4].

Due to the reduction of local revenues in 2008 their high dependence on intergovernmental transfers from the budgets of other levels survived, the volume of which (including subventions) amounted to 1412,7 billion rubles or 58,6% of revenues of local budgets. The share of tax revenues in the local budget revenues amounted to 29,9%, the share of nontax revenues – 11,5% [4]. In connection with this, the mechanism of targeted financial assistance to regional and local budgets in times of crisis is introduced. This problem was solved when making changes to the federal budget in 2009, which contains new terms and parameters of the economy of the country. Making these changes will allow solving such problems as:

- unconditional implementation of all social obligations assumed by the State, and national projects;
- review of all investment projects on the basis of their efficiency and urgency, as well as determining the feasibility of using them as «locomotives» of economic stabilization.

Similar principles would be appropriate to use also in amendment of regional and local governments when they need to optimize them in connection with the financial crisis.

One of the factors stabilizing of the economy of municipalities may be the objects of their infrastructure. In accordance with the Federal Law of 28.04.2009 № 76-FZ «On Amending the Federal Law On the Federal Budget for 2009 and the planning period of 2010 and 2011» it is expected to provide an additional 300 billion rubles, including 150 billion rubles – in the form of grants for the balance of regional and local budgets, and 150 billion rubles – in the form of loans (including up to three years). For municipalities, it is very important that out of 150 billion rubles of loans – 25 billion rubles is allocated for targeted use – for road construction [4].

Instability of the financial situation at the municipal level during the crisis creates additional difficulties to municipalities to establish economic base – the basis for the formation of their budgets. Meanwhile, this problem can be solved today in the framework of the territorial dimension of regional programs of socio-economic development. This aspect implies a regional policy aimed at creating a single, well-functioning economic area by maximizing the competitive advantage of all types of municipalities eliminate the negative trends and crises in some areas of the region. In this regard, at the regional level during the crisis an objective picture of the available resources and social and economic potential of all municipalities should be presented, their common problems should be identified, goals should be set (long-term, medium-term and short-term), a set of policy measures aimed at achievement of the objectives of anti-crisis should be developed [4].

In conclusion, we note that in a more complex financial situation is especially relevant, in our view, the proposal [5] on the consolidation of municipalities, as the deal with the crisis in a weak financial base not everyone can do. The crisis has vividly demonstrated that the existence of a large number of rather small settlements without its resource and financial base, and living only through financial assistance from the upper level, is not conducive to solving the problem of strengthening the local self-government. Such settlements (mainly rural) essentially has not their own tax base, revenue is less than the amount of the cost of maintaining municipal officials. Obviously, association of several similar settlements with the appropriate concentration of financial resources will facilitate the solution of these problems fulfilling by their office (area cleaning, provision of utilities, maintenance of local roads, etc.). At the same time, for the subjects of the Russian Federation the task of providing financial assistance to municipalities also will be simplified, as an opportunity to focus resources on priority areas of corresponding entities, facilitate the monitoring of the use of allocated resources and a number of other benefits.

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# **EVALUATION OF BUDGET ASPECTS OF FUNCTIONING OF MUNICIPALITIES (THE CASE OF MUNICIPALITIES OF THE NOVOSIBIRSK OBLAST)<sup>1</sup>**

*Tatyana V. Sums kaya<sup>2</sup>*

In this paper we identify the conditions of formation of the financial base of local self-government, the technique of analysis of the structure, stability of budgets and efficiency of sub-federal budget policy, calculations are carried out on materials of Novosibirsk oblast for the period 2006–2012 years. The structure of the local budgets of Novosibirsk oblast is evaluated, the characteristics of heterogeneity of budget indicators before and after the transfer of funds from the regional budget are calculated. The dependence between transfers and tax and nontax revenues is analyzed; marginal effect of increasing the taxes paid to local budgets is calculated.

## **TERRITORIAL BUDGET AS THE TOOL FOR REGIONAL ECONOMIC MANAGEMENT**

Fiscal policy is a prerequisite for the formation of a single economic space, overcoming the excessive differences in socio-economic development of regions and municipalities. At the regional level, the importance of the budget is primarily determined by its ability to finance the development of social and infrastructural arrangement of the territory, to stimulate industrial activity, to ensure the relative economic independence of regional economic system. Thus, the budget is the most important form of direct exposure to the controls on the processes occurring in the territory. Regional budget is the main source of funding for operating costs of the regional economy and the social sphere. It plays a crucial role in the financing of economic and social programs and investment projects. An important form of territorial impact of the budget is the placement of orders for enterprises in the region for region-wide needs as well as the provision of subsidies to individual enterprises. The budget serves as a multiplier of certain revenues to the territory of the other (non-budgetary) resources. Here we can distinguish equity financing, indirect multiplicative effect, investment in territorial infrastructure, entailing an increase in the flow of financial resources to the territory. Framework for fiscal policy in any country with a federative structure is organized system of intergovernmental fiscal relations.

The practice of management of the public finances in a country with few budgetary levels is called fiscal federalism. There are several models of fiscal federalism, which are based on the principle of decentralization. It is reflected in the form of government, the structure of the federal, regional and municipal law, in patterns of distribution of powers

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between different levels of government and in building unified, but multilevel fiscal systems. At the present stage we can highlight the following points of interest for Russia:

- clear lines of budget authority, the relative autonomy of regional and local authorities, provided by guidance on general standards, the lack of authority at lower levels, not provided by adequate financial resources;
- distribution of revenues should take into account the overall expenditures of the territorial authorities and their fiscal capacity;
- financial assistance to territories should be provided according to normative expenditures and tax potential of the regions;
- members of the Federation and municipalities must each have at least one major tax, which is entirely at their disposal;
- a number of federal taxes (such as personal income tax, corporate income tax) should be divided between the levels of the budget system using either method of addition of rates or stable norms;
- A number of indirect federal taxes (such as VAT, excises), it is advisable to enroll in the federal budget, followed by partial redistribution between areas within established schemes of leveling;
- fiscal policy of all the subjects of the Federation should be based on uniform principles of intergovernmental fiscal relations;
- federal laws should ensure the financial autonomy of local authorities.

The development of intergovernmental fiscal relations in Russia in recent years goes in the direction of strengthening the formalization of the process of distribution of federal financial assistance. It also seeks to eliminate the asymmetry in the fiscal status of the subjects of intergovernmental fiscal relations at various levels. In this case, one has not been able to reach the desired hardness of budget constraints for the authorities of subjects of the Federation, to establish control over the efficient use of resources at the regional level, as well as to achieve the required growth formalization of intergovernmental fiscal relations.

At present, fiscal regulation in Russia is overcentralized; therefore, many municipalities cannot function autonomously and sustainably, as local taxes and other local revenues make up less than 20% of their budgets. The decrease in the share of local budget revenues in the consolidated budget of the Russian Federation, given the growth of the proportion of their expenditures, will lead to an excessive reduction in capital costs compared to the operating costs and, hence, the underfunding of investment expenditures. These problems cannot be solved without consolidating the municipal budget's local revenue base.

Russian municipalities differ noticeably in both the actual tax revenues and tax potential. In this respect, we can single out a group of municipal entities, e.g., the capital cities of oblasts and republics, i.e., centers of constituent entities whose financial statuses differ greatly from those of other Russian municipalities. The local self-government bodies of the constituent entities administrative centers, as a rule, have budgets comparable to those of the constituent entity itself (excluding the municipal budgets). We have selected the Novosibirsk oblast as a research target, as it can be classified among the abovementioned group of Russian constituent entities. An analysis was conducted based on the data on the municipal districts (administrative territorial units comprising several small settlements) (30) and towns (cities) subordinate to the authorities of the Novosibirsk oblast (5).



### SPECIFIC FEATURES OF REVENUE GENERATION IN THE BUDGETS OF MUNICIPALITIES OF THE NOVOSIBIRSK OBLAST

The main revenues of local budgets are tax, non-tax revenues and grants from regional budget. Besides, it is only the tax revenues connected with economic potential of the given territory that can be regarded as a stable revenue base for the budgets of local self-government bodies. The nontax revenues are to a large extent either temporary, or instable. Apart from tax, nontax revenues, and grants, the local budget revenue pattern included revenues from entrepreneurial activity. Their share in the aggregate revenues of all the oblast municipalities was, on average, in 2006–2011 1–2%, in 2012 it dropped to 0.5%.

To estimate the level of autonomy of local budgets, we have analyzed the distribution of the municipalities based on the share of collected (tax and nontax) revenues in the aggregate revenues of the local budgets in 2006–2012. The calculations results are presented in Table 1.

*Table 1*

**Distribution of the municipalities of the Novosibirsk oblast by the share of collected revenues\***

Share of collected (tax and nontax) revenues, %	Number of municipalities in the group						
	2006	2007	2008	2009	2010	2011	2012
0–10	9	17	12	9	13	14	14
10–20	18	10	10	13	12	11	11
20–30	3	5	7	5	4	5	4
30–40	3	1	3	5	3	2	1
40–50		1	1		1		3
50–60	1		1	2	1		
60–70		1	1	1	1	2	2
70–80	1					1	
80 or more							

\* The empty cell in this and the following tables means that none of the municipalities under study fell in the given group.

As can be seen, the proportion of collected revenues for the majority of municipalities of the Novosibirsk oblast was in 2006–2012 within the limits of 20%, and more than one third of municipalities in 2007, 2008, 2010–2012, i.e. five years of the seven-year period under review, the share of tax and nontax revenues was less than 10%. Thus, the situation has worsened compared to the end of 90th – beginning of the 2000s, when the share of this type of revenues for most municipalities of the Novosibirsk oblast was in the limits of 20–40% [1].

It is noteworthy that, over the period under study, in the Novosibirsk oblast, the proportion of collected revenues was more than 30% for a very small number of municipalities: 3 – in 2007, 5 – in 2006 and 2011, 6 – in 2008, 2010 and 2012, 8 – in 2009. This is explained by the fact that most of the territories in Novosibirsk oblast (except for a number of urban settlements subordinate to the oblast) have rural specialization. Over 50% of collected revenues for the entire period were considered only in the city of Novosibirsk. In 2006, 2008–2012 more than half of aggregate budget revenues were also collected revenues in the town of Ob. In 2009 and 2011 to the category of such municipalities concerned also science town Koltsovo.

One of the weaknesses of the system of intergovernmental fiscal relations at the level of the subject of Federation is a high degree of centralization of budget revenues on sub-federal level, bias in favor of grants in the structure of municipal budget revenues. To test this assertion, consider the distribution of the share of grants in the aggregate budget revenues of municipalities in the Novosibirsk oblast (Table 2).

Table 2

**Distribution of the municipalities of the Novosibirsk oblast by the share of grants in their budgets**

Share of grants, %	Number of municipalities in the group						
	2006	2007	2008	2009	2010	2011	2012
0–20	0	0	0	0	0	0	0
20–30	1	0	0	0	0	1	1
30–40	1	1	2	3	1	2	2
40–50	0	0	0	0	3	1	0
50–60	0	1	2	1	1	0	3
60–70	3	3	2	4	2	2	1
70–80	5	4	7	5	4	6	4
80–90	19	14	12	13	12	9	11
90 or more	6	12	10	9	12	14	14

It follows from Table 2 that, in the majority of municipalities of the Novosibirsk oblast, grants make up more than 70% of budget revenues, and consistently high throughout the period considered is the number of territories for which the share of grants exceeds 90%. In the structure of grants a high proportion of subventions and subsidies from the upper-level budget, which is caused by the transfer of the powers and financial resources from the regional to the local level.

The situation is even worse if we consider the level of settlements. Distribution of 26 urban and 429 rural settlements of the Novosibirsk oblast by the share of major groups of revenues in the aggregate budget revenue is presented in Tables 3 and 4.

Table 3

**Distribution of settlements of the Novosibirsk oblast according to the share of tax and nontax revenues in the aggregate budget revenue**

Share of tax and nontax revenues	The proportion of urban settlements with the appropriate share of tax and nontax revenues						
	2006	2007	2008	2009	2010	2011	2012
50% or more	19,23	38,46	42,31	46,15	23,08	15,38	3,85
60% or more	7,69	19,23	23,08	26,92	15,38	11,54	3,85
70% or more	3,85	7,69	7,69	23,08	7,69	3,85	3,85
80% or more	3,85	0	3,85	11,54	3,85	0	3,85
90% or more	0	0	0	7,69	0	0	0
Share of tax and nontax revenues	The proportion of rural settlements with the appropriate share of tax and nontax revenues						
	2006	2007	2008	2009	2010	2011	2012
50% or more	5,83	4,43	4,66	6,29	5,13	3,50	2,56
60% or more	4,20	2,10	2,80	3,26	3,50	2,80	1,86
70% or more	3,03	1,63	1,86	2,56	2,80	1,63	0,47
80% or more	2,33	0,47	1,40	0,93	2,10	1,17	0,23
90% or more	1,63	0	0,70	0,93	0,47	0	0,23

One can notice, that the proportion of urban settlements, for which the share of tax and nontax revenues is more than half of aggregate budget revenues increased from 2006 to 2009 from 19.23% to 46.15%, and then began to decline sharply, reaching in 2012 the level of 3.85%. The proportion of rural settlements with the corresponding share of tax and nontax revenues was in the period under consideration at a very low level (maximum was achieved in 2009 and it was just 6.29%).

Table 4

**Distribution of settlements of the Novosibirsk oblast according to the share of grants in the aggregate budget revenue**

Share of grants	The proportion of urban settlements with the appropriate share of grants						
	2006	2007	2008	2009	2010	2011	2012
50% or more	80,77	61,54	57,69	53,85	76,92	84,62	96,15
60% or more	65,38	50,00	34,62	42,31	73,08	73,08	88,46
70% or more	42,31	34,62	19,23	23,08	61,54	61,54	65,38
80% or more	15,38	7,69	7,69	11,54	30,77	34,62	38,46
90% or more	0	0	3,85	3,85	3,85	0	0
Share of grants	The proportion of rural settlements with the appropriate share of grants						
	2006	2007	2008	2009	2010	2011	2012
50% or more	94,17	95,57	95,34	93,71	94,87	96,50	97,44
60% or more	90,21	93,71	90,211	90,68	92,77	94,87	94,41
70% or more	84,15	85,55	83,92	85,31	89,28	91,38	91,84
80% or more	66,90	72,49	76,92	74,83	78,09	84,15	85,78
90% or more	32,40	44,52	47,55	44,06	44,99	56,88	56,41

The situation is exactly the opposite, if we consider the share of grants in the aggregate revenues of urban and rural settlements of the Novosibirsk oblast. As is shown in Table 4, the proportion of urban settlements in whose budgets grants accounted for more than half of the aggregate revenue was in the period under review at a high level, and in 2012 it amounted to more than 96%. The corresponding proportion of rural settlements exceeded 90% level during the period under review. In addition, the rising trend is shown by the proportion of settlements, in which the share of grants is over 90% of aggregate budget revenues. It increased during the period from 32.40% in 2006 to 56.41% in 2012.

**INHOMOGENEITY CHARACTERISTICS  
OF THE FISCAL CAPACITY OF MUNICIPALITIES  
IN THE NOVOSIBIRSK OBLAST**

When comparing budgets of the same level, it is important to assess the expediency of concentrating resources from the standpoint of equalizing the municipalities' fiscal capacity and the levels of socio-economic development of the municipalities. This comparison can be conducted by using the per-capita inhomogeneity characteristics of the fiscal capacity before and after the municipal budgets were given grants from upper-level budgets. We propose to use variation indicators as characteristics of inhomogeneity, i.e., the range of asymmetry, scatter, excess of scatter, standard deviation, and variation coefficient [2].

With increasing homogeneity of the fiscal capacity in the sample, the variation indicators should go down. In our work we assessed the above indicators for the per capita collected and disposable budget revenues of municipalities of the Novosibirsk oblast, i.e., revenues that exclude grants to local budgets from the oblast budget and revenues that include these grants (Table 5).

Table 5

**Inhomogeneity of per-capita budget revenues**

Indicator	Collected revenue						
	2006	2007	2008	2009	2010	2011	2012
Range of asymmetry	29,42	49,55	40,59	19,36	8,34	12,22	5,08
Scatter	1075	2293	2626	2209	1915	2571	2244
Excess of scatter	1,406	1,851	1,747	1,273	1,128	1,325	1,254
Standard deviation	1702	3286	3868	3297	2598	4357	3182
Variation coefficient, %	92,31	102,94	98,52	78,13	57,71	84,76	57,17
Indicator	Disposable revenue						
	2006	2007	2008	2009	2010	2011	2012
Range of asymmetry	13,59	19,70	13,07	14,21	6,13	4,00	4,15
Scatter	3098	2629	6219	6734	9461	7874	8742
Excess of scatter	1,009	1,112	1,129	1,113	1,124	1,000	1,038
Standard deviation	4493	10297	10217	9955	12219	11285	11954
Variation coefficient, %	41,67	53,03	46,82	44,99	39,17	33,39	32,13

It follows from the data in Table 5 that the range of asymmetry between the municipalities in the Novosibirsk oblast after grant transfers from the oblast budget was decreasing in 2006–2012. The most significant reduction was observed in 2008 and 2011. The scatter of the municipalities based on the indicators of collected and disposable revenues, in general, increases over the period under study.

The excess of scatter is greater than one in all of the explored cases. This is indicative that half of the municipalities with lower values of the indicators under study (i.e. collected and disposable budget revenues) are close to one another in these indicators than the other half of the municipalities. Otherwise, the excess of scatter would be less than 1.

The growth of the standard deviation of disposable revenue as compared to the standard deviation of the collected revenue is explained by the increase in the average level of the varied indicator. This effect occurs if the growth rate affects most of the elements of the sample. Because in Novosibirsk oblast all the municipalities get financial aid from the regional budget, then this result is easily explained. If grants from the regional budget should be addressed only to pull the budgets of low-income to middle-level, the standard deviation would be reduced. But due to the high centralization of financial resources on a regional level, some grants are not coupled with function of leveling of development, so it is necessary to eliminate this part of the financial flows, i.e. to estimate the change in inhomogeneity with regard to the increase in the average value of local budgets' revenues. As such indicator the variation coefficient by the standard deviation was used.

As seen in Table 5, the indicator of disposable revenues has a lower variation coefficient, i.e., the inhomogeneity of the municipalities' fiscal capacity after grant transfer from the oblast budget is 1.5–2.5 times.

To determine which municipality groups experienced losses as a result of changes in the aggregate scatter indicators, we need to consider the changes in the distribution of territories based on the level of budget income as a result of money transfer from upper-level budgets. Tables 6–7 present the distribution of municipalities by the level of collected and disposable budget revenues per capita. Tables 8–9 show the same but centered values (the difference with the average for the region level).

Table 6

**Distribution of municipalities of the Novosibirsk oblast  
by the level of collected revenues**

Per-capita revenue, thousand rubles	Number of municipalities in the group						
	2006	2007	2008	2009	2010	2011	2012
0–1	7	6	1	1			
1–4	25	22	23	19	18	19	13
4–7	2	2	7	10	14	10	16
7–10	1	2		2		3	3
10–13		2	1	2	3	1	
13 or more		1	3	1		2	3

Table 7

**Distribution of municipalities of the Novosibirsk oblast  
by the level of disposable revenues**

Per-capita revenue, thousand rubles	Number of municipalities in the group						
	2006	2007	2008	2009	2010	2011	2012
0–2	1						
2–10	14	5	1	1			
10–18	18	14	14	10	3	2	1
18–26	2	11	13	12	11	7	4
26–34		1	6	9	10	9	11
34–42		3		2	4	12	11
42–50					4	2	5
50–58		1			2	1	
58–66				1	1	1	1
66 or more			1			1	2

Table 8

**Distribution of municipalities of the Novosibirsk oblast by level of centered indicators  
of collected revenue**

Per-capita revenue, thousand rubles	Number of municipalities in the group						
	2006	2007	2008	2009	2010	2011	2012
Less than –2		6	9	11	8	13	10
–2 – –1	5	15	14	55	8	7	10
–1–0	20	3	1	4	4	4	6
1–2	7	6	7	10	12	5	4
2–4	1			1		3	1
4–6	1	2		1	1	1	1
6–8	1	1	1	2	2		
8 or more		2	3	1	1	2	3

Table 9

**Distribution of municipalities of the Novosibirsk oblast by level of centered indicators  
of disposable revenue**

Per-capita revenue, thousand rubles	Number of municipalities in the group						
	2006	2007	2008	2009	2010	2011	2012
Less than –15		1	1	1	2	3	3
–15– –10		4	0	1	4	4	4
10– –5	4	3	7	8	8	4	5
–5–0	15	16	14	12	6	6	8
0–5	14	5	7	7	6	10	7
5–10	0	2	5	3	1	3	2
10–15	2			2	4	2	3
15–20		3			1	1	
20–25					1		1
25–30					1	1	
30 or more		1	1	1	1	1	2

The data in Tables 6–7 show that after the grant transfers to municipalities of the Novosibirsk oblast from the regional (oblast) budget, there is sharp growth in the per-capita budget-revenue indicator by territory.

If, before the transfers from oblast budget, the modal interval was from 0 to 4 thousand rubles in 2006 and from 1 to 7 thousand rubles of per-capita budget revenues in 2007–2012 (the vast majority of municipalities fall within a given interval), after the distribution of grants from the upper-level budget per-capita revenues increase dramatically. This situation is explained by the relatively high concentration of financial resources at the regional (oblast) level and, as a consequence, the acute shortage of locally collected budget resources in the municipalities of the Novosibirsk oblast. In 2006, in only seven municipalities disposable revenues per capita were less than 8 thousand rubles. In 2007, the disposable revenues of the five municipalities accounted for less than 10 thousand rubles; in 2008 and 2009 only in one municipality disposable budget revenues per capita was less than 10 thousand rubles. In 2010–2012 per-capita disposable revenues of all municipalities of the Novosibirsk oblast accounted for more than 10 thousand rubles. Modal interval for per-capita budget revenues with grants in 2006 was the interval from 2 to 18 thousand rubles, in 2007–2009 – from 10 to 24 thousand rubles, in 2010–2012 4 from 18 to 42 thousand rubles. This indicates a significant increase in absolute and relative size of fiscal regulation resources in the municipal revenues in the Novosibirsk oblast.

To exclude the effect of changes in the average level of budget revenues and assess the changes in their distribution with regard to the increased fiscal capacity standard, we have calculated centered values of the collected and disposable budget revenues.

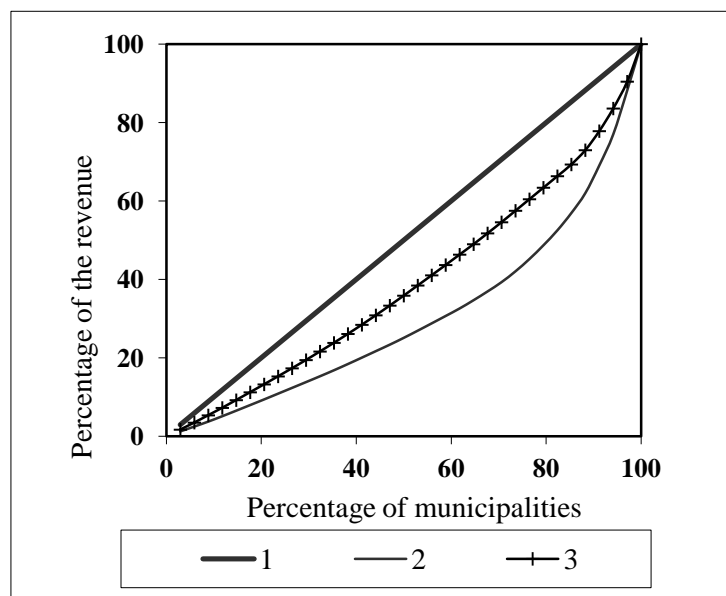
If we take into account that all the municipalities of the Novosibirsk oblast are recipients of regional grants, which results in growth in the average level of fiscal capacity, then the outcomes of the oblast's fiscal policy appear to be less effective. The data in Tables 8–9 show that there is an increase in both the number of urban settlements and municipal districts with below average budget revenues and the number of municipalities with the highest revenues.

To assess the increase or decrease in the cross-territory differentiation by the level of collected and disposable budget revenues one can use the funds coefficient and Gini index calculated by Lorenz curve [3].

The funds coefficient, or income differentiation coefficient, is determined as the ratio of income received by 10% of the highest-income territories to the income of 10% of the lowest-income territories. Such comparison shows how many times the first group have revenues higher than the second. The dynamics of the funds coefficient is also informative,

as it illustrates a decrease or increase in the municipalities' differentiation. When analyzing the budgets of municipalities funds coefficient was calculated for collected and disposable budget revenues in dynamics.

The Gini index shows the concentration of income by groups of territories, which gives one an idea of the territories for whom the distribution mechanism works in their favor; the incomes are either distributed relatively evenly among the territories or the main benefit goes to a small group of territories, where the concentration of income is pronounced.



*Fig. 1.* Graphical representation of the Lorenz curves

Geometric interpretation of the Gini index (Figure 1) is area of the figure «crescent», which is limited by the top line of uniform distribution of revenue (line 1), and the bottom by the Lorenz curve (curves 2 or 3). The index is calculated as a percentage Ginny area ratio of this figure to the area of an isosceles triangle with the length of the cathetus of 100 and apexes (0, 0), (0, 100), (100, 100). Accordingly, the greater is the value of the Gini index, the greater the disparity between the territories. The dynamics of the Gini index indicates the direction of change in inequality over time. With the reduction of inequality, the Lorenz curve is shifted from «2» to «3», approaching the curve of absolute equality «1».

Gini index (G) is calculated by the following formula:

$$G = \left[ 1 - 2 \cdot \sum_{i=1}^{N-1} (X_{i+1} - X_i) \cdot (Y_{i+1} - Y_i) : 2 \right] \cdot 100\% ,$$

where N – number of segments that are broken abscissa and the ordinate axis (respectively, the number of points on which we construct the Lorenz curve would be equivalent to the value of N + 1).

Located in the sum expression  $(X_{i+1} - X_i) \cdot (Y_{i+1} + Y_i) : 2$  represents the area of a trapezoid, the sides of which form the Lorenz curve's segments above and below the x-axis,  $Y_i$  and  $Y_{i+1}$  – the length of the bases of the trapezoid, and the height of the trapezoid is  $(X_{i+1} - X_i)$ .

Values of the funds coefficient and Gini index calculated for the collected and disposable budget revenues of municipalities of the Novosibirsk oblast are shown in Table 10, graphic interpretation of these indicators is shown in Figures 2 and 3.

Table 10

**Funds coefficient and the Gini index calculated for municipalities of the Novosibirsk oblast**

Years	Funds coefficient		Gini index	
	Collected revenue	Disposable revenue	Collected revenue	Disposable revenue
2006	14,02	5,63	39,69	21,23
2007	23,69	6,64	47,97	26,03
2008	12,51	3,51	41,20	20,17
2009	8,98	3,70	36,79	20,78
2010	5,46	3,73	29,32	21,13
2011	6,53	3,14	34,45	17,48
2012	4,35	2,99	26,62	17,04

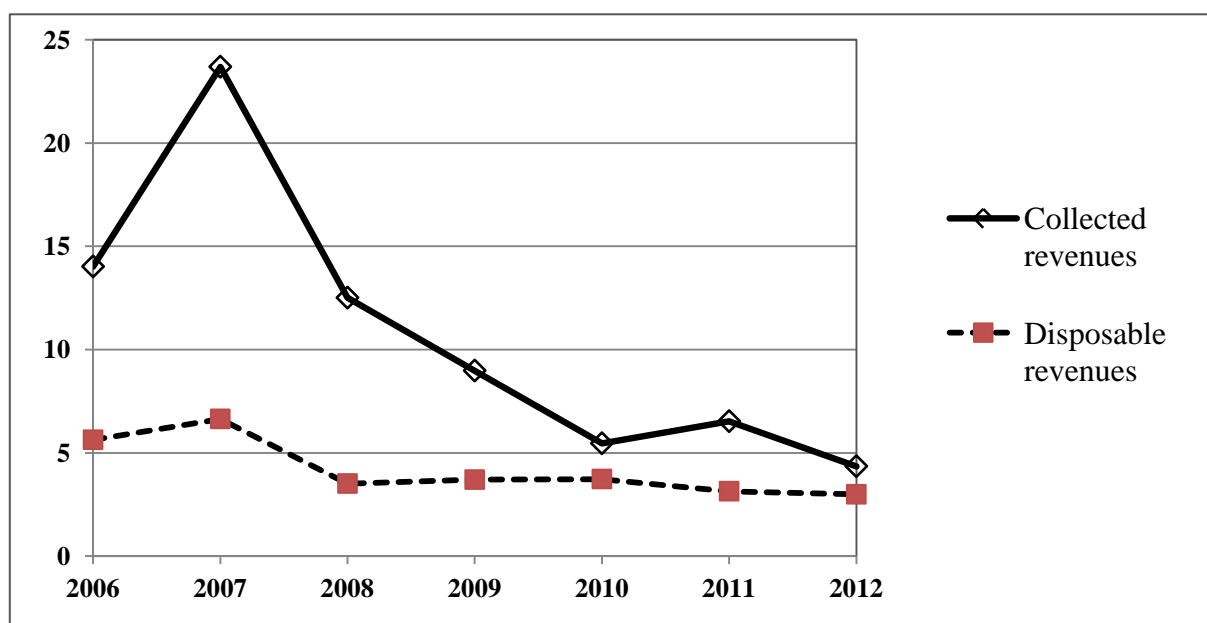


Fig. 2. Graphical interpretation of the dynamics of the funds coefficient

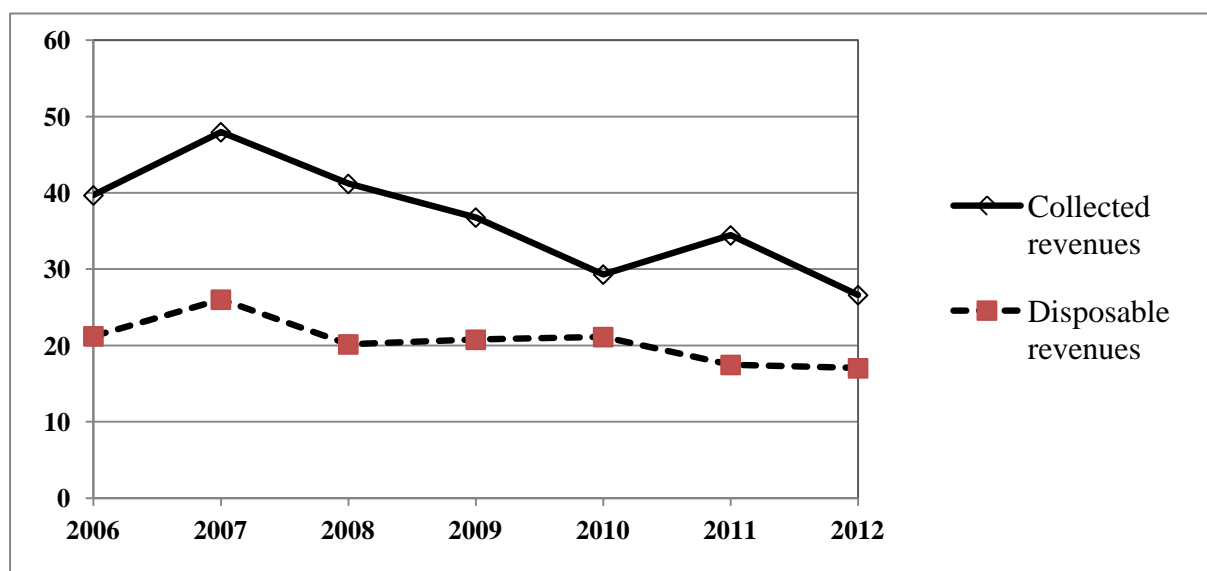


Fig. 3. Graphical interpretation of the dynamics of the Gini index



**ASSESSMENT OF THE FISCAL POLICY  
ON THE ECONOMIC DEVELOPMENT  
OF MUNICIPALITIES OF THE NOVOSIBIRSK OBLAST**

In order to assess how well the current system of intergovernmental fiscal relations cope with its functions, (in particular the alignment of budgetary security differentiation of municipalities and encouraging municipalities to strengthen their own revenue base), you can use methods of regression analysis and ranking of municipalities in terms of collected and disposable budget revenues. With this interest are not the ranks, but changing them in the process of budgetary control, i.e. the extent to which these ranks are changed after receiving of intergovernmental grants from upper-level budget. This change can be estimated by calculating the Spearman and Kendall correlation coefficients. Obviously, the normal system of budgetary control should not allow ill-founded and abrupt changes in the ranks of the territories, i.e. correlation coefficients should be close to 1.

Spearman's rank correlation method allows determining the closeness (strength) and direction of correlation between the two signs. Each value of the two study data sets assigned rank. On the basis of their ranks are calculated difference  $d$  and Spearman correlation coefficient is calculated by the following formula:

$$\rho = 1 - \frac{6 \sum d^2}{n(n^2 - 1)},$$

where  $\sum d^2$  – the sum of the squares of the differences between ranks, and  $n$  – the number of paired observations.

When using the rank correlation coefficient conditionally evaluate closeness of the relationship between signs, considering the coefficient equal to 0,3 and less weak closeness of the connection parameters, values greater than 0,4 but less than 0,7 – moderate closeness of the connection parameters, and values of 0,7 and more – high performance closeness of the connection.

Kendall's rank correlation coefficient determines the extent to which the ordering of all pairs of objects in two variables and is used to identify the relationship between quantitative and qualitative indicators, if they can be ranked. This ratio is preferable to calculate in the case of outliers.

Values of the first indicator (X) are ranked in ascending order and assign them grades. Then, the values of second indicator (Y) are ranked and Kendall's correlation coefficient is calculated by the following formula:

$$\tau = \frac{2S}{n(n - 1)},$$

where  $S = P - Q$ .

$P$  – the total number of observations following the current observations with a large value of ranks Y.

$Q$  – the total number of observations following the current observations with a lower value of ranks Y.

Values of Spearman's and Kendall's rank correlation coefficients calculated for series of collected and disposable budget revenues of municipalities of the Novosibirsk oblast for the period 2006–2012 years are presented in Table 11.

As the calculations in 2006, 2007, 2011 and 2012 showed a moderate correlation between the ranks of collected and disposable revenues of municipalities' budget in the region. In 2010, the relationship was weak. Calculations for the periods 2008 and 2009 found no statistically significant relationship between the ranks of collected and disposable budget revenues. Importantly, in 2006 and 2007 the relationship of analyzed signs carried upright

character, but in the case of 2010–2012 relationship was reversed, i.e. municipalities with large values of collected (tax and non-tax) budget revenues had lower values of disposable revenues, i.e. revenues taking into account the grants. This fact indicates that there is a significant change in the ranks of the municipalities of the Novosibirsk oblast after they received grants.

Table 11

**Spearman's and Kendall's rank correlation coefficients calculated for the series of collected and disposable budget revenues of municipalities of the Novosibirsk oblast in 2006–2012**

Coefficient	2006	2007	2008	2009	2010	2011	2012
Spearman's rank correlation coefficient	0.40	0.61	-0.17	-0.17	-0.37	-0.47	-0.63
Kendall's rank correlation coefficient	0.28	0.44	-0.14	-0.16	-0.28	-0.37	-0.44

To answer the question of whether resources transferred from the oblast budget to local self-government bodies serve the purpose of intraregional equalization, it is of interest to determine the dependence between the grants from the oblast budget and per-capita tax or nontax local budget revenues. Therefore, we propose to estimate the following equation:

$$T_i = \alpha + \beta \cdot R_i + \xi_i,$$

where  $T_i$  are per-capita grants from the oblast budget to the  $i$ -th municipality,  $R_i$  – indicates per capita tax and nontax revenues of the  $i$ -th municipality,  $\alpha$  is the intercept,  $\beta$  is the slope coefficient, and  $\xi_i$  are the regression residuals. The results of calculations are presented in Table 12.

Table 12

**Estimation results for the equation  $T_i = \alpha + \beta \cdot R_i + \xi_i$**

Indicator		2006	2007	2008	2009	2010	2011	2012
R <sup>2</sup>		0.002	0.11	0.21	0.21	0.19	0.26	0.42
Estimate of $\alpha$		8564	13150	19884	21444	36154	36126	47114
t statistics		8.31	6.74	13.18	11.22	8.88	12.03	12.82
95% confidence interval	lower bound	6467	9180	16810	17553	27873	30015	39638
	upper bound	10660	17119	22958	25335	44435	42237	54590
Estimate of $\beta$		0.10	0.88	-0.92	-1.09	-2.21	-1.52	-2.78
t statistics		1.25	2.05	-2.91	-2.91	-2.81	-3.38	-4.84
95% confidence interval	lower bound	-0.74	0.01	-1.56	-1.85	-3.81	-2.43	-3.95
	upper bound	0.94	1.75	-0.28	-0.33	-0.61	-0.60	-1.61
Number of observations	total	35	35	35	35	35	35	35
	excluding outliers	35	35	34	34	35	35	35

The given data show that, in the Novosibirsk region in 2006, the relationship between collected revenues and grants was not statistically significant, i.e. grants from the regional budget were accidental. In 2007, there was a statistically significant positive correlation between the studied variables. In the case of exclusion from consideration the city of Novosibirsk, dependence remained statistically significant positive, coefficient of determination increased. When we estimated regressions for 2008 and 2009 Severnyi raion was excluded from the consideration. During the period from 2008 to 2012 there was a statistically significant negative correlation between these parameters. In other words, with 5% error probabil-

ity, it was found that the oblast fiscal policy in 2008–2012 is aimed at equalizing the per-capita budget revenues of the municipalities. In connection with this, we should note that all of the coefficient estimates in the analyzed regression in 2008–2012 are also significant at a 99% confidence level.

The literature has repeatedly emphasized that, in the given system of intergovernmental fiscal relations, local governments are not interested in implementing rational, transparent, or responsible fiscal policy. We can assess whether municipalities of the Novosibirsk oblast have positive or negative stimuli for responsible fiscal policy by the marginal effect of increases in taxes allocated to local budgets, i.e., by the growth of disposable revenue that results in the growth of tax revenues to the budget by 1 ruble, as follows:

$$(Y_{it} - Y_{it-1}) = \alpha + \beta (X_{it} - X_{it-1}) + \varepsilon_{it},$$

where  $Y_{it}$  – are disposable revenues of the  $i$ -th municipality in year  $t$ ,  $X_{it}$  - are tax revenues of the  $i$ -th municipality in year  $t$ ,  $\beta$  is the slope coefficient,  $\alpha$  is the constant, and  $\varepsilon_{it}$  are the regression residuals.

If there are no stimuli to increase tax and nontax revenues, then the regression coefficient  $\beta$  must be statistically insignificant. If stimuli (increase or decrease) are present, the regression coefficient shall be statistically significant (positive or negative). The city of Novosibirsk was excluded from the calculations. The estimation results are shown in Table. 13.

Table 13

**Estimation results for the equation  $(Y_{it} - Y_{it-1}) = \alpha + \beta (X_{it} - X_{it-1}) + \varepsilon_{it}$** 

Indicator		2006–2007	2007–2008	2008–2009	2009–2010	2010–2011	2011–2012
R <sup>2</sup>		0.45	0.10	0.10	0.26	0.27	0.64
Estimate of $\beta$		157640	94760	14743	200241	57365	68485
t statistics		5.87	3.68	1.04	7.24	1.65	4.07
95% confidence interval	lower bound	102906	42320	–14126	143893	–13474	34219
	upper bound	212374	147201	43612	256590	128203	102751
Estimate of $\alpha$		2.72	–1.03	0.55	2.38	1.56	1.06
t statistics		5.07	–1.88	1.95	3.31	3.43	7.54
95% confidence interval	lower bound	1.63	–2.15	–0.02	0.92	0.63	0.78
	upper bound	3.81	0.08	1.12	3.85	2.49	1.35

The presented results indicate that for two periods considered, namely 2007–2008 and 2008–2009 years measured dependencies were found to be statistically insignificant. This fact can be explained by the 2008 crisis, which entailed certain changes in fiscal policy in the region. Other dependencies presented in Table 13 have proven to be statistically significant; the estimate of the  $\beta$  coefficient in all the regressions is greater than zero; furthermore, this coefficient is also significant at a 99% confidence level. Thus, the stimuli work towards conserving and developing municipalities' local tax potential in the Novosibirsk oblast.

An analysis of the revenue breakdown of the local budgets of the Novosibirsk oblast speaks of their low level of autonomy, since it is typical for them to not have any stable revenue base. For the majority of the municipalities, the percentage of grants makes up more than 70% of the revenue sources. The low level of collected revenues is not offset by a reliable mechanism for setting fixed rates of regional and federal taxes transferred to the local budgets.

### BUDGET COEFFICIENTS FOR MUNICIPALITIES OF THE NOVOSIBIRSK OBLAST

An important aspect of the budget analysis is the analysis of the stability of regional and local budgets [4]. This analysis can be performed using budget coefficients (Table 14). The practical application of budget coefficients increases the objectivity of the assessment of regional and local budgets, and helps to identify the factors influencing them.

Table 14

Budget coefficients		
Name	Formula	Content
The ratio of grants and collected revenues	$R_{GCR} = G/CR$	G – grants; CR – collected (tax and non-tax) revenues
Coefficient of budget effectiveness of territories*	$C_{BE} = R/P$	R – budget revenues; P – average annual population of the municipal settlement
Coefficient of budget debts*	$C_{BD} = D/E$	D – local budget deficit, E – municipal settlements budget expenditures. Если $D < 0$ , то $C_{BD} = 0$ .
Coefficient of budget coverage*	$C_{BC} = R/E$	R – budget revenues E – budget expenditures
Coefficient of budget provision of the population	$C_{BP} = E/P$	E – budget expenditures P – average annual population of the municipal settlement.

\*  $C_{BE}$ ,  $C_{BD}$ ,  $C_{BC}$  are calculated in two ways. I variant: R – is collected (tax and nontax) revenues of municipal settlement, D – is the difference between expenditures and collected revenues of municipal settlements' budgets; II variant: R – is disposable revenues of municipal settlement (tax, non-tax revenues and grants from the regional budget), D – is the difference between expenditures and disposable revenues.

Let's analyze the results of calculations of given budget coefficients for municipalities of the Novosibirsk region (Table 15–19).

Table 15

#### The ratio of grants and collected revenues

Indicator	Value of $R_{GCR}$						
	2006	2007	2008	2009	2010	2011	2012
maximum	13,59	38,55	41,48	21,06	26,58	28,95	19,33
minimum	0,36	0,57	0,46	0,55	0,59	0,36	0,64
average	6,87	8,95	8,28	6,74	8,18	8,45	7,58

In the Novosibirsk oblast the ratio of grants and collected revenues reaches a maximum in 2006–2009 in Zdvinsky raion, in 2010 and 2011 – in Kyshtovsky, in 2012 – in Ust-Tarksky raion.

The minimum value of the ratio of grants and collected revenues was characteristic for the city of Novosibirsk in 2006–2010 and in 2012 and in 2011 for science town of Koltsovo (Novosibirsk is second from the end). We'd like to note other municipalities of Novosibirsk oblast, included in the group with the lowest value of the ratio of grants and collected revenues. In 2006, this may include cities of Ob, Novosibirsk and Ordynsky raion, in 2007 – the

city of Ob and science town of Koltsovo. In 2008 their number also included Novosibirsk raion, cities of Berdsk and Iskitim. In 2009–2012 this group of municipalities included Novosibirsky raion, the cities of Berdsk, Iskitim, Ob, science town of Koltsovo. It is worth noting that throughout the period in question the value of  $R_{GCR}$  was less than one in 2006, 2008, 2010 and 2012, only in two municipalities (cities of Novosibirsk and Ob), and in 2007, 2009 and 2011 - in three municipalities (cities of Novosibirsk, Ob and science town Koltsovo). I.e. for all other municipalities the grants exceed tax and nontax revenues collected. Average level of the considered factor is very high, i.e. during 2006–2012 years on the average for municipalities of the Novosibirsk oblast grants from the regional budget exceed the tax and nontax revenues in 7–9 times. And that's just the average excess. The maximum value in 2006 and 2012 – more than 10, in 2009–2011 – more than 20, and in 2007 and 2008 – more than 38! Number of municipalities that had the ratio of grants and collected revenues more than 10 in 2006 were 8, in 2007 and 2010 – 10, in 2008 – 12, in 2009 – 9, in 2011 and 2012 – 11, i.e. in these municipalities grants exceeded the collected revenues by more than 10 times.

Table 16

## Coefficient of budget effectiveness of territories

Indicator	Value of $C_{BE}$						
	2006	2007	2008	2009	2010	2011	2012
<b>I variant</b>							
maximum	8526	13040	16445	16403	12484	25501	14784
minimum	290	263	405	847	1497	2086	2910
average	1844	3192	3927	4220	4501	5140	5566
<b>II variant</b>							
maximum	24866	57264	70282	64812	62434	67624	69272
minimum	1830	2906	5379	45622	10180	16913	16702
average	10781	19416	21823	22629	31197	33793	37206

According to the first variant of calculations for this coefficient for the period from 2006 to 2012 cities of Ob, Novosibirsk and science town of Koltsovo headed the list of municipalities. Relatively high coefficient of budget effectiveness of territories (collected budget revenues per capita) was in 2006 in the Novosibirsky raion, cities of Berdsk and Iskitim, in 2007 – in Iskitimsky, Severnyi raions, cities Berdsk and Iskitim, in 2008 – in the Kuibyshevsky, Novosibirsky, Severnyi raion, cities of Berdsk and Iskitim, in 2009 – in Ordynsky, Severnyi raions, cities of Berdsk and Iskitim, in 2010 – in Barabinsky, Ordynsky, Severnyi raions and in the city of Iskitim, in 2011 – in Karasuksky and Toguchinsky raions as well as in the city of Iskitim and in 2012 – in Novosibirsky and Kochenevsky raions and in the city of Iskitim. That is, those municipalities that are characterized by a relatively low value of the coefficient  $R_{GCR}$  discussed above.

Coefficient of budget effectiveness of territories was minimal in 2006, 2011 in the Kyshtovsky raion, in 2007–2009 – in Zdvinsky, in 2010 – in Karasuksky, 2012 – Ust-Tarksky raion. In addition, we allocated a steady group of Novosibirsk oblast's municipalities with traditionally low collected budget revenues per capita. These include Vengerovsky, Dovolensky, Zdvinsky, Kyshtovsky, Ubinsky and Ust-Tarksky raions.

In the second variant of calculations maximum of the coefficient of budget effectiveness of territories in 2006 was observed in science town of Koltsovo, in 2007 – in

Iskitimsky raion, in 2008–2011 – in the Severnyi raion, in 2012 – in the most distant from the city of Novosibirsk Kyshtovsky raion, having a high proportion of grants from regional budget. During the reporting period in the group of municipalities with a relatively high value of this coefficient also included Bagansky, Kargatsky, Maslyaninsky, Tatarsky, Ubinsky, Ust-Tarksky and Chistoozerny raions, science town of Koltsovo.

The minimum value of the coefficient of budget effectiveness of territories, calculated according to the second variant was in 2006 and 2012 in the city of Berdsk, in 2007–2010 – in Karasuky raion and in 2011 – in the Novosibirsky raion. Importantly, among the territories with relatively low values of this coefficient were municipalities, which had the highest values of the same coefficient, calculated according to the first variant, i.e. cities in which the level of tax and nontax revenue was the largest, after the distribution of grants from the regional budget had the lowest values of disposable revenues. There were such cities as Novosibirsk, Berdsk, Iskitim and Ob. Among the municipalities that had the lowest values of disposable revenues, were Iskitimsky, Kochenevsky, Moszkowsky, Novosibirsky, Suzunsky and Toguchinsky raions.

As noted above,  $C_{BD} + C_{BC} = 1$ . Consequently, we consider the results of calculations of these budget coefficients together.

Table 17

## Coefficient of budget debts

Indicator	Value of $C_{BD}$						
	2006	2007	2008	2009	2010	2011	2012
<b>I variant</b>							
maximum	0.933	0.975	0.976	0.950	0.963	0.967	0.950
minimum	0.261	0.357	0.366	0.395	0.404	0.143	0.340
average	0.823	0.838	0.816	0.795	0.822	0.819	0.814
<b>II variant</b>							
maximum	0.196	0.073	0.119	0.145	0.064	0.080	0.075
minimum	0	0	0	0	0	0	0
average	0.011	0.004	0.025	0.015	0.012	0.014	0.003

Table 18

## Coefficient of budget coverage

Indicator	Value of $C_{BC}$						
	2006	2007	2008	2009	2010	2011	2012
<b>I variant</b>							
maximum	0.739	0.643	0.634	0.605	0.596	0.857	0.660
minimum	0.067	0.025	0.024	0.050	0.037	0.033	0.050
average	0.177	0.162	0.184	0.205	0.178	0.181	0.186
<b>II variant</b>							
maximum	1	1	1	1	1	1	1
minimum	0.804	0.927	0.881	0.855	0.936	0.920	0.925
average	0.989	0.996	0.975	0.985	0.988	0.986	0.997

The minimum value of  $C_{BD}$  and, accordingly, the maximum value of  $C_{BC}$  in the first variant of calculations was in the city of Novosibirsk in 2006–2010, in science town Koltsovo in 2011 and in 2012 in the city of Ob. Less than 0.5  $C_{BD}$  was also only in the city of Ob in 2006–2010, in cities of Novosibirsk and Ob in 2011 and in the cities of Novosibirsk in 2012. In the group of municipalities, relatively well on this indicator during the period under review included Novosibirsky raion and all the cities of the Novosibirsk oblast. Also in this group were Karasuksky raion in 2006–2008, Ordynsky raion in 2006 and 2009, Severnyi raion in 2007 and 2008, Iskitimsky raion in 2008 and 2012, Moshkovsky and Toguchinsky raions in 2011. Noteworthy very high average value of the coefficient of budget debts, calculated according to the first variant: 0.795 – in 2009 and more than 0.8 – in other years in the period under consideration. Accordingly, the average value of the coefficient of budget coverage, calculated according to the first variant, in 2009 is 0.205, while in other years it is less than 0.2. Thus, on average, less than 20% of the expenditures of municipalities of the Novosibirsk oblast covered by the tax and nontax revenues collected in their territories.

The maximum value of the coefficient of budget debts was in 2006–2009 in Zdvinsky raion, in 2010 and 2011 – in Kyshtovsky, in 2012 – Ust-Tarsky raion. Among the municipalities with the highest values of this coefficient, and hence the lowest values of the coefficient of budget coverage there are Bagansky, Vengerovsky, Dovolensky, Kargatsky, Kolyvansky, Kyshtovsky, Maslyaninsky, Ubinsky, Ust-Tarsky and Chistoozerny raions, i.e. those areas in which the ratio of grants and collected revenues considered above had the highest values. Note that a fairly large group consists of the territory in which the value of the coefficient of budget coverage calculated according to the first variant is less than 0.1 (or  $C_{BD}$  greater than 0.9), i.e. tax and nontax revenues for these areas cover less than 10% of expenditure needs. In 2006 and 2009, respectively, there were 9 such municipalities, in 2007 – 16, in 2008 and 2012 – 12 in 2010 and 2011 – 14.

According to a second variant of the calculations in 2006 in 24 municipalities of Novosibirsk oblast  $C_{BD}$  was equal to zero. In 2007 the coefficient of budget debts was equal to zero in 25 municipalities, in 2008 – 10, in 2009 there were 20 such municipalities, in 2010 – 17, in 2011 – 13 and in 2012 – 29. Expenditures of local authorities are determined by their disposable revenues, which consist of collected revenues, grants from the regional budget and borrowed funds (loans, etc.). Borrowed funds are very small. Because region covers from its budget a significant part of major expenditures of municipalities for which local self-governments bodies do not have money, the coefficient of budget debts, calculated by the second variant for the entire period is considered low values, respectively, the coefficient of budget coverage for all the cities and raions of the oblast is close to unity.

Table 19

#### Coefficient of budget provision of the population

Indicator	Value $C_{BP}$						
	2006	2007	2008	2009	2010	2011	2012
maximum	24961	56190	68766	62565	66680	69695	69978
minimum	2275	3134	5567	4417	10306	16487	15975
average	10583	18944	22214	22444	31257	33934	35916

As already have been mentioned, in all the municipalities of the Novosibirsk oblast disposable revenues per capita are slightly different from the total expenditures per capita. Overall, therefore, the results of calculations of budget provision of the population in cities and raions of the Novosibirsk oblast coincide with the results of the coefficient of budget effectiveness of areas, considered by the second variant.

The analysis showed that one of the key problems in the field of budgetary alignment at the subnational level – are significant differences in the budgetary provision of municipalities before and after budget equalization. They are so significant that municipalities

being the most financially secured on the result of the budget tax and nontax revenues, after the distribution of grants are among the “outsiders” according to per-capita budget revenues.

Thus, the analysis of performed budget coefficients illustrates their opportunities and practical significance for the assessment of local budgets. First, the calculation of these coefficients allows proving the size of financial assistance to local authorities from the regional budget. Second, budget coefficients allow presenting more transparently a financial situation in the region, including the identification of the solvency of each municipality (i.e. as a municipality has capacity in the formation of budget revenues). Taken together budget coefficients allow us to estimate the structure of budgets of local self-government bodies. Finally, the calculation of the coefficients for different years allows monitoring dynamics.

Setting up an effective local self-government requires, first of all, the consolidation of the revenue base of local budgets. At present, the proportion of collected revenues in the total sum of revenues in the local budgets of the municipalities of Novosibirsk oblast, is, on average, less than 20%. This means the dependence of the local budgets on the upper-level authorities.

This is supported by the recently increased centralization of the territorial budgets accompanied by an increase in the percentage of grants in the municipal budgets. In particular, in the majority of municipalities of Novosibirsk oblast, grants make up more than 70 of all their revenues. However, as calculations have shown, this does not deprive the local self-government bodies of stimuli to fund their activities aimed at increasing their local tax base. Therefore, despite the lack of local resources and insufficient autonomy, the local self-government bodies of Novosibirsk oblast are interested in implementing effective fiscal policy.

The system of intergovernmental fiscal relations is of economic, political, and social importance for the country’s development. However, financial aid should play a secondary role in the development of a local tax base for budgets at each level. In order for the whole national budget system to function effectively, i.e., for budgets of different levels to be balanced and autonomous, it is necessary, first of all, to establish clear-cut and valid criteria for the distribution of tax revenues between budgets of all levels.

In general, a system diagnostics of territorial budgets creates an information base for future managerial decisions – for the elaboration of the development’s strategy, training of development’s programs, budgeting, etc. [5]. The results allow you:

- to use in further work prepared structured description of the territorial fiscal system, including key numerical parameters and relationships;
- to identify the main causes of problems arising in the municipality;
- to prepare solutions based on identified trends and estimates of the budget situation in various areas of revenues and expenditures of the regional and local budgets;
- to gain the understanding of the available reserves and restrictions;
- to pre-identify areas in which it is advisable to carry out a problem decision in order to prepare the elaboration of practical recommendations;
- to focus on developing solutions for the most problematic areas;
- to gain the understanding of best practices from other regions and countries, as well as to avoid a repetition of negative results.

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# PROTECTED AREAS NETWORKS IN POLAND – ORIGIN, CORE AND CURRENT TRENDS

*Agnieszka Rzeńca*<sup>1</sup>

The purpose of the article is a presentation of current Polish experiences in the scope of the development and accomplishment of the protected area networks in comparison to the evolution of the nature conservation purposes and directions. An important aspect of the discussed issues is the international conditions resulting from Polish membership in the European Union, and above all Polish collaboration on Natura 2000 network.

## INTRODUCTION

Nature conservation constitutes a foundation for a permanent and sustainable development, which means a socially desired, economically justified and ecologically acceptable economic development which results in a balance between the economic, social and natural system<sup>2</sup>. It is a result of an unavoidable compromise between social and economic purposes and preservation of natural capital which is essential for a permanent and sustainable development.

In a substantive sense, nature as a subject of protection consists among others of: self-set plants, animals and fungi that are protected or not, natural habitats<sup>3</sup>, (animate and inanimate) nature formations, landscape, greenery in cities and villages, tree-covered areas<sup>4</sup>. These subjects play a particular role in the functioning of natural systems or constitute rare dying out resources (formations, nature elements), they have ecological functions as well as cognitive and educational functions, and they confirm theses and scientific statements or historical facts and are a sightseeing attraction<sup>5</sup>. In order to protect the most valuable species and their habitats, diversified ecosystems and landscape, they are covered by legal forms of nature conservation. They constitute a richness and potential of the territories of communes and regions, but also play a key role in developing national and international protected areas networks (ecological networks).

Protected areas networks reflect the sense of current trends in nature conservation, since the basis is cooperation and integration of national and international activities. The main purpose of their development is providing sustainability of the ecological system that is retaining the coherence and continuity of natural processes by connecting nature conservation forms with ecological corridors (ranges) and widely understood cooperation (the accomplishment of conservation programmes, nature monitoring, experience exchange). Developing a comprehensive system is supposed to help complex accomplishment and comprehensive nature conservation. Establishing common rules and priorities, activating common programmes, and providing conditions for active actions support the preservation of the most valuable natural fragments of the Earth and reinforcement of the cohesion of the natural ecological system.

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<sup>2</sup> G. Dobrzański, B.M. Dobrzańska, D. Kielczewski, *Ochrona środowiska przyrodniczego*, Wydawnictwo Ekonomia i Środowisko, Białystok 1997, p. 213.

<sup>3</sup> Natural habitat – an area of land or water, semi-natural or anthropogenic, separated on the basis of geographical features, abiotic and biotic, Nature Conservation Act of 16 April 2004, Dz. U. 04.92.880 of 30 April 2004, Art. 5, par.17

<sup>4</sup> Nature Conservation Act of 16 April 2004, Dz.U.04.92.880 of 30 April 2004, Art. 2, par. 1.

<sup>5</sup> R. Olaczek (red.), *Ochrona przyrody w Polsce*, LOP, Warszawa 1996, p. 6.

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The purpose of the article is a presentation of Polish experiences to date, in the scope of the development and accomplishment of protected areas networks in comparison to the evolution of nature conservation purposes and directions. An important aspect of the discussed issues is international conditions resulting from Polish membership in the European Union, and above all Polish collaboration on Natura 2000 network development.

## **GENESIS AND EVOLUTION OF NATURE CONSERVATION IN POLAND**

The origins of nature conservation in the world date back to the ancient times and the early Middle Ages and they have their grounds in religious beliefs. Various nature forms (trees, springs, rocks) were worshipped and at the same time protected, because of their looks and character they were attributed a particular impact on a human life. The conviction about positive or negative influences of the nature specimen provided them with an effective protection. Later (in the 14th – 19th century), protection was determined by economical reasons.

In Poland, the first nature conservation forms, coming from the economic reasons, were king's regalia. The oldest were the so-called hunting regalia. It was a law that was granted to lay and cleric feudal lords by the ruler, which allowed them for obtaining game. The so-called fishing, bee-keeping and mining regalia were functioning in a similar way. The limitation of hunting, fishing, bee-keeping, and mining only for the ruler or people granted by him a special privilege was caused mostly by the protection of private property and economic reasons. However, it served nature protection against an excessive and uncontrolled use<sup>1</sup>. With time, apart from the economic reasons there were other reasons for nature protection: scientific, aesthetic, historic-souvenir, cultural. Subjective feelings and selfless need of nature protection decided about the ban on destroying or obtaining chosen plant and animal species – species protection of plants and animals (one of the first formal regulations concerning species protection was a Galician act concerning chamois and marmot protection in the Tatra Mountains in 1868). From these motifs comes also the idea of creating natural monuments and national parks – natural souvenirs, unique specimen of particular scientific, aesthetic, commonly acknowledged values that are historical souvenirs. As nature monuments one considered nature formations that are impressive historic trees, boulders, outcrops, caves, karst springs or their centers characterized by individual properties.

Till the mid of the 19th century, both in Poland and in the world, nature protection had a conservative character. Its main purpose was the protection of natural formations (individual and their agglomerations) and plant and animal species endangered with destruction or extinction. The basic activity was limiting the use of nature and a ban on the exploitation or disturbance of their natural state<sup>2</sup>.

In the interwar period in Poland, the conservative protection trend was preserved, which was expressed by the first nature conservation act that was enacted in 1934<sup>3</sup>. According to this act, nature forms that underwent protection were: the earth, its landform features and formations, caves, waterfalls, flowing and stagnant waters, shores of these waters, minerals, fossils, animals, plants – specimen, centers and individual specimen which preservation was of public interest from the scientific, aesthetic historical, souvenir perspectives or because of their individual landscape features and which public authority acknowledged

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<sup>1</sup> W. Radecki, *Zarys historii prawnej ochrony przyrody w Polsce* [w:] J. Sommer, *Prawne formy ochrony przyrody*, Wydawnictwo SGGW-AR, Warszawa 1990, p. 88–89; K. Górka, B. Poskrobko, W. Radecki, *Ochrona środowiska, Problemy społeczne, ekonomiczne i prawne*, PWE, Warszawa 2001, p. 161–163.

<sup>2</sup> T. Szczęsny, *Ochrona przyrody i krajobrazu*, PWN, Warszawa 1977, p. 143.

<sup>3</sup> Ustawa o ochronie przyrody z 10 March 1934, Dz. U. Nr 31, poz. 274.

as undergoing protection. This act was meeting the new trends in the scope of nature conservation, and it was placing under protection not only single specimen but the whole biocoenosis, especially sensitive and valuable species. Creating national parks and nature reserves was at that time an expression of a new protection trend that was called a biocoenotic trend.

Progressing negative changes in the environment enforced the reorientation of the nature conservation policy. Architectural conservative studies and natural monument expertise (protection of nature formations, specimen, species, biocoenosis) did not suit the social-economic reality of the industrial period, which was expressed by the promotion of a new nature conservation trend – the planning trend. A subject of nature protection was supposed to be natural environment as a whole also to a smaller or bigger extent changed by a human being but still valuable. The idea of this direction of activities is connected with the limitation of an excessive investment pressure and security of the naturally attractive areas through the activities in the scope of spatial planning. Such a situation was also influenced by legal regulations, which in 1980<sup>1</sup> created a chance to appoint new spatial forms: landscape parks and protected landscape areas. From that time, particularly since 2000, a sustainable systematic growth of the spatial forms of nature conservation forms has been observed.

Present nature conservation in Poland and in the world is motivated by:

- 1) *A biological aspect.* It means protection of species and their habitats in order to preserve the continuity of their existence, providing ecosystem diversity and sustainability, and thus protection of the biological existence of a human being and providing health conditions;
- 2) *A social aspect.* Protection of natural values and resources which means improvement of the quality of life and surrounding aesthetics, preservation of «nature souvenirs» and material and non-material culture for the future generations;
- 3) *An economic aspect.* From the perspective of the economy «nature devastation is equated with the capital decrease which leads to decreasing its value and income inflow»<sup>2</sup>.

Nature conservation is described as a positive activity including preservation, permanent use and renewal of resources, formations and elements of nature. It is a set of activities which is about:

- 1) Preserving basic ecological processes and systems that are the basis for life (protection and regeneration of soils, watershed forests and green areas, self-purification of waters, protection of systems that are the basis for life and feeding ecosystems);
- 2) Preserving biological diversity on all the levels of the organization;
- 3) Preserving sustainable use of land and ecosystems which should not disturb natural environmental processes and is supposed to guarantee retaining the self-reproduction of mechanisms and nature diversity<sup>3</sup>.

A priority is the protection of living natural resources in the context of preserving the biodiversity which is essential to retain basic ecological processes and providing the sustainability of the resource use and in consequence retaining the natural capital (both its quantity and quality). The sustainability of the natural capital is then in particular a condition of an intergeneration justice<sup>4</sup>. Biodiversity protection is supposed to «preserve the entire native natural richness and provide the sustainability and possibility of development of

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<sup>1</sup> Ustawa o ochronie i kształtowaniu środowiska z dn. 31 stycznia 1980 r. Dz. U. Nr 3, poz. 6 z późn. zm., aczkolwiek pierwszy park krajobrazowy został powołany w 1976 r.

<sup>2</sup> J.T. Winpenny, *Wartość środowiska. Metody wyceny ekonomicznej*, PWE, Warszawa 1995, s. 19.

<sup>3</sup> *World Conservation Strategy. Living Resources Conservation for Sustainable Development*, IUCN, Gland 1980; przekład polski: *Światowa Strategia Ochrony Przyrody. Ochrona żywych zasobów dla trwałego rozwoju*, LOP, Warszawa 1985.

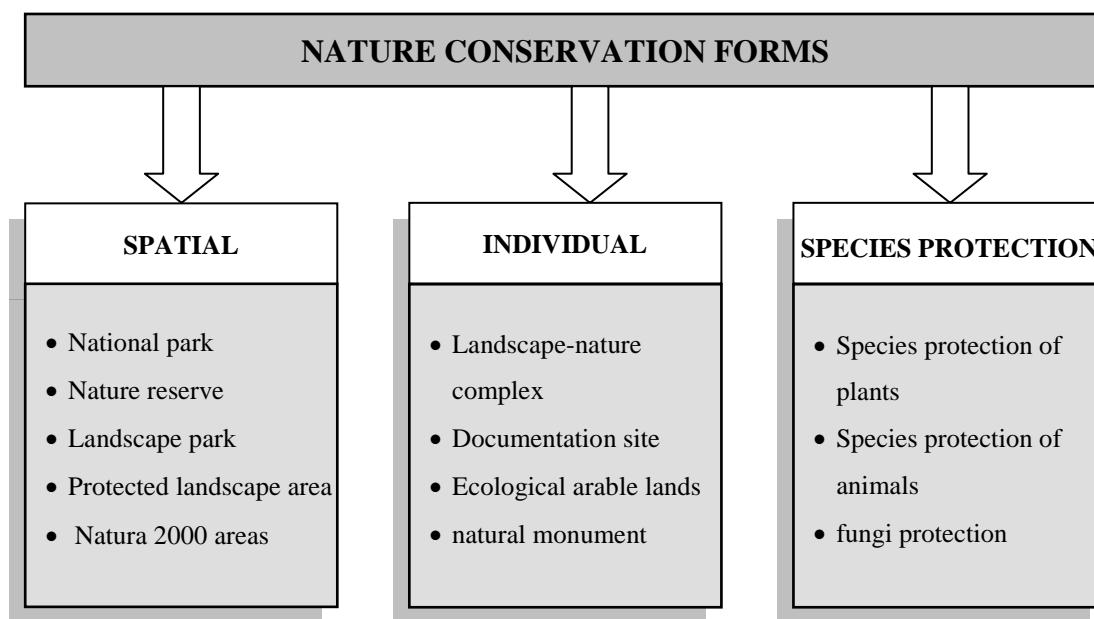
<sup>4</sup> T. Borys, *Wskaźniki ekorozwoju*, Wydawnictwo Ekonomia i Środowisko, Białystok, 1999, p. 148.

all the levels of its organization (intraspecies, interspecies and overspecies)»<sup>1</sup>. A particularly strong impact is made on the protection of habitats and wild flora and fauna biodiversity, which are determined by the genetic and specific diversity and also by the anthropogenic impact conditions.

## NATURE CONSERVATION FORMS IN POLAND

Legal nature conservation forms are a commonly applied instrument of nature capital conservation all over the world. National states make individual decisions concerning the scope and activities of the protection and the nomenclature of the established forms. In consequence, the regime, purposes, principles and ways of nature conservation accomplishment are set up individually. Guidelines in the scope of running a business activity on the protected areas are defined.

In Poland, in the Nature Conservation Act there were 10 nature conservation forms<sup>2</sup> mentioned, among them one can differentiate: spatial and individual nature conservation forms and species protection of plants, animals, fungus. The basis for the classification is a defined subject of protection (protection of ecosystems, natural processes, nature elements), which is imposed by the scope, character and categories of the protection (Figure 1).



Source: Nature Conservation Act dated 16 April 2004, Dz. U.04.92.880 dated 30 April 2004, Article 6.

**Fig. 1.** Classification of nature conservation forms in Poland

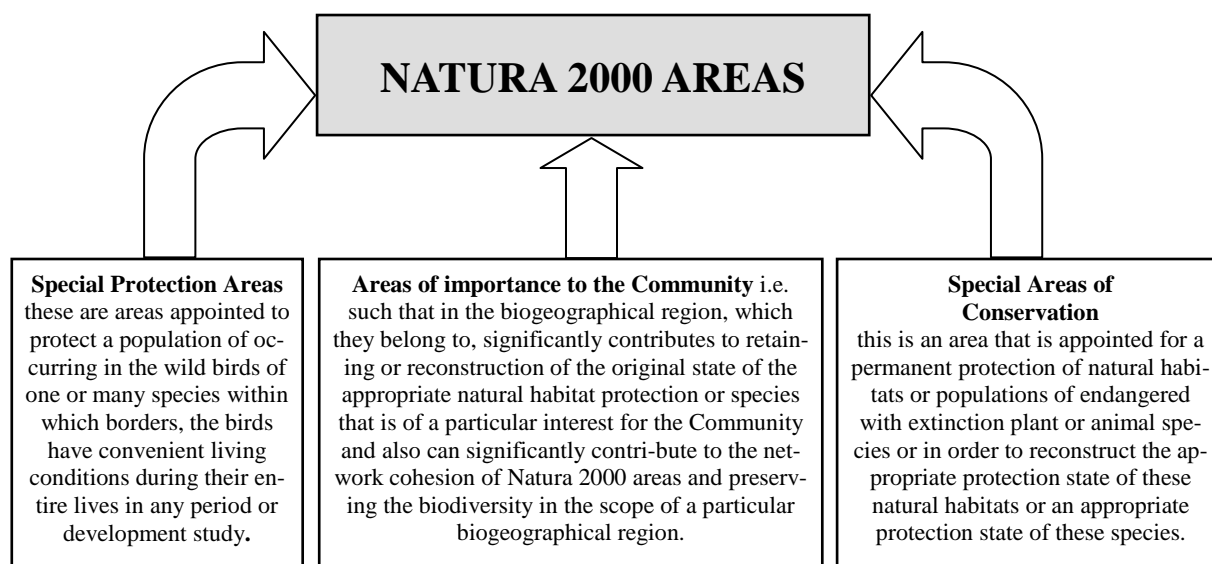
The most restrictive form of nature conservation is nature reserves and national parks, within their areas entire nature and specific landscape features are protected. These areas are fragments of a biosphere, where there may be a spontaneous wildlife, with not numerous areas with a preserved autonomy, integrity and diversity of the ecological systems. They have the following functions: scientific (cognitive), educational (didactic), touristic (sightseeing-didactic tourism) and economical. The most important and superior is the protective function, all the other functions are of a secondary importance and are subordinate to it.

<sup>1</sup> Krajowa strategia ochrony i umiarkowanego użytkowania różnorodności biologicznej wraz z programem działań, dokument zatwierdzony przez Radę Ministrów w dniu 25 lutego 2003 r., Warszawa 2003, p. 18.

<sup>2</sup> Nature Conservation Act dated 16 April 2004, Dz. U. 04.92.880 dated 30 April 2004, Art. 6.

The role of national parks, similarly to nature reserves, in the nature conservation system cannot be undervalued. These areas are the bonds that stabilize the ecological balance of the whole biosphere and areas of retaining the natural genetic biodiversity of organisms, from which these organisms are spread and supply the more and more impoverishing humanoecumene. They protect the most valuable natural resources of the state, provide pleasant experience, provide conditions for relax and constitute «a living research laboratory»<sup>1</sup>.

Landscape park is a spatial conservation form of natural, cultural and historical values in conditions of the economic use of this area. Retaining, popularizing and making public valuable assets are made by developing appropriate relations between the area value protection and its possibilities of the economic growth. While in case of a national park and nature reserve all the activities are subordinate to nature conservation, in case of landscape parks, the protection is supposed to serve creating a durable and sustainable development of the area.



Source: ownworkbased on M. Makomaska-Juchiewicz, S. Tworek, *Miejsce sieci Natura 2000 w europejskiej ochronie przyrody* [w:] M. Makomaska-Juchiewicz, S. Tworek (red.), *Ekologiczna Sieć Natura 2000. Problemy czy szansa*, Instytut Ochrony Przyrody PAN, Kraków 2003, p. 11–15 oraz *Ustawy o ochronie przyrody z 2004. z póź.zm.*

**Fig. 2.** Classification of Natura 2000 areas

In order to limit changes in the landscape caused by the business activity pressure, the landscape protected areas are set up. This conservation form is supposed to ensure a relative ecological balance to the natural system, protect the diversified landscape, prevent the deterioration of the nature condition within its area and provide conditions for efficient economy, including tourism development. Including the areas of river valleys, forests, water and rocky areas may have a function of ecological corridors, protection areas as well as lagging for the nature conservation forms that have a stronger regime (e.g. landscape park).

Poland has been obliged by the European Union directives, and presently also by national legislation to appoint a new form of nature conservation which is Natura 2000 areas: Special Protection Areas (SPA), Special Areas of Conservation (SAC)<sup>2</sup>, and the areas of im-

<sup>1</sup> K. Grodzińska, R. Olaczek (red.), *Zagrożenie Parków Narodowych w Polsce*, PWN, Warszawa 1985, p. 6.

<sup>2</sup> Dyrektywa 79/409/EWG o ochronie dziko żyjących ptaków z dnia 2 kwietnia 1979 r. (poprawki: dyrektywa 91/244/EWG i 94/24/WE), Dyrektywa 92/43/EWG z 21 maja 1992 r. o ochronie siedlisk przyrodniczych oraz dzikiej flory i fauny oraz ustawa o ochronie przyrody z 2004 r.

portance to the Community (Figure 2). The main purpose of the appointment of these areas is biodiversity protection of the Community states by retaining the most valuable natural habitats and biodiversity of plant and animal species and birds populations appearing in a natural state and representing different European bio-geographical regions. The protection concerns both the areas and the species. Natura 2000 areas may be appointed within the already existing nature conservation forms and in the areas that have not been protected yet.

Nature conservation forms are diversified to a great extent in view of the properties and values of the protected facility, changes implemented by a human being and the established scope of limits, management style and accomplishment of the protection. Individual nature conservation forms protect the specific values of the natural environment that record the geological past (documentation site), impressive and valuable formations of nature (nature monument) or enriching the biological and landscape diversity (ecological arable lands) (Table 1).

Table 1

**Individual nature conservation forms**

Nature conservation forms	Features
<b>Nature monument</b>	it is the oldest conservation form that can include the individual animate and inanimate nature formations or their agglomerations of a particular natural, scientific, cultural, historical or landscape value or those having distinctive individual features, singling them out among the other forms. The purpose of establishing this form is the protection of facilities against destruction, damage or removal.
<b>Documentation site</b>	that is a conservation form concerning geological facilities such as: quarries, excavations, erosive escarpments, headwaters niche, natural unveilings of both solid and non-cohesive rocks, which behavior is caused by the scientific reasons. Protection of the documentation site is about maintaining permanent accessibility and possibility of carrying out practical activity and preventing its destruction or covering by introducing a ban of such activities and respecting this conservation form while making decisions concerning location.
<b>Ecological arable lands</b>	It is created in the areas that are usually economically unused and that are important for the preservation of species and habitat diversity. Protected are natural water reservoirs, field and forest ponds, clumps of trees and bushes, marshes, bogs, dunes, patches of unused vegetation, oxbow lakes, rock outcrops, slopes, gravel, natural habitats and the habitats of rare or protected species of plants, animals and fungi, their refuges and breeding places or seasonal stay. These objects are specific peculiarities of nature, which often are the result of human intervention, and although they do not represent the value in use, they perform ecological functions and diversify the landscape.
<b>Landscape-nature complex</b>	In order to preserve the aesthetic values or avoid degradation of valuable fragments of natural or cultural landscape, an individual nature conservation form is being set up, this form, despite the fact that it may concern relatively large area, protects a special natural component, that is, a landscape.

Source: own work on the basis of the Nature Conservation Act 2004 with further amendments [w:] Burchard-Dziubińska M., Drzazga D., Rzeńca A. (red.) *Zrównoważony rozwój - naturalny wybór*; Wydawnictwo Uniwersytetu Łódzkiego, Łódź, 2014

Spatial land individual forms of nature conservation occupy total of approximately 1/3 of Poland (32.5%). By far the largest area is occupied by facilities that protect natural and anthropogenic landscape (protected landscape areas and landscape parks). The most severe forms of nature protection, i.e. national parks and nature reserves occupy only 1.5% of the country (Table 2).

Table 2

**Number and percentage of nature conservation forms (2012)**

Nature conservation form	Facilitynumber	% share in the total area
National parks	23	1,0
Nature reserves	1469	0,5
Landscape parks	121	8,1
Protected landscape areas	385	22,4
Landscape-nature complexes	328	0,3
Ecological arable lands	7032	0,2
Documentation sites	161	0,0

Source: Nature Conservation 2013, Central Statistical Office.

Completely different from the previously described forms is the species protection that is a set of enterprises and activities within nature conservation that aims at the preservation of the occurring in the wild plants and fungi, animals and their habitats. This concerns mainly the following species: endemic, relict, occurring in the borderlands of their ranges, endangered or vulnerable to extinction and listed in the conventions and international agreements. The essence of species protection is the protection of certain species and the legal prohibition on their destruction, sourcing and trading them (both alive and dried).

### **INITIATIVES TO DEVELOP SPATIAL PROTECTED AREAS NETWORKS**

First national and international initiatives undertaken in order to create a system of protected areas were a response to the U Thanta report and indicated there environmental threats. In Poland in 1971, The National Council for the Conservation of Nature has developed a nationwide project of landscape protection, which became the basis for a discussion on the comprehensive protection of the accomplishment of nature conservation objectives.

As a result, in 1977 the Commission of Landscape Protection and Development and the Committee for Nature Conservation and Natural Resources of the Polish Academy of Sciences together with the National Council for Nature Conservation prepared a programme of the Ecological System of Protected Areas. The core of this system was to provide protected areas: national parks, nature reserves, landscape parks and protected landscape areas interconnected by natural corridors. Such a structure was supposed to provide free migration of species and the protection of over-ecosystem natural functional units, and at the same time reduce the excessive human pressure. Almost simultaneously, the Institute of Environmental Development has drawn up a project of Multispatial System of Protected Areas. The system was to consist of nodes (national parks, nature reserves, and landscape parks) connected in a homogenous network by ecological corridors and small strips of land with few restrictions of use (protected landscape areas, river valleys). Both proposals were based on these assumptions and proposed almost identical solutions<sup>2</sup>. The developed programme has not been accomplished, although in the contemporary spatial development plans,

<sup>1</sup> National parks and protected landscape areas have been developed since 1977, although only in 1980 the legal articles regulated the appointment and accomplishment of these nature conservation forms.

Parki krajobrazowe i obszary chronionego krajobrazu tworzone były od 1977 r. mimo, iż dopiero w 1980 r. przepisy prawa uregulowały powoływanie i realizację tych form ochrony przyrody.

<sup>2</sup> E. Gacka-Grzesikiewicz, W. Różycka, *Obszary chronione a przestrzenna struktura aglomeracji*, Instytut Kształtowania Środowiska, Warszawa 1977, p. 25.

the system areas for particular voivodeships were appointed. It has not been appointed in the area though, since the undertaken activities were not synchronized and in the border areas of the voivodeships sufficient system of integration has not been retained.

### **ECONET POLAND AS AN ELEMENT OF AN INTERNATIONAL ECOLOGICAL NETWORK**

In 1991, a concept of the European Ecological Network ECONET appeared; it was supposed to protect the natural heritage of the European Community countries. The project concerned countries that have already been the members of the community and those applying for this status. It was an attempt to combine in a coherent pan-European system the areas which natural values and ecological connections form the essence of the European natural heritage. During the International Conference on «The European Natural Heritage Conservation» in Maastricht, the concept of ECONET network gained the full approval of the participants of the meeting, which was reflected in the Declaration of the Conference. Determining the ECONET network was carried out within the three-year project called National Nature Plan. The Council of Europe requested the International Union for Conservation of Nature (IUCN) to accomplish a project aimed at developing and expanding the ECONET network into the countries of Central and Eastern Europe. IUCN, after obtaining the approval from the ministries responsible for nature conservation, commissioned national offices of IUCN to develop the ECONET network, in Poland – Foundation IUCN-Poland. Apart from Poland, in the project participated Hungary, the Czech Republic and Slovakia.

The developed National Ecological Network ECONET-Poland creates, by definition, a continuous system of a structure determined by the nodal areas and ecological corridors of a national and international scope, which decide about the Polish nature specificity (Figure 3). It is a multispatial system of the best-preserved nodal areas in terms of nature and a representative of different natural regions of the country, interrelated by ecological corridors that ensure the continuity of the natural connections within the system<sup>1</sup>. Nodal areas have been designated on the basis of: the degree of naturalness or the presence of semi-natural systems that prove the low-intensity of management, diversity (habitat, species, forms of use), the representativeness of habitats in the region, the rarity of forms, habitats, species (endemism, relics, species endangered in a European scale), the size of the areas providing permanent conservation of biodiversity and landscape diversity. When delineating the ecological corridors attention was drawn to the preservation of the integrity of the system (length and width of corridors), habitat compliance of the corridor with nodal area, the distribution of natural systems of the corridors (river valleys, ice-marginal valleys, mountain ranges), spatial differentiation of the land use structure. Ecological corridors are to be links for the isolated from each other protected areas, allowing the migration of plants, animals and fungi.

The assumptions of the appointed ECONET network (similarly to ESOCh) concern:

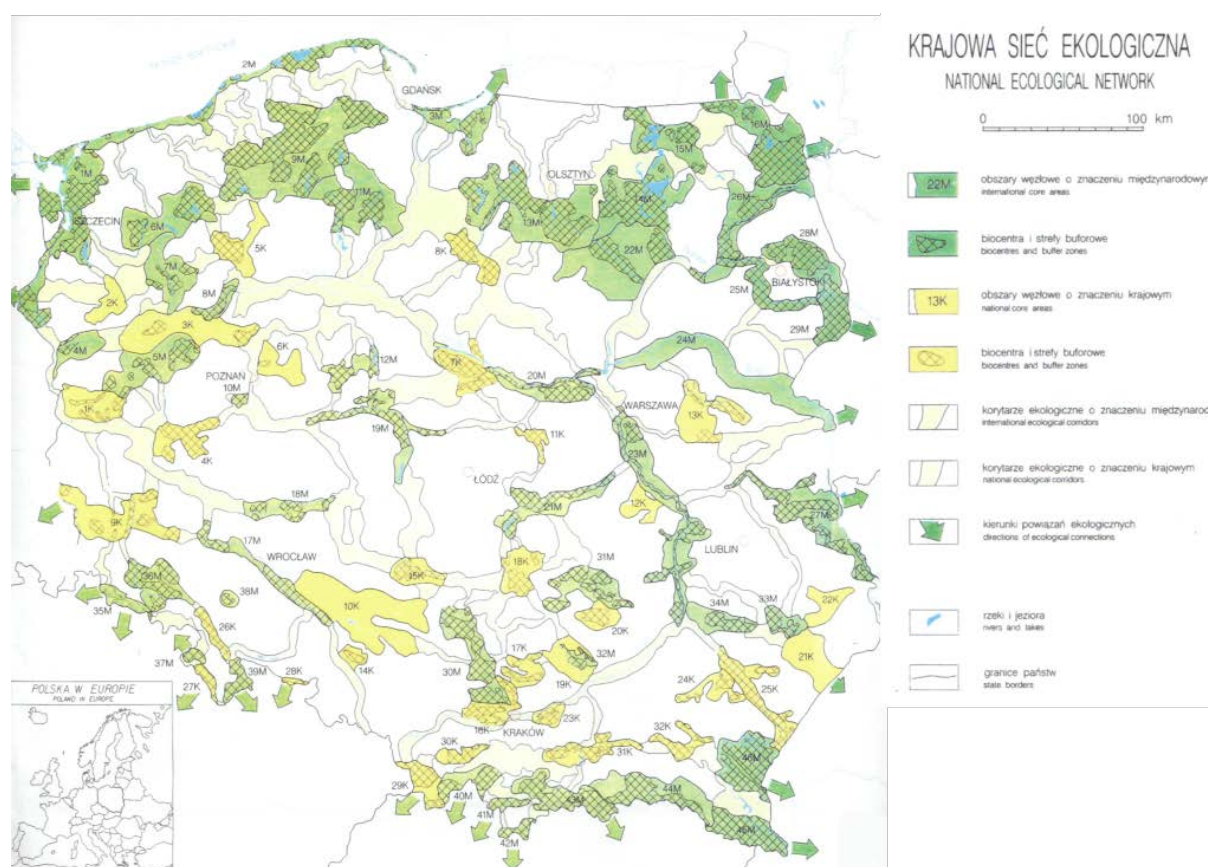
- preservation of the continuity of the system by determining the ecological corridors linking individual protected areas, strengthening or regenerating the natural bonds between the nodal areas;
- modification of the boundaries of the existing nature conservation forms on the basis of the existing legislation and expanding the conservation protection;
- introduction of appropriate forms of land use to land use plans;
- gradation of protective regimes, so that the most valuable areas were protected by the buffer zones, bio-centre-buffer zones, i.e. a gradual reduction in the use of

<sup>1</sup> A. Liro (red.), *Strategia wdrażania krajowej sieci ECONET- Polska*, Fundacja IUCN-Poland, Warszawa 1998, p. 15.



natural resources, starting with a strict protection and ending up with the appointment of rational methods of use;

- taking under protection the endangered areas and introducing the principles of retaining their sustainability to land-use plans;
- preserving areas determining the biodiversity (stenotypical species habitats, hydrogenic-wetland habitats, wetlands, xerothermic grasslands habitats, dunes) and the key physio-tactical and physiocenotic functions (headwaters areas, woodlots);
- renaturalization of areas, i.e. restoring the natural functional-spatial structures to the degraded areas and improving the quality of space that has unprofitable trends of change<sup>1</sup>.



Source: A. Liro (red.), *Koncepcja krajowej sieci ekologicznej ECONET-Polska*, Fundacja IUCN-Poland, Warszawa 1995.

**Fig. 3.** ECONET-Poland network map

The appointed Network consists of 78 nodal areas – 46 international and 32 national (they constitute 31% of the country's surface) and 110 ecological corridors – 38 international and 72 national (15% of the country's surface). Altogether the Network occupies 46% of Poland's territory – these are mainly forests and agricultural areas. A significant part of the network's surface are protected areas (42.6%), and 82.7% of the surface of the existing protected areas have been included in the network.

The ECONET network and the developed strategy of its implementation are a multi-dimensional policy oriented to the efficient biological diversity and landscape protection in the full scale of ecosystem change of different value. Legally protected areas due to the network are not isolated «isles», as due to ecological corridors they are powered and

<sup>1</sup> Ibidem, p. 15

supported form outside which strengthens their biodiversity and increases the resistance to changes<sup>1</sup>. ECONET network, despite its lofty assumptions and formal existence, has not been accomplished in practice. Presently, its ideas became «alive» together with the Natura 2000 programme.

### **NATURA 2000 AS AN INSTRUMENT OF NATURE CONSERVATION IN THE EUROPEAN UNION**

The flagship project of the European Union for the sake of nature conservation is the determination and establishment of Natura 2000 areas in the nation states, in areas not yet protected as well as those for which protection has been implemented. The basis for the establishment of the Natura 2000 areas are two directives: «Habitats»<sup>2</sup> and «Birds»<sup>3</sup>. Under the Birds Directive are designated Special Protection Areas for birds (Special Protection Areas – SPA), and on the basis of the Habitats Directive, Special Areas of Conservation for habitats (Special Areas of Conservation – SAC), the areas are designated both on land and sea territories. Programme Natura 2000, provides an opportunity to intensify efforts to preserve the European natural heritage on the basis of a uniform law by the duty to prevent any deterioration of the conditions and quality of habitats and species and proactive protection.

The genesis and need to create Natura 2000 network is explained by A. Kiczyńska, A. Weigle: «a degree and pace of transformations of natural space cause that the effectiveness of the preservation of the most valuable natural resources within isolated areas in many cases is unsatisfactory. Hence, different concepts of biological diversity conservation, both at the level of ecosystems, species and genetic resources, for many years have strongly emphasized the need for integration into a consistent system (network) of areas whose values constitute the natural heritage of the continent, country, region and/or relevant for the development of climate, water and soil conditions. “Consistency” means at the same time providing spatial and functional connections between the specific areas of the system (network)»<sup>4</sup>.

According to theories describing creation and functioning of ecological networks (network systems of protected nature areas), the main purpose of their functioning is providing relative sustainability and stability of landscape functioning by preserving spatially connected areas of the greatest natural value. Thus, it can be assumed that a network consists of the two main elements: areas of the greatest natural value (these are usually areas protected legally, in the concepts of ecological networks they are called «biocenters», «source» or «nodal areas»<sup>5</sup>) and connecting them corridors which are called ecological or migration – structures that are usually belt-shaped, characterized by conditions that are convenient for species migration and matter and energy transfer.

According to classical approach of developing ecological networks the appointed SPA and SAC will fulfill the functions of nodal areas. However, to talk about the completeness in terms of methodology and science and spatial coherence of Natura 2000 network, it is essential to provide connections between individual elements [12]. Treating

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<sup>1</sup> The strategy to implement the national ECONET-Polska network is the second stage of the project called *National Nature Plan* and it was compiled by a team that designated the *ECONET network*; A. Liro (red.), *Strategiawdrażania...*, op. cit., 1998, p. 40.

<sup>2</sup> Council Directive 92/43/EEC of 21 May 1992 on the conservation of natural habitats and of wild fauna and flora, O.J. L206, 22.07.92, <http://eur-lex.europa.eu/legalcontent/EN/TXT/PDF/?uri=CELEX:32009L0147&from=EN>, 01.07.2014

<sup>3</sup> Council Directive 2009/147/EC of 30 November 2009 on the conservation of wild birds (codified version), <http://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:32009L0147&from=EN>, dostęp 01.07.2014.

<sup>4</sup> Kiczyńska A., Weigle A., *Jak zapewnić spójność sieci Natura 2000, czyli o korzyściach ekologicznych*. [w:] *Ekologiczna sieć Natur A.a 2000, problem czy szansa* (red.) M. Makomaska-Juchiewicz, S. Tworek, IOP PAN, Kraków, 2003, s. 169.

<sup>5</sup> Przykł.: parki narodowe, rezerwaty przyrody parki krajobrazowe, obszary chronionego krajobrazu.

SPA and SAC as the only elements of ecological network the Habitats and the Birds Directives provide methodological bases and detailed criteria to appoint only nodal areas, whereas the issue of ensuring the integration of these areas into a coherent system is treated in a less detailed way. The regulation of the Article 10 of the Habitats Directive in this respect gives only a general delegation to the Member States in order to «endeavor, where they consider it necessary, to promote the development and protection of these landscape elements which are of a major importance for wild fauna and flora while planning the land management and formulating the development policy, in particular, with a view to improving the ecological coherence of the Natura 2000 network. Moreover, the Directive indicates that the improvement, or even the guarantee of the coherence of the Natura 2000 network will be accomplished due to the designation and appropriate development of the elements «which because of their linear and continuous structure (for instance banks or the traditional systems for making field boundaries) or the fulfilled function of the initial areas of the expansion (for instance ponds or small forests) are of a particular importance for the migration, dispersal and genetic exchange of wild species». Thus, the Directive refers to the standard methodology of developing ecological networks and provides the basis for determining the ecological corridors connecting the SPA and SAC, however, it does not specify any rules for identifying, shaping and preservation of these structures. This can be explained by the fact that, although the EU directives are binding legal documents, they leave to the Member States the choice of a form and method of the implementation of certain instruments, provided that they serve the main purpose of the directives. Hence, the formation and functioning of the Natura 2000 network to a considerable extent will be subject to the traditions of nature conservation and the ensuing administrative solutions applied in different countries<sup>1</sup>.

A particularly important aspect of developing Natura 2000 network is the need to designate in geographical space of Europe and EU states, the areas of the so-called ecological corridors, which according to EU regulations falls within the competence of the Member States and thus is their obligation. Although directives concerning Natura 2000 network do not define neither where and how specifically the above mentioned corridors should be created (which criteria and instruments should be applied), nor how should they be developed. However, it can be assumed that they should provide the spatial coherence of the entire network, that is, the integration of individual areas that they are a part of. Taking into account the functions of ecological corridors, it has to be noticed that the most serious threat to them is building development and cutting them with linear elements of the technical infrastructure which break the communication of natural landscape and lead to ecosystem fragmentation. This means, therefore, that certain fragments of space between the Natura 2000 areas (corridors) should be subject to specific land management regimes – they should be characterized by a more extensive way of usage (e.g. lack of building development) that enables preservation their character of biologically active open space within the area. Designating ecological corridors as spatial areas merging the Natura 2000 network into a coherent network obviously makes sense only if the areas are in reality provided with such a way of development that will not disrupt their ecological and biocoenotic functions.

Natura 2000 programme meets the demand of creating an integrated network of biologically active areas both natural and semi-natural on the basis of four basic principles:

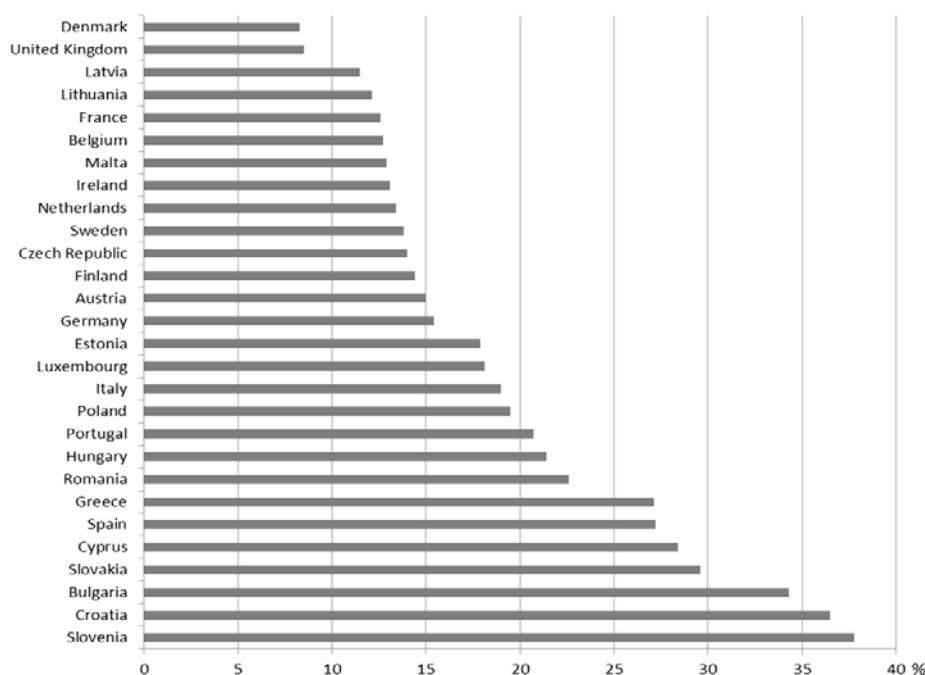
1. preserving the continuity of ecosystems in time;
2. preserving the continuity of ecosystems in space;
3. diversity of ecological niches;
4. agreement between the biotic environment and its abiotic conditions<sup>2</sup>.

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<sup>1</sup> Kiczyńska A., Weigle A., *Jak zapewnić spójność sieci Natura 2000, czyli o korytarzach ekologicznych*. [w:] *Ekologiczna sieć Natura 2000, problem czy szansa* (red.) M. Makomaska-Juchiewicz, S. Tworek, IOP PAN, Kraków, 2003, s. 170–171.

<sup>2</sup> Andrzejewski R., W poszukiwaniu teorii fizjocenozy, *Wiadomości Ekologiczne* 29, 1983.; Andrzejewski R., *Ekologia a planowanie*, *Wiadomości Ekologiczne* 311, 1985.

Natura 2000 areas constitute 18.36% of the EU-38 territory, in the 14.01% of the EU area Special Areas of Conservation (SAC)<sup>1</sup>, have been appointed, Special Protection Areas (SPA) take up 12.51% (Figure 4). Participation of the areas included in the Natura 2000 is diversified in individual EU states which results from the natural conditions and the level of the nature preservation and activity in the scope of the implementation of the directives. In the top of the countries with the highest percentage of the Natura 2000 areas there are the most recent EU states which have to make up in terms of the designation of areas which is not easy in the state of a huge investment pressure.



Source: own work based on the European Environment Agency data <http://www.eea.europa.eu/data-and-maps/daviz/natura-2000-barometer#tab-dashboard-03>

**Fig. 4.** Participation of Natura 2000 areas in EU states (% total area)

Among the EU states one can indicate these of the highest level of biodiversity, which is determined by a large participation of the areas included in the birds and habitats directive, these includes: Slovenia, Croatia, Bulgaria, Spain, Greece, Estonia (Figure 4). Poland belongs to the states of an average participation of the Natura 2000 areas, however, it should be borne in mind that the process of designation of these areas still lasts. Presently, in Poland participation of areas included in the birds directive has been dominating which is a result of the diversified physical-geographical conditions (natural rivers, forest complexes etc.) and a high participation of agricultural areas used extensively.

## CONCLUSIONS

A challenge for the national states and international organizations is initiation and accomplishment of a broad partnership for the sake of building spatial ecological networks, which basis is nature conservation forms. As presented in the article, a condition for the accomplishment of the assumptions of every network is a legal situation, as it is in the case

<sup>1</sup> Interpretation Manual of European Union Habitats EUR 28, April 2013, European Commission DG ENVIRONMENT Nature ENV B.3, [http://ec.europa.eu/environment/nature/legislation/habitatsdirective/docs/Int\\_Manual\\_EU28.pdf](http://ec.europa.eu/environment/nature/legislation/habitatsdirective/docs/Int_Manual_EU28.pdf), dostępną 03.08.2014.

of Natura 2000 areas i.e. European Union directives and national laws. Lack of legal bases significantly weakens their importance and actually prevents the full accomplishment in practice.

Creating a comprehensive system on the basis of legal articles is supposed to enable the extensive and in-depth nature conservation. Weakening the ecosystems and upsetting the ecological balance does not concern single sensitive ecosystems but entire natural systems. Building ecological networks strengthens nature resistance and increases its possibilities in the scope of ecosystem benefits, which are an essential stabilizing factor.

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# GENERATION 55+ AS USERS OF E-TOURISM SERVICES

*Beata Gontar*<sup>1</sup>

In developed countries over a quarter of adults is 55 or older. The attractiveness of this 55+ age group was recognized. With longer life expectancy, the older consumers are likely to continue working, be wealthy, have much more time, like to learn new things and be increasingly interested in new technology. This age group is likely to control a large proportion of disposable income in their countries. As such, they are not just an untapped market. Older generations are slower in adopting computer skills and using the Internet every day because they are not aware of benefits they can gain using it. However once they overcame the initial lack of knowledge and confidence, they became and remain very enthusiastic users. Among others, there are some fields of special interests that should be adopted in special way to serve older generation (bigger letters, very clear comments) [15], like e-administration, e-health and e-tourism.

The objective of the paper is to present the interests of 55+ group in Poland in e-tourism services, especially in Lodzkie region, where the survey was done. They also pointed out the advantages and barriers of using them more often.

The research methods used in the paper include the issue analysis, desktop study (review of academic papers and related works), the survey (using questionnaire) and analysis of the obtained results.

## INTRODUCTION

The XXI century is a time of intensive development of information-communication technologies, which change not only the way of communication but also the way of serving services for consumers. It is worthy to remark that the use of internet depends strongly on the age of the user and is the lower in the older group. The problem of digital exclusion of the older is the subject of interest resulting in scientific research and prevention programs in almost all the countries. In Poland, Ministry of Labour and Social Policy established the Council of the Seniority Policy, which has developed the senior policy assumptions in Poland for the period 2014–2020 [4]. Ministry of Administration and Digitization of Poland developed the program «Digital Poland». The main aim is to expand broadband internet, develop e-administration and to enhance computer skills, especially in the group 50+. The introduced program «Digital Poland Lighthouse Keepers» where young volunteers teach the older what the benefits of using Internet are and how to effectively use it in daily life [12]. Workshops with the lighthouse keeper aim to «convince the unconvinced» that the Internet is for everyone and everyone can find there something interesting and useful. Convince that the use of modern technology is not difficult and possible in any age. In Poland, there are more than 2,900 volunteers. Since the beginning of 2013, almost 225 thousand of people were taught [12].

The use of ICT plays important role in the increase of incomes from tourism in each country and in the whole world. It gives new possibilities and kinds of online tourism understand as a service offered by websites and touristic portals [8]. Clients choose internet as a place where they can find or buy a service. Many services for tourists are offered

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online. They include reservations or purchase of: hotel rooms, trains, planes or bus tickets, but also hiring a car or check-in which allow avoiding the long lines at the airport. Online services also let to book/buy tickets to the museums, what is very helpful, because many of them are very overcrowded. It can help to save the time or compare offers to find the restaurant/wine bar offering the favourite product. This allows visitors to select concerning personal preferences which correspond to their wallets. Most of tourists want to control their trip and decide about details according to their own preferences, for example the way from the airport to hotel (bus or metro), that's why the personal planning using internet is more and more popular. What is more, tourists would like to realize their own non-standard plans and to travel following the footsteps of their favourite writers or book heroes or to visit places sacrificed to religious cult like pilgrimage route to Santiago de Compostela known as St. James's Way.

### RELATED WORKS

*Age UK*. Digital inclusion evidence review covers the aspects of use computers in the UK and digital inclusion connected with internet used by British. «Digital exclusion» refers throughout only to those not using the internet [1]. Life online gives overview of the latest developments in the use of the internet in the EU provides insights into the frequency of use by several socio-economic groups and the kind of services most used by EU internet users [13]. The reports published by Polish Public Opinion Research Center (pol. CBOS) monitor the situation in Poland. There are reports and several papers on digital exclusion [3, 19] where the problem is discussed and factors influencing that situation are presented.

The choice of paper topic obliges the author to draw attention in particular for e-services related to tourism. Tourism includes moving to other destinations and leisure. In these area projects and studies are undertaken conducted around the world they include a variety of services. These can include, for example, a discussion on virtual museums [6, 21] examination of the level of quality hotel services [5, 16, 18] and travel agency [11, 17] or the applications for mobile devices [23] and others. The inspiration for the author was the paper (Jain and Sharma) on the main factors determining the choice of e-tourism in India [8].

### OBJECTIVES AND METHODOLOGY

The main objective of the paper is to point out whether the older internet users choose digital services, especially connected with tourism. In the first part literature study was undertaken. It concerns the acceptance and use of digital services by generation 55+ in Poland. The second part consists of survey results conducted among seniors in the Lodzkie region. The questionnaire was addressed to the older (55+) who can and use internet. The obtained results were a base of data analysis and conclusions.

The survey consisted of 17 questions. All of them have been completed correctly and were statistical sample. The questionnaire consisted of the multiple-choice and single-choice questions. All questionnaires were analysed using standard statistical analysis tools. The data analysis let to derive some objectives:

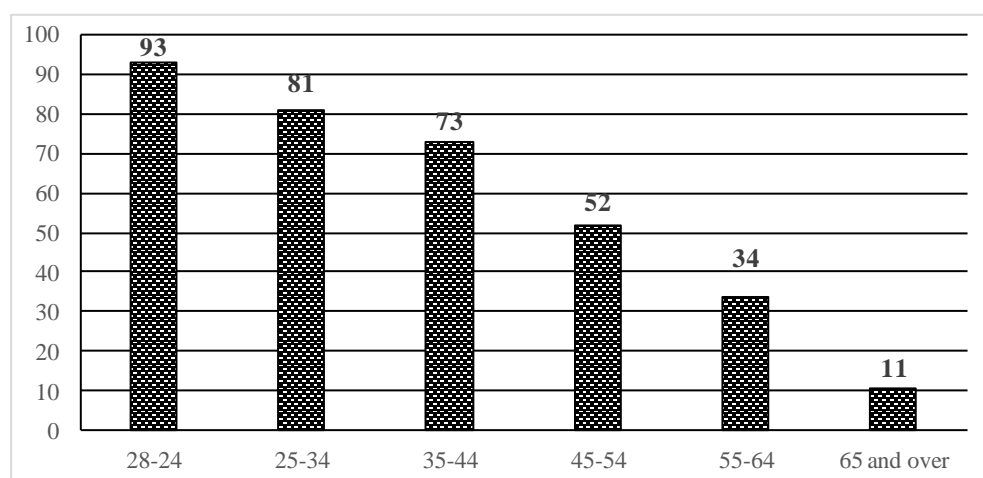
- ✓ to point out the source of internet knowledge and skills;
- ✓ to determine the level of interest and use e-tourism services by generation 55+;
- ✓ to point out factors which influence and barriers in using internet and e-services by respondents.

## INTERNET USERS IN POLAND

The use of internet is monitored and the researches are undertaken in all countries. In Poland there are some centres, including government ones, like Ministry of Administration and Digitization of Poland, Central Statistical Office of Poland or Public Opinion Research Center, which publish reports on use of internet by Poles [9, 10, 20]. Researches are led also by internet providers and firms that offer their services and items in this way. It can expand their range of activity and reduce operating costs, and point out as well, what to change in the way of offering their products. Of course the increase of clients which are present in the net including the mobile devices and smartphones, and places with free access to internet in the city. Municipalities, facing the need expand such areas and let to use free internet. It is worthy to say that European Commission has started implementation of the new initiative «Connected Communities» [2]. It is the European Commission initiative to support regions and cities in the broadband networks development. Its aim is to identify and support a number of innovative pilot projects for deploying high speed broadband which can be replicated across the European Union. It will map the potential broadband projects, and identify the most mature ones, which will have priority for «technical assistance» services under the Connected Europe Facility, in partnership between two organisations: the European Commission and the World Bank. The initiative will also create a community of stakeholders which will work towards closing the high speed broadband gap. It is planned that till 2020 each second home have high-speed broadband access to internet [2].

Based on researches of Central Statistical Office of Poland which are conducted annually, the number of households (at least one person in the age of 16–74 per a household) where there is a computer is growing. In 2012 it was 73% and 77% in 2014. The rate of people using the Internet also has increased and is about 74%, while 71% using broadband Internet. The Lodzkie region has one of the lowest rate of households possessing computers at home (71.3%) and access to broadband internet (66%) [7].

Poles frequently work with a computer at home and work (59%). The most common activities are: sending/receiving emails (51%) and searching for information (48%). The number of mobile devices has also increased. Their owners, having such possibility, use the Internet (60%) [20].

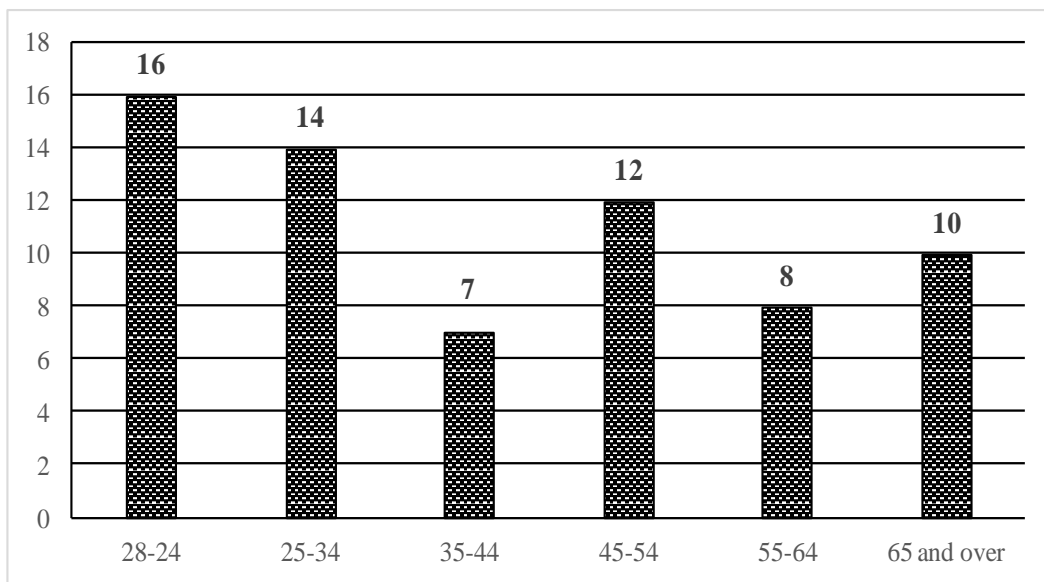


Source: [10]

*Fig. 1.* The internet users age structure

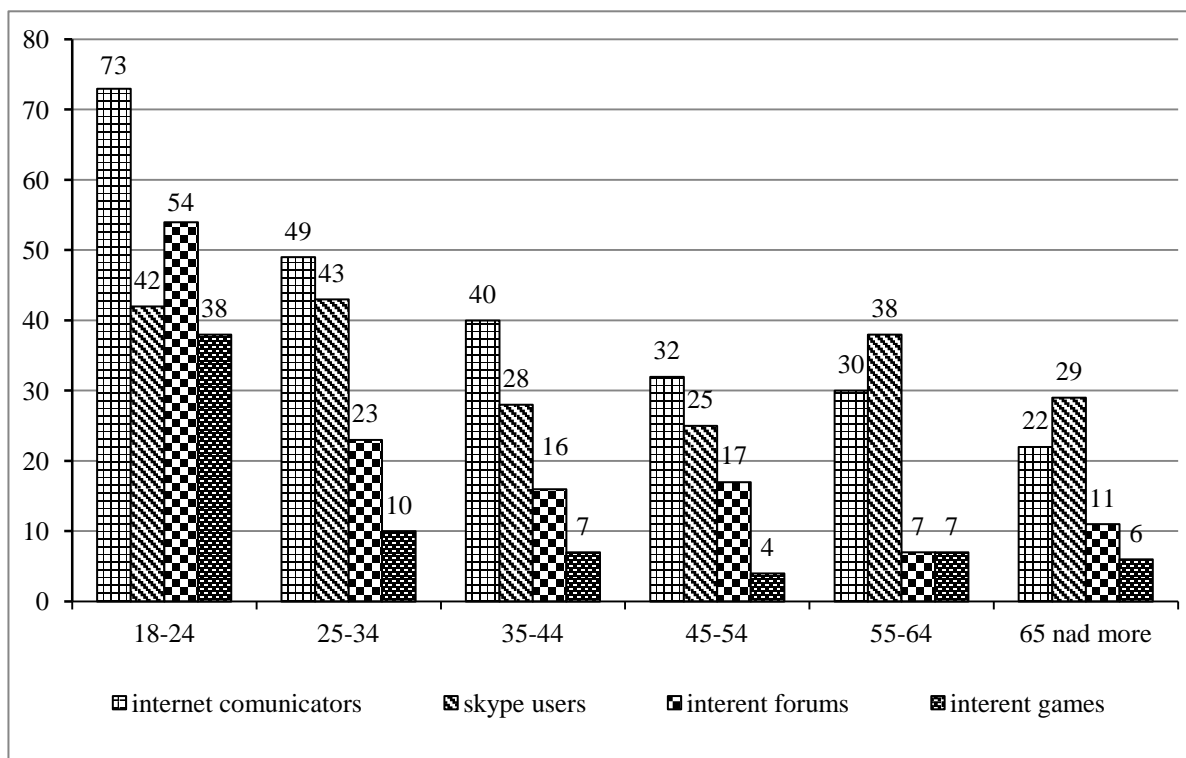


Two factors are the most influential: age and education level [7]. According to age, there are different levels of using internet by Poles. Young people acquire digital skills quite intuitively. The sources of information are schools of different educational levels, books, friends or just curiosity so their internet presence is common. For older it is much more difficult. Researches carried out by CBOS show that the older the respondents are, they are less active in the web (Figure 1).



Source: [10]

Fig. 2. Number of hours spent in internet per week



Source: [10]

Fig. 3. Internet users' activity during a month according to the age

According to the data from the CBOS report, the most active group in internet are young people in the age of 18–24. They spend in the web about 16 hours per week. The least active are people above 65 years old. Representatives of this group spend in the Internet about 10 hours per week, which is the mean value for whole (Figure 2).

Time spent online depends on the age of the respondents, although there is no simple linear relationship. Weekly, the youngest are on-line pretty longer than the others. Relatively minimum hours in the Internet spend people from 35 to 44 years and 55 to 64 years. As the most common cause of not having access to the Internet at home, just like in previous years, respondents indicated no need to use it (57.2%). Another important reason was the lack of appropriate skills (37.9%). Too high cost of the equipment is also relatively frequently mentioned obstacle of not having access to the network at home, however, the proportion of people indicating that barrier decreased compared to the previous year (from 28.4 to 26.6%). Almost 23% of households did not have access to the Internet due to high cost of connecting to the network. Older internet users most often use a global network to send and receive e-mail, reading newspapers and magazines online and search information on health, hobby... They also search for information about the services and goods, they plan to buy, and use chats/video chats by computer (e.g. Skype) [9] (Figure 3).

Below there is Table 1 which gives overview on selected data of Lodzkie region.

Table 1

#### Lodzkie region in numbers

Description	Rate
Households with computer	74%
Households with access to internet	73%
Households with access to broadband internet	68%
People who do not use internet	29%
People who use internet regularly	63%
People who use internet to learn	43%
e-administration users	39%
People who buy in internet	45%

Source: [10]

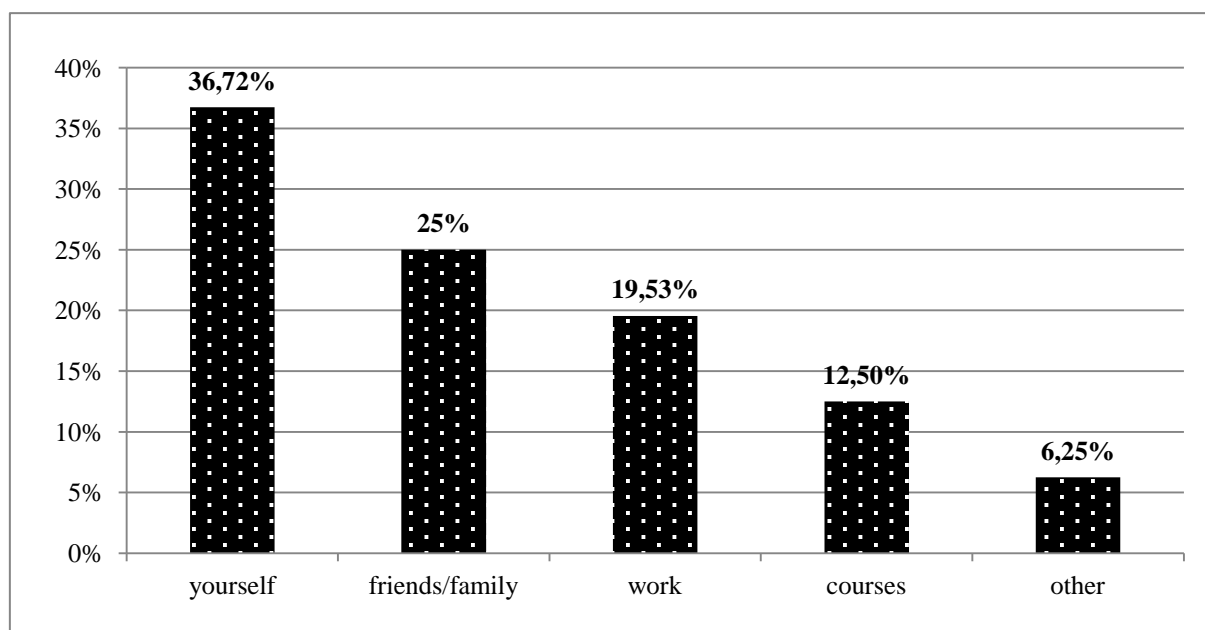
## SURVEY-DATA ANALYSIS

The survey was addressed only to people over 55 years old that can use internet. Respondents came from the Lodz region. The study was conducted as an electronic questionnaire. The questionnaire contains 17 questions and was placed in electronic form on one of the free websites offering research services on-line. Additionally the mailing to 14 organizations was done. Over 80 questionnaires were received. 18.5% of them were filled by men and 81.5% by women.

The obtained test results provide knowledge about the e-services they use, barriers in using Internet and a source of respondents' skills. It shows that a significant part of respondents acquired internet skills by their own (36.72%) or with the help of a family (25%) (Figure 4).

Concerning the main part of the survey, the questions were connected with three areas:

- services linked with accommodation,
- services linked with transport, and
- services linked with buying and ticket reservation for different artistic shows.



Source: own work

**Fig. 4.** The sources of internet skills

Concerning accommodation, the most popular service is searching for offers and room reservation by email and appropriate forms placed on websites. Details are presented in Table 2.

*Table 2*

#### **E-tourism services - accommodation**

Service	Used by
Searching offers	67.90%
Room reservation (directly in hotel) by reservation form	50.62%
Room reservation (directly in hotel) by reservation form by email	46.91%
Room reservation (directly in hotel) by reservation form by specialized portals like: hotele.pl or booking.com	34.57%
Room reservation/buying by reservation form in tourism office	17.28%
Holiday reservation by portals (like wakacje.pl)	14.81%
Reservation of trips abroad by form in tourism office	24.69%
Reservation of trips abroad by holiday portals	12.35%
Reservation of medical or spa holidays by form in tourism office	16.05%

Source: own work

The most popular service is reservation or buying tickets to the cinema or theatre. More than one third surveyed use online guides and around a half use city applications. It proves that internet users like to be well prepared before visiting other cities. There are details in Table 3.

Table 3

**E-tourism services – buying tickets for artistic shows**

Service	Used by
Reservation/buying tickets to the cinema	61.73%
Reservation/buying tickets to the theatre	59.26%
Reservation/buying tickets to the museum	25.93%
Reservation/buying tickets to the concert or show	51.85%
Using online guides	44.44%
Using audio guides (in museum)	38.27%
Using city applications	46.91%

Source: own work

Survey presented that respondents are active in internet forums and portals on tourism revealed that customers read opinions about hotels and other tourism services before taking decision. The most popular evaluated services are accommodation, trips and holidays, restaurants. Some of them also comment and write own opinion about bought/used service. Details are presented in the Table 4.

Table 4

**Activity in internet forums, portals and websites connected with tourism**

Activity	I read	I comment
Opinions on hotels and accommodation possibilities	71.60%	9.88%
Opinions on travel offices and sales agents	56.79%	6.17%
Travel blogs, reports	64.20%	3.70%
Opinions on restaurants	50.62%	9.88%
Opinions on car rentals	20.99%	6.17%
Opinions on tourist equipment rental	23.46%	4.94%
Opinions on artistic shows, concerts you took part	59.26%	4.94%
Opinions on planed artistic shows, concerts	71.60%	0.00%

Source: own work

In using e-services, clients often find some advantages and barriers (Table 5). Concerning internet users from 55+’ group the most influential was possibility of making transactions fast, anytime and at any place (82.72%) and comparing offers (81.48%). More than 60% of surveyed said that opinion read in internet influence their clients decisions.

The most important problem for surveyed in using e-tourism services is too complicated process of buying/reservation (more than 90%) and lack of internet at home (88.89%). One third respondents point out that service sellers are not honest. Some respondents are afraid of client tracking using portals and websites.

Table 5

**Factors which influence the decision about using digital services**

Factor	Yes
The possibility of making transactions fast	82.72%
The possibility of making transactions from any place (eg. at home, in the evening)	82.72%
Possibility to read different opinions	60.49%
Bigger number of offers to choose	67.90%
Possibility to compare different offers and prices	81.48%
Possibility to get more information using forums or chats	49.38%
Promotions, bonuses	51.85%

Source: own work

Table 6 shows the reasons for not using Internet and its services among respondents. The more important barriers is too complicated process of reservation/buying e-service (more than 90% of answers), one third of respondents are afraid of dishonest vendors of services (33.33%). Among other barriers the important is also the possibility of fear of interception of personal and financial data. Details are enclosed in Table 6.

Table 6

**Barriers to e-services use**

Barriers to internet use	Yes	No
No access to internet at home	88.89%	11.11%
Too complicated process of reservation/buying e-service	90.12%	9.88%
Fear of dishonest vendors of services	33.33%	66.67%
Lack of confidence in the financial transactions security in the Internet	71.60%	28.40%
Fear of interception of personal and financial data	43.21%	56.79%

Source: own work

**CONCLUSIONS**

Digital services are in interest of respondents. This survey found that a notable percentage of people from generation 55+ depend on the Internet as a valued source of in-depth information. Most of the services in the field of tourism are well accepted. The analysis of the obtained data leads to the conclusion that two factors are very important in spreading them among the group 55+. The first one is the possibility to make the transaction fast and in any place and any time. At the same time, the respondents are aware of the lack of computer/internet skills. They indicate educational needs, point out that there are too few training courses for seniors improving or introducing internet and computer skills and courses which present its possibilities. Some respondents, who are active users, declare a lack of skills and knowledge of the use of new technologies in everyday life (e.g. different services which can make a life easier). Education of seniors cannot be limited to the internet literacy. It is important that they possess the ability to use different e-services and are aware of the possibilities to achieve the benefits.

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# HISTORICAL ASPECTS AND THE PLACE OF POLAND'S FOREIGN TRADE IN THE COUNTRIES – FORMER MEMBERS OF THE COMECON

*Andrey A. Shevelev*<sup>1</sup>

Poland has a good economic performance and successfully integrated into the European Union that draws attention to the study of that in more detail. To analyse economic development its dynamic was divided into three main periods and reviewed the main economic indicators. Factor principal component analysis were used to classification economic groups.

## INTRODUCTION

Dynamic of Poland's economic development was divided into three periods and reviewed the main economic indicators. First period is 1970–1990 is a membership in Council for Mutual Economic Assistance (Comecon<sup>2</sup>). Second, 1991–2003 economic reforms introducing market principles, and the last 2004–2012 is a membership in EU.

## FIRST PERIOD, 1970–1990

The economy of the first period characterized by high cooperation ties in enterprises between Poland and the Comecon countries. In 1970, value of Poland's GDP was 117.3 bln US\$ (constant 2005) (Figure 3) [1]. It was the second place after USSR in the Comecon countries<sup>3</sup>. Poland had lowest average growth rate of GDP in 1970–1990 among the Comecon countries (2.2%). Growth rate of GDP of Mongolia (5.6%) and Romania (4.9%) was the highest among the Comecon countries.

GDP per capita was 3.6 thousand US\$ and it was the third place after Czechoslovakia and Hungary. Average growth rate of GDP per capita for this period was only 1.4% which was significantly lower than in countries such as Bulgaria (4.5%), Romania (4.2%) and the USSR (3.8%).

Poland was third after USSR and Vietnam by population and had stable growth in that period from 32.7 mln to 38.1 mln people.

Factor principal component analysis (FPCA) of GDP of the Comecon countries in 1970–1990 [1] defines the Poland's place among these countries. FPCA of GDP 1970–1990 identified two components with cumulative coefficient of dispersion over 98%. GDP dynamics of Vietnam, Mongolia and USSR was decisive for the first component. Also it consisted of Bulgaria, Cuba, Mongolia, and Czechoslovakia. The second included Hungary, Poland and Romania (Figure 1). However, the difference in correlation of Romania

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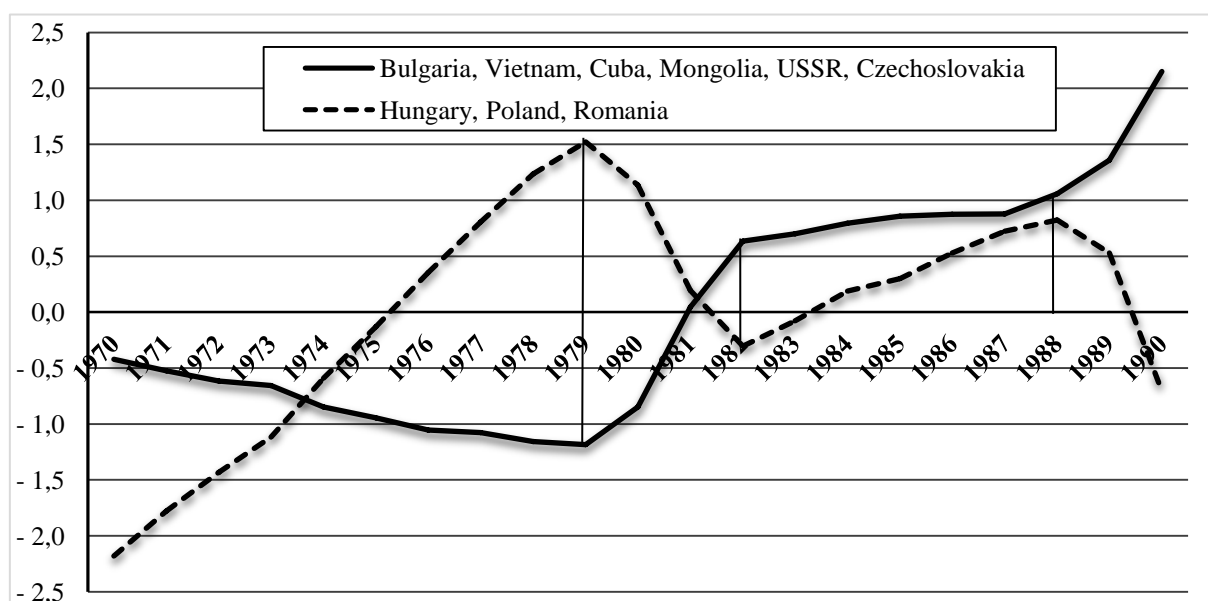
<sup>2</sup> The Council for Mutual Economic Assistance (Comecon) was an international economic organization from 1949 to 1991 that founded by Bulgaria, Hungary, Poland, Romania, USSR and Czechoslovakia. In next years it also comprised the countries: Albania (1949–1961), Cuba (since 1972), GDR (1950–1990), Mongolia (s. 1962) and Vietnam (s. 1978).

<sup>3</sup> Here and below, we do not include GDR and Albania in the observation.

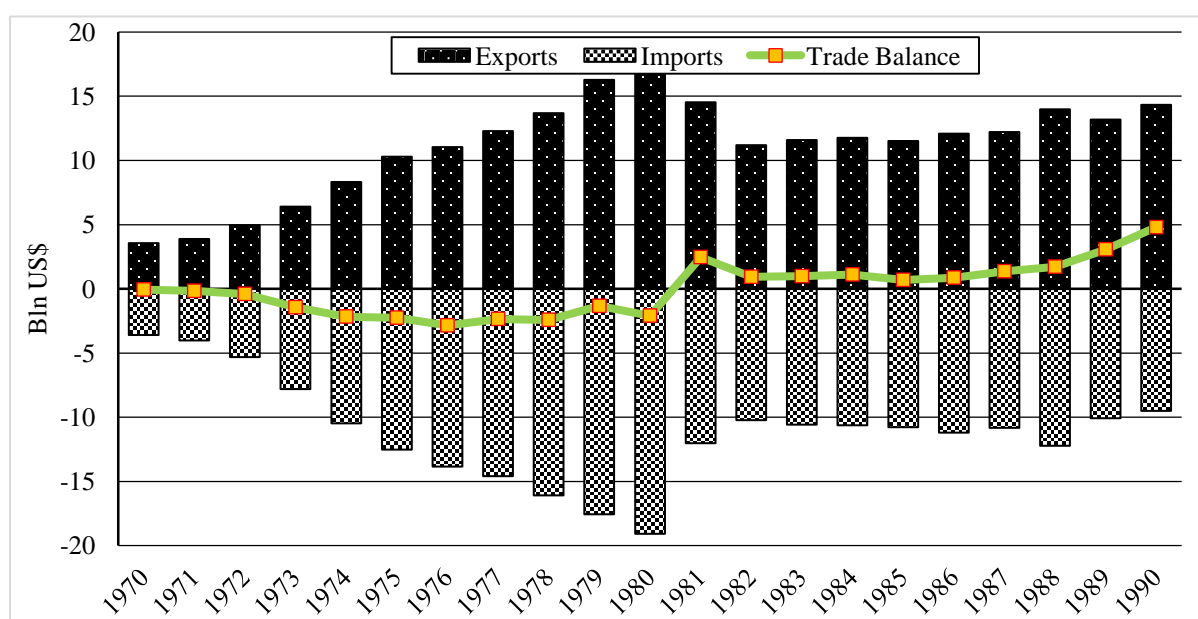
and Hungary with components does not exceed 0.05 so belonging to the second component is unstable. Thus, we can conclude that our assumption about the exclusivity of economic development of Poland among the Comecon countries has a statistical demonstration.

Let's consider the volume of International trade of 1970–1990 to identify the causes of different dynamics of the Poland's economy from the Comecon countries.

In 1970 value of Poland's exports were 3.5 bln US\$, imports –3.6 bln US\$ [1]. Average growth rate 1970–1990 of exports were 7.1%, imports –5.6%. In 1990 value of exports and imports grown up to 14.3 and 9.5 bln US\$, respectively (Figure 1). But the average growth of trade balance was one of the lowest among the Comecon countries.



*Fig. 1.* Identified components of Factor principal component analysis of GDP of the Comecon countries in 1970–1990.



*Fig. 2.* Values of Poland's Exports, Imports and Trade Balance in 1970–1990, bln US\$



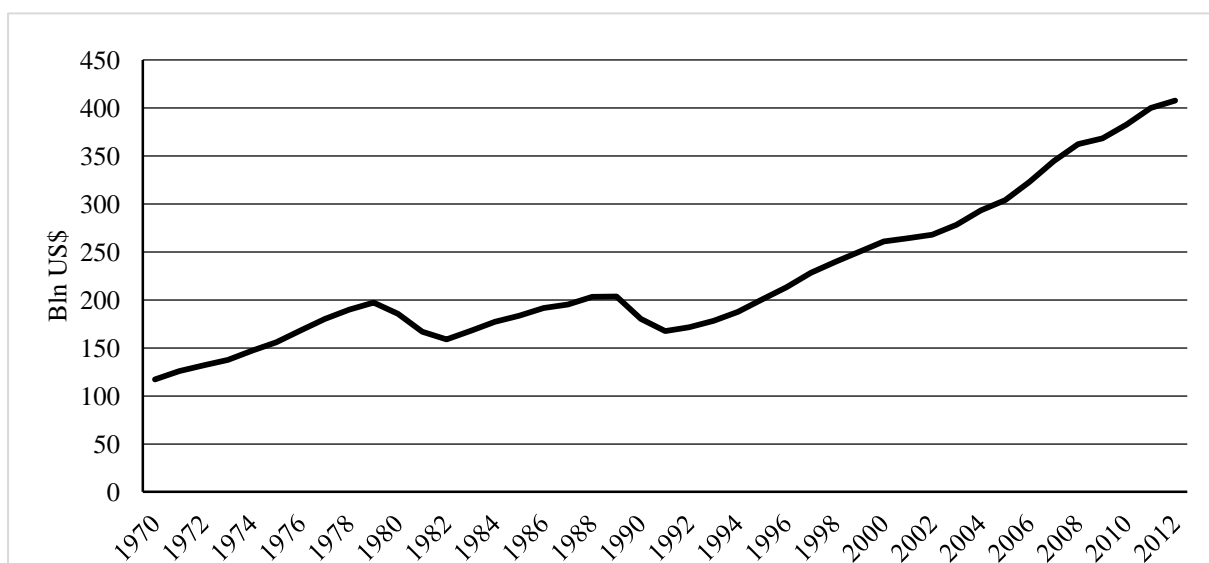
In 1990, Poland's exports were composed (by industrial origin) of 36% metal manufacturing, 14% basic metal, 11% mining quarry. In addition to Germany (25%), other major destination for exports included USSR (15%), the United Kingdom (7%) and Switzerland (5%). Percentage of European countries (excluding USSR) grew from 51% in 1983 to 69% in 1990 and was highest among the Comecon countries.

The main components by broad economic category of Imports were machinery equipment (34%), industrial supplies (24%) and fuels (22%). The principal countries of import were German (20%), USSR (19,8%) and Italy (8%). The share of European countries (ex. USSR) increased from 49% in 1983 to 67% in 1990 and was one of the greatest among the Comecon countries.

Thus, the foreign trade of Poland was directed more towards the European countries than in the countries of the Council for Mutual Economic Assistance. That may partly explain its allocation in the dynamics of GDP countries considered in the first period.

### SECOND PERIOD, 1991–2003

In 1989 the Polish People's Republic converted to the Republic of Poland. The country began market and democratic reforms, price liberalization and privatization of state property. After decrease in 1989-1991, the value of Poland's GDP in constant 2005 prices steady rise with 4.3% of average growth rate till 2003 to amount to 278.4 bln US\$ (Figure 3). Only Vietnam has a larger average growth rate among the countries of Comecon (7.6%). GDP per capita grew up from 2.2 thousand US\$ in 1991 to 5.7 thousand US\$ in 2003. Population of Poland in 1990–2003 grew up from 38.1 mln to 38.2 mln people [1].



*Fig. 3.* Poland's GDP 1970–2012 in constant 2005 prices

The main components of value added by economic activities in 2003 were wholesale and retail trade, transport, accommodation and food service activities (25%), manufacturing (17%), public administration, defense, education, human health and social work activities (15%) (Table 1) [2].

The following activities had biggest change of share in 1995–2003: professional, scientific and technical activities; administrative and support service activities increased by 1.9, agriculture, forestry and fishing decreased by 1.8, information and communication increased by 1.7, financial and insurance activities decreased by 1.6 (Table 1).

Table 1

## Poland's GDP by value added

Economic activities	Share, %		avg. growth rates, %	Share, %		avg. growth rates, %
	1995	2003	1995-2003	2004	2012	2004-2012
Arts, entertainment and recreation; other service activities; activities of household and extra-territorial organizations and bodies	3,8	3,6	6,9	3,3	3,0	6,9
Information and communication	2,6	4,4	14,8	4,6	3,7	5,1
Agriculture, forestry and fishing	7,9	4,4	0,0	5,1	3,9	4,4
Financial and insurance activities	2,7	4,2	14,1	4,2	4,6	9,1
Real estate activities	6,0	7,0	9,8	6,5	5,7	6,4
Professional, scientific and technical activities; administrative and support service activities	3,3	6,3	16,5	6,1	7,0	10,1
Industry (except construction and manufacturing)	7,7	6,7	5,8	6,8	7,3	9,2
Construction	7,7	6,2	4,8	5,8	7,5	11,6
Public administration, defense, education, human health and social work activities	14,1	15,0	8,5	14,3	13,4	7,2
Manufacturing	20,2	16,9	5,2	18,3	17,3	7,3
Wholesale and retail trade, transport, accommodation and food service activities	24,1	25,4	8,4	24,9	26,5	8,9
Total - All NACE activities	100	100		100	100	

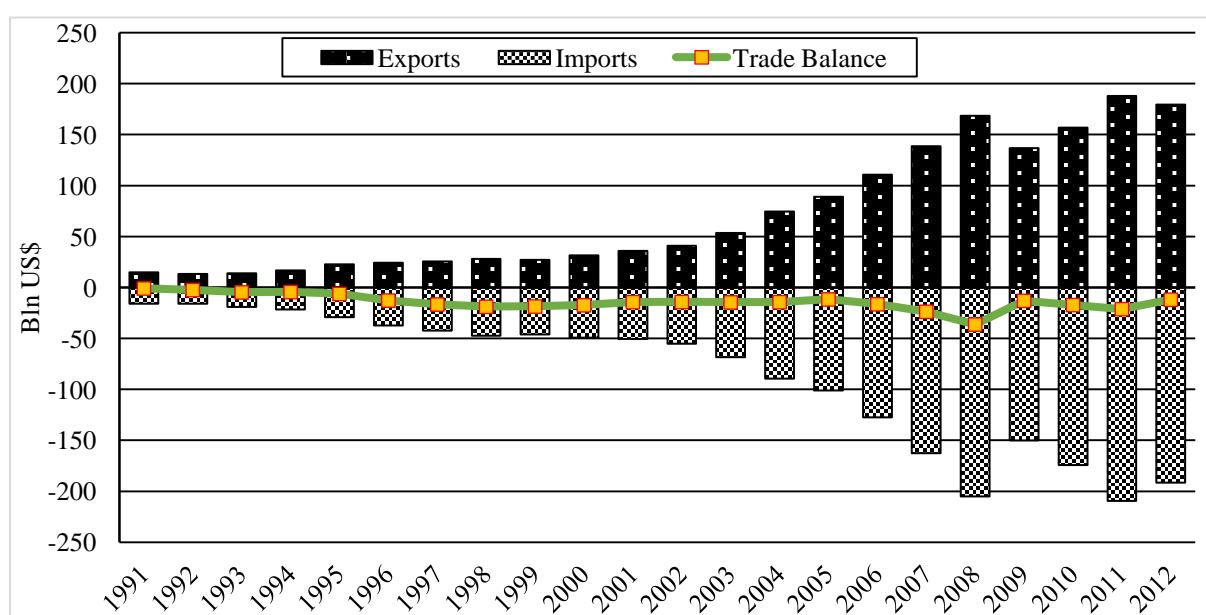


Fig. 4. Values of Poland's Exports, Imports and Trade Balance in 1991–2012, bln US\$

Average growth rates of Poland's exports and imports for 1991–2003 were 11% and 17%. That is higher than in period of stay in the Comecon. In 2003 values of exports and imports were 53.7 bln US\$ and 68.1 bln US\$ (Figure 4) [1].

In 2003, exports consist of machinery and transport equipment (37%), manufactured goods (23.6%) and other manufactured goods (16.8%). Imports comprised machinery and transport equipment (37.7%), manufactured goods (20.9%) and chemical products (14%).

The major destinations for exports were Germany (32%), France (6%) and Italy (5.7%). The main countries of import were Germany (24.3%), Italy (8.5%) and Russia (7.6%). Exports and imports share of European countries (ex. f. USSR) grew up 81% and 71%.

### THIRD PERIOD, 2003–2012

Continuous growth of values of Poland's GDP were observed after Poland's accession to the EU. The volume in 2012 amounted to 407.6 bln US\$ (constant 2005) [2]. (Second place after Russia among the Comecon countries) Average growth rate of GDP almost unchanged from 4.3% in 1991–2003 to 4.2% in 2003–2012. Average growth rate of GDP per capita increased from 8.3 to 8.6% in the same periods. In 2012, GDP per capita was 12.7 thousand US\$ (Figure 3).

Major economic activities in 2012 were wholesale and retail trade, transport, accommodation and food service activities (27%), manufacturing (17%), public administration, defense, education, human health and social work activities (13%) [2].

The following economic activities highly changed after accession to the EU: average growth rate of construction increased from 4.8% to 11.6%, agriculture, forestry and fishing increased from almost unchanged to 4.4%, manufacturing increased from 5.8 to 9.2%. Share of agriculture, forestry and fishing decreased by 1.3, construction increased by 1.3, information and communication decreased by 1.2 (Table 1).

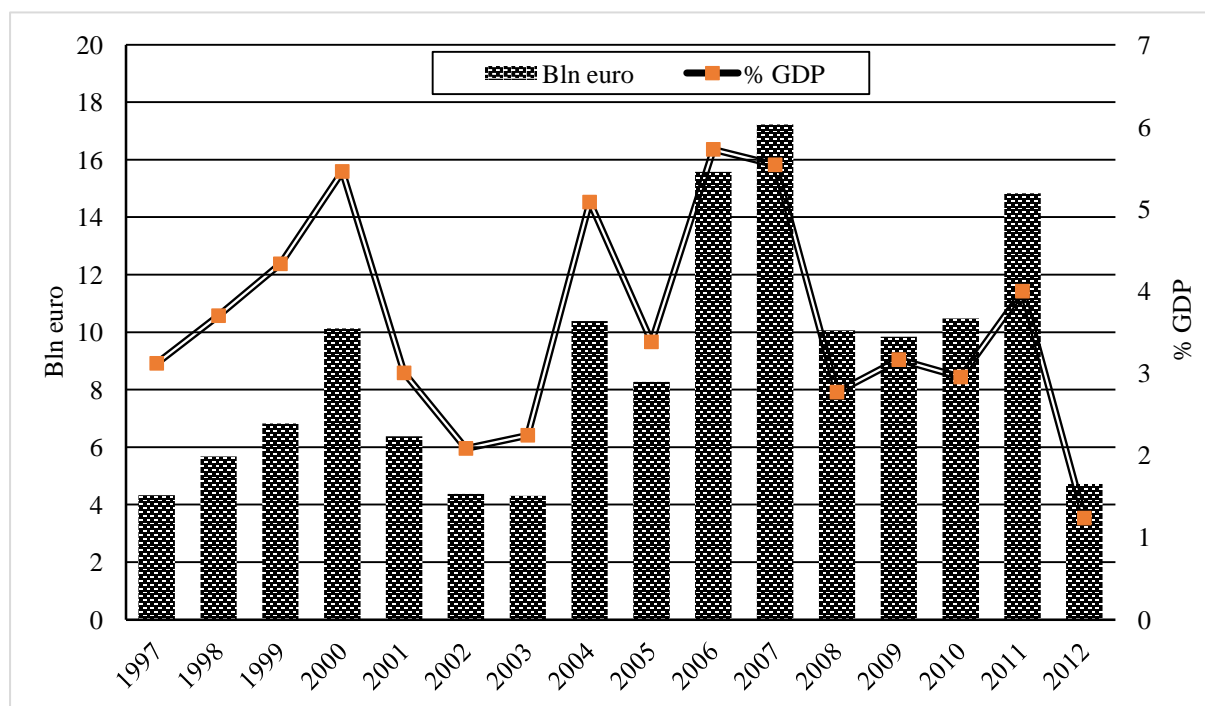


Fig. 5. Values of Poland's Foreign Direct Investment 1997-2012, bln euro, % GDP



**RISK AND COMPROMISE IN THE INTERACTION  
AMONG REGIONAL ECONOMIC AGENTS:  
THE CASE OF NOVOSIBIRSK OBLAST**

*Galina A. Untura*<sup>1</sup>

The paper considers regional economic system as a coalition of agents: individuals and legal entities, federal and regional authorities. In the system there occur risks of interaction among economic agents in the event of their failure to fulfill financial obligations to each other. In this paper methodological approach and mathematical model for the assessment of integrated risk of disturbance of holistic and sustainable regional economic development have been proposed. The model presents and considers main financial flows between the agents, such as monetary payments to population, tax payments to budgets, budget spending, net profit of agents, and total financial resources of the region ensuring effective interaction between diverse economic agents of the region. Scenarios and compromises of interaction of economic agents are a set of conditions that ensure a normal level of social and economic living conditions of the public in the region. Optimization criterion in the model is the minimum of integrated risk in the region.

The analysis of the expected effects of different scenarios of economic agents' behavior correlating the assessment of integrated risk of interaction between economic agents has been made. Empirical results have shown that it is possible to reduce the risk of failure of fulfillment of social obligations to the population by increasing the diversity of economic and financial relations between the regional economy agents.

**BASIC IDEAS AND HYPOTHESES, BACKGROUND**

The recent changes in the federal structure and management of the Russia (RF) have given more legal and executive powers to its constituent units. Two new subjects of state power have appeared – the RF subjects (oblasts, krais and former autonomous republics) and inter-regional associations uniting territorially associated subjects of the Federation.

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Along with new subjects of power, market-based economic agents have appeared, including those with private ownership. The co-existence of conventional and new market institutions has led to that each subject of power or of economy performs a certain set of functions, is endowed with appropriate rights and is acting according to its motivations.

In the administrative-economic system the interaction among the agents was governed by plans through a centralized system of material-technical supply and flows of money and credit by which the established national economic proportions were sustained. As the underlying idea of plans was that they represented the social-economic goals of the nation, enterprise or region, the problem of security of goals achievement was related to the security of fulfillment of plans. Problems of social protection and living standards in regions were also put in relation to the fulfillment of plans.

The transition to a market-based model of economy introduces many changes in the system of interactions because now each economic agent has its «own» goals which can be achieved under a certain efficiency of input-output relationship (Von Neumann J., Morgenstern O., 1970; Rawls J., 1995; North D., 1999; Porter M., 2000; Errol P. Mendes, Jeffrey A. Clark, 1999). Central planning deals with security of plans given from top, while «self-planning» (i.e. business-plans of firms, investment projects) with security of payback of supposed costs and sufficient income to sustain the socially acceptable living standard for their staff. Factor of uncertainty is inherent in any economy. And in this respect the problem of security is invariant of the economic mechanism, be it rigid central planning or, the other way around, self-planning. While in the former case the security of the made decision is paid for by the state, in the latter case it is primarily production units. And while under central planning the strongest factors of uncertainty were lack of coordination between activity of production units in the regions and the social conditions of its residents as well as interruptions in material-technical supply, under cost-benefit relations the sources of information uncertainty affect sales of products, technological processes, partners in large projects with a high degree of risk.

If the regional economic system is viewed as a coalition of economic agents and subjects of federal and regional power (we call them economic agents), the problem of security and risks should be examined from a systemic aspect. In our view, in parallel with goals of security for each subject, a concept of integral risk of interaction among regional economic agents developing under the action of the economic mechanism should be put forward.

It should represent security for the residents which means that in the result of economic reformation, economic restructuring and emergence of new market institutions the fundamental conditions of life activity, i.e. employment, level of incomes, a set of social goods/services of education, health care, social welfare etc., will continue. If the security of achievement of a high level of social-economic development in a particular subject of federation is not high, then it is possible to speak about emergence of regional risks for normal population processes. In this context, therefore, it seems reasonable that jointly with the concept of security that of risk should be considered proceeding from the understanding that the higher is the security of goal implementation, the lower is the risk of negative consequences in case of its failure. So the study of risks would permit, with scientific substantiation, to approach the formation of reserve funds at the regional level.

*The objective of the research* is to develop a methodological approach and its formalisation in the form of a mathematical model for assessment of flexibility and integral risk in the development of regional economic system which would provide a set of conditions for a normal social-economic level for the region's residents. Participants and objects of compromise in the form of a set of conditions in the regional system are described in detail in the preprint (Untura, Evseenko, Zverev, 2001).

*The tasks include:*

1) to reveal major factors influencing the security of interaction among economic agents in the region;

2) to assess their impact on reducing the risks of individual agents of regional growth with the use of a model to make assessments of integral risks of implementation of various scenarios of interaction of agents and, in particular trade-offs between the production and the budgets of the federal and regional levels.

*As the working hypothesis is* a statement that a sharp imbalance of financial flows under influence of uncertainty of many market factors is the major cause of risk of the interaction.

It is supposed to consider risk of the economic functioning of an economic agent with respect to its incomes and expenditures balance which is achieved with a certain degree of probability, caused by uncertainty of the behavior of all members of regional coalition in the market environment. In practice, the cases of insecurity and risks have got recently a form of universal unpayments. We are going to develop an economical-mathematical model in order to make calculation experiments on assessment of security and risks in interaction among regional economic agents.

## METHODS TO BE USED

*The methodological basis of the study* will be systems analysis (Untura, 1999; Untura, et al., 2001; Untura G., Zverev V., 2002). The object is a system (coalition) of regional agents of the Novosibirsk oblast. For examination of their interaction special methods of retrospective analysis of the economic mechanism and methods of economical-mathematical modeling describing the balance relationships of expenditures and incomes of major economic agents of the region and financial flows among them will be considered.

*Description of the structure and relations in the model.* The model provides six blocks describing the following economic agents according to spheres of their activities:

- 1) production sectors (profitable and unprofitable);
- 2) sectors of services (social-sector and commercial);
- 3) extra-budgetary funds (formation and spending of social and special funds);
- 4) financial-credit sphere (local banks and subsidiaries of central and other regional banks participating in attraction and allocation of regional financial resources);
- 5) households (incomes and expenditures of the employed, pensioners and unemployed);
- 6) federal and regional authorities (formation and allocation of budgets of different levels).

The model simulates only the key financial ties that form a major part of the financial potential of the region, i.e. that part of financial flows among the objects represented in the model which are associated with monetary payments to population and their expenditures, tax deductions to budgets and spending from the budget in the region - distribution of net profit, attraction and placement of financial resources in the region and outside.

The model represents monetary flows providing for the interaction among different spheres of the regional economy. Such flows considered in the model are the following to:

- 1) the sphere of production – that part of enterprise income (produced added value, including wage fund, free residue of profit and compulsory payments, taxes, levies, etc.);
- 2) the sphere of services – financial receipts from different sources (equivalent to incomes) and compulsory payments (taxes, levies, etc.);

- 3) financial sphere – employed monetary resources, allocated monetary resources and compulsory payments (taxes, levies, etc.);
- 4) extra-budgetary funds – financial receipts from different sources (equivalent to incomes) and payments (financing the sphere of services and payments to population);
- 5) population – incomes and expenditures;
- 6) budget – receipts of financial resources from different sources and expenditures of the territorial budget.

The model takes into account the effect made on the financial situation of each agent by other participants of the regional economy described by these ties and, vice versa, the effect of the financial situation of an individual agent on the stability of the regional economy (in terms of generation or prevention of integral risk). Such description of these ties allows tracing the direct and indirect effect of individual economic agents on the whole totality of the agents of the regional economic system.

In the formalised record of the model each economic agent is presented by a system of conditions describing the formation of its financial results with employment of inner and external financial flows. These conditions reflect either requirements of functioning «without loss», or sufficiency of resources for the execution of the target program by appropriate economic agents.

The model conditions include also constraints on the fulfillment of the expenditures of territorial budgets, extra-budgetary funds, incomes of different groups of the population. In particular, risks for residents include reduction of the normal level of average labor payment, impossibility to raise incomes up to the subsistence level. In establishing the parameters of these constraints considered were the established norms of social security legally adopted at the federal and regional levels.

The final result of the interaction of the above considered sphere of the regional economy is provision of an acceptable living standard for its residents.

The parameters of economic agents' ties are determined on the basis of the operating economic legislation (for interactions among executive bodies of different level, public-sector organisations and the rest of economic agents of the region) as well as on the basis of available estimates of market parameters (interest rates on credits, average wage, shares in the distribution of incomes etc.)

The model estimations will permit to analyse the consequences of different scenarios of the economic agents' behavior and determine directions for reduction of local risks and integral risk of their interaction.

As a criterion of risk, minimization of integral risk in the region can be used in the model (formal record of the model shown Untura, Zverev, 2002).

The study will permit to make both systemic qualitative analysis of individual causes influencing the security of the achievement of the regional system's goal and to obtain certain quantitative assessments of the integral risk and consider possibilities for reducing them under different scenarios and variants of the development of regional systems. Simultaneously, it will be possible to assess the flexibility and controllability of regional systems understood here as the maximum ability of the regional economy to perform structural, technological, organisational and economic restructuring in a broader sense. In scenarios this can be presented by its constituting elements: 1) presence of sufficient reserve capacities; 2) allocation of reserves that are at the disposal of regional bodies; 3) increased structural flexibility due to the necessary diversity in the structure of regional economy which creates different institutional ways to achieve the development goals.

It is supposed to perform a retrospective analysis of factors determining the structure and functional properties of the economic mechanism, such as: the recognised conception of economic activity; target direction of region's development; economic priorities; type of regional reproduction process which was used to provide interaction among economic agents in the region. The results of the analysis are needed to prepare different scenarios for exper-



imental calculations by economical-mathematical simulation (Untura et al., 1999; Untura et al., 2001; Untura, Zverev, 2002).

*Information base.* Applied calculations on the assessment of security and integral regional risks are supposed to be made with respect to the Novosibirsk oblast with the use of the regional statistics, forms of tax and bookkeeping accounting, assessments of the state of regional budgets by experts and of extra-budgetary funds by the officials from regional government.

## RESULTS

The results of model calculations in the Novosibirsk region showed: for the period 1997–1999 there was an increase in the value of the integral risk in the economic system of the Novosibirsk region by 2.2 times in the absence of a compromise agreement between the parties.

Table 1

**The structure of the integral risk of interaction between economic the subjects of the Novosibirsk region in 1999, %**

Types of risk	Scenario, without compromise	Scenario, compromise
Integrated risk	100	100
Risk of loss of production	5.1	20.4
Risk of non-productive sphere	28.0	40.2
Including:		
Risk of budget organizations	26.7	36.2
Risk of self-supporting organizations	1.2	4.0
Risk of financial sector	22.5	37.0
Risk of extra-budgetary funds	0	0
Risk of non-income population	44.5	2.4
Risk of budgets	0,0	0,0

In addition, implemented strategy (without compromise) changes the structure of its risks: increase local risks to the subjects of non-manufacturing, financial, credit and industrial areas. At the same time during the period of greatest risk for the specific gravity of the population practically saved. Hypothesis about the possibility of reducing the integral risk due to compromises interaction members of the regional system was confirmed for population (Table 1). The magnitude of reduction or increasing depends on the scenario of compromise, which takes into account the number of participants and the strategy for implementing the priorities of individual socio-economic development in the region. For example, overall level of integral risk in 1999 reduced by more than 1.7 times in a scenario of coverage compromises all sectors of the economy compared with the situation the lack of compromise, i.e. if contractual activities of economic entities have not agreed. Implementation of compromise can significantly change the structure of integral risk. The compromise allows fundamentally change the proportion of the population in the risk structure of integral risk. He is reduced by 42.1 percentage points. At the same time significantly increased risks: the production sector – 15.3, non-productive sphere – 12.2, financial and credit sector – 14.5 percentage points. Thus the largest risk of the non-manufacturing sector is the risk for subject to budgetary organizations. There is a redistribution center of gravity of the integral risk with the risk of local population to the risks of other areas (Table 1).

A series of calculations on the private compromises in the regional economic system (affecting some sectors of the economy) has shown varying degrees of influence of each of them to reduce the integral risk. In this case, the 4 groups of agents were clearly marked. The average estimates of each groups show possibility of the risk reduction differ by more than 3–10 times (Table 2).

Table 2

**The characteristics of Reducing risk of the groups of branches of the Novosibirsk region in 1999**

Group Number	Group 1	Group 2	Group 3	Group 4
Reducing risk in the integral compromise in a particular industry, bln Rubles.	92.50	34.67	11.60	3.46
The share of risk reduction, %	1.30	0.49	0.16	0.05

The first group: transport, engineering and metalworking, agriculture, construction, energy, food-processing industry;

The second group: housing and utilities, retail and catering, private sector market infrastructure, communications, computing and information services, non-ferrous metallurgy, building materials industry;

The third group: non-productive public services, chemical and petrochemical industry, wholesale and foreign trade, light industry, MTS and the work piece;

The fourth group: health (commercial services), other material production, ferrous metallurgy, fuel, forestry, woodworking industry, other industrial production, education (commercial services), geology and exploration, microbiology, printing industry, forestry, commercial services in culture, art and science.

Correlation between the degree of reduction of the integral risk and changes in specific parameters (net profit, wages and taxes) branches of different groups has observed. In scenarios where a compromise in a particular sector the largest decline integral risk provides a compromise administration, public enterprises and transport, engineering, agriculture and other primary industries Novosibirsk region belonging to the first group.

Calculations based on scenarios consistent expansion of the circle of participants (by adding groups of technologically related industries) have shown that the expansion of the number of groups of industries involved in the compromise, a reduction in the level of integral risk. However, the technology groups have different effects on the components of the integrated risk. This may occur deterioration resulting indicators to reach a compromise. In particular, when you add a group of processing industries to other participants' compromise there is a relative increase in the integral risk (due to increased risks in the credit and financial sphere). However, even with such a relative increase in the risk scenario integral compromise is less than that for a situation of lack of compromise between the administration and the public enterprises.

Thus, the application of the developed methods and models to assess the impact of compromise to reduce the r integral risk in the region by the example of Novosibirsk region shows that:

- firstly, the trade-offs between the administrations, economic entities allow increasing the income level of the population without increasing the amount of risk in the integrated regional economic system;
- secondly, to reduce the size of the integral risk depend on the type of scenario to reach a compromise in the region (for participation and ways to reach a compromise;
- thirdly, the regional administration has an opportunity to assess the priorities support for individual industries in the region, depending on their contribution to the reduction of the integral risk.

## SIGNIFICANCE, DISSEMINATION

The results of the studies will be of importance to governmental bodies of the RF subjects since under new conditions of the economic activity they are in a great need for scientific approaches since the whole previous financial system and logistics of the USSR were destroyed in 1991. Starting conditions of the RF subjects turned out non-equal, technological ties even within the NIS have been destroyed which increases insecurity of regional development both of the RF and its regional units.

Scientifically, theoretical ideas about the assessments of security and regional risks for the RF subjects will be enriched. The difference of the proposed approach from the one existing in literature in publications on integral assessment of regional risk for investors is in that it yields an integral assessment of the risk of the regional environment on the whole instead of the risk in the result of interaction on the part of particular economic agents of the region. Such approaches do not regard special features in the process of reproduction associated with insecurity of material-financial links among economically independent agents including the residents who pursue their own interests.

In societal and social terms the results are important for the formation of reserve funds to support the population at the regional level. In our view, underestimation of the fact that it is the residents who really carry on themselves all the burden of the consequences of the «systemic» risk of non-effective economic activities and degradation of the economic potential of the region strips the government and regional administrations of a drive to look for positive policy measures such as creation of insurance funds that should accompany all the course of reformation and ameliorate the damage inflicted by a sharp deformation of the region's economic structure.

The results of the project can be of interest to the following categories of audience: regional and central politicians, economic scientists, sociologists and political scientists.

At the same time, the materials of the research will be of practical use also for the developers of documents about conjunction of rights and responsibilities of central and regional bodies of authority.

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# **OBJECTIVE CONDITIONS AND PATTERNS OF GOVERNING SOCIO-ECONOMIC PROCESSES IN A REGION**

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The paper considers methodological approaches to and principles of regional and municipal management of socio-economic development of Siberian regions. Studied are the challenges related to the changes in the mechanism of management of regional spatial development, problems of creation of an efficient system of management and prerequisites for economic and social reforms realization in the regions of Siberia.

## **MANAGEMENT OF REGIONAL ECONOMY AND ECONOMIC RELATIONS BETWEEN REGIONAL AUTHORITIES AND COMPANIES**

The theory of regional government is at its development stage. In respect of some theoretical and methodological issues, economists have not yet come to a balanced view; this is also true of the lack of terminological agreement. So it is of interest to analyze different concepts of regional government developed in domestic and world science.

The theoretical management fundamentals of a region's economy have been laid down in the works of researchers as early as the second half of the 20th century. These studies analyze the patterns, principles and factors of industrial location and investigate the problems of economic zoning and planning and management methods of spatial development.

The process of management of regional economy and associated economic relations between regional decision making bodies and companies and organizations, that is, economic agents of a region, is investigated. The purpose of these studies is to develop theoretical foundations for the management of a region's economy during a transition to a developed market environment by analyzing the regularities in the formation of regional economy government systems and special features in the growth and transformation of the native economy. For this purpose, the following objectives are stated:

- to study the objective conditions, preconditions, and patterns of governing the socio-economic processes in a region;
- to justify the methodological principles of governance of the regional economy;
- to study the basic patterns of the interaction mechanism among economic agents in a territory;
- to develop a methodical basis for the concept of socioeconomic governance of a region;
- to develop proposals for the improvement of the forms and methods of economic growth and the social area of a region.

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The methodical basis for the management of a region's economy is the theory of regional sustainability worked out by R.I. Shniper [1]. The practical value of the sustainability (economic reproduction) approach to the governance of a region's economy is the possibility of a balanced substantiation of the power distribution among different levels of the administrative setup, i.e., federal, regional, and municipal. These powers and functions of governance should be determined by a complex of regional sustainability (reproduction) cycles, spatially distributed according to the administrative level of a given entity. The criterion for the distribution of socioeconomic functions between different levels of the territorial system is the degree of localization in the use of the results of their governance functions. It is not the scale or quantitative parameters of socioeconomic development but the system of performed functions that should become a distinctive feature of the political unit of a given rank. The approach to this problem in terms of the regional sustainability theory concretizes the responsibility for a certain objective at each level of the regional system.

Thus, the sustainability approach first of all means the adjustment of the development cycles at the level of a region of a given rank. In the generalized form, the governance function performed by regional executive bodies can be presented as the creation of a system effectively using the competitive advantage and resource potential of the region. It is possible to say that the process of governance of a region's development is the creation of proportions among various elements of the regional system that provide its efficient socioeconomic growth. Different regional units make up the uniform administrative system of the federal state; its units not only differ by the scale and status in the system of federal setup, but by the objectives they are to achieve and by the mechanism of their administration.

The governance of a region is control over its functioning and development. A question naturally arises concerning the essence of socioeconomic development governance, because economic and social processes directly meet here in decision making results at all levels of governance: federal, regional, and business. The competence of each power level implies the creation of a favorable environment for people's life activity and the preservation of the natural system and favorable environment for business and other organizations. The socioeconomic functions at all levels of the administrative system ultimately lie in the creation of sustainability, rational application of regional resources, and maintenance of a balance between economic, natural, and social systems.

The regional sustainability process represents a constant interaction between different structural elements of the regional economy (population, public organizations, business structures, and regional governing bodies), under which each party is guided by its own interests, and these interests do not always coincide with each other. The role of governing bodies of the regional socioeconomic system is to develop a mechanism regulating intra-systemic relations, allowing for the creation of long-term stable financial-economic ties based on some balance of interests.

For the integration of these interests, a mechanism is needed to provide the interaction between interests in the process of consistent implementation of priority directions of a region's socioeconomic development, economic interests taken by a region's economic agents in the achievement of objectives at each stage; monitoring economic relations and resolution of arising differences between some agents of the regional economy, and conditions allowing for the adaptation to the existing mechanisms of regional governance.

The study proceeds from the following methodological premises:

- 1) A regional economy is viewed as a system of interacting agents (enterprises, associations, organizations with different forms of ownership, independent entrepreneurs vested with extensive right in production and sales);
- 2) Agents can be grouped with regard to their activities into the following subsystems: material production, circulation, finance and credit system, local authorities, population;

- 3) Regional sustainability (reproduction) process evolves through interaction of agents in production, distribution, exchange and consumption;
- 4) Over the preceding period there formed stable production-technological, socio-economic and organization-management relations (vertical and horizontal) which show considerable inertia;
- 5) In the period of transition to a market economy as changes take place in property relations, management structure, economic relations sphere, the system of vertical and horizontal ties undergoes change as well, new relations take shape, transformation occurs in the agents' economic interests, incentives and motivation.

The study of economic relations in the regional reproduction process implies both a static examination of the proportions of distribution of national income produced in the region, and an analysis of the dynamics of financial and material relations among regional system agents.

Therefore it is essential to consider the flow of income produced in the region through different channels of its distribution and redistribution, as well as the flow of consumed national income resources supplied to the regional system.

In analyzing distribution relations we'll consider the interaction of regional system agents with regard to two interrelated aspects: distribution of value added (net product) created in the region and distribution of national income resources supplied to the region.

The former aspect involves isolation of three stages of distribution. At the first stage the value added in the region is distributed among the following elements of the regional system: enterprises, associations, organizations; local authorities, population, as well as among federal authorities, ministries and agencies. The value added allocated to the first three groups remains in the region, while that assigned to the latter two is transferred to federal funds for subsequent redistribution. At the second stage resources of value added are distributed to the population, non-production enterprises and local authorities and part of the necessary product created in the form of monetary income of the population is channeled into the non-production sphere and the local budget in the form of taxes and rates. At the third stage resources are redistributed through the local budget. They are allocated to the development of local industry, non-production sphere, for payments out of social consumption funds as well as to federal and regional budgets. The identification of these stages is more or less conventional as distribution processes evolve concurrently in both time and space involving all agents in the regional system.

The second aspect of distributive relations comprises the analysis of incoming financial flows from federal budget and the funds of federal ministries and agencies. They are subdivided into flows of assets from the federal budget to the regional budget, material production enterprises, non-production sphere, population and flows from ministerial and agencies funds to enterprises and organizations in material production and non-production spheres located in the region.

### **LOCAL GOVERNMENTS POTENTIAL IN REGULATION OF REGIONAL ECONOMIC RELATIONS**

A variety of methodological approaches may be used in studying the issues relating to local authorities' participation in the regulation of regional economic relations. Local authorities without interfering in the affairs of economically independent enterprises should attend to integrative processes of regional socio-economic environment formation, i.e. manage the processes that answer the interests of all regional enterprises and population yet lies outside the scope of individual enterprises. In this context the processes of regional socio-economic environment formation are viewed as functioning of a system of local

reproduction cycles, and the local authorities' financial and economic base is formed as a result of equivalent economic relations between enterprises and the region, which involves dependence of the regional authorities' economic capabilities on the performance of local enterprises.

This approach has the indisputable merits of profound scientific substantiation proceeding from fundamental provisions of regional reproduction process theory, clear-cut demarcation of the competence of both local authorities and enterprises, consideration of socio-economic interests of regional reproduction process participants.

An interesting methodological approach to the study of this problem was set forth by R.J. Bennett [2], who considers relations among local authorities and business in each agent's perspective in interrelation of different aspects (finance, investment, technology). In looking into matters of local taxation from the point of view of entrepreneurs he isolates the following aspects: impact on profit, investment, reinvestment, technology, while when taking the local authorities' viewpoint he notes the degree of freedom in the choice of tax system, independent tax rate setting, imposition of other taxes, as well as the effect of external sources of income and pursuit of independent regional development policies. In our opinion, the main advantage of this approach consists in possibility of taking comprehensive account of the agents' economic interests, which makes for consistency and mutual benefit of regional economic relations system.

Also noteworthy is the study of J. Blair [3] who regards the relationship between enterprises and local authorities as a partnership, local taxes serving as an effective means for maintenance of mutually beneficial relations: when having a good taxation base local authorities provide development of infrastructure essential for enterprises, environmental protection, development of the education and health care system for enterprises employees. Besides, J. Blair considers partnership mainly as a matter of local competence, and argues that local authorities should be independent, and not be governed by the will of the others.

From the above it follows that local authorities gain extensive opportunities for regulation of distributive relations through the oblast's finance-credit system. This results in a change in the structure and functions of the system. Previously the local budget, cash and credit plans were drawn up independently of the oblast's comprehensive socio-economic development plan; there was a lack of adequate coordination between the oblast economic planning department, financial authority and central bank territorial agency. Under current conditions for economic relations to be regulated in the money and finance turnover process we believe it expedient to pursue a unified regional policy of finance and credit system management. Coordinating and methodological functions can probably be discharged by the economic development authority of the oblast, consolidated financial planning functions – be the oblast financial authority whose structure should presumably change in line with the new management functions. The oblast financial authority will probably be assigned the functions of coordination and methodological support of the oblast's finance-credit system.

While earlier oblast financial organs dealt mainly with functions related to budget planning, control over financial discipline, with transition to new system of government obviously many control functions lose their validity. Hence the oblast's financial authority's functions should conform to the new economic mechanism and conditions of formation of market and finance-credit relations. This includes primarily participation in elaboration of differentiated rates of payment for regional resources, differentiated norms for profit tax, etc.

To be sure, for effective regulation of regional economic relations full information is essential on financial resources formation process in different segments of the economic system both through distribution and redistribution of products and profits of the oblast's enterprises, and distribution of national income resources. This information can be drawn from the consolidated oblast financial balance which can take into account: financial resources retained by enterprises; local budget revenues; investment financing resources;

resources providing the development of the non-production sphere and circulation sphere, money income and spending of the population.

The development of a consolidated financial balance presupposes analysis of local budget revenue formation, financial activities and profitability of enterprises, financing of the social sphere, entrepreneurial activities of the population, redistribution of profit and other financial resources, proportions of average wages growth rates to labor productivity. In the process of balance calculations one can determine the potential sources of coast financing from resources of state and private enterprises, public organizations, the population, bank credits; income from primary financial resources (profit, turnover tax, net income, taxes on enterprises, deductions from the gross income to funds for social insurance, depreciation payments); proceeds from redistribution of assets held by the population (budget income from state taxes and other payments by the population, proceeds from loans and lotteries); redistributed incomes of enterprises (amounts paid by customers under contracts, other items of income); credit (increment in short-term credit resources, repayment of long-term loans, other sources of long-term crediting).

The oblast's finance-credit system can promote efficient economic development through maintenance of proportions of money income and real possibility of their realization, spending of money earned and fulfillment of cash circulation plan, and between the latter and wages and other payments to the population.

One of the principal tasks of the oblast's financial-monetary system is promotion of efficient money circulation. While the general money circulation policy is prescribed and supported by legal norms developed at the federal level of administration, the acceleration of circulation, maintenance of an optimal balance of population income and spending and the cash circulation plan fall within the scope of the oblast government level. At this level the finance-credit system can provide acceleration of money circulation by means of better trade and personal services made available to the population, minimization of finance in production and circulation, expedition of current assets circulation and the contribution of the credit system to improvement of the oblast economic performance.

Thus, it can be maintained that under economic reform changes occur in the functions of the finance-credit system of the regional reproduction process. It assumes the following basic functions: implementation of distributive processes involved in the oblast comprehensive socio-economic development, financial support for the oblast's development, regulation of distributive relations between the enterprises, population, local budget and banking system; enhancement of efficiency of money and financial resources utilization in the process of crediting and circulation.

### **BASIC DIRECTIONS IN THE NEW SYSTEM OF A REGION'S GOVERNANCE**

The borrowing of foreign experience in governing the regional process allows us to conclude about the possibility of its application in Russia's context. On the basis of an analysis of the participation of nongovernmental business organizations in regional development practiced abroad, it is possible to recommend the creation of similar organizations in Russia both at the regional and interregional level. A number of competencies in the economic interaction between enterprises and regional organizations in socioeconomic trends in a region can be taken on by public organizations, unions, and associations already existing in Russian regions: regional associations and unions of manufacturing enterprises, commercial banks, and small business organizations. The functions of interregional interaction concerning regional development problems are performed by the interregional association of economic interactions of the federation's subjects.



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In a system of economic governance methods, an important role is played by the regional marketing strategy. In a market environment, regions and cities are competing in different areas and aspects. In this competition, those regions win that have the strongest competitive positions [4]. As is shown by international experience, one of the critical advantages in a system of competitive positions can be the formation of a favorable business environment on the basis of a system of financial and nonfinancial incentives. Financial incentives are privileged loans, subsidies, loan guarantees, tax privileges, etc. Nonfinancial incentives include simplification of licensing procedures, issue of permissions, business consulting, subsidies for research and design works, provision of land plots for development, etc.

In the creation of a favorable business environment in a region, an important role is played by regional governance bodies and public organizations of entrepreneurs. In accordance with the concept of regional marketing, it is reasonable to create a special noncommercial organization, which will be able to perform the marketing of social and infrastructural services. This organization should represent both sectors, public and private, as well as various social groups. Its founders can be regional governance bodies, manufacturing enterprises, commercial banks, trade organizations, social services, etc. The main task of such an organization is the development of a regional marketing strategy and the implementation of a marketing program oriented to the provision of a high living standard, total employment of the population, restructuring of production, and the development of a market infrastructure. A regional marketing strategy should be developed on the basis of estimating the strengths and weaknesses of a region's economy with account of its economic and geographical location, the location of manufactures near capacious markets or sources of raw materials, etc.

Basic directions in the new system of a region's governance are the achievement of publicly important results, improved quality and access to public services, lower intervention of regional bodies in the economy, lower costs of inefficient purchases for public needs, and higher public trust in regional governance bodies. The final results of the formation of a new system of regional governance should be higher competitiveness of a region's economy, better investment climate, higher quality of life, better manageability at the regional and municipal levels, higher efficiency of budgetary expenditures, and stronger coordination within the regional community.

The Russian experience in the last decade has visually shown that, to achieve the objectives of regional governance, it is not merely enough to formulate them, supply with a legal framework, and developed a plan of action. In order to achieve significant publicly important results, it is needed to introduce a system of governance by results which connect the objectives, measures, and resources needed for the achievement of the governance objectives. This system uses a mechanism of project management, the application of which allows one to have control not only at the decision-making stage, but also at the implementation stage. The absence of this mechanism considerably impedes the achievement of the outlined results at both regional and municipal levels of government. Its introduction is equally important for the formation of a new system of governmental regulation on the whole and for the solution of many other problems associated with the implementation of structural transformations in the economy. The practical application of the mechanism of project governance should be closely tied with the introduction of a mechanism for the definition of objectives and budgeting by results.

In the budgetary process, the main direction is introduction of budgeting methods oriented to results, a transition to the distribution of budgetary resources between administrators of budgetary resources and their budgetary programs on the basis of their concrete results, and a higher financial independence of agents of budgetary planning on the basis of their stronger financial management.

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The transition to this type of budgeting requires an inventory of the expenditure obligations of budgetary planning subjects in coordination with the register of the federal and municipal services and development of technology for their rendering, as well as procedures for calculating the costs of governmental and municipal services. The introduction of standards for governmental services will allow for the coordination and concretization of the obligations of state and municipal governance bodies to regional communities, will require the use of objective procedures for the control and appraisal of their activity, and will lead to lower scarcity of socially important services. These standards should be created for services fixed in the registers of state services of federal subjects, coordinated with requirements for the legislation and register of expenditure obligations of budgets.

Functions without sufficient legal foundations and precluding the exercise of the rights of residents or imposing additional duties on economic agents should be abolished. This will make it possible to reduce the unjustified intervention of the government in the economy, to reduce the transaction costs of subjects of the regional economy, and to concentrate the administration bodies of federal subjects on the problems within the direct circle of their powers.

In order to prevent the appearance of additional functions, it is important to legally fix the procedure of proving the reasons for the introduction of state regulation measures for business activity at the regional and municipal levels. Before the introduction of a new regulating function, it is necessary to motivate that the objective cannot be achieved by market methods and self-regulation, while the summary losses for subjects of the regional economy will be far below the effect. The introduction of a procedure for new measures of state regulation will allow for a reduction in the number of newly introduced additional functions and a decrease in total costs for businesses, thus increasing their competitiveness.

The development of self-regulation mechanisms of socioeconomic development processes in a region will also increase the efficiency of the regulation of activity types. Self-regulatory institutions, such as insurance of responsibility and compensation, can provide a more effective protection of consumer rights than state methods, such as licensing. As a result, it will be possible to develop effective self-regulatory institutions, which will be able to carry on part of functions which are currently fulfilled by state and municipal governance bodies.

A realistic estimation of all undertaken measures for the perfection of regional governance and the available proposals, characterizing the general concept of economic reformation at the regional level, allow for the following conclusions.

First, the basic elements of the socioeconomic systems of regions are not equally prepared to a transition to a new model of regional governance.

Second, the powers of official bodies of the hierarchical system of territorial governance are not clearly defined.

Third, the economic, social, and financial norms, which should perform the functions of financial economic instruments, providing the achievement of objectives and tasks of integrated socioeconomic development, are not justified.

Fourth, in some governmental links of a region's economy, there is a lack of world-view susceptibility and personnel preparedness to a transition to a new model of regional governance.

From this it follows that a transition to a new model of economy governance of a federal subject should be of a stepwise character and implies the constant replacement of ineffective elements of the economic mechanism. At the first stage, it is necessary to provide the following tasks:

- proceed from the priorities of a region's socioeconomic development to motivate authorities, concrete prerogatives, and duties and functions of regional governance bodies and local self-government;

- to develop a system of regional planning–forecast and normative documents, providing a high level of reliability and quality of governance;
- to establish order in the organizational structure of the government in accordance with its tasks, to increase the efficiency of governance by simplifying the government structure, abolish the multilink system, and exclude irrational costs;
- to establish scientifically motivated regulating bodies with a mutual economic interest in the activity of local bodies of governance and business structures located in a territory;
- to form a necessary information base of regional and municipal statistics which would make it possible to investigate the regional financial and economic proportions of sustainability and the instrument of action in order to change them in the necessary direction;
- to create the necessary infrastructure for a transition to updated methods of governance with a wide application of new information technologies.

On the basis of this new regional governance model, the following will become possible:

- to make decisions which can be really fulfilled in terms of the availability of adequate financial and economic possibilities in a region;
- to arouse the interest of business structures located in a region in solving the general regional objective to increase the competitive positions of the region and its financial and economic potential, without using administrative actions but instead creating conditions for business which would provide economic feasibility and profitability from participation in the solution of regional problems;
- to concentrate activity on the development of promising economic clusters and on solving inter-industrial boundary problems that are important for each particular production located in the territory of a region but can only be solved on the basis of inter-industry interaction.

The strategy of a federal subject should be the one that provides a common platform, which is called to provide the mutually profitable development of business and the territory in the interests of the region's population.

## CONCLUSIONS

As a result of research, the following conclusions are made: in the context of the crisis in the socio-political and socio-economic management system in the post-socialist space, there is a need to develop new mechanisms of management of the state and its regions, and to create proper conditions for the efficient interaction between regional and municipal authorities. The main guideline of modernization should be innovation in the system of management.

At the regional level, the modernization should include the development of new principles and approaches to the management of socio-economic development of regions and municipalities. The complexity of modernizing management mechanism is that the traditional management of individual regional and municipal entities cannot create a competitive point of growth in each territory. The outcome of the situation is on the way of formation of the cluster approach to management, which aims to unite the interests of the various municipalities and provide efficient spatial development of a region. The solution to this problem can be achieved by concerted action of national and regional public authorities, local governments, non-governmental organizations and experts.

Overall assessment of the whole set of measures to modernize the system of management in Russia and proposals describing the concept of economic reform at the regional

level, leads to the conclusion that the modernization of the system of regional management in Russia should be incremental and assume a permanent replacement of inefficient elements in the economic mechanism.

Based on the priorities of regional economic and social development, it is necessary to justify the powers, specific rights, duties and functions of regional and local government; develop a system of regional planning and forecasting and regulations to ensure high reliability and quality of management; streamline the organizational structure of management in accordance with the terms of tasks, and improve management efficiency by abolishing multilink and unsustainable costs.

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# THE ALTAI REGION FORESTRY: ITS FEATURES AND CHALLENGES OF DEVELOPMENT

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The article evaluates the condition and development of the Altai region forestry. Special attention is paid to the spatial aspects of the regional forestry development both in terms of its characteristics as a whole, and in the context of forestry-based zones of the region. The article not only reveals and systematizes the key issues of the forestry development of the region, but also outlines the authors' stance on their settlement.

## GENERAL DESCRIPTION OF THE REGIONAL FORESTRY

The Altai region occupies the southern part of Western Siberia and encompasses four natural zones: steppe, forest-steppe, Salair lowland taiga and mountain taiga of Altai. About 28% of the Altai region area is occupied by forest ecosystems which differ in the wood species' composition, productivity and age structure.

According to the territorial authority of the Federal State Statistics Service of the Altai region on January 1, 2013, forest land and lands of other categories, where forests are located, occupies 4506.6 thousand hectare or 26.8% of all lands in the Altai region. The area covered by forest vegetation accounts for 3,796.7 thousand hectare or 84.2% of the total area of forest resources<sup>3</sup>.

The variety of major forest species of the region is not very diverse on account of harsh climatic conditions. Coniferous species occupy 40.7% of the silva covered land. Scotch pine, Siberian spruce, Siberian fir, larch and Siberian cedar grow here. The share of hard deciduous and soft deciduous wood species is 58.6%. Plantation of other wood species and shrubbery accounts for 0.8%.

As it has been noted earlier, the Altai region is one of the low forest cover territories. The amount of forests of the region constitutes only 22.6% while the average rate for the Siberian Federal District is 53.8%, for Russia – 46.6% (Figure 1).

Many areas of disappearing wildlife were taken under protection during the last years. This is the specificity of the Altai region. The region has a network of natural areas of preferential protection, including 1 wildlife reserve, 1 natural park, 36 environmentally sensitive areas, and 51 natural sanctuaries. However, the total area of protected territories comprises only 4.4% of the area of the region, which is well below the average for Russia, and not enough for preservation of favorable environment in the region<sup>4</sup>.

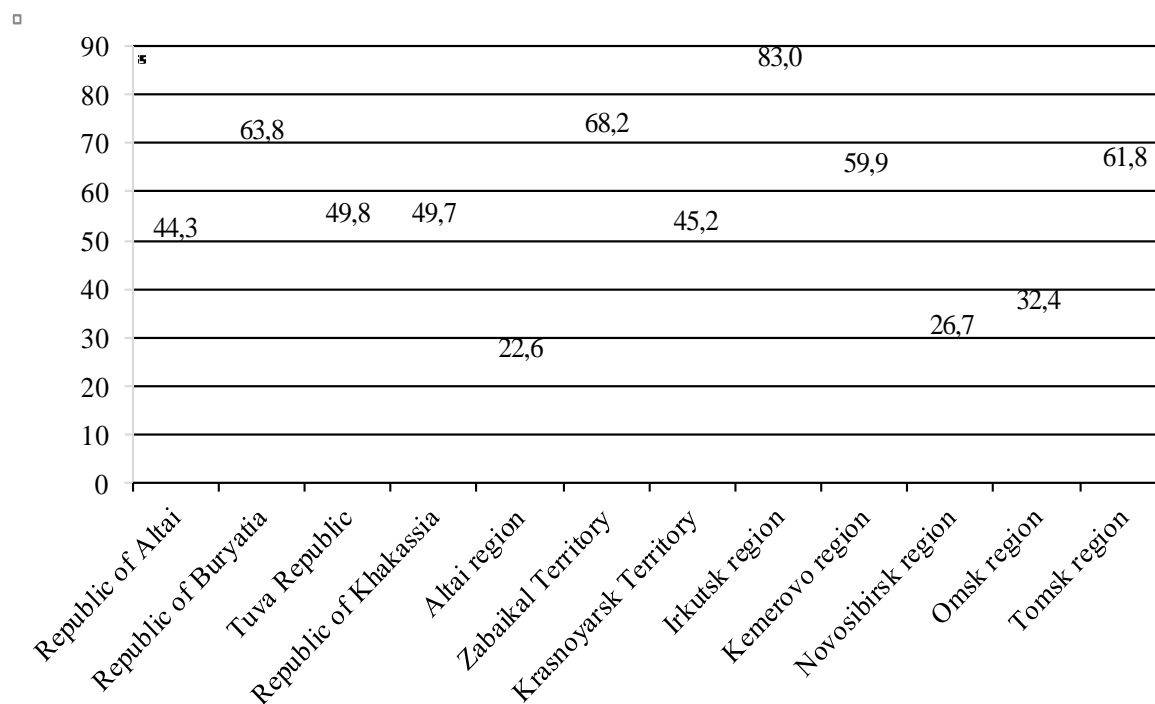
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<sup>3</sup> Ecological functions of forests and efficient use of forest resources of Altai region: analytical review. / V.M. Mochalov, S.Yu. Bayeva, N.N. Deryuga; edited by V.M. Mochalov: Regional office of the Federal State Statistics Service of Altai region. – Barnaul, 2013. – P. 4.

<sup>4</sup> Detailed description of the flora and fauna of the Altai region forests as well as their performed functions such as climatic, meteorological, water protection, soil conservation, recreation, sanitation and hygiene, is given in the previously mentioned analytical review of Altaikraistat, thus, there is no necessity of their presentation in the present article.



Source: Ecological functions of forests and efficient use of forest resources of Altai region. – P. 4.

**Fig. 1.** Amount of forests of the Siberian Federal District territories, %

Executive authority of the Altai region in the forest sphere is the Forestry Department, which is a structure within the Chief Department of Natural Resources and Environment of the Altai region. It is responsible for forests located on forest land – 4429.4 thousand hectares or 98.7% of the total regional forested area<sup>1</sup>. The average annual growth on forest land funds is 8.46 million m<sup>3</sup>, of which the share of coniferous forest accounts for 3.68 million m<sup>3</sup>, the share of deciduous forest is 5.67 million m<sup>3</sup>.

On the territory of the Altai region there are also forests located on the lands of other categories, namely:

- lands of the Russian Federation Ministry of Defence – 12.6 thousand hectares;
- lands of specially protected territories under the jurisdiction of the Federal Service for Supervision of Natural Resources (Rosprirodnadzor) – 41.4 thousand hectare (State Nature Reserve «Tigireksky»);
- lands of urban settlements, i.e. urban forests – 10.0 thousand hectare (Table 1).

In accordance with the peculiarities of silva wood, economic conditions, intensity of forest management as well as the role and importance of forests, the forest fund is divided into 4 forestry-based regions, namely

*Band-type pine wood forests.* Here there are unique band-type pine wood forests that stretch like long, narrow bands from northeast to southwest across the Kulunda steppe and two state forest belts. Geographically, these forests are divided into fifteen forestries.

*Priobskiy forests.* The district includes forests, located on the right bank of the Ob River and its tributaries. All Priobskiy forests are referred to as protective ones<sup>2</sup>. There are seven forestries in these forests.

<sup>1</sup> It is worthy to note that the total forest area of the Altai region has decreased from 4522.2 to 4506.6 thousand ha or by 0.35% in the period from 2008 to 2012.

<sup>2</sup> For details see: Kukis S.I. History of protective afforestation in Altai region / S.I. Kukis, V.I. Gorin. – Barnaul: Altai publishing house, 1973. – 308 p.

Table 1

**Structure and main characteristics of the Altai region forests**

Forests affiliation	Total area, thousand hectare	Silva lands, thousand hectare	Distribution of forest area for designated purpose, thousand hectare			The total stock of wood, thousand m <sup>3</sup>	The total annual growth of wood stock, thousand m <sup>3</sup>
			Protective forests	Merchantable forests	Reserve forests		
Forests, located on the lands of the forestry							
Total on the Altai region forestry	4429.4	3817.2	2436.4	1197.1	–	535569.0	8462.7
Forests, located on the lands of the Ministry of Defence							
Altai military forestry	8.2	7.3	7.3	–	–	1768.4	7.9
Forests, located on lands of urban settlements, i.e. urban forests							
Urban forests	10.0	9.3	9.3	–	–	2058.0	31.5
Forests, located on specially protected territories							
State Nature Reserve «Tigireksky»	41.4	33.1	41.4	–	–	4787.4	44.7
Total on the Altai region :	4489.0	3866.9	2494.4	1197.1	0.0	544182.8	8546.8

Source: Forest plan of the Altai region. Barnaul, 2011 – (<http://www.altailles.ru/actual/lesplan/>)

*Salair Ridge Forests.* The area is represented by aspen-birch and fir woodland on lowland Salair ridge and forest and groves at the adjoining forest-steppe. Geographically the forests are arranged into four forestries.

*Foothill forests.* The area includes the foothills of the Altai Mountains. Geographically these forests are arranged into five forestries.

Tenants of the forest sites for logging are commercial organizations, mainly companies, mostly Ltds., and one individual entrepreneur. Most tenants of forest sites for logging are incorporated into a timber holding company «Altailles».

The principal activities of the tenants are the implementation of works on logging and wood processing, conducting activities on protection, conservation and reforestation on the leased forest areas.

In 2012, according to Altaikraistat data, sixty three forest sites per the area of 2202.2 thousand hectare which comprises 49.7% of total forest area were released on loan for wood harvesting. The statutory volume of wood harvesting on the leased forest areas is 2848.7 thousand m<sup>3</sup>. Ninety one forest sites per 242 hectare area were released on loan for recreational activities. In addition, 154 forest sites were released for harvesting food forest resources and collecting medicinal plants, implementing activities in the field of hunting, performing works on geological exploration of mineral resources, exploitation of mineral resources, construction, reconstruction, operation of power lines and other linear objects on the area of 155.8 thousand ha.

In 2012, tenants of forest sites performed wood harvesting in the amount of 2416.0 thousand m<sup>3</sup>. In addition, timber has been harvested while executing state contracts on conducting works for conservation, protection and reproduction of forests, as well as while implementing contracts of forest purchase and sale in the amount of 565.9 thousand m<sup>3</sup>.

Table 2

**Dynamics of the allowable volume of cut wood**

Year	Allowable cut volume, thousand m <sup>3</sup>	The volume of cut liquid wood	
		thousand m <sup>3</sup>	% for allowable cut volume
2009	5911.0	2810.5	47.5
2010	6407.1	3084.2	48.1
2011	7119.2	3345.5	47.0
2012	6543.4	2981.9	45.6

On January 1, 2013 the total forest reserves in the Altai region amounted for 547.8 million m<sup>3</sup>, more than half of which fell at conifers. Allowable wood cuttings have been recently estimated at about 5.9 – 6.5 million m<sup>3</sup>, and their use – 45.6 – 48.1% (Table 2).

Sanitary thinnings were annually carried out in order to increase productivity and improve the qualitative composition of forests. The area of sanitary cuttings fell by 8.3% in 2012 compared to 2009.

Activities on conservation, protection and reproduction of forests on forest sites that are not leased are carried out by the executors which are mainly business entities (Ltds). These business entities concluded state contracts to perform the above-mentioned types of work based on the results of the auctions held by the Forestry Department of the Altai region. Tenants of forest lands also participate in these auctions. They claim to perform works on the unleased forest areas adjacent to their leased ones.

Large-scale wood-processing enterprises of the Altai region are equipped with foreign expensive equipment and consist of automated belt complexes, high-tech drying chambers, highly productive planing machines, optimization and production lines for manufacturing laminated furniture boards<sup>1</sup>.

Forestry complex of the region is mainly based on the use of local forest resources. Exports of manufactured wooden products such as pit props, lumber, sleepers, milled products in the form of flooring strip and wainscoting, round logs are carried out both in the near-abroad countries and far abroad ones such as the Republic of Kazakhstan, Kyrgyzstan, Tajikistan, Uzbekistan as well as China and Afghanistan. The main consumers of wooden goods have been and still are the consumers of the Russian Federation, i.e. a greater share of wooden products sale is the domestic market.

According to Altaikraistat data as of January 1, 2013, the actual received payments into the federal budget total 121.5 million rubles, which is 2.5% higher than in 2011. The Altai region budget received 36.2 million rubles. Total income for the 2012 year from forest usage accounted for 157.7 million rubles.

According to Altaikraistat data, the main sources of income became the revenue from wood harvesting (87.8%), monetary penalties and fines (5.8%), leased forest sites used for recreational activities (3.9%).

Thus, the Altai region possesses sufficiently developed wood processing complex, modern production facilities for logging and wood processing. However, despite a considerable potential, the use of non-wood resources finds no significant industrial applications.

**CHALLENGES OF FORESTRY DEVELOPMENT**

Not only does the forestry take the leading place in the Altai region economy, but it is a «trendsetter». Over the past four years the Regional Forestry Authorities managed to attract solid investment in the sector. For instance, the Forest holding company «Altailes»,

<sup>1</sup> A detailed description of the wood-processing see: State and trends of development of the Russian wood-processing market [electronic resource]: an electronic scientific journal [www.uecs.ru](http://www.uecs.ru).



which is the largest tenant of the forest in the region, intends to invest in the sector more than 5 billion rubles in the coming years. Attracting investments allowed not only to start the process of modernization and technical re-equipment of production, but also created the conditions for rapid socio-economic development of the Altai forest settlements primarily because the majority of the forestry investment projects were implemented exactly in these rural territories. Together with the development of wood processing enterprises not only new jobs are being created, but also social infrastructure is being built, i.e. affordable housing, cultural and sports facilities, transport and engineering infrastructure<sup>1</sup>.

In our opinion, due to this situation, there are no problems in the forestry development in the Altai region that are common to most areas of Russia, including a marked depletion of operational stocks of wood in the areas where the functioning wood processing companies are located as well as transportation ways<sup>2</sup>.

Meanwhile, many of the mentioned challenges of the Russian forestry development are relevant to Altai region as it is. Let us consider the main ones.

Among the first issues is *the lack of facilities for deep mechanical and chemical processing of wood raw materials*, capable of processing low-quality deciduous wood and lighter species as well as wood waste and wood harvesting.

Chemical-mechanical and chemical processing of wood have been recently the world's most rapidly developing manufacturing while in the Russian Federation the production volume of paper and paperboard still remains at the level of the 1980 year which is caused by the lack of own capacities for deep wood processing<sup>3</sup>.

There has been reached almost maximum level of capacity utilization in the regional forestry, which is 100% in the production of plywood, fiberboard, paper and cardboard. There is no market cellulose production in the region.

*The presence of forest road network* is another key issue of the Altai region forestry<sup>4</sup>.

The total length of highways is 35,366 km, whereas 3642 km of highways is covered with hard surface. The density of the road network constitutes 8.1 km per 1 thousand ha of forestry, including 0.8 km. road sections with hard surface<sup>5</sup>. Taking into account the total length of roads in the region, the road network could be considered sufficient. However, some forest roads, represented by natural passages, are not suitable for automobile traffic in the spring and autumn periods because of waterlogged areas and the absence of man-made structures. From the mentioned above, it follows that on the whole the provision of the Altai forestry with transport routes cannot be considered sufficient. Especially there are not enough hard surface roads and upgraded quality roads. Such conditions can neither make effective use of forest resources nor the operational control of forest fires and pests.

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<sup>1</sup> Klyayn V. Forestry of the Altai region // LesPromInform. – 2012. – № 1 (83). – P. 24.

<sup>2</sup> It should be noted that some authors are of the opposite point of view. So, in the prepared analytical review by the experts of Altaikraistat it is written as follows: «Despite the huge amount of forest areas, Russia faced the problem of depletion of forest resources. This phenomenon is also characteristic of Altai region. The presence of vast forest areas that are not affected or are slightly affected by human activity makes no difference. These are either low-productive forests or forests that are located in difficult to access regions». See: Ecological functions of forests and efficient use of forest resources of the Altai region. – P. 12.

<sup>3</sup> The shortage of facilities for deep wood processing remains relevant throughout the years of the forest industry evolution. Not only scientists but the Government as well is well aware of the criticality of the situation. However, no significant progress has been observed in the industry yet: Russia remains the world leader with regard to forest areas with valuable coniferous species, production and exports of round logs and at the same time it is significantly behind the developed countries on efficient use of wood, production volume of paper, plywood, fiberboard and other products. See: Kalabekov I.G. Russian reforms in facts and figures. – Moscow. – 2010. – P. 129.

<sup>4</sup> Depending on the purpose, forest roads are divided into three types: I type – highways, road network uniting the II and III types and connecting woodland with roads of public use. Their width is 6.5 m or more, the width of the traffic area is 4.5 m.; II type – roads serving the forestry and overlooking the main roads. Their width is 4.5–6.5 m, the width of the traffic area is 3.5 m.; III type – highly specialized forestry roads, which include fireproof roads, driveways to logging sites, roads for access to forest nurseries, seed trees' sites and plantations as well as roads for cleaning forest sites after sanitary thinning and etc. Their width is 4.5 m, the width of the traffic area is 3 m.

<sup>5</sup> The forestry plan of the Altai region.

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The provision of the Altai forestry with transport routes varies considerably from one forestry-based zone to another. So, the number of roads is quite enough to accomplish activities directed at protection and reproduction of forests, as well as their use in two forestry zones such as Band-type pine wood zone and Priobskaya zone. Road length of these zones is 13.9 and 10.5 km. per 1 thousand ha of forest land respectively.

In Salair lowland zone, however, road provision is inadequate; the length of roads is only 3.3 km away. The roads are in poor condition, as they were constructed in the period of logging enterprises existence, i.e. until 1993, and now require reconstruction. In the Foothill forests zones the road length is only 2.6 km per 1 thousand ha of forest land.

More intensive construction of forest roads, the achievement of their required density, and upgrading the quality of roads will definitely lead to the development of infrastructure in the regions alongside with the implementation of new investment projects and the development of new forest lands. As a consequence, the productivity of forests, improvement of their species composition and efficiency of land use will be enhanced.

As a third (not least) issue of forestry development which is to be specified is *the use of outdated technology, machinery and equipment with a high proportion of manual labor and low productivity*. Obsolete machinery and technology are used in logging and forestry. It is connected with the termination of the activities of majority of forest engineering plants. Operating businesses in this sector do not provide the required technical level and quality of logging machinery. Output wood processing machinery manufactured by domestic enterprises does not correspond to the current level of requirements. In terms of material and energy consumption it is considerably inferior to foreign analogues. Applied-research industry and project base development of forest mechanical engineering have been destroyed. There is neither platform for service nor maintenance of domestic logging machinery.

This issue is of less topicality in the Altai region in comparison with the situation in Russia in general due to the fact that forestry enterprises of the region have embarked on the use of imported machinery and equipment. Meanwhile, high cost of imported equipment and the discrepancy between the Russian forest engineering and tasks of forestry development cause the challenge for the Altai region.

The next problematic issue point in the forestry development is associated with *an insufficient level of innovative activity in the forest industry enterprises*. This issue is typical in general for the whole Russia and the Altai forestry is not an exception. The causes of this situation, as well as the above-mentioned challenges, are related to the sharp decline in funding research organizations through the state budget. Business does not substantially participate in funding of research activities. This fact eventually led, on the one hand, to the spray of budgetary funds to address small and private matters, which do not solve the problem of a strategic nature, and, on the other hand, – to the stagnation of research and development organizations. The system of pilot enterprises, test stations and proving grounds that functioned prior has been completely destroyed. In our opinion, there is a lack of new lines of research, in particular in the field of forest economics, forestry management, information systems and models of the industry development. There is a lack of a comprehensive approach to addressing the forestry issues. Technological gap between the world level is characterized by the absence of «breakthrough» innovation projects in the forestry, allowing to remove the structural constraints of the industry development and launch the production of a completely new (i.e. in accordance with consumer properties) range of goods that are in demand both in the domestic and foreign markets such as construction of wood-based materials, environmentally friendly wooden panels, semi-finished fiber goods, manufactured without the use of chlorine, high-quality types of paper and cardboard for printing and packaging, the upgraded range of sanitary and hygienic goods, low-tonnage types of paper for industry, etc.

Equally important for the forestry development is *the lack of qualified personnel and low labor productivity* caused by the deteriorating situation in the vocational and professional staff training, accompanied by a growing shortage of skilled personnel in various fields of forestry and forest industry activities.

Currently, there is no single higher education institution in the forestry sector. Meanwhile, this problem is less attributed to the Altai region due to the conducted training on the basis of state educational establishment of vocational training «Biysk leskhoztehnikum» (Biysk College of Forestry) and at the Department of Forestry in Altai State Agrarian University.

The forestry development of the region is constrained by *insufficient use of forest lands for purposes that are not related to wood harvesting*.

Article 25 of the Forest Code of the Russian Federation establishes the possibility of multiple forest use. Whilst, in the practical application of this article there is still unresolved procedure of allocation of forest sites, as well as the mechanism of coordination and respect of mutual interests of persons who use the forest resources for various purposes. The issue is connected with the distribution of these persons' rights, obligations and expenditures on forest protection and reforestation as well as cadastral registration.

This issue is rooted to the previously existing legislation (i.e. The Forestry Code of the Russian Federation adopted in 1997). The object of regulation of relations was the «forest site», which referred to as «the totality of the land and vegetation that grows on some land» herewith a particular site could be leased by several legal entities for different purposes such as hunting, wood harvesting, recreation. The interests of landlords and tenants are balanced in the lease agreements. In 2007, there was adopted a new Forestry Code, which differentiated the concepts of land and forests. The regulation of forestry relations was built on the use of the «land site» concept. Activities are to be carried out on the land site with a cadastral number only by one tenant. If, for example, the land site has been transferred to the lessee for logging, it can no longer be transmitted to other users for hunting, recreation, etc. To solve this case, in our opinion, it is necessary to return to the positions set out in the 1997 Forestry Code while reviving the concept of «forest land site».

Further, Articles 32 and 34 of the Forestry Code of the Russian Federation stipulate the performance of activities both by legal entities and citizens. Their range includes wood harvesting and collection of non-wood forest resources, forest food and medicinal plants only on the right of long-term lease of forest sites. However, the rent for these types of usage is often not profitable (lean years, seasonal work, little income, whereas the cost of lease payments and performance of activities on conservation, protection and reforestation are mandatory and permanent). Currently, this type of forest use has become not in demand, thus budgets of all levels lose revenue. Enterprises, which were earlier involved in procurement and processing of these types of forest resources, close down the production, and sometimes even businesses.

Since harvesting and collection of non-timber forest resources, forest food resources and medicinal plants alongside with logging are associated with the withdrawal of forest resources, it seems logical to provide the use of these forest resources on the basis of contracts of sale without letting forest sites on lease in addition to leases of forest sites.

*The conclusion of forest lease in accordance with the results of auctions with unscrupulous and incompetent managers* has become one of the major impediments to the development of the region forestry.

While carrying out forestry auctions in the Altai region, in some cases there have been documented the evidence of participation of legal entities and individual entrepreneurs who are interested only in wood harvesting. These participants have neither experience nor awareness of the specifics of works on conservation, protection and reforestation.

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To ensure the effective implementation of forestry management, improvement of forest lands' condition, development of a favorable investment climate it seems appropriate to replace the forestry auctions by competitions, providing preferential right for usage of forest sites to persons who have the resources and capacity (i.e. human resources, specialized machinery and equipment, etc.) for conducting activities on conservation, protection and reproduction of forests, wood harvesting, wood processing. These criteria should serve as a prerequisite for participation in the competition for the right to sign the lease agreements.

*Unsettled relations with regard to the use of urban forests* acquire particular relevance for the development of the regional forestry.

Outside the «coverage» of the unified management system of Russia there are forests of specially protected areas (26.9 million ha) as well as forests on land settlements (1.4 million ha) and other lands. Particularly acute issue of forestry management is the use of municipal lands which are extremely crucial in terms of social and environmental importance of forests. The situation here is not transparent - the status of urban forests is to be finalized, their management structure is not clear. Municipal forest control and supervision, municipal forest fire control require close attention as, however, it is not currently clear how these functions are performed, what technology is implemented and who are responsible for monitoring.

Summing it all up, it is worthy to note that there is a whole set of problems on the way to enhance the functioning of the regional forestry and its further growing contribution to the formation of the regional budget. These challenges form a kind of «swaddling bands» in the forestry development.

Difficulty in solving the problems of forestry development is largely determined by the fact that they are rooted in the imperfection of the federal legislation, which does not take into account the interests of various actors of the «forest» relations.

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# ASIAN PART OF RUSSIA: TO SETTLE OR TO GIVE AWAY?

*Vladimir Yu. Malov*<sup>1</sup>

Modern period of development of the Russian economy is characterized by the necessity to find an appropriate response to the EU sanctions against Russia so as to minimize the losses in the living standards of the Russian population. In the Institute of Economy and Industrial Engineering (Novosibirsk) an attempt is made to find a way to respond to economic sanctions by using interregional intersectoral model: the criterion is maximization of final consumption (FC). The result is not unexpected: within the initial ten year period the level of FC in the terms of growth rates will decrease by about 10-12%, though over the next ten year period it will be reversed and even probably surpass its previous figures particularly by maximizing home production and economic growth of Russia. Tellingly, in order to overcome the consequences of sanctions it would be desirable and probable to promote the accelerated growth of production in Siberia (Table 1).

*Table 1*

## The Resulting Indexes based on the moderate forecast of development and alternative version “With EU sanctions” for the economies of Russia and Siberia (in trillion rubles)

	Years	2015	2020	2025	2030	2035
Final Consumption of the Russian Federation (RF)	Without sanctions	38,1	43,5	53,6	84,3	101,5
	With sanctions	34,7	38,2	48,6	84,2	108,8
Gross output production (RF)	Without sanctions	81,8	102,5	131,3	150,5	174,7
	With sanctions	78,2	94,5	124,8	148,2	183,5
Gross output production (Siberian Federal District)	Without sanctions	11,3	15,3	19,9	25,1	34,7
	With sanctions	11,9	15,6	20,1	25,2	35,8

**Note:** Calculations implemented by B. Melentiev on the basis of results of decision on an optimization inter-branch interregional model.

Against this background it is useful to call to mind such statements as, for example, «Siberia<sup>2</sup> only by mistake fell to Russia’s share» repeated with enviable regularity. Some politicians, for instance, M. Albright, M. Thatcher supposed that there would be only 30–40 million people living in Russia and foreign researchers of Siberia made similar statements. Their recommendations on relocation of the most part of Siberia’s population into more warm regions of the country (or even in other countries) are «naturally» explained totally by the wish to bring advantages and benefits to people of the Russian Federation.

In Russian society an attitude toward Siberia was also ambiguous from the first-ever years of settlement of these new territories. For instance, governor general M.M. Speransky in the very beginning of his stay (1819) in Siberia asserted that «Siberia is simply Siberia,

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<sup>2</sup> In this article «Siberia» and «Asian part of Russia» are thought of as synonyms, if it is not specially specified, for example in a place where it is referred to Siberian Federal District.

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i.e. wonderful place for those who had been sent into exile, advantageous for some part of trade, advantageous and rich for mineralogy, but it is not a place for life and higher civil education, for development of property. Strong property based on arable farming, manufactures and domestic trade». However already in 1820 he has written: «If a bit I did here, at least consoled those who mourn, calmed indignations, stopped blatant violence and, maybe, even more important, I opened Siberia in its true political relations»<sup>1</sup>.

Russian writers have not stayed half-hearted to Siberia as well. F. Dostoevsky, exiled to Siberia for penal servitude (in Omsk) in the first years of his presence here had an opinion that Siberia has no future, since all its rivers fall in the Arctic ocean and no other sea gates exist. Later, in 1881 in the «Diaries of a writer» he wrote completely opposite thing: «Russia is not only in Europe, but also in Asia... Moreover: in our coming destinies perhaps Asia will be our major outcome». Compare these words with the ideas of Anglo-Saxon geopolitists who are unfriendly to Russia (A.T. Mahan, H.J. Mackinder and others) about the global impact of this part of land surface (Lenaland) and the connected decision of Alexander III, Russian tsar, on building the Trans-Siberian Railway. Thus one can say that understanding of value of Siberia namely as a part of Russia comes step by step.

History repeats itself. Nowadays the issue of development of new attitude towards Siberia and to the North of Russia in general comes up again. Is it necessary to reclaim and populate Russian North, and if yes, then how. What advantages of Siberia are usually mentioned today as competitive ones? They say that Siberia is a storeroom of natural resources and a land bridge between East and West of the Eurasian continent. If to be on the side of Siberians, then one should agree, that life in a storeroom is cold and uncomfortable, and under a bridge – noisy and uneasy. Though the centuries-long experience of such towns and villages as Yeniseisk, Boguchany, Kezhmaand and many other located along the stream beds of great Siberian rivers, far to the north above the 50th parallel shows that it is possible not only to live in Siberia, but to raise healthy generations.

New territories development not so often realizes without direct or indirect impact of a state. One of the first large state strategic projects of Siberia's development was building of the Trans-Siberian Railway. It is telling that this project in present-day expressions was knowingly loss-making: nobody could say how many million tons of loads to be transported by this railway. Moreover, freights were extremely few in number since in Siberia there were no agriculture, coal mines and plants which could offer goods for transportation in European part of the country. Nevertheless Alexander III accepted a responsibility for making so important decision.

Certainly, there was an obvious military component: Japan established both fleet and ground troops for further occupation of the part of China (Manchuria) and, probably Russian Far East. Trans-Siberian Railway became the part of project of settling all Siberia – from the Urals to the Pacific Ocean, thus so effective, that only bread (grain) freights allowed make this Railway profitable. In other words, production came after a road. The predictions of our sincere friends came true: «On these boundless plains millions of Russian families will find life and activity» (F. Nansen wrote it after his journey over North Sea Rout (NSR), Yenisei river and Trans-Siberian Railway in 1913). It turned out that «life and activity» Russian families found not only on plains but also on foot-hills, and even in the mountains of Siberia and Far East, where enormous natural resource stocks have been found.

Direct participation of the state in developing new regions is foremost to create the infrastructure: objects of transport industry and energy production. It is also difficult to over-estimate the importance of state in realization of academic research of new territories. It is useful to remember that work on exploration of Siberia's resources has been started long before they were practically explored. Geographical, geodesic, and geological studies

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<sup>1</sup> From the letters of M. Speransky to his daughter Elisabeth.

of enormous territories have been conducted, not always commercially reasonable. Accumulated academic stock now brings effective results. Unfortunately, this stock is used not always in the interests of the whole country. At all times the challenge of estimation of various projects involving «entering» new regions for their further development was particularly acute. The point is the absence or inaccuracy of information, sometimes its deliberate misrepresentation.

Presently the realization of big projects of new regions' development comes across a serious problem: government requires the ground of commercial efficiency of any large-scale project for decision-making of its implementation. As a rule, it is impossible. Many projects (especially infrastructural), in particular transport projects are evidently unprofitable. Why no impulse to see far prospects and no wish (skills?) to climb above the tasks of receiving money income as quick as possible. Here it is necessary to remember about the origin of concept «economy». The great Greek philosopher Aristotle is considered to be the author of this concept. Though people, as a rule, usually omit his pointing on the moment that one should distinguish «economy» from so-called «chrematistic», also science how to manage, only not to meet vital requirements of individuals (material and natural characteristics of requirements), but totally for the sake of getting money income, for the sake of accumulating richness. «Since chrematistic is located next to economy, people mistake it for economy; but it is a not economy. As chrematistic does not follow nature but focuses on exploitation. Usury works for chrematistic and people hate usury for clear reasons since it gets profit from money not from goods though money have been established to distribute goods. Money should facilitate trade, but usurious interest increases only money. Therefore this type of enrichment is most perverted» (Aristotle, «Politics»).

History knows many examples, when setting not money goal helped overcome crisis moments. Participation of the state as an organizing and financing promoter often allowed cope with difficulties in the shortest time. For example, the way out of the Great Depression in the USA (1930), plan of Th. Roosevelt on road building (transport infrastructure) and policy of De Gaulle on the revival of France after World War II. Though it would most like if emphasize the recovery program of Germany after World War II, so-called Marshall Plan. A goal «to provide the deserving standard of living to all Germans in a short space of time» was set. However a market (and regulated at initial stage) was established to be means towards this end in contrast to present Russia, where market in practice became an aim. Market in fact provided the rapid increase of welfare, but only for very narrow group of so-called «new Russians». Probably, Aristotle's warnings were unknown in Russia.

Difficulties in using positive aspects of market mechanisms in the Russian economy resulted from both objective and subjective reasons. Academician V. Makarov gives simple and clear explanation why most our building and transport projects are stuck: it is unwillingness of officials (and, unfortunately, even of many businessmen) to change anything in their smooth-running life, bringing good profits without attracting innovations and attempts to put into effect any new, sometimes risky projects. This is all the more true as far as the Asian part of Russia is concerned. To objective difficulties, alas, one should put down the fact of natural restrictions to the efficiency of most projects, especially in the development of processing productions in the east part of country.

Three basic components can be determined that can nowadays provide profitability of many Russian (especially Siberian) corporations:

1. Increased exploitation of Russian population by reducing its standard of living («eating away» of the present).
2. Subzero ecological requirements and appropriation of natural rent («eating away» of the future).
3. Lack of amortization of the before created capital assets («eating away» of the past).

Strict comment has been stated by S. Kara-Murza, scientist and political writer: «We are eating away the last of stock accumulated by a previous generation. We eat the body of murdered soviet system. It is enormous, but it is non-renewable resource. And it comes to an end».

Next question is also important: if profit is decided to be invested in the production development (although it is not obvious fact, taking into account a private character of many corporations), then where, in what region and what country to do it in reasonable way (naturally, from the point of view of maximization of corporation's profitability and the growth of its capitalization)? An answer is as well obvious: other things being equal where environment is warmer, all investment costs are lower and where markets of consumption of these goods are closer i.e. to China, Indonesia, Africa, Latin America and such. All of this is in the framework of operation of market economy laws: «nothing against you personally, only business!»

It is hard to argue with those, who are for full developing of territorial division of labor, who are for the rational distribution of production from the point of view of receiving maximum effect from profitable international trade. However organization of the mutually advantageous trade with other countries and integration in a world market make sense only in case when it is mutually beneficial. But it carries certain threats, first of all the loss of technological safety. Then it is again useful to remember the economists of dead and gone years.

German scientist Frederic List (1789–1846) contrary to A. Smith and D. Ricardo stated that it is far not always necessary to aim for taking advantage of relative efficiency between national economies. Thus, for example, according to him, Germany must develop those branches of industry, which have no competitive edges as compared to English branches. Germany has to do it for the achievement of national goals. This loss of costs, in his point of view, one should treat only as a price for «industrial education of nation». However hundred years before him similar ideas about absolute priority of home market appeared on Russian soil. Our compatriot I. Pososhkov in his «Book on Scarcity and Richness» intended to Russian tsar Peter I suggested to stop completely an import of commodities that can be produced in a country, though at first stage not of perfect quality. In his opinion, Russia needed an active protectionism policy to increase home industry. It would lay the bases for future Russian export of released product (in current terms «with bigger added value»). Notice that it had been said about three hundred years ago. Other our compatriot D. Mendeleev who are closer to us in time when made a presentation on Industrial Congress in Moscow in 1882 (i.e. before the decree on starting the building of Trans-Siberian Railway) urgently suggested to keep in mind a need to continue creation of convenient ways to the East, as he saw ahead the rapid growth of demand for manufactured goods in this region of the world. At that, he stressed: «Without a primary protection, it is certainly impossible to expect even that on internal markets the national plants could compete with existing western plants» (Mendeleev..., p. 141). Today we reopen these historical truths.

In 1930s the USSR had no choice but to be oriented towards the domestic market, to the development of its own diversified production and provision of the country with practically all needed goods, especially in relation to energy, metallurgy, engineering and defense industries. There was understanding of necessity to locate productions in various regions of country, which should be difficult to access in case of external threats. All these statements have been realized when fulfilling the plans of GOELRO (first Soviet plan for national economic recovery and development), Uralo-Kuznetsky integrated plant, group of territorial-production complexes (TPC) of the Angaro-Yenisey region and, finally, creation of the theory of TPC as a form which is especially useful in the regions of the new settling, for example Siberia. Many of these projects have been realized, even not in full size,



but still functioning. It is useful to compare what was accomplished in the framework of the processing industries creation within last 20 year period of the Soviet Union and 20 years of the new Russian economy (Table 2).

Even this short list of objects constructed within 1990–2009 period shows that they practically implemented a policy of «electric power export in the form of aluminum», 80% of it is meant for export. Some revival in the last five years of namely the «second floors» (for example, Boguchany forest processing complex and aluminous plant) does no foundation for strong optimism on the development of processing industries in Siberia. The objects located in Far East have also vector towards exporting of their products (mostly semi finished articles) to China and other countries of Asian Pacific Region. It is difficult to argue those, who consider Siberia to be in transformation into a raw material colony. However it is now reasonable to ask: whose colony? What country?

Table 2

**Several most big objects of the «second floors» (second generations)  
of resource processing located in Siberia**

Period: 1970–1989	Period: 1990–2009
Krasnoyarsk Metallurgical Plant	Kharanorsk GRES
Achinsk Aluminous Combine	Khakask Aluminous Combine
Krasnoyarsk Hydroelectric Power Station (HPS)	Boguchany HPS (started building in 1974)
Surgut GRES-1 (state district power station)	
Lesosibirsk Forest Processing Complex (FPC)	
Ust-Ilimsk FPC	
Tomsk Chemical Integrated Plant	
Ust-Ilimsk HPS	
Achinsk Oil Processing Complex	
Petroleum Runback in Surgut	
Nizhnevartovsk Gas Processing Plant	
Tobolsk Gas-Chemical Complex	
Sayano-Shushensk HPS	
Surgut GRES-2	
Sayan Aluminous Combine	

Many questions arise in respect to the turn of Gazprom to the East and to the «Force of Siberia» project. This project is not new. Several variants of the turnabout of Russian gas to the East, first of all Eastern Siberia gas have been examined ten years ago (this experience is described in a book «Problem regions of resource type: Asian part of Russia»). It was then already clear that it is impossible to sell gas without leaving its helium component on the territory of Russia. Moreover, as gas of East Siberia has a lot of valuable components (ethane, propane, and others) it would be good to build a number of processing productions along the transportation of this gas in order to increase the added value for Russia. If to trace further possible chain of the use of this gas, then there are options to create in Siberia and on Far East mineral fertilizers plants, which can improve yields (agriculture productivity) and, thereafter create here a lot of new high-yield workplaces. This is

the most effective way to solve demographic problems in this region. In addition, in several options (south variants) on the way of gas transporting it was assumed to install gas service to population centers of the Irkutsk area, Buryatia and Transbaikal region.

However it is well-known that Gazprom is a commercial company and its aim is to get maximum profit. Therefore we have another resulting effect: a maximum of net profit reached in a variant, when on the territory of Russia only plants for helium utilization, least needed (for strategic safety reasons), are built. No gas-chemical plants, much less mineral fertilizers plants and no gasification of population centers are envisaged. Mineral fertilizers, alas, give much more return on the land of Chinese farmers.

The very sad thing here is that company's interests (even state company, but first and utmost a joint stock company) coincide with the interests of neighbor country. Deep processing production is more profitable to locate in other country: all components are cheaper. Objective evidence says that Russia (including Siberia) may lose in a competition for these profitable objects. In case the focus on pure market criteria to be kept then state interest maybe unable to hold its ground against commercial interest.

One can permanently hear that in Russia is no investment as they hurry from Russia. Traditional explanation is a bad institutional environment, bureaucracy, corruption etc. All these reasons are in evidence in Russia, but there is also another more deep and, first of all, intrinsic reason: a priori less effective production resulted from natural, climatic and geographical factors. Decisions about redirection of profits received from Siberian resources' use are usually accepted by so-called «top-managers». Their personal interests are frequently far from the interests of both Russian and Siberian population. The real investment resources (including preliminary studies of fundamental and applied sciences) are concentrated mostly in large companies. The point is that «dolce vita» for these large companies is provided without the realization of new, often risky projects. Middle and small businesses can be prepared for such risks, but they have neither financial nor technological possibilities.

In conclusion it would be helpful once again to pay your attention on the basic concepts of this study.

1. Asian part of Russia as no unique resources for the world economy. That is, no one and only resources to be found in other regions of the world (rare exceptions are Norilsk region and Baikal Lake). No super profitable projects are to be expected in this region. All economic aspects are more expensive: energy, transport, building and, mainly, MAN.
2. In mining operations a small and even medium size business is not able to bear the strain in the form of additional expenses in energy, transport and social spheres.
3. Economy of Asian part of Russia can compete on the world market only on account of redistribution of added value to the advantage of a «customer» by means of reducing a share of a «producer».
4. There is nothing «personal» (national, patriotic, etc.) in business. A private company (particularly not resident one) is not able to agree to the decrease of its profitability for the sake of state developing and achieving national strategic aims.

**BUT!** The Asian part of Russia is first of all Russian territory and as a minimum it is essential to maintain OUR population. For this purpose we should at least maintain infrastructure and create new high-paid jobs.

Therefore:

1. For Asian Russia application of the large complex projects with the casting vote of state structures is preferable
2. Competition is a good thing. Bad thing is when the third party wins from it. So for neighbor regions it is favorable to seek and find mutual understanding when carrying out large resource projects.

3. For the resources development projects of Asian part of Russia we propose a conception of «advance initiatives», supplementing conception of the «territorial-production complexes». This conception is strongly reasonable for «going» into the north and arctic regions of Russia.
4. «Transparency» is needed when it comes to the estimation of expenses and incomes of every participant of large investment projects.

Throwing a bridge into 2015 and continuing the logic of expediency of projects developed a century ago one can state that in order to evaluate the projects on further development of Siberia and all North (plus water areas of the Arctic Ocean) market criteria are in applicable. The narrowing of economic space for the sake of achieving today market effects can become tomorrow big and even irretrievable losses for the whole country.

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# THE STRATEGIC MANAGEMENT OBJECTIVES AND THE PRIORITIES OF SIBERIAN DEVELOPMENT

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In the article the main objectives of formation the regional system of strategic administration of Siberian social and economic development are stated. The decision of them would allow not only providing a long-term sustainable economic development of the Siberian regions, increasing the level and the quality of life of the population, stimulating the priority development of innovative productions, but also strengthening geopolitical and economic positions of Russia.

The current stage of institutional transformations is characterized by deviation from extreme forms of economic liberalism and recognition of state and special regulation necessity. Systems transformation of a state structure and economy are followed by changes of power authority and responsibility at all levels of management. The market relations development happens along with decentralization and development of territorial self-government functions, broadening economic independence of Federal subjects and municipalities.

The Federal subject is a fundamental link in the system of public administration which consistently concentrates functions of state and economic management. At the same time at the regional level institutions of the government are almost reformed and new ones acting in the conditions of unbalance and an economic crisis appears.

The inevitable regional variety of economic reforms, which assumes maintenance of social and economic stability in each Federal subject, imposes restrictions on sequence, terms and intensity of implementation of many actions in the context of reform, including the structural transformations of a directional system. Insufficient scientific justification of the idea of reforming a directional system at the level of the Federal subject affects. Innovations are often carried out irregularly, without any sufficient justifications. As a result logically contradictory and wasteful directional system is formed.

Therefore it is essentially important to increase efficiency of public administration by creation a regional directional system of a social and economic complex which would be adequate to market transformations. It will also promote the realization of one of the capital goals of Russian regional economic policy – strengthening the economic integrity, the state and society.

Historically developed distinctions in economic development of regions have considerable impact on a government, structure and efficiency of economy, strategy and tactics of institutional transformations and social and economic policy.

Reduction of distinctions in economic development creates favorable conditions for development of domestic market, optimization of social and economic transformations, strengthening the unity of the state while boosting of distinctions complicates carrying out

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uniform policy of social and economic transformations and building-up the national-wide market, increases the danger of emergence of regional crises and interregional conflicts, disintegration of national economy and decrease of integration processes in society and the state [1].

Distinctions in development of Federal subjects through the main socio-economic indexes reached critical level. Sharp interregional differentiation has the inevitable consequence expansion of number of the lagging behind regions, weakening of interregional economic interaction mechanisms and increase of interregional contradictions that complicates carrying out unified all-Russian policy of social and economic transformations. Excessive distinctions in living conditions of the population of the center and the periphery, various regions of the country are perceived by society as violation of principles social justice principles and can lead to strengthening of centrifugal tendencies and separatism [1].

Disorder of Siberia is usually explained with scales of the macroregion and difficulties of maintaining to economic activity here. Such theses don't maintain criticism. For example the population density (2.24 people/sq.km) is comparable to Australian indicators (2.81 people/sq.km) or Canadian (3.4 people/sq.km), and more than by 4 times exceeds ones for Alaska (0.49 people/sq.km).

At the same time in Australia the density of a railway system is higher than Siberian one in 3 times, road – in 10 times, and the number of airports on 100 thousand inhabitants – in 14 times (in Canada the same indicators make 4. 7 and 19 times). In both countries GDP per capita reaches 40–42 thousand dollars against 241 thousand rubles (4 thousand dollars) in Siberia. In Alaska the average per capita income is about 65 thousand dollars, it is more than in California or in the State of New York [2]. Therefore Siberia doesn't become the region attracting to life, because of the pursued social policy.

The long-term interests of Russia consisting in creation of the innovative economy which is integrated into Euro-Asian economic space define a special role of Siberia owing to its geographical position and existence considerable resource, production, scientific and technical, educational and personnel potentials. Meanwhile, there were recently outlined the tendencies of population's outflow from Siberia, comparative delay of economic development, strengthening the differentiation of the Siberian regions by the level of social and economic development.

Formation of a new economic basis of the state construction in Russia, emergence of new economic problems and new conditions of their decisions are all demanded the change of the state regional policy and system of its realization in scale as the countries in general, and certain regions. Necessary conditions for increase of the state regional policy effectiveness in Russia are the development of the Strategy of territorial development of the country as the most important component of the Strategy of social and economic development of the state.

In turn, this strategy is a synthesis of strategies of macroregions development in Russia on the base of strategy of Federal districts development. The «pioneer» was Siberian Federal District where at the request of the Russian President the Strategy of economic development of Siberia which was approved by the decision of the Government of the Russian Federation. These strategies, in turn, are coordinated to medium-term and long-term programs of development of Federal subjects and the large cities [3].

According to Goskomstat of the Russian Federation the territorial structure of a total gross regional product of Siberian Federal District testifies that the most part of its gain concentrates in a small amount of economically developed regions, mainly raw specialization (Krasnoyarsk Krai, the Kemerovo and Irkutsk areas). Extent of differentiation between regions of the district on average per capita VRP between the maximum indicator in Krasnoyarsk Krai and minimum in the Republic of Tyva reached sixfold size and in annual dynamics steadily increases.

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The gap between specific GRP across Russia and Siberian federal district progresses, lag of specific GRP of the district from Russian makes more than 20%. The share of Siberian federal district in total GRP of the country decreases. It testifies to reduction of internal opportunities of regions of Siberian Federal District for independent development.

The serious threat in the sphere of economic security is reduction of investment potential of economy of Siberian Federal District. At preservation of the developed level of investment activity and taking into account the existing condition of fixed assets, the probability of their mass leaving and technogenic catastrophes increases. Fixing of raw specialization of the region, dependence on a foreign market and world prices for export production is possible.

Among the federal districts in Siberian Federal District the lowest specific indicators of investments for the last years remain. At the same time in the sphere of public finances and interbudgetary streams the policy aimed at the state support of investment activity isn't looked through. As a result, tendencies of decrease in investment activity amplify and fixed, their level, insufficient for expanded reproduction, and structure remains. There is indeed a threat of loss of high production potential, and these tendencies can negatively affect the dynamics of economic development.

The existing budgetary policy and the interbudgetary relations don't reduce regional economic differentiation, soften a little, but don't eliminate social differentiation, don't compensate negative tendencies in the investment sphere, and also doesn't promote increase of level and quality of life of the population.

The condition of budgets of the majority of regions of the district worsened significantly, noted growth of accounts payable and debt obligations that speaks:

- the advancing growth rates of operating costs of budgets of regions over the income;
- deterioration of a financial position of the most part of the budget forming enterprises;
- lack of regulation of the interbudgetary relations «center – regions».

In recent years the share of Siberian regions in the budgetary system of Russia was reduced almost twice. In conditions when the share of the oil and gas income in the federal budget exceeds 50% and in Siberia more than 75% of the Russian oil and 85% of gas [2] are extracted.

The developed model of management of social and economic development doesn't allow using fully economic potential for overcoming of negative tendencies in investment and innovative spheres. A disturbing factor is folding of economic activity of the state in the territory of Siberia. Therefore carrying out the strong state regional policy directed on smoothing of distinctions in the level of social and economic development of regions of the Russian Federation [1] is strategically important. A priority is the improvement of living conditions.

The realization of objectives possibly with participation of the state is in a number of the priority directions. First of all, this formation and acceptance of the corresponding standard and legal base supporting the social and economic sphere, improvement of the mechanism of realization of regional economic policy. Realization of the strategy of forward development of the Siberian macroregion calculated on long prospect taking into account the balance of federal and regional interests provided with the reliable mechanism of realization and leaning on new conditions of managing and financing is necessary.

Strategy of development of Siberian Federal District is based on the following program provisions:

- economic growth in the sizes which are steadily advancing growth of world economy is necessary for reduction of the existing gap between Siberia and the developed countries;
- growth rates have to provide achievement of welfare reference points, significant

for the population, the solution of problems of structural and technological modernization, strengthening of competitive opportunities of Siberia in the Russian market and the international scene;

- economic growth can be provided with a combination of the saved-up capital and intellectual resources, increase of efficiency of their use, release of an enterprise initiative;
- at any options of development Siberia remains the main supplier of fuel and energy, mineral and raw and forest resources on domestic market and for export;
- priorities in development of economy of Siberia are defined by hi-tech and knowledge-intensive productions in industrial areas and productions of consumer appointment in the southern areas;
- ensuring complex processing of mineral and raw and forest resources, introduction of progressive methods of production of hydrocarbon raw materials, the state support of hi-tech and knowledge-intensive productions of mechanical engineering, modernization of the processing productions of consumer appointment, use of capacity of defense industry complex;
- development of transport system of Siberia, including pipeline transport of oil, oil products and gas.

In this regard «the innovative model» of Siberia is based on a number of the principles:

- multidimensional economic cooperation of the subjects of Federation located in the territory of Siberia, i.e. creation of the large-scale all-Siberian market;
- to targeted support of the state in the solution of social problems of the population of Siberia, especially its northern areas;
- to structural policy in the sphere of the real economy relying on science, hi-tech productions, the relevant system of reproduction of shots for them, etc.

Natural and resource, production, scientific and technical, geopolitical capacity of Siberia have to be fully involved in this model. For realization of capacity of the district it is necessary to create the state social, structural, investment policy of innovative development of Siberia.

The policy of the state protectionism for Siberian Federal District is necessary: increase in investments into region economy, projects having interregional and international character, different preferences (preferential customs and tariff policy). It is important to concentrate efforts of public authorities on improvement of investment climate through attraction to the district of the centralized capital investments of various form, strengthening of integration communications of governing bodies of various levels, development of the markets of east countries;

Concentration of efforts of the authorities of all levels on innovative, and not just raw nature of development of the Siberian region, orientation to creation of the productions realizing the latest technological way with an entry into the internal and external markets with the knowledge-intensive production especially as for development of innovative economy there are prerequisites in the form of the potential of a powerful scientific and educational complex and not loaded capacities of engineering plants of defense industry is necessary.

Without federal support transition of economy to an innovative way of development in Siberia is almost impossible as there is no sufficient solvent demand for innovations from businessmen, solvent demand of the population is low and possibilities of stimulation of economic growth of the authorities of subjects of Federation are limited.

Considering the available research and production potential of the Siberian subjects of Federation, and taking into account support of the federal government the innovative way of development of economy is possible and will make favorable impact on economy of

Omsk, Tomsk, Novosibirsk, Kemerovo and Irkutsk areas, the Altai and Krasnoyarsk Krai, the Republic of Buryatia. Such approach is represented to the most effective from positions of increase of a standard of living of the population.

Many problems of regions of Siberian Federal District are solved on the basis of change of the economic mechanism of subsurface use. Property questions on resources, granting subsoil in paid use, production sharing agreements, licensing are almost removed from under control of the Siberian subjects of Federation. Change of the principles of pricing and the taxation on production of branches of mineral and raw sector of economy of Siberia taking into account system of the market relations is necessary. Especially it is necessary to mark out need of carrying out in Siberian Federal District with the state of policy of mutual control of the prices and tariffs of natural monopolies.

When forming the budgetary policy it is expedient to continue work on ordering of the interbudgetary relations, development of accurate criteria in system of financial aid and investments from the federal budget to subjects of Federation, providing social standards with the state to each inhabitant taking into account specifics of the region of residence.

It is obvious that Siberia needs a powerful source of financing of its development – and redistribution of the raw income can be it. The most important direction of investment of these means have to become infrastructure, scientific and technological and social, including educational, projects, whose realization will provide inflow of private investments and improvement of conditions for business. As a source of technologies as for carrying out industrialization and for formation of the important innovative centers foreign investors from China of Korea, Japan and the United States can act. Siberia has to be positioned as «Europe in Asia», as the bridge connecting not only Russia and China, and Europe and America [2].

Realization of Strategy of social and economic development of Siberia will allow providing a long-term sustainable development of economy of the region, to increase level and to improve quality of life of the population, to stimulate priority development of innovative productions, to strengthen geopolitical and economic positions of Russia [6].

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# DEVELOPMENT PROBLEMS OF THE AGRARIAN PRODUCTION IN THE SOUTH OF WEST SIBERIA

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In the south of West Siberia (Republic of Altai, Altai Territory, Kemerovo, Novosibirsk and Omsk regions) with the largest Ob-Irtysh river basin there are territories with middle and low available water supply (Baraba and Kulunda steppes).

Baraba steppe (about 117 thousands square kilometers) is situated at the territories of Novosibirsk and Omsk regions. This is forest-steppe lowland with the branching network of minor water streams, fresh and salt lakes (Lake Chany, Lake Ubinskoye, Lake Sartlan, etc.) and numerous not so deep water reservoirs as well as swamp lands. Swamp lands are one of the dominating landscape complexes. According to the Decree of the Government of the Russian Federation, Baraba water bodies, first of all Lake Chany system, have been included in the List of Wetlands of international importance.

Kulunda steppe (about 100 thousands square kilometers) is situated in Altai Territory of Russia and Pavlodar region of Kazakhstan. Here, the steppe landscapes prevail; the large lakes (Yarovoe Lake and Lake Kulunda) are situated in the central part of the lowland. The climate is continental: hot torrid summer and cold winter.

Natural climatic conditions predetermine the existence of the extreme hydrological situations in the south of West Siberia: interchange of lack of water, high water, and flood water. These situations create unfavorable conditions for water use. In dry year the local water deficits arise: up to 155 million cubic meters in Altai Territory, 3 million cubic meters in Kemerovo region, and 8 million cubic meters in Novosibirsk region. Water deficiency is worsened because of the irregularity in distribution of water resources across the territory and throughout a year.

Lack of water causes financial economic damage and breaks conditions of human life and activities. Agricultural producers did not receive planned volume of revenue. For example, in 2012, in Altai Territory, where 70% of territory is used for agricultural production, 3 million hectares from 5.4 million hectares were damaged by severe drought and 749.000 hectares totally burned down. Actual damage of the agrarians amounted to 3 billion rubles, profit decreased by 40%. The similar situation also occurred in Novosibirsk region where agriculturally used area is equal to 48%. Here, 22 regions were recognized as drought affected areas, of which in 11 regions the emergency situation has been announced. Harvest failure caused by the unfavorable weather conditions amounted to 50%. People managed to gather only 1.5 million tons of grain. The damage resulted in 4 billion rubles.

The problems arise in a wet year, too; and they galvanize authorities to make adequate decisions. For example, the winter of 2010–2011 was snowy in Novosibirsk region, and the winter of 2012–2013 was one in the top ten of the snowiest winters of the last century: as of from November to January snow precipitation reached 137% of norm.

Abnormal wet May and early June of 2014 occurred in the south of West Siberia. The rivers were up in Altai Territory and in Republic of Altai because of the heavy rains. That resulted in the introduction of the emergency situation regime. Sixty five human set-

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lements were underflooded, 915 houses, where 3527 individuals resided, occurred under the water. The partial road havoc took place: the length of the washed out parts of the road exceeded 50 kilometers. More than 30 bridges have been damaged. In the Republic of Altai 1576 individuals suffered in the flood peak, the water flooded 518 smallholdings, 22 road bridges were flooded, and water washed out 230 kilometers of the road and damaged electric power transmission lines.

For the first time, the water renovation of the south of West Siberian land began with the Trans-Siberian Railway construction. Its building has required the development of the production, providing the efficient railroading and the human migration from the European part of Russia. It was necessary to create favorable living environment, to clear the wetlands for the future action and to open access to fertile soils, to shape croplands and meadowlands and to provide the population with the drinking water. In 1895, the tsarist government has developed the project for Baraba Lowland draining as well as for its general melioration and water-economic practice. Land improvement has been carried out by means of hydro-technical, erosional-preventive, cultural-technical (including burning top soil with the fertilization and deoxidization of soil with ashes), and other kind of works.

The essence of the approach referred to the minimal intervention into the environmental processes. Baraba Lowland is of ridged nature. Between ridges (along lows) the rivers run almost in-parallel, they provide the natural reflux of the excess water thus fulfilling a function of channels. It is known that fast runoff leads to the territory drainage, slow runoff leads to the mire formation. Ameliorators increased the steepness of slope at languid rivers, then the water flowed down faster and accretion of silt stopped, overgrowth of rivers decreased, too. People had to slow down rapid rivers. In such a manner main natural channels were formed, smaller (side) channels were led up to them, and then shallow leats have been added. Thus, a single melioration network has been formed. Water-economic practice has been implemented competently; the results of territory research were used (relief, soil, flora, etc.). The practice was tested onsite. It helped to improve sanitary and hygienic living conditions of indigenous people and incomers, to predetermine the agricultural territory development. Over a period of 1895-1916 only in Baraba 4 million hectares of lands were introduced in agriculture on the basis of drainage. Livestock husbandry was the most profitable business, and Baraba melted butter was considered to be the best one not only in Russia but also in Europe in prerevolutionary years. Alongside with livestock husbandry, development of the areas under grain crops has been expanded.

The economic policy in the Soviet period, based on the ideology of conquering the nature, opened the way for implementation of ambitious projects. The melioration projects in Baraba have been prolonged on a large scale with the use of powerful machinery. Unfortunately, the previous experience has been ignored. As a result, they have got soil salinization in one place, excessive dehydration, weathering, and burning of peats in the other places. So, the land «improvement» works had been practically stopped, and Baraba Lowland has been included into the category of deficit water areas.

The partial river flow transfer was carried out to improve the conditions for the development of agricultural production in Kulunda steppe. In 1983, Kulunda channel was constructed in Altai Territory with 396 million m<sup>3</sup> a year intake to irrigate 20,000 hectares of lands and to flood pastures. However, in the course of channel construction these works were not done at sections (more than 80 kilometers long) requiring waterproofing. This is largely responsible for substantial water losses, mire formation, soil resalting, and flooding of the settled lands. At the present day, the channel potential for systematic irrigation is used less than it planned in the project. The projected capacity of Aleisk canal system is not used in full. The intake of main channel (90 kilometers long) is from Alei River (left tributary of Ob River) near village Veseloyarsk. Of planned 50,000 hectares agriculturally used areas only 14,000 hectares are irrigated (28%).

Charysh group water supply line was constructed in 1982 to provide human settlements with drinkable water. Ground water transfer from the Charysh River basin (from 30 subsoil wells) into the Aleya River basin is carried out. Maximum drinkable water abstraction occurred in 1990th – up to 34,000 m<sup>3</sup> per day, at present – 13,700 m<sup>3</sup> per day to supply it to 73 settlements of the Altai Territory. The fact is that of 1167 kilometers of water supply line 499 kilometers are recognized as unusable for further service and are written-off. Meanwhile, groundwater storage is all-sufficient to provide all nearest inhabited localities and city of Aleisk with quality drinkable water [1].

In recent years, the problem was discussed to implement the project of local water importation of Ob-Irtysh basin into the republics of Central Asia and Kazakhstan. This project was rejected in 1986 for environmental and economic reasons. In particular, according to the decree of the Republic of Kazakhstan prime minister the commission was formed to evaluate the prospects of this ambitious project of transformation of nature. The researchers of the Institute of Hydrogeology and Geocology took active part in commission work. The main results of the commission work came into the public domain in August 2011. The project supposing water abstraction from 27 up to 37 km<sup>3</sup> per year at the place of Ob River and Irtysh River junction, near city of Khanty-Mansiysk, and its water transportation to the south by open earth canal (2550 kilometers length, 6 meters wide, and 15 meters deep) has been recognized as inexpedient. [2]. Nevertheless, in June 2013, the Regional Development Ministry of Kazakhstan presented General development scheme for Kazakhstan developed with Kazakh Scientific-Research Institute of Construction and Architecture. In this document, it was suggested to turn the part of trans-boundary Irtysh River flow, passing across the territory of East Kazakhstan, to Central Kazakhstan. It is expected to implement this project within the next thirty years [3].

Time will show the results of this remaking the nature. But the experience of hydro-technical projects implementation (Kara Kum Canal, etc.) in Central Asia and Kazakhstan shows that these projects produce a short-term effect only, and then they lead to the worsening of problems (growth of external solonchak volumes, increase of water salinity, etc.). Irrigating-water supply Irtysh-Karaganda canal built in 1971 became the source of salting and acidification of vast areas while it was constructed primarily to irrigate these areas. Irrigation water use efficiency is very low today, 38% on the average.

What will be the consequences of the local water transfer of Irtysh River within Kazakhstan for the socio-economic development of Russian area? The question still remains open. Science still has no reliable basic data and methods of spatial forecast management for large regions for long-term perspective. People lack background knowledge of environment; it is not all that simple to include theoretical knowledge into the modeling of ecological processes, some of them have cyclical pattern. There are some other difficulties of ecological forecasting which is always associated with ambiguities and uncertainties of various kinds.

To prevent conflict situations Kazakhstan is ready to discuss this project with Russia. Will the bordering countries succeed to reconcile their interests and to avoid the environmental threats? At Security Council meeting in November 2013 President of the Russian Federation V.V. Putin set a task «to work out and adopt the Environmental Safety Strategy of the Russian Federation in the nearest time. It should contain assessments of external and internal threats in this sphere as well as threshold safety indicators». [4]

The internal threats exist in the south of West Siberia, and they are considerable. Agriculture is in a spontaneous mode: its effectiveness is determined by the weather conditions. The most effective way to provide the agricultural production stability in climate extremes is hydraulic reclamation, i.e. irrigation and drainage of lands. However, current melioration fund capacities do not allow addressing the unfavorable weather conditions because they are under unsatisfactory condition. Degree of the irrigation facilities depreciation comes up

to 77%. More than 70% of water measurement points fail to meet the requirements: they are not equipped with the means of water balance measuring. More than 80% wide-coverage sprinkler systems are in breakdown state [5]. Split of melioration systems and their transfer to private property has led to the fact that new owners failed to maintain sprinkler systems in a proper condition. Many of the new owners abandoned melioration. The drainage systems do not fulfill a function of diverter network. Melioration systems and capacities built more than a century ago and in subsequent years are in the growing process of destruction. The intake structures, collection and control networks are the most worn-out systems. The risk of emergency situations at waterworks has been increased. The main canals are silted, bushed, stopped by numerous earth cofferdams, etc. As a result, not only farmlands became bogged up and salted, removed from operation, but rural villages were drowned and overflowed. Thus, the ecological conditions grew worse in the large territory.

The Russian Federation government policies targeted to import relief actions relative to food products activated reclamation works (melioration). The federal agricultural melioration program has been adopted [6]. Subjects of Federation of the south of West Siberia are developing their regional programs of soil improvement.

Availability of hundreds of thousands hectares of fertile lands in Baraba and Kulunda steppes is a good base for organizing powerful agro-industrial complex for cultivating and processing agricultural products in the south of West Siberia. With this end in view, accumulated problems need to be resolved. First of all, technical re-equipment of the melioration (soil improvement) systems at work should be accomplished. Measures on the refusal to import certain types of agricultural products from the countries of the European Union could be the incentive for large-scale development of the national agricultural sector [7].

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# HIGHER EDUCATION REFORMS AFTEREFFECTS: INTEGRATION WITH ACADEMIC SCIENCE INSTITUTES AND EXAMPLES OF LOCAL SUCCESS

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Institutions of higher education together with academic institutes have established a network of innovation structures in several Siberian regions. However upcoming conversion of fundamental knowledge into specialist training and starting new products and businesses is surely subject to substantial government support. The establishment of federal centers of science, education and high technologies in Siberia has already started in Tomsk and Novosibirsk. Novosibirsk State University (NSU) together with the Siberian Branch of the Russian Academy of Sciences (SB RAS) cooperates in the development of innovation initiatives and improvement of NSU position so as to be in the academic and educational mainstream within the near-term perspective.

The paper studies the first steps in education system reforms in Russia. It shows that the processes of integration of science and education in the Russian top universities as well as around recognized regional centers in the cities of Novosibirsk, Krasnoyarsk and Tomsk increased. By the example of Novosibirsk National Research University working in collaboration with the Siberian Branch of the Russian Academy of Sciences and Technopark «Akadempark» with the support of federal and business structures the prerequisites for the entry into the education services and high technologies world market are developed. The paper describes zones of mutual interests that are attractive for the Public Private Partnership (PPP) projects.

## INITIAL STEPS OF A REFORM OF THE RUSSIAN HIGHER EDUCATION SYSTEM

Debates concerning reforms of the education system in the Russian Federation have lasted for more than ten years. All through this period, measures have been taken to increase the value-added of the knowledge accumulated in science and education by its further application in business and society. Among these measures are the establishment of federal and national universities, as a means to foster top-level higher education, as well as research and educational parks focused on the needs of high-tech business.

The elite of Russian top-universities had been in the process of formation since 2010, when the rectors of 39 Russian universities announced the creation of the Association of leading universities, with the Rector of St.Petersburg State University as its president. One of the main objectives of this new Association is to develop national academic research and to lobby for the interests of its members in the government. The Association includes all universities with a special status: federal universities, national research universities and both Moscow State University and St. Petersburg State University, whose rectors are to be appointed by the President of the Russian Federation since 2012.

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Table 1

**Rating of Preferences Shown by the Winners and Runners-up of Academic Olympiads  
When Selecting Higher Education Institutes in 2011**

Preferred list	Name of higher education institution	Number of top high-school graduates
1.	Lomonosov Moscow State University (MSU)	1961
2.	National Research University «Higher School of Economics»	927
3.	Siberian Federal University	745
4.	Saint-Petersburg State University	589
5.	Moscow Institute of Physics and Technology State University (MIPT)	414
6.	Pirogov Russian National Research Medical University	399
7.	St. Petersburg National Research University of Information Technologies, Mechanics and Optics	337
8.	National Research Nuclear University (MEPhI)	300
9.	Novosibirsk State University	244
10.	Financial University under the Government of the Russian Federation	240
11.	MGIMO University (Moscow State Institute of International Relations)	231
12.	National Research University «Moscow Power Engineering Institute»	180
13.	Novosibirsk State Technical University (NSTU)	173
14.	Moscow State Pedagogical University	164
15.	Russian State University for the Humanities	139

Nearly 40% of foreign students in Russia come from Commonwealth of Independent States (former Soviet Union republics generally with some fluency in Russian) and more than 35% from Asian countries, 6.3% from Arabic-speaking Middle East and Northern Africa countries and 6.9% from other African countries. The share of students from Western Europe in Russian universities (4.4%) is much lower and other continents and regions are represented even less (V. Kuleshov, G. Untura and A. Evseenko, 2012). All in all, 120.000 students from 165 countries are trained in full-time programs at Russian higher education institutions. The most popular universities which train from 1,000 to 5,000 foreign students are listed in Table 2.

In Siberia, Tomsk, with the Tomsk State University, National Research Tomsk Polytechnic University and some other universities, stands out as an international education center (V. Kuleshov, G. Untura and A. Evseenko, 2012). The region of Altai Krai is setting ambitious goals for itself, hoping to profit from its geographical location. European universities attract increasingly more students from Russia, but are slow to send their students to Russia.

Attractiveness for prospective students can hardly be considered as the sole indicator for the selection of a university for increased funding, however, since student numbers have recently experienced a serious inflation. Currently, 57 percent of Russian citizens at the age of 25–35 have completed higher education. Only three other countries – Japan, South Korea and Canada have achieved the same level. While Japan has set for itself the goal to give

higher education to all its citizens, it has at present 31 university students per thousand citizens, while Russia has 65. In Japan, this figure has been stable in the last twenty years, while in Russia a similar level (around 30 students per thousand citizens) was attained in the beginning of the 1990's and has about doubled since then. A similar situation is typical for most of the countries of the former Soviet Union. This can mainly be attributed to the advent of fee-based higher education, which provided financial incentives for universities to expand the number of their students (Present-day Role of Siberian Economy in the Russian Macroeconomic Complex / ed. V.V. Kuleshov. (2013).

Table 2

**Russian Higher Education Institutions Having the Highest Number of Foreign Full-time Students in 2008/2009 – 2010/2011**

Name of higher education institution	Years		
	2008/2009	2009/2010	2010/2011
Peoples' Friendship University of Russia (PFUR)	5353	5324	8221
Lomonosov Moscow State University (MSU)	5776	4187	3512
Saint-Petersburg State University (SPSU)	3751	3626	3431
Saint Petersburg State Polytechnical University (National Research University)	2402	2254	2297
I.M. Sechenov First Moscow State Medical University	2335	2123	2216
Pushkin State Russian Language Institute	3708	2349	2001
National Research Tomsk Polytechnic University	1626	1592	1794
Smolensk State Medical Academy	1227	1345	1391
Pirogov Russian National Research Medical University	1042	1187	1286
Moscow Aviation Institute (State University of Aerospace Technologies)	945	973	1277

Source: Newspaper *Poisk*, № 50, 2012

Until 2020, another 10 to 11 million young people will come to the labor market and a very high fraction (8 to 9 million) of them is expected to have a university education (Education Today, 2009). It is questionable, however, whether their education will meet the requirements of the labor market. In many cases, the students' qualifications are not sufficient for the needs of high-tech production and demanding management institutions. In other parts of the labor market, the required qualifications are below that of a college graduation. The present system of higher education does not appear to be flexible enough to adapt to such a diversification.

In our opinion however, an evaluation of the universities' current situation shows a need for further development of processes which lead toward an integration with research in institutes of Academy, rather than a contraposition. This opinion is supported also by the experience of Russian scientists, who are doing research in world-ranked universities abroad. Andrey Starinets (Starinets A., (2013), for instance, now working at the Department of Physics in the University of Oxford, states in this regard: «Mechanical, thoughtless and thus all the more forced transfer of any models into a different civilization is prone to run



into many hazards... Some elements of research engineering are certainly quite universal and can be adapted, like properly organized grant financing, open international competitions to fill temporary and permanent vacancies, prestigious national fellowships which can be won by a strong candidate from any country, research institutes ... Before adapting one method or another, one should first of all consult a wide range of experts, who know the essence of the matter firsthand».

The need for more integration is evident also from data published by Vladimir Polterovich (Polterovich V., 2013) that show a significantly higher academic productivity of those top universities, which cooperate with the Russian Academy of Sciences (RAS) (Table 3).

Table 3

### Scientific Productivity of Universities and RAS, 2011

University	Total number of publications	Number of publications co-authored with RAS	Share of publications co-authored with RAS
<b>Federal Universities:</b>			
Ural Federal University named after the first President of Russia B.N. Yeltsin	342	122	35.67
Southern Federal University	296	89	30.07
Kazan Federal University	285	80	28.07
Siberian Federal University	175	127	72.57
Far Eastern Federal University	88	64	72.73
North-Eastern Federal University in Yakutsk	22	14	63.64
Immanuel Kant Baltic Federal University	12	2	16.67
<b>National Research Universities:</b>			
Novosibirsk State University	622	581	28.07
St.Petersburg Academic University – NanoTechnology Research and Education Centre of the Russian Academy of Sciences	53	45	84.91
Moscow Institute of Physics and Technology State University (MIPT)	334	206	61.68
National Research Irkutsk State Technical University	15	8	53.33
Higher School of Economics	61	29	47.54
Perm State University	71	31	43.66
Samara State Aerospace University named after academician S.P. Korolyov	44	19	43.18
St Petersburg State Polytechnical University	235	100	42.55
Nizhny Novgorod State University named after N.I. Lobachevsky	232	91	39.22
Tomsk State University	273	100	36.63

(RAS share in Russia's scientific productivity (number of publications): 55.11%; Share of the total higher education sector: 44.1%; Cooperation with RAS namely Moscow State University – 30.2% and St. Petersburg State University – 29.04%).

Source: Polterovich V., 2013.

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A serious omission of the current education reform appears to be that it ignored not only the positive aspects of programs aimed at an integration of academic science and education, but also the urgent need to develop regional innovation systems. Institutions of higher education, especially when they are united within a zone around a top university, are the most significant intellectual resource for the development of regions and municipal units. The experience of cooperation between academic research and innovation work in some regional Siberian universities has clearly demonstrated that excellent project research and architectural and engineering results can be achieved within the framework of student graduation projects. Despite the fact that municipal and regional authorities often lack resources to support these projects, they have been vitally important for the region concerned. Many local branches of central institutions of higher education brought discredit on themselves because their activity had lacked adequate quality control for almost a decade and had come down to just issuing diplomas of higher education. In the context of a current demographic dip, the maintenance of strong regional and interregional academic and education integration systems is a strategic task of top priority, whose solution requires supplementing of existing market mechanisms with government instruments.

### **INTEGRATION OF A NATIONAL UNIVERSITY AND THE ACADEMY OF SCIENCES: THE EXAMPLE OF NOVOSIBIRSK STATE UNIVERSITY**

The creation of the Siberian Branch of the Russian Academy of Sciences (SB RAS) in the 1960's played a key role in the development of a regional innovation system in Siberia (Untura G., 2013a). Since its beginning, this system has been based on a combination of scientific achievements with knowledge transfer into the education system. Presently, 179 main chairs (departments and schools programs) of leading Siberian institutions of higher education are integrated into SB RAS institutes. In addition, 80 research and educational centers as well as 94 other facilities, which belong to a joint research and education infrastructure, have thus been established. Approximately 6,000 senior students and 1,000 master's students are trained in these joint programs (chairs) and about 2,000 post-graduates complete their training at SB RAS institutes. At the same time, almost 2,500 highly qualified specialists which are employed by research institutes teach in the higher schools (colleges) (Present-day Role of Siberian Economy in the Russian Macroeconomic Complex / ed. V.V. Kuleshov, 2013).

In 2011, about 50 years after its foundation, Novosibirsk State University (NSU) has been granted the status of National Research University. In 2012, the newly elected Rectorate (the university board) developed a program with the challenging goal of entering the list of the world's top 100 universities. In NSU, basic education in mathematics, natural sciences, economics and management is quite competitive on a national level. It includes training, which is «customized» for the needs of specific businesses and companies, focusing on engineering-technology aspects. Over the last years, the National Research University NSU has expanded by adding two new departments – a Department of Medicine and a Department of Law. In addition, NSU went ahead in developing the following innovative structures and training programs: A Cross-Disciplinary Master Center for Engineering Training, a National Nanotechnology Network, and several other developments in the fields of functional nanomaterials and high-purity substances and of information and communication technologies (IT).

Particularly the project «Specialist training on the basis of the Centers of Education and Development in Information Technologies in the Siberian Federal District (SFD) and Far Eastern Federal District» and the participation in a project for training in the area of

supercomputer technologies and specialized software in SFD are included in a list of projects recommended by the Committee on Modernization and Technological Development of the Russian Economy for funding.

In addition, «Nuclear Medicine» is a joint work of NSU with the Federal «Academician E.N. Meshalkin Novosibirsk State Research Institute of Circulation Pathology» («Meshalkin Clinic») on training for this direction. Finally, the companies Unicat and Technoscan (and others), which were founded by NSU, participate in a cooperation with the Skolkovo Innovation Center near Moscow.

In our opinion, NSU can be considered as a testing ground for «cross-boundary internationalization» of higher education in the Russian Federation. NSU has a chance to transform itself into a university that is able to meet the challenge of training skilled professionals at the world level in the context of a knowledge-based economy. This is an achievable task, given that specific experience in innovative activities have been accumulated at NSU and prerequisites for an integration between science and business have been established in the last decade. The demand for «rebranding» NSU – increasing its world ranking and the quality of professional training – had already appeared earlier, but these issues became particularly pressing by the recently proposed goal of establishing a National Center of Education, Science and High Technologies (hereinafter called CENTER).

NSU is facing several challenges in implementing these changes. While NSU holds position 3 among the top universities within Russia, one problem is a lag in upgrading NSU's international university ranking and entering a world market for educational services. Another problem is an insufficient capability to attract attention on the part of the business sector to «break-through» projects, for example in radiation medicine, laser- and space-technology projects.

With regard to specific aspects of the project of placing NSU in the Top-100 ranks, we have identified the main features of an integration of NSU and SB RAS, which have worked well in practice in recent years. To strengthen these traits, the authors proposed to outline the directions of prospective contacts between NSU, other participants of a future federal CENTER and external partners from the world's academic and education community, using the analytical tool «interaction matrix». By a matrix analysis of the relations between potential participants of such a CENTER, the prospects of stable and reliable communications can be established, which will allow the participating educational, research, business and government organizations to look for synergies from the joint use of their potentials.

We propose to use the approach «Identification of Zones of mutual interest» to detect synergy potentials and to increase the effectiveness of interactions between the participants of the CENTER (Untura G., 2013a; Untura G., 2013b). Several mutual interest zones which are widely presented in innovation practice in Novosibirsk on the initial stage of the Federal CENTER's creation. These zones are in the area of interaction between NSU and other Novosibirsk institutions of higher education and regional Academies, first of all SB RAS and the Siberian Branch of Russian Academy of Medical Sciences (SB RAMS). But this is only the beginning of searching, developing and coordinating new possibilities for the integration including the strategies of NSU development.

*Zone of interest 1:* Training of high-demand qualifications based on secondary-level (pre-college or school) and higher-education institutions, including specialized masters programs customized to the demands of specific companies.

In the following areas, integration between education and research, that takes into account mutual interests in staff training and its further employment in the framework of the CENTER can be organized on the basis of NSU, SBRAS, SBRAMS and Novosibirsk Interacademic Education Center:

- NSU's academic department, including master, postgraduate and postdoctoral student training based on SB RAS and SB RAMS institutes (top skilled specialists);

- The Engineering technological department of NSU, together with the Multidisciplinary Center and the Center of Prototyping of Academpark and Novosibirsk Interacademic Education Center (focused on doing business with transnational corporations, high-tech businesses, including information technologies, information and communication technologies services, technological structures);
- Training of specialists in medical and biology sciences, for the provision of high-tech medical services in the area of environmental management, and also combining/including the capabilities of various medical clinical bases (NSU, Medical University, SB RAS, SB RAMS, Novosibirsk Research Institute of Traumatology and Orthopedics and others);
- Training of specialists for work in the resource sector, based on the NSU Department of Geology and the Resource Center of the Institute of Economics and Industrial Engineering (SB RAS) and other SB RAS institutes;
- An International Business School focused on training of specialists for innovation business. Useful in this regard might be the experience of the above-mentioned Skolkovo, Moscow State University's «Business University» (which created positive environment for entrepreneurship in innovation and new businesses), as well as the experience of Norway in training specialists for the resource sector;
- Multilevel Training Centers, including a Management Competences Center;
- Other pilot projects, following from the long-term models of education development in the world.

*Zone of interest 2:* Cluster interactions: competition/cooperation with the Skolkovo Foundation, the Education, Research and Development Center in Tomsk, the Siberian Federal University in Krasnoyarsk and others.

Research and education «process stock» in SB RAS and NSU is formed to create seven research and education clusters:

- 1) Information Technologies (IT);
- 2) Nanomaterials;
- 3) Quantum technologies and nanoelectronics, with a silicon factory within the cluster structure;
- 4) Nanotechnologies, including genomics, molecular and cellular biology technologies;
- 5) Medical technologies;
- 6) New technologies for mineral resource exploration and extraction;
- 7) Technologies for national defense and security.

An analysis by several researchers from the Institute of Economics of more than 25 cross-disciplinary projects in the field of physical and technical sciences shows especially that sufficient research «process stock» has been formed for the development of innovation clusters, that will help to advance technological areas of high priority in the Russian Federation.

In 2012 applications for the following five territorial innovation clusters have been prepared and submitted to the Russian Federal Ministry of Economic Development and Trade with the participation of the regional Administration of Novosibirsk:

- 1) A biopharmaceutical cluster;
- 2) Modern ceramic materials and nanotechnologies;
- 3) Independent energy sources;
- 4) A territorial cluster in the area of Information and communication technologies of the Novosibirsk region;
- 5) Power electronics and electrical engineering.

Two of these applicants have been identified for further support by the federal selection process – the biopharmaceutical cluster and the territorial information and communication technologies cluster. Nevertheless, NSU and other institutions of higher education and research institutes from Novosibirsk region will keep working on all the above-mentioned clusters on a priority basis with further support of the regional Administration.

*Zone of interest 3:* The development of joint small enterprises together with NSU or other research institutes according to Federal Law 217 and 218. Another increasing role of institutions of higher education is the implementation of contracts for large businesses in the form of «public-private partnership». For example, several Siberian institutions of higher education had implemented large amounts of research and staff training services for the open joint stock company «NEVZ» (Novosibirsk Electrovacuum Plant), that has launched the production of nanoceramics with the support of RusNano Company.

### **ENTRY OF NOVOSIBIRSK STATE UNIVERSITY INTO THE WORLD ACADEMIC MARKET**

Gaining the economic benefit from knowledge and skills is one of dominant characteristics of a knowledge economy. New terms of globalization call for new organizational forms, coupled with the understanding of nature of knowledge and skills set (competencies) as strategic assets. Nature of knowledge and the ways in which the knowledge can be bought and sold, are of key importance for the strategic aspects of management of knowledge and competencies (Teece D.J., 1998).

University brand becomes a market indicator of the quality of education and, therefore, the competition between universities in the world educational environment increases. We try to cite data describing the present place of NSU in several well-known world rankings.

According to the Quacquarelli Symonds (QS) TOP-400 World University Ranking, Novosibirsk State University (NSU) ranked 352nd in 2013 (up from 371st in 2012). At the same time, the University ranks 211th in terms of natural sciences which is mainly attributable to different contributions of the University departments in the ranking's results.

Obviously, the University government is aware of the difficulties of a breakthrough to the objective in view – rising to the TOP 100 group from the current TOP-400. Three foreign universities (VU University Amsterdam, Netherlands; Sungkyunkwan University National, South Korea; Tsing Hua University, Taiwan) succeeded in making it to TOP-200 from TOP-400 in five years (2007–2012), mainly by virtue of increasing their reputation in the academic environment and the number of citations of the faculty publications.

The TOP-100 goal is challenging, as the current position of NSU looks quite impressive against the background of some groups of countries. In Quacquarelli Symonds (QS) World University Rankings NSU ranks 22nd among BRICS countries (Brazil, Russia, India, China and South Africa). After the leaders – Chinese universities, Lomonosov Moscow State University and Saint Petersburg State University – comes NSU. Even Bauman Moscow State Technical University (33th position), the National Research University «Higher School of Economics» (50th position) come in after NSU. In 2013, NSU was also on 6th position in an Interfax rating among the universities of CIS, Baltic countries and Georgia.

Nevertheless the goal – making it to the TOP-100 – has been set. The move towards this objective should rest on «hyper efforts» and tailor-made approaches. The more so, since the needed resources are quite restricted by the federal budget and since a new institutional environment has appeared. A condition required to participate in the federal program for increasing the competitive ability of the top Russian universities is self-sustainability and an appointive rector.



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The Rector of NSU, Mikhail Fedoruk (Fedoruk M., 2013a; Fedoruk M., 2013b), outlined several aspects of the general problem of the breakthrough to the top-100 and noted that the key indicators should be changed at the cost of quality shifts which will happen in the University, in addition the system of management must be transformed and it should become similar to the management system of TOP-100 world universities. Analyzing the growth-promoting factors, he stressed that the University's reputation in the academic environment and better positions in the quoting of the university staff publications cannot take the University higher than to the TOP-200. Further growth is possible only by means of a dramatic increase in research activities (NSU website, 2013).

The University plans to use the first financial tranche of the TOP-100 campaign in the following manner:

first, on the growth of the number of citations of university staff publications by developing double affiliation with SB RAS institutes;

second, on the reform of the university management system;

third, on the creation of a marketing service of the university;

fourth, on the development of joint laboratories in cooperation with the SB RAS;

fifth, on the establishment of «mirror laboratories» (up to eleven by 2020) that are the look-a-likes of foreign laboratories, dealing with subject matters tested by the world academic community to be tested under the supervision of foreign researchers including expatriate researchers and former NSU graduates.

Prospective research activities of the joint laboratories, to be developed in cooperation with the SB RAS, will focus on the following areas: Biotechnologies; Photonics (optoelectronics); New materials; Nanotechnologies; Power engineering; Translational medicine; High energy physics; Forecast and exploration of mineral, Energy-efficient catalysis and Monocrystal growing for neutrino research.

In the present situation, when the future of the Russian Academy of Sciences is uncertain, it is hardly possible to develop these joint laboratories, particularly because the SB RAS institutes will be financed by FANO (Russian abbreviation for the «Federal Agency for Scientific Organizations»). Nevertheless, premises for the new laboratories are being allotted at the SB RAS research institutes, with the idea that some empty or liberated premises can be transferred to NSU in order to develop new joint laboratories. The Rector noted that, along with the problem of equipping the laboratories, it will be most important to create an appropriate infrastructure and to offer social benefits to the researchers who are ready to move to NSU.

While NSU does not intend to increase the number of students, the University has set for itself the task of increasing enrolments in Master's and PhD (postgraduate) programs. Currently NSU has about one third of Master's Degree students while at the top world universities this figure is over 50%. A project is now underway to organize a system for the conferment of the PhD degree in natural sciences and applied directions, based on the experience of Saint Petersburg State University. There is even an idea to hold a pilot thesis defence of Russian and foreign applicants for a degree from the year of 2015.

An important area is the cooperation with the Academpark (Technopark of Novosibirsk, Akademgorodok), developing joint applied and engineering programs, together with launching various programs in English language.

Finally we can arrive at some conclusions about the problems which NSU faces on its way to becoming a world-class top university. After the adoption of the NSU «road map» in October 2013, the Rector summed up the problems and bottle-necks of its realization during meetings with students and university teachers in December 2013 and January 2014. The following key issues can be outlined:

1) Novosibirsk Research Center or the institutes of SB RAS and NSU have different departmental structures. Under the conditions of reformation of the Russian Aca-

demy of Sciences and the uncertainties resulting from this process, it is difficult even to develop an idea of a successful, robust and consolidated university in cooperation with the SB RAS institutes. It is highly desirable that NRS and NSU look like a single entity to an external observer and in the future act as a joint research and educational system, authorized by appropriate legal acts (Yakovleva T., 2014).

- 2) Dual degree programs. Currently, the share of foreign students at NSU is about 6%, most of them from China; for world top universities this figure is not lower than 15%. NSU is interested in dual diploma program, but it is also interested in equal cooperation. Unfortunately this is not been achieved: for example, in 2013 about 70 students moved from NSU to foreign universities and few (if any) foreign students came to NSU.
- 3) The University lacks an efficient management system. There is a need to change the structure of the university governance and to seek the participation of almost all university teachers in the management process, which must take over parts of the administrative load and to set new projects into motion.
- 4) The Humanities departments must/should find their place in the development program. Currently, natural science departments, in contrast to the humanities departments, have good ratings and high numbers of publication citations. At present, there is a need for the foreign languages department, since NSU plans to launch various programs in English.
- 5) Creation of a database of the University graduates and graduate statistics concerning their occupational work; attraction of NSU graduates to the further development of the University.
- 6) Creation of a system for involving gifted researchers and professors, including foreign scientists, and the development of international mobility programs for students and teachers of the university.

Cooperation with medical workers/practitioners and researchers, physiologists and virologists is highly promising, since interdisciplinary collaboration, including international collaboration, is in demand. An undoubtedly promising project is the cooperation between NSU and NPO Vector, namely the continuation of the work on developing oncolytic virus strains.

Promising forms of cooperation are also joint laboratories and research conducted by NSU graduates in international groups and teams. There are interesting examples such as the initiative of French researchers to work directly with SB RAS institutes in the field of cellular interaction. Moreover, French professors will deliver lectures in NSU.

A new option for development and cooperation is a program for adjunct professors, which offers foreign professors the opportunity to teach NSU students, not only giving lectures on specific subjects but working with them on a more regular basis.

Other attractive areas are the cooperation with the leading Russian and foreign corporations, innovation centers, Skolkovo Foundation in the first place, technology development economic zones and Siberian technoparks.

## CONCLUSIONS

It can be concluded that the basic elements of the Siberian regional innovation system have already formed. They are primarily centered around academic institutes, the National Research Universities of Novosibirsk and Tomsk and the Siberian Federal University of Krasnoyarsk. Further increase in the competitive power of universities, the conversion of fundamental knowledge into specialist training and starting new products and businesses is subject to substantial government support. The establishment of federal centers of



science, education and high technologies in Siberia has already started in Tomsk and Novosibirsk. This process involves the identification of strategic interest zones and further concentration of state and private business resources within them. NSU together with SB RAS have mapped out a program for the development of innovation initiatives and for improvement of the position of NSU in the rankings of the world's best universities, so as to be in the academic and educational mainstream within a near-term perspective.

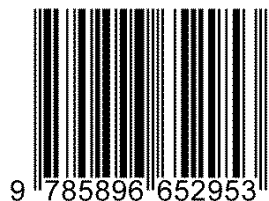
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