New Paradigm in the Regional Management

First A. Peter I. Kamyshanov, Second B. Alexander P. Kamyshanov

Abstract—The European Union countries are realizing economic integration transformations. Period of these reforms is coinciding in time with the global economic downturn. These reforms are affecting the whole continent with economies on various stages of development and operating on different principles. To overcome crisis new theoretical and practical approaches are working out. Modern time is the period of knowledge economy, which is based on information technologies and cognitive science. A net-centric paradigm is one of the key concepts of these sciences. In the framework of this paradigm new approaches are working out for planning, implementation, and management of the European transformations with the goal to increase competitive advantages of the countries and to ensure the prosperity of the citizens.

Keywords—Regional Management, System of Systems Engineering.

I. INTRODUCTION

OVER the last 20 years the European Union (EU) countries were realizing extra ordinary reforms targeting on integration of the old 15 EU countries with economies operating on the basis of market principles and the new 13, mainly Central East European (CEE) states, with economies defined as "transitional". First of all, the transformations' strategies in these countries were focused on macroeconomic stabilization and microeconomic restructuring in conjunction with institutional and political reforms. Implementations of these strategies varied across the countries in speed and specifics.

Nowadays the population of 28 EU countries is exceeding 506 million [1]. More than 106 million people are living in new CEE member states. Ineffective transformations of economies may negatively impact on the people living in the Europe. Theorists working in the universities of the EU countries are representing most advanced and dynamically developing schools in the world economic science. Some of them worked out new sophisticated management concepts applied to market economy. At the same time their colleagues in CEE countries as students had studied the principles and the practical methods of the socialist enterprises management. But in practice, economic schools of the new EU member states

F. A. Peter I. Kamyshanov is Professor at Plekhanov Russian Economic University, Moscow, 117218, Russian Federation (e-mail: a_kamyshanov@rbcmail.ru).

S. B. Alexander P. Kamyshanov , Jr., is Assistant-Professor at Plekhanov Russian Economic University, Moscow, 117218, Russian Federation (corresponding author to provide phone: 7-499-129-83-04; e-mail: a_kamyshanov@rbcmail.ru).

are creating the competitive knowledge economies in post industrial information societies [2], [3]. These societies are operating on market principles with significant social constraints. In the European transformations as the historical experience of the Western Europe economic schools, so the advanced ideas of socialist financial and corporate management are utilizing [4]. Applying early acquired knowledge the European countries are realizing transformation scenarios from traditional market economies and from developed socialism to post industrial information societies with various successes [5], [6], [7].

Economic downturn had affected significantly on the EU countries. Certainly the income per capita indexes for the EU are far ahead from Russia. But today some macroeconomic parameters of the leading EU states are not shining bright above the clouds. At the same time in the framework of financial stabilization policy the Russian Federation had stored significant reserves in hard currencies.

Theory declares economic downturn should be accepted in different ways as a trouble or as new opportunity.

II. PROBLEM FORMULATION

A. Review Stage

The problems of growth and competitiveness in the uniting Europe are very relevant in today's economic context. Various methods have been worked out to evaluate the efficiency of integration strategies as for developed market, so for post socialist economies with the goal to ensure their future growth.

The studies conducted before 2002 showed that strategy, priorities and pace were extremely important for the integrative economic reforms. Their impact on the subsequent growth in new EU countries was uncovered with the help of regression functions in [8]. It was hypothesized, that the reorganization of economic entities with central planning inevitably led to the shifts in efficiency and thus caused the increase in the measured parameters. Initial conditions e. g. the previous structure and the state of development seriously impacted the following growth during integration. The statistical models for effectiveness of the government regulation of entrepreneurs' activity, education level, and employee wages were described in [9]. The probabilistic model for political support of the institutional markets reforms was published in [10]. As were shown in [11], [12], [13], the establishment of integrating market institutions and their following development were the most challenging tasks

for reformers in the new uniting economies. The inadequacy of European institutions made integration liberalization policies ineffective. Many research groups tried to synthesize formal models for complex the European Union integrating economy. The model with closed social architecture, which replicated many of the known macro parameters for the market economy, was described in [14]. It utilized the Laplace distribution of firms' growth, the power-law distribution for firms' sizes, the lognormal distribution of firm demises, the exponential distribution of firm life spans, the normal distribution of the log of detrended Gross Domestic Product (GDP), the exponential distribution for duration of recessions, the lognormal-Pareto distribution of income and some others. This model gave the possibility to explain a broad range of macroeconomic phenomena in terms of some very basic and simple structural features of economy.

Results of the work supported the argument, that in order to understand macroeconomic phenomena the concept of statistical equilibrium was essential. The sophisticated research tools for analysis the integration reforms path based on the theory of deterministic chaos led to revealing results in the case of the new EU countries [15]. The roles of the governments as well as the key role of the public administrations were emphasized in integrating processes of the EU. The influence of geographical features of high-tech and medium-tech manufacturing in knowledge-based economy of the integrating CEE country was examined in [16], [17]. There were shown that high-tech knowledge intensive services coupled the knowledge functions synergy to geographical locations of R&D centers. The values of configuration information based on the high- and medium-tech industries were more pronounced in the regions where international firms had higher share. Analysis utilized three dimensional model of innovation system synergy [18].

Table I. GDP per capita at purchasing power parity (PPP) rating for the EU countries in current US international dollars.

Country	GDP per capita		Rank in the EU	Growth rate	Rank in the EU
	2001	**2011**			
Austria	29 035.6	42 195.7	3	1.453	17
Belgium	28 519.0	38 768.4	8	1.359	23
Bulgaria	6 760.2	14 825.1	28	2.193	2
Croatia	11 664.1	19 469.0	25	1.669	8
Cyprus	20 931.5	32 254.2	13	1.541	12
Czech Rep.	16 819.0	26 207.7	17	1.558	11
Denmark	29 433.1	40 907.8	6	1.390	20
Estonia	10 717.7	21 995.4	21	2.052	4
Finland	26 540.2	37 464.3	9	1.412	19
France	26 537.1	35 245.6	11	1.328	25
Germany	26 713.7	39 491.0	7	1.478	14
Greece	19 751.3	25 849.5	18	1.309	26
Hungary	13 398.2	21 662.6	22	1.617	10
Ireland	30 767.6	41 681.6	4	1.355	24
Italy	27 286.4	32 647.5	12	1.196	28
Latvia	8 918.4	17 569.4	26	1.970	6
Lithuania	9 554.5	20 320.9	24	2.127	3
Luxembourg	53909.0	89 011.9	1	1.651	9
Malta	18 251.0	27 283.9	15	1.495	13
Netherlands	30 787.8	42 771.8	2	1.389	21
Poland	10 953.3	21 260.6	23	1.941	7
Portugal	18 514.1	25 372.0	19	1.370	22
Romania	6 418.8	15 138.9	27	2.359	1
Slovak Rep.	12 074.5	23 910.4	20	1.980	5
Slovenia	18 443.5	26 954.1	16	1.461	16
Spain	22 586.7	32 044.6	14	1.419	18
Sweden	28 236.7	41 467.4	5	1.469	15
United Kingdom	27 532.0	35 657.0	10	1.295	27
European Union	**23 034.7**	**32 643.6**		**1.417**	
To compare					
USA	35 912.3	48 112.0		1.340	
Switzerland	33 326.8	51 262.1		1.538	
Canada	29 272.6	40 369.6		1.379	
Japan	26 531.9	34 313.6		1.293	
Russia	7 361.3	21 247.6		2.886	
China	2 602.0	8 400.2		3.228	
India	1 612.9	3 652.0		2.264	

Table II. Life expectancy at birth in total years.

Country	Life expectancy		Rank in the EU	Growth rate	Rank in the EU
	2001	**2011**			
Austria	78.53	80.38	6	1.024	19
Belgium	78.47	79.79	14	1.017	27
Bulgaria	71.77	73.54	26	1.025	18
Croatia	74.51	76.54	20	1.027	13
Cyprus	78.09	79.50	15	1.018	26
Czech Rep.	75.17	77.54	19	1.032	7
Denmark	76.80	78.84	18	1.027	12
Estonia	70.26	74.94	23	1.109	1
Finland	77.97	79.84	13	1.024	20
France	79.06	81.14	4	1.026	15
Germany	78.33	80.12	9	1.023	21
Greece	78.39	80.06	11	1.021	24
Hungary	72.25	74.27	24	1.028	9
Ireland	77.14	80.33	7	1.041	3
Italy	79.83	81.57	1	1.022	22
Latvia	70.76	73.40	27	1.037	5
Lithuania	71.66	72.89	28	1.017	28
Luxembourg	77.82	79.94	12	1.027	11
Malta	78.55	80.29	8	1.022	23
Netherlands	78.19	80.59	5	1.031	8
Poland	74.20	76.13	21	1.026	16
Portugal	76.81	79.29	16	1.032	6
Romania	71.16	73.79	25	1.037	4
Slovak Rep.	73.40	75.31	22	1.026	17
Slovenia	75.76	79.24	17	1.046	2
Spain	79.37	81.43	2	1.026	14
Sweden	79.80	81.33	3	1.019	25
United Kingdom	77.99	80.10	10	1.027	10
European Union	**77.48**	**79.65**		**1.028**	
To compare					
USA	76.74	78.11		1.018	
Switzerland	80.18	82.01		1.023	
Canada	79.49	80.59		1.014	
Japan	81.42	82.55		1.014	
Russia	65.49	68.81		1.051	
China	71.40	73.42		1.028	
India	61.97	65.48		1.057	

The current macroeconomic indicators received on the base of statistics were utilized as meta-variables for description the nations' development in [1]. There were considered Gross Domestic Product (GDP) per capita, Current Account Balance, External Debt, Government Budget Balance, Private sector share, Domestic and Foreign Investments, Foreign Direct Investment, Consumer price inflation, Life Expectancy, Income inequality and many others.

Based on meta-variables introduced in [1] various clustering methods variables for different consequence time periods were applied in [5] to analyze the EU cohesion processes in terms of quality and dynamics. As the result the minimum similarity of individual member states hypothesis was put forward. The probabilistic model for an integrating economy with cause-effect relations operating with same meta-variables was proposed in [19]. It allowed grouping the EU countries into four clusters, which were characterized by the values of terminal probabilities depending on the quality of national institutions and on the results of reforms.

Table III. Global competitiveness index for the EU countries (the 1st is the best) [20].

Country	Global Competitive-ness Index Rating		Rank in the EU	Growth rate	Rank in the EU
	2001	2012			
Austria	13	16	7	-3	8
Belgium	14	17	8	-3	9
Bulgaria	56	62	24	-6	13
Croatia	--	81	27	--	--
Cyprus	--	58	22	--	--
Czech Repub.	35	39	14	-4	11
Denmark	8	12	6	-4	10
Estonia	27	34	12	-7	14
Finland	1	3	1	-2	6
France	12	21	9	-9	15
Germany	6	6	4	0	3
Greece	43	96	28	-53	24
Hungary	26	60	23	-34	23
Ireland	22	27	11	-5	14
Italy	24	42	16	-18	18
Latvia	42	55	20	-33	22
Lithuania	49	45	17	4	1
Luxembourg	--	22	10	--	--
Malta	--	47	18	--	--
Netherlands	3	5	3	-2	7
Poland	41	41	15	0	4
Portugal	31	49	19	-18	19
Romania	61	78	26	-17	17
Slovak Rep..	39	71	25	-32	21
Slovenia	32	56	21	-24	20
Spain	23	36	13	-13	16
Sweden	6	4	2	2	2
United Kingdom	7	8	5	-1	5
European Union	--	--	--	--	--
To compare					
USA	2	7		-5	
Switzerland	5	1		4	
Canada	11	14		-3	
Japan	15	10		5	
Russia	58	67		-9	
China	47	29		18	
India	36	59		-23	
-- No data					

The paper [21] revealed the importance of the discrete multi criteria decisions-making to establish ranking among the European Monetary Union countries and suggested a new macroeconomic approach.

New strategies and driving forces are demanded for sustainable economic growth in the European Union. In history there are quite distinctive examples of the states (e.g. Switzerland, Singapore, Republic Korea) with remarkable economic results and lack of natural resources. However these countries had utilized new type of unrestricted resources such as knowledge, innovations, information technologies and systems not only for the analysis of economic processes, but also for strategic management of the competitive growth.

Summarizing these ideas European science put forward the conceptual management paradigm [22], which is characterized by the following categories Quality, Utility, Formality and Abstractness. This paradigm now is developing in the framework of System of Systems Engineering (SoSE) methodology.

B. What is System of Systems?

The term System of Systems (SoS) has been applied to numerous types of systems. It was used for modeling and simulation in [23], [24], for information management and net-centric system of systems in [25], [26], [27], for communication structures in [27].

A SoS is a type of system. In [28] it is defined as the super-system, the meta-system, the SoS, which is made up of components. They are large-scale complex systems themselves. The following definition for a SoS was proposed in [29]: "A meta-system comprised of multiple autonomous embedded complex systems that can be diverse in technology, context, operations, geography, and conceptual frame."

Five distinguishing characteristics have been proposed to differentiate SoS from the more common monolithic complex systems. They include:

1. Operational independence of the individual systems. A SoS is composed of systems that are independent and useful in their own right. If a SoS is disassembled into the component systems, these component systems are capable of performing useful operations independently of one another.

2. Managerial independence of the systems. The component systems not only can operate independently, they generally do operate independently to achieve an intended purpose.

3. Geographic distribution. Geographic dispersion of component systems is often large. Often, these systems can readily exchange only information and knowledge with one-another and not substantial quantities of physical mass or energy.

4. Emergent behavior. The SoS performs functions and carries out purposes that do not reside in any component system. These behaviors are emergent properties of the entire SoS and not the behavior of any component system.

5. Evolutionary development. A SoS is never fully formed or complete. Development of these systems is evolutionary over time and with structure, function and purpose added, removed, and modified as experience with the system grows and evolves over time.

These five characteristics begin to place some degree of formality on the notion of SoS. Later three new characteristics had been added. There are.

Interoperability is considered as "the ability of two or more systems or components to exchange information and to use the information that has been exchanged" [30].

Complementarity provides multiple perspectives of any given system. While each perspective is neither correct nor incorrect, the "Multiple views and perspectives are essential, particularly in the formative stages for a system of systems effort, to ensure a robust approach and design".

Holism is a philosophical concept that is opposed to atomism. An atomist idea presents the belief that any whole system can be broken down or analyzed into separate parts and the relationships individually can be identified. However, the holistic view maintains that the whole is the primary and often greater than the sum of its parts.

C. System of Systems Engineering Process

System of Systems Engineering (SoSE) has inherited the basic principles of System Engineering (SE), at the same time it is developing new approaches for modern dynamic environment of multiple integrated complex systems. New methodology is oriented on network-centric dynamic complex systems with multiple pluralistic goals.

In SoSE domain the people or organizations being affected by process or product are considered as **Stakeholders**. They have different responsibilities, concerns and interests. In SoSE domain the term "**Stakeholders**" is quite different from the same one in an economy or financial management. Main categories of stakeholders are characterized by Table IV.

The first step of analysis requires the identification of contextual and environmental factors of greatest influence upon the system under study. The construction of the high-level, wide-view context diagram is conducted to capture the set of circumstances, factors, conditions, values, or patterns that constrain and enable the SoSE process, the system solution design, system solution deployment, as well as interpretation of outputs and outcomes. The wide area context diagram must account for relevant perspectives associated with the problem system under study [31].

A complex systems problem cannot be understood independently of the context within which it is embedded. Context is the circumstances, factors, conditions, or patterns of the problem domain that will enable/constrain the problem, approach, and potential solutions. Every SoS problem is embedded in a unique context.

Table IV. Stakeholders' Responsibilities.

Stakeholder	Responsibility
Sponsor	Analysis of reforms outcome, economy performance, system alternative trade-offs, etc. Credibility of reforms results analysis. Making sure that the SoSE model represents necessary and sufficient relevant information about reforms issues, economic and political context of interests (correct scope). Decision-making based on analytic products (introducing a new tactic of reforms, procuring a new economic system, etc.). Cost-effective training. Cost of SoS engineering, modeling, and simulation.
Producer (SoSE Project Manager)	Effective use of allocated resources (e.g. ensuring reuse when appropriate). Unambiguous communication with customer or customers.
Producer (Knowledge Engineer)	Understanding of reforms' issues and context. Translation of reforms' issues and context into a SoSE model. Unambiguous communication with domains experts and implementers.
Producer (SoSE Domains Expert, Economic and Political Expert)	Understanding of reforms' issues and context. Provide economic and political know-how at appropriate level of detail.
Consumer (SoSE Model Implementer)	Understanding of reforms' issues and context. Implementation of SoSE simulation model. Verification of SoSE simulation model compliance.
Consumer (Analyst)	Understanding of reforms' issues and context. Producing relevant analytic products.
Consumer (Training System Developer)	Understanding of reforms' issues and context. Producing adequate training environment.
Custodian	Provide services for effective reuse of available knowledge and SoSE model components.
Evaluator	Ensuring validity of SoSE model and compliance with requirements.

The similarity of the EU member states was examined in [5]. There had been pointed out that it was strongly depended on the nature of the integration processes. The successful work in the reduction of the economic disparities and creation the sense of "belonging" for member states should contribute to the successful cohesion of the EU. It should be built on the joint development and prosperity. The vision of the disorderly grouping countries is quiet in contrast with this point of view. In such case cohesion is maintained artificially by political decisions of the most influential member states.

To overcome problems the EU regional policy had been designed with the goals for further economic, social and territorial cohesion, by reduction of the gap in development between regions and among member states.

Regional policy helped to finance specific projects for regions and towns, supporting job creation, competitiveness, economic growth, improved quality of life and sustainable development. It was set forward in line with the priorities of the Europe 2020 strategy. During the period, which covers 2007 - 2013, economic and social cohesion policy across the regions benefits from EU 347410 million. The influence of this policy on the regional competitiveness was evaluated numerically in [7]. At 2012, there were 68 regions in the European Union, where the average GDP per inhabitant was on 25% or more below the EU-27 average, 48 of which were in Member States that joined the EU in 2004 or 2007.

Among these regions, in 22 the average GDP per inhabitant was equal 50 % or less than average of the EU-27. They could be found in Bulgaria, Hungary, Poland, Romania and Slovakia. Around 8.5 million people lived in such regions. This was equivalent to 7.7 % of the EU-27 population [32].

Generally low average GDP per inhabitant was also in Croatia, although the region of the capital city of Croatia (Sjeverozapadna Hrvatska) had a level equivalent to 78 % of the EU-27 average.

Nevertheless the results of economic development for 2001 – 2011 show that the "integration choice" of the new EU member states was correct. The next step is to improve the quality of integration policy with the goal to increase the number of the EU citizens living in the leader-countries, which are solving successfully the problems of competitive economic growth [33].

In April 2011 The European Council endorsed the EU Strategy for the Danube Region (DR) with Action Plan covering over one hundred actions and examples of projects.

III. PROBLEM SOLUTION

The Danube is Europe's second longest river at about 2 850 km. It links the Black Forest with the Black Sea and runs through ten countries, with four more in its basin. Four European capitals are locating on the Danube. Its basin covers 20% of the EU territory with around 115 million people. Linked by the Main-Danube channel the Danube and

Rhine are connecting 11 countries from the North Sea to the Black Sea and representing the backbone of the region.

This European garden macro region has one interrelated and inter dependent ecosystem providing invaluable environmental goods and services. It contains a great share of Europe's wilderness areas and provides health ecological environment, which is vital for all continent. But today the Region faces numerous specific challenges: chaotic industrial development, significant socioeconomic disparities, underdeveloped potential of the Danube waterway (cargo traffic over the Danube in 5-10 times less than over the Rhine), and deforestation. A unique environment is threatened by pollution. Furthermore, the integration of Region's eastern part into the EU since 2004 and 2007 had brought the dramatic changes, which must be assisted and reinforced. All these are demanding a stronger than usual need for integrating cooperation in all dimensions and responsibility across national borders [34].
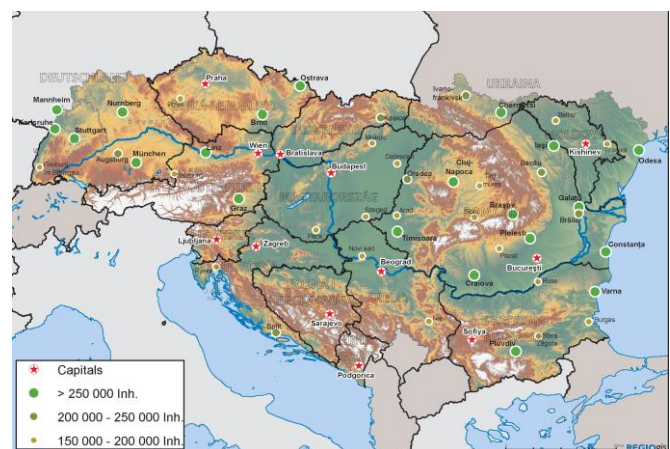

Figure 1. The map of the Danube Region

Strategy for the Danube Region is concerned 14 countries in the Danube basin: 9 Member States (Germany [Baden-Würtenberg and Bavaria], Austria, Czech Republic, Slovak Republic, Hungary, Croatia, Slovenia, Bulgaria, and Romania) and five non-Member States (Serbia, Bosnia-Herzegovina, Montenegro, Ukraine, and Moldova). The countries are different in terms of their economic development.

However, as they share common territory their policies are interdependent and called for improved cooperation, for example: for closing missing transport links, lowering pollution and the danger from floods, or reducing the dependency on energy providers from outside the Region. There is equally important to consider, the countries are economically strongly interlinked.

The competitiveness of the Region depends on joint actions in the fields of SME support, labor market policies, education, and security. The Danube Region has been also the hot spot of the three last rounds of the EU enlargement, and

encompasses seven countries all developing in various ways their political, socio-economic and sectoral links with the EU. They need to improve the institutional capacity at all levels.

Table V. GDP per capita at purchasing power parity (PPP) rating for the DR countries in current international US dollars [1].

Country	GDP per capita		Rank in the DR	Growth rate	Rank in the DR
	2001	2011			
Austria	29 035.2	42 195.7	1	1.453	14
Bosnia-Herzegovina	4 756.4	9 076.4	12	1.908	8
Bulgaria	6 760.2	14 825.1	9	2.193	2
Croatia	11 664.1	19 469.0	7	1.669	9
Czech Rep.	16 819.0	26 207.7	4	1.558	11
Germany	26 713.7	39 491.0	2	1.478	12
Hungary	13 398.6	21 662.6	6	1.617	10
Moldova	1 598.8	3 369.1	14	2.107	3
Montenegro	6 541.0	13 431.9	10	2.053	4
Romania	6 418.8	15 138.9	8	2.359	1
Serbia	6 221.7	11 883.1	11	1.910	7
Slovak Rep.	12 074.4	23 910.4	5	1.980	5
Slovenia	18 443.4	26 954.1	3	1.461	13
Ukraine	3 699.1	7 208.1	13	1.949	6
European Union	**23 034.7**	**32 643.6**		**1.417**	
To compare					
USA	35 912.3	48 441.6		1.349	
Switzerland	32 343.4	49 151.4		1.520	
Russia	7 361.3	21 247.6		2.886	
China	2 602.0	8 400.2		3.228	
India	1 612.9	3 652.0		2.264	

Table VI. Life expectancy at birth in total years [1].

Country	Life expectancy		Rank in the DR	Growth rate	Rank in the DR
	2001	2011			
Austria	78.53	80.44	1	1.024	9
Bosnia-Herzegovina	74.55	75.55	7	1.013	13
Bulgaria	78.47	79.79	3	1.017	12
Croatia	74.51	76.54	6	1.027	7
Czech Rep.	75.17	77.54	5	1.032	3-4
Germany	78.33	80.11	2	1.023	10
Hungary	72.25	74.27	10	1.028	6
Moldova	67.08	69.21	14	1.032	3-4
Montenegro	74.68	74.50	9	0.998	14
Romania	71.16	73.79	12	1.037	2
Serbia	72.19	74.25	11	1.029	5
Slovak Rep.	73.40	75.30	8	1.026	8
Slovenia	75.76	79.24	4	1.046	1
Ukraine	68.29	69.54	13	1.018	11
European Union	**77.48**	**79.65**		**1.028**	
To compare					
USA	76.74	78.12		1.018	
Switzerland	80.18	82.01		1.023	
Russia	65.49	68.81		1.051	
China	71.40	73.42		1.028	
India	61.97	65.48		1.057	

The problems of competitiveness in the national economies and meta-variables for their description were discussed by the World Economic Forum's Annual Global Competitiveness Report [20]. They are quite good for characterizing the EU integrating economies. There are Openness, Quality of Government (revenues, system's reforms, state expenditures, inflation), Compliance with international standards, Foreign investments, Infrastructure, Technology, Institutions (Political environment, Rule of law), and so on. The quality of government, its institutions as well as laws and policies affect significantly on economy. The countries' geography and culture are also of great importance [35].

Table VII. Global competitiveness index for the DR countries (1 is the best) [20].

Country	Global Competi-tiveness Rating		Rank in the DR	Growth rate	Rank in the DR
	2001	2012			
Austria	13	16	2	-3	2
Bosnia-Herzegovina	--	88	13	--	--
Bulgaria	56	62	6	-6	4
Croatia	--	81	11	--	--
Czech Rep.	35	39	3	-4	3
Germany	4	6	1	-2	1
Hungary	26	60	5	--34	8
Moldova	--	87	12	--	--
Montenegro	--	72	8	--	--
Romania	61	78	10	-17	6
Serbia	--	95	14	--	--
Slovak Rep.	39	71	7	-32	--
Slovenia	32	56	4	-24	7
Ukraine	60	73	9	-13	5
To compare					
USA	2	7		-5	
Switzerland	5	1		4	
Russia	58	67		-9	
China	47	29		18	
India	36	59		-23	
-- No data					

As the result of transformations the EU countries in the Danube Region had created the economic interfaces for the expansion on foreign markets at the Eastern Europe, Caucuses, and Southern Mediterranean. Some companies from the Danube Region, such as automotive BMW Group, Daimler AG, "Škoda", and electro technical Siemens AG, JSC "Gorenje", Croatian tourist business are highly successful on these markets. But great number of other companies' products is often considered old fashioned or technologically poor developed [36]. So, competitive catch up is a hot item of current economic agenda as for the new, so for the old EU countries [37]. Science, research and innovations, information and communication technologies at the different levels of business management e.g. strategic, financial, marketing, and technological, all of them, should provide the growth of competitiveness [38], [39].

IV. CONCEPTUAL MANAGEMENT FOR THE DANUBE REGION

The Strategy for the Danube Region brings forward concrete transnational projects with impacts on the Region [38], [40]. Ministers of Transport agreed to step up efforts for maintaining the Danube waterway [41]. The Danube Region Business Forum is connecting Small and Medium Sized

enterprises. Police authorities are establishing a law enforcement platform to tackle organized crime.

The Strategy produces first results in coordinating different national and the EU policies and funds, and paves the way for better coordination in the next financial periods. Structural Funds gave the possibility to finish the reconstruction of the second bridge over the Danube between Romania and Bulgaria. National funds provide start-up capital for technology transfer centers. Private funds are financing the lifting of ship wrecks from the Danube to ensure safe navigation.

Following conflicts and separation, and building on the enlargement process of the European Union, the Danube Strategy has put forward a cooperation structure to overcome common challenges.

The Strategy is concentrated on the following four pillars and 11 priority areas:

A. Connecting the Danube Region

1) To improve mobility and intermodality;

2) To encourage more sustainable energy;

3) To promote culture, tourism, and people-to-people contacts.

B. Protecting the environment in the Danube Region

4) To restore and maintain water quality;

5) To manage environmental risks;

6) To preserve biodiversity, landscapes, and the quality of air and soils.

C. Building prosperity in the Danube Region

7) To develop the knowledge society through research, education, and information technologies;

8) To support the competitiveness of enterprises;

9) To invest in people and skills.

D. Strengthening the Danube Region

10) To step up institutional capacity and cooperation;

11) To work together to tackle security and organized crime.

Each Priority Area is coordinated by two Danube countries, the "**Priority Area Coordinators**" (PAC), responsible for coordinating the implementation of the actions from the Action Plan. Priority Area Coordinators, typically national or regional ministries, are supported by their counterparts from the Danube Region, which form eleven "**Steering Groups**".

At **national and regional level**, the implementation is supported by "National Contact Points" (NCP), ensuring the coherence between the different players within national and regional administrations. The role of the NCP is crucial for ensuring a strong and coordinated engagement, in particular of all relevant line ministries. High-level political commitment is ensured through meetings of ministers of foreign affairs and line ministers, and through initiatives by cities and regions.

The **European level** facilitates the implementation and the embedding of the Strategy in EU policies, through continuous contacts to the main stakeholders in the Danube countries, by regular participation of the relevant Directorates General to Danube wide meetings, and through Technical Assistance provided for by the European Parliament to support the work of the Coordinators. The EU program INTERACT, through

its office in Vienna, is an essential additional resource.

Civil society actors are included throughout the Strategy, in stakeholder seminars, Steering Groups or the Annual Forum, and are addressed in particular in the Priority Area 10 on "Institutional Capacity". As a coherently structured framework, the Strategy represents a new form of cooperation for partners in the area. It focuses on coordinating existing financial instruments and policies, not creating new ones, **nor creating new institutions or new bureaucracy.**

The Strategy has also given more prominence and operational support to already existing **institutions** in the Region [42], such as the International Commission for the Protection of the Danube River (ICPDR), addressing environmental and water quality issues, and the Danube Commission with office in Budapest, working on navigability. Austria, Bulgaria, Croatia, Germany, Hungary, Moldova, Romania, Russian Federation, Serbia, Slovak Republic, and Ukraine are the member-states of this Commission.

Following the invitation of the Commission, ministers of Transport of the Danube Region Countries on 7 June 2012 adopted the declaration for maintenance of the Danube waterway, committing themselves to concrete measures, including surveillance of water-depth and signaling navigation routes in shallow sections [41]. This has in turn led to an agreement between Romania and Bulgaria to plan together and to share equipment for common work. European and Russian space navigation systems should intensify this work and the river vessels traffic.

A new technological project on innovative vessels is developing the solutions to renew the Danube fleet through more fuel efficient and cleaner engines, and better design of ship bodies. In addition, the Commission's Directorate General for Research and Innovation has launched a call for research projects on an innovative fleet for inland waterways. This will contribute to the overall goal to increase cargo transport on the river on 20% by 2020 compared to 2010 in a sustainable way.

Two natural gas trunk pipelines: Nabucco and South Stream should be constructed in the Region before 2014. In complete with the Bulgaria-Serbia gas interconnector project they will link the Baltic Sea area to the Adriatic and Aegean Seas, and further to the Black Sea.
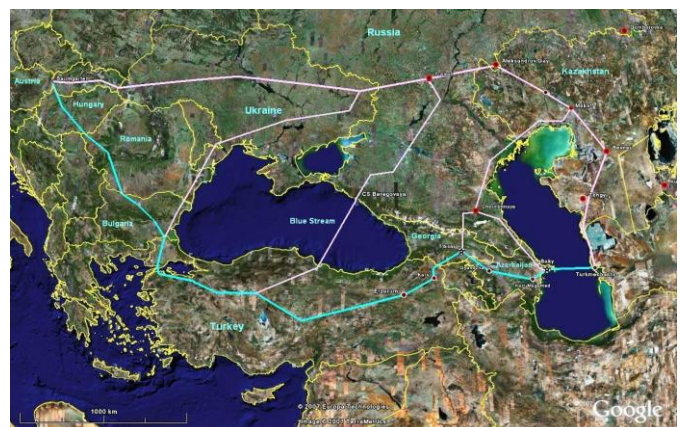

Figure 2. Map of the Nabucco trunk gas pipeline

These projects will improve the natural gas network interconnections, as well as diversifying natural gas routes and sources for Region countries.

Figure 3. Map of the South Stream trunk gas pipeline

common methods and common databases that countries can adopt. The 19 institutions all along 8 Danube countries are participating.

This project has already produced the tangible results such as the "Manual of harmonized requirements on the flood mapping procedures for the Danube River", which is an important step towards shared databases [43]. In the framework of South Stream Projects two Russian commercial banks VTB Bank (Austria) AG and Gazprombank (Open Joint-Stock Company) start the financing of the GIS for flood information monitoring, mapping, and risk management. European Space Agency, Russian Federal Space Agency in cooperation with the universities from Danube countries and Faculty of Geography from Moscow State University are participating in this work.

Technology Transfer Centers are establishing in the Danube Region, to improve the links between academia and the private sector. As a pilot project, three technology transfer centers attached to important Danube Region universities will be set up. New energy efficient transformers based on modern meta-magnetic materials [44], [45] and multiphase coaxial cables with minimal energy losses for medium and small hydropower plants in the Danube basin are designing in the framework of these projects [46].

V. CONCLUSION

The results of economic development for 2001 – 2011 show that the "integration choice" of the new EU member-states was correct. It has to be noted, the smallest among the EU states GDP per capita index for Bulgaria was about in 1.8 times higher than the same one for China. But over this period the growth rate of discussing index for Bulgaria, which is one of the most dynamically growing economies in the EU, was in 1.47 times less than for China. In national

economies competitiveness ranking for 2012 China took the 29th position, Bulgaria occupied the 62nd, Romania – 78th, and Croatia was the 81st. The Russian Federation with its vast reserves of oil and gas, highly developed metal production industry, and internationally recognized scientific schools was ranked to the 67th place [20].

Nowadays economies of the EU countries are coming through very complex market oriented integration transformations, which are synchronizing in time with restructuring of the traditional industries producing commodities into a new era competitive knowledge economies in post industrial information societies.

The Strategy for the Danube Region targets to synergy the advanced technologies developed by the European Union countries and significant financial and natural resources accumulated by the Russian Federation [38]. Conceptual project management [22] and social networking as System of Systems Engineering tools are inherent parts of this Strategy.

REFERENCES

[1] World Bank, 2012. *World Development Indicators,* Washington, database [accessed 03/21/2013].

[2] P. Bednar, P. Grebenicek, "Emerging creative cities: mapping regional capitals in the Czech Republic and Slovakia," in *Proceedings of the 1st WSEAS International Conference on Economics, Political and Law Science (EPLS '12), Proceedings of the 1st WSEAS International Conference on Risk Management, Assessment and Mitigation (RIMA '12),* Zlin, Czech Rep., Sept. 20-22, 2012, pp. 178-185.

[3] J. Kloudova, O. Chwaszcz, "The application of creative economics to selected regions of the Czech Republic," in *Proceedings of the 1st WSEAS International Conference on Economics, Political and Law Science (EPLS '12), Proceedings of the 1st WSEAS International Conference on Risk Management, Assessment and Mitigation (RIMA '12),* Zlin, Czech Rep., Sept. 20-22, 2012, pp. 71-76.

[4] J. Hanclova, M. Stanickova, "Assessment of the Visegrad Countries performance by application of the DEA based Malmquist Productivity Index," in *Proceedings of the 1st WSEAS International Conference on Economics, Political and Law Science (EPLS '12), Proceedings of the 1st WSEAS International Conference on Risk Management, Assessment and Mitigation (RIMA '12),* Zlin, Czech Rep., Sept. 20-22, 2012, pp. 47-52.

[5] P. Kotakova Stranska, T. Lelek, V. Linhartova, "Analysis of the EU cohesion in terms of selected macroeconomic indicators," in *Proceedings of the 1st WSEAS International Conference on Economics, Political and Law Science (EPLS '12), Proceedings of the 1st WSEAS International Conference on Risk Management, Assessment and Mitigation (RIMA '12),* Zlin, Czech Rep., Sept. 20-22, 2012, pp. 24-29.

[6] J. Matoskova, H. Rehackova, M. Jurasek, M. Polcakova, I. Pejrova, A. Gregar, V. Svec, "Tacit knowledge and leadership," in *Proceedings of the 1st WSEAS International Conference on Finance, Accounting and Auditing (FAA '12),* Zlin, Czech Republic, Sept. 20-22, 2012, pp. 50-55.

[7] J. Nevima, Z. Kiszova, "Evaluation of regional competitiveness – case study of Visegrad four regions using Analytic Hierarchy Process," in *Proceedings of the 3rd International Conference on Development, Energy, Environment, Economics (DEEE '12),* Paris, France, December 2-4, 2012, pp. 433-438.

[8] K. Staehr, "Reforms and economic growth in transition economies: complementarities, sequencing and speed," *Bank of Finland Institute for Economies in Transition, Discussion Papers,* no. 1, pp. 5-31, 2003.

[9] P. Aghion, Y. Algan, P. Cahuc, A. Shleifer, "Regulation and distrust," *The Quarterly Journal of Economics,* no. 130, pp. 1015-1049, 2010.

[10] R. Desai, A. Olofsgard, "Constitutionalism and credibility in reforming economies," *Economics of Transition,* vol. 14, no. 3, pp. 91-114, 2006.

[11] G. Kolodko, "Great Polish transformation: lessons for the developing markets," *The World of Changes*, no. 4, pp. 33-45, 2005.

[12] J. Marangos, "A post Keynesian approach to institutional development in transition economies," *Journal of Economic and Social Policy,* vol. 5, no. 2, pp. 1-14, 2001.

[13] I. Popescu, "Institutions and economic growth theory," *Proceedings of the 1st WSEAS International Conference on Economics, Political and Law Science (EPLS '12), Proceedings of the 1st WSEAS International Conference on Risk Management, Assessment and Mitigation (RIMA '12),* Zlin, Czech Rep., Sept.20-22, 2012, pp. 253-256.

[14] I. Wright, "A closed social architecture model," *Proceedings of Conference on Probabilistic Political Economy: Laws of Chaos in the 21st Century,* Kingston University, U.K., July 14-16, 2008.

[15] C. Scarlat, E. Scarlat, "Theoretical aspects of the economic transition: the case of Romania," *Managing Global Transition,* vol. 5, no. 4, pp. 307-331, 2007.

[16] L. Leydesdorff, M. Fritsch, "Measuring the knowledge base of regional systems in Germany in terms of a Triple Helix Dynamics," *Research Policy,* no. 35, pp. 1538-1553, 2006.

[17] J. Novosak, O. Hajek, "Regional policy, enterprise and innovation: some spatial relations," *Proceedings of the 1st WSEAS International Conference on Economics, Political and Law Science (EPLS '12), Proceedings of the 1st WSEAS International Conference on Risk Management, Assessment and Mitigation (RIMA '12),* Zlin, Czech Rep., Sept.20-22, 2012, pp. 102-107.

[18] L. Leydesdorff, *The Knowledge Based Economy: Modeled, Measured, Simulated,* Boca Rota: Universal Publisher, 2006.

[19] P. Kamyshanov, A. Kamyshanov, "Probabilistic model for an economy coming through integration transformations," *Proceedings of the International Workshop on Applied Modeling & Simulation,* Rome, Italy, Sept. 24-27, 2012, pp. 82-89.

[20] World Economic Forum, 2013. *The Global Competitiveness Report 2012-2013,* Geneva, Switzerland, 2013.

[21] M-C. Garcia-Centeno, S. Rodriguez-Sanchez, "The importance of the discrete multicriteria decision to establish a ranking among European Monetary Union countries. A new macroeconomic approach," *Proceedings of the 7th WSEAS International Conference on Business Administration (ICBA '13),* Milan, Italy, Jan. 9-11, 2013, pp. 11-16.

[22] C. Firat, "A knowledge based look at federation conceptual model development," *Proceedings of the European Simulation Interoperability Workshop,* Euro SIW Harrow, England, 2001.

[23] D. DeLaurentis, "Appropriate modeling and analysis for Systems of Systems: case study synopsis using a taxonomy," *International Conference on System of Systems Engineering,* Monterey, California, June 2-4, 2008.

[24] S. Mittal, P. Zeigler, L. Risco-Martin, F. Sahin, M. Jamshidi, "Modeling & Simulation for Systems of Systems Engineering," in *Systems of Systems Engineering: Innovations for the 21st Century,* M. Jamshidi, Ed. John Wiley and Sons, Hoboken, NJ, 2009, pp. 101-149.

[25] T. Bass, "Information management: challenges on the path to net-centric operations," *IEEE Military Communications Conference, 17–20 October 2005, Atlantic City, NJ.* S. Beer, *The Heart of the Enterprise*, John Wiley and Sons, New York, 1979. S. Beer, *The Brain of the Firm*, John Wiley and Sons, New York, 1981.

[26] A. Gorod, R. Gove, B. Sauser, J. Boardman, "System of Systems management: a network management approach," *IEEE International Conference on System of Systems Engineering,* San Antonio, Texas, April 16-18, 2007, pp. 1–5.

[27] V. Kotov, "Systems-of-Systems as communicating structures," *Hewlett Packard Computer Systems Laboratory Paper HPL-97-124*, Hewlet Packard Company, Palo Alto, CA, 1997.

[28] M. Maier, E. Rechtin, *The Art of Systems Architecting,* 2nd ed., CRC Press, Boca Raton, FL., 1999.

[29] K. Adams, "Systems principles: foundation for the SoSE Methodology," *Int. J. System of Systems Engineering,* vol. 2, no. (2/3), 2011, pp. 120–155.

[30] *IEEE Glossary of Software Engineering Terminology,* IEEE 610.12 Standard, International Organization for Standardization and Institute of Electrical and Electronic Engineers, New York, 1990.

[31] C. Keating, P. Katina, "Systems of Systems Engineering: prospects and challenges for the emerging field," *Int. J. System of Systems Engineering,* vol. 2, no. 2/3, 2011, pp. 234–256.

[32] Statistical books. *Eurostat Regional Yearbook 2012,* Publications Office of the European Union, Luxembourg, 2012. [Online]. Available: http://epp.eurostat.ec.europa.eu/cache/ITY_OFFPUB/KS-HA-12-001-00/EN/KS-HA-12-001-00-EN.PDF

[33] R. Scrudder, "Modeling the Federation development and execution process," in Waite W. F. (Ed.).

[34] Reflection Paper. *On the Implementation of the EU Strategy for the Danube Region 2013*. [Online]. Available: http://www.danube-region.eu/[04/18/2013]

[35] R. Myskova, "Assessing a region's economic level using the regional economic development risk indicator," *Proceedings of the 3rd International Conference on Development, Energy, Environment, Economics (DEEE '12),* Paris, France, Dec. 2-4, 2012, pp. 374-379.

[36] T. Baković, "Managing innovation systems," in *Transition Economies, Working Paper Series, paper # 10-01,* University of Zagreb, Faculty of Economies and Business; 2010, pp. 2-11.

[37] D. Kuttor, A. Hegi-Keri, "Sectoral and regional dimensions of industrialisation in East Central Europe," *Proceedings of the 1st WSEAS International Conference on Economics, Political and Law Science (EPLS '12), Proceedings of the 1st WSEAS International Conference on Risk Management, Assessment and Mitigation (RIMA '12),* Zlin, Czech Rep., Sept. 20-22,2012, pp. 290-299.

[38] M. Hedvicakova, "Project management as a tool for solving regional disparities," *Proceedings of the 2nd International Conference on Design and Product Development (ICDPD '11),* Montreux, Switzerland, December 29-31, 2011, pp. 29-32.

[39] J. Sundbo, *The Strategic Management of Innovations,* Cheltenham, U.K.: Edward Elgar, 2001.

[40] L. Smekalova, "Spatial distribution of operational program rural development and multi-functional agriculture resources," *Proceedings of the 1st WSEAS International Conference on Economics, Political and Law Science (EPLS '12), Proceedings of the 1st WSEAS International Conference on Risk Management, Assessment and Mitigation (RIMA '12),* Zlin, Czech Rep., Sept.20-22, 2012, pp. 96-101.

[41] Z. Riha, M. Honcu, V. Faifrova, "Transportation system, economics and quality of life," *Proceedings of the 1st WSEAS International Conference on Economics, Political and Law Science (EPLS '12), Proceedings of the 1st WSEAS International Conference on Risk Management, Assessment and Mitigation (RIMA '12)*, Zlin, Czech Republic, September 20-22, 2012, pp. 281-284.

[42] I. Popescu, "Institutional quality: criteria, determinants and benefits," *Proceedings of the 1st WSEAS International Conference on Economics, Political and Law Science (EPLS '12), Proceedings of the 1st WSEAS International Conference on Risk Management, Assessment and Mitigation (RIMA '12),* Zlin, Czech Rep., Sept. 20-22, 2012, pp. 36-40.

[43] R. Snow, M. Snow, S. Brisson, "GIS approach to sea level rise risk assessment," *Proceedings of the 1st International Conference on Climate Change (CLICH '13),* Cambridge, MA, USA, January 30 - February 1, 2013, pp. 171-175.

[44] A. Bulucea, D. Nicola, N. Mastorakis, P. Dondon, C. Bulucea, D. Cismaru, "Fostering the sustainability of power transformers," *Proceedings of the 7th WSEAS International Conference on Energy & Environment (EE '12),* Kos Island, Greece, July 14-17, 2012, pp. 72-80.

[45] V. Volcko, Z. Eleschova, A. Belan, P. Janiga, D. Viglas, M. Smitkova, "Modeling of power autotransformer," *Proceedings of the 3rd International Conference on Development, Energy, Environment, Economics (DEEE '12),* Paris, France, Dec. 2-4, 2012, pp. 451-456.

[46] K. Kiousis, A. Moronis, "Modeling and analysis of the electric field and potential distribution in a wire-cylinder air gap," *Proceedings of the 7th WSEAS International Conference on Computer Engineering and Applications (CEA '13),* Milan, Italy: January 9-11, 2013, pp. 35-40.

First A. Peter Ivanovich Kamyshanov graduated Plekhanov Russian Economic University, Moscow in 1954. As Professor he works at the Department of Accounting on Faculty of Business at Plekhanov Russian Economic University, Moscow since 1994.

Dr. Alexander P. Kamyshanov had graduated Moscow Aviation Institute in 1981, where at 1989 he received his PhD degree in System Engineering. Dr. A. Kamyshanov is currently an assistant-professor at the Department of Business Analysis and Audit of Plekhanov Russian Economic University, Moscow.

They are the authors of more than ten books. One of which is the textbook in financial accounting for the universities. P. I. Kamyshanov and A. P. Kamyshanov had participated several International Conferences in the field of computer science, system engineering and financial management as in Europe, so in Asia and America. Their research interests are system engineering, artificial intelligence, business analysis and management, applied modeling and simulation.