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Description

The aim of the *Creative and Knowledge Society* journal is to be recognized worldwide as one of the leading forums of discourse for human creativity, extending across different disciplines, whilst providing substantial contributions ranging from scientific research to innovative approaches addressing new, controversial, and potential developments at the interface between creative society and related fields. The journal's central idea is to enable great variety of ways how to challenge, facilitate and protect potential in creative and knowledge society.

Creative and Knowledge Society is an international scientific journal publishing original scientific articles and scientific studies based on theoretical and empirical analyses. The journal is comprised of main and related section:

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Articles are welcomed from all parts of the world. If possible, article should demonstrate theories, report empirical and analytical research, present critical discourses, apply theories to case studies, and set out innovative research methodologies.

The journal publishes two issues annually; one in the spring (July) and one in the fall (December).

The journal publishes independently peer-reviewed original full-length research articles, review articles and book reviews.

All views expressed in the *Creative and Knowledge Society* journal are those of the authors only and do not necessarily represent the views of the Pan-European University, the Editorial Board, the staff, or any associates of the journal.

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Education As Tool For The Development Of Creative Industries In Slovakia

Miroslav Šipikal, Emília Madudová

Abstract

Education is widely accepted as important source of future economic growth and is strongly supported by public sources. Most of this support is oriented toward traditional education and industries. However, several studies show importance of creativity education as important feature for innovation and future growth. However, public support of creative industries is relatively new and most of policy measures that have been implemented are still not fully evaluated and understood. There is a strong need to look much more closer on way how public education influence creative industries and what policies could be placed to strengthen positive effects of this education also in the long run. This article represents an output of the research about the creative industries support policy in Slovakia in the field of education activities. It is containing basic literature overview comparing support policies for traditional sectors and the creative industries. We analyzed conceptual documents at the national level and basic strategic documents in the regions and selected cities of the country. We also realized several interviews in different creative economy industries. Generally, creative industries in Slovakia are much less in the centre of public support policy compare to traditional industry sectors. This is also the same in case of education. Despite of wide variety of support tools used in the world, only few of them are applied in Slovakia. Interestingly, creative industries do not strongly require more creativity in education in schools. We found out the most important support in the field of education should not be related to creativity itself, but more on the complementary skills as ICT or entrepreneurship. We also found very limited role of universities and other public institutions in creative industries success stories.

Keywords: | Support Programs, Creative Industries, Support Policy, Creativity, Education, Entrepreneurship

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Introduction

Creativity is not a new phenomenon in economics, but it has been gaining importance last years. As a policy concept, it started to be used only since 1997 in Great Britain (DCMS, 1998). Despite of that there are already many support programs in various countries, which reflect the increasing importance of supporting this sector (UNCTAD, 2008). Representative examples may be found in particular support systems of the UK, Finland, the Netherlands, Spain or Austria (HKU, 2010). However, most of them are still just in the implementation phase with low level of evaluation of these support programs. The support policy is not clearly connected to other state or regional policies and there is a high duplicity in these programs (Fleming, 2007). Innovation support, however, especially for university-business interactions, has failed to keep pace with advances in policy thinking, and still focuses on a linear, technology-driven model rather than collaborative, interactive approaches. As a result, many creative businesses view the support structures as not relevant (Universities, 2010). Many countries also used only “copy paste” strategies, without clear understanding of their own creative industries development and the pure adoption of best policy practices has been also criticized in several studies context (Pratt, 2005; Evans, 2009). This is also the case of post-command countries, which nowadays make part of the EU, whose are often jumping and leaving out some of the essential steps needed for well-grounded policies, such as research and public debate, and are simply adopting best-practices from other countries, lacking local content (Rozentale, 2012).

Most of the research was done on the most developed countries. That is why we would like to look more closely on country, where more traditional industries are dominant. As for the Eastern European countries, although the initial creative industries mapping has been done and policies are often present, there is an enormous lack of research in other industry characteristics than the basic economic ones to adequately set up these policies. Even more so, as these countries are often small in size the urban development debate on creative cities could possibly only apply to the capital city (Rozentale, 2012) or few other main cities in the country. This is also the case of Slovakia.

Several researches were conducted already in Slovakia that examined for instance the role of creative industries in the regional development and their role in regional employment (Blahovec a Hudec, 2012; Murgaš a Ševčíková, 2011) or their typical concentration in largest cities of Slovakia (Chovanec - Rehak, 2012). Most of the studies only concentrate on mapping present situation of creative industries in the country. More detailed look at main characteristics together with some policy background could be found in Balog (2014). However, we have not experienced research of creative industries in the context of promoting education as one of factors not only of their development but the overall development of the country's economy.

Therefore, the aim of this research paper is to examine needs of creative industries support policies regarding to their adequacy in the field of education and human resources to support development of this type of industries. All this with respect to specific condition of Central Europe country where the creative industries are not that important compare to Western Europe countries and policies to support creative industries have not been developed. To meet this objective, we provide a brief literature overview about the different approaches to support creative industries in the field of education; later on we deal with the experiences of education support in the context of creative industries in Slovakia. The empirical part of the paper consists of an analysis of the current needs in this field in the Slovak Republic and current policies used to satisfy this needs.

1 The Role of Education in the Development of Creative Industries

Creative industries work on the basis of different principles than some traditional industries. Compare to traditional sectors where significant role play big enterprises, in creative industries dominate self-employed entrepreneurs and small businesses. Their number varies according to different types of industries. There are sectors of creative industries, where the proportion of self-employers is two times higher than the number of self-employers in traditional sectors (HKU, 2010). For instance in design is this share of self-employment approx. 30% and in some sectors of art over 60% (Markusen - Gadwa, 2010). In United Kingdom, one in three creative graduates run their own business and/or work in a freelance capacity (Ball et al, 2010).

For the creative industries was a high concentration in large cities recognized, moreover these sectors prove to be substitutes of several traditional industries (Cooke and Lazzaretti, 2008). The products of these sectors are characterized by uniqueness and also an unpredictability of their further development (Fesel, 2007). The creative industries require specific and highly specialised skills in a rapidly changing environment, and are characterised by a high concentration of young people with a desire for lifelong learning (Universities, 2010). It also leads to the fact that in many cases - contracts tend to be short, the work is irregular, income is unequally distributed (Banks, 2009). Subjective value of these products for different people also plays an important role in this context (HKU, 2010). As regards the innovations in this sector, are rather a natural part of the business cycle and not exactly an embodiment of purposeful research activities (Potts, 2009). Innovations are often results of a combination of technological and non-technological activities often arise as products of pilot laboratories (Fesel, 2007).

All above mentioned aspects strongly influence the types of measures used in the support programs and particular measures. First issues arise during the formal education of creative workforce. For academics, engagement with diversified small and medium enterprises is difficult due to the fragmented company base, and is not clearly rewarded. For small creative businesses, costs and time to cooperate are higher barriers than for traditional enterprises, and many struggle to articulate their innovation needs clearly or even to recognise what they do as innovation (Universities, 2010). This cause a problem for SME to be able to define the needs from formal education institutions. Another issue is related to discussion about how to teach creativity or if it's even possible to teach creativity. Similar issues are related also to lifelong learning support. Compare to formal education, this education (mainly paid short term courses run by private education companies) is usually much more costly. For self-employed persons or small companies, who are dominant in these industries, it could represent substantial burden to continue with education also after university.

With the increasing importance of creative industries in national economies grows the number of various types of measures to support their development like financial aid, tax benefits, export supporting policy and also institutional support. Another form of support policy in the field may be the support of education and human development. It belongs to traditional instruments of regional policy, but certainly not tailored to the requirements of the development of creative industries. The main reasons lie in the special characteristics of the labor force working in these sectors (Gunnel - Bright, 2010). Many countries and regions tried to improve their education system to be more supportive for creative industries. Especially we could see a tendency to integrate creativity in curriculum

frameworks (Sheenan, 2010). Especially Asian countries have imposed curriculum reforms, which emphasized creativity development in their primary and secondary schools (e.g. Cheng, 2011). However, education in countries with dominant traditional sectors is usually much more rigid in terms of changes in the curriculum.

Based on the literature, a summary of education support measures is provided in the Table 1. Measures are aimed at promoting the development of creative industries in the context of supporting education and human capital development. The measures are divided according to the type of education process and also based on territorial level of the policy. On this basis, we distinguish a support of formal education, lifelong learning, improving of quality of labor force. This may be supported at different territorial or policy levels, like national, regional and local policy measures.

As we can see, there is a lot of possibilities compare to very restricted financial amount for support, so all measures must be implemented in line with present role of creative industries within regional or national development strategies. Each measure has its own strengths and weaknesses in support creative industries development, so in depth studies of local environment is necessary to properly design adequate support policies. This article tries to analyse the need of creative industries in Slovakia from this perspective and identify potentially successful policies to support the development of creative industries.

Table 1 Measures to support creative industries in the field of education and human development

Measures	National level	Regional level	Local level
Formal Education	Building strong university with flexible curriculum for creative industries Support of cooperation between universities and private companies Interdisciplinary programs	Creativity and entrepreneurship in high school ICT education support Interdisciplinary programs (networking, social interaction)	Creativity and entrepreneurship in elementary schools ICT education support
Lifelong Education	Requalification programs in the field of creative industries Education standards for creativity education	Support of talented individuals Organizing competitions for individuals in creative industries	Training programs Voluntary courses in creative industries sectors
Measures Related to Education of Quality of Workforce	National award for „best“ in selected creative industry fields Support of export of creative industries	Mentor´s programs Supporting culture activities	Local community development activities Support of traditional culture activities Creative incubators

Source: Own summary based on cited literature.

2 Methodology

We analyzed existing need for support and existing support for creative industries in the field of education and labor force development in Slovakia. This was done in two ways. First, we analysed of policy documents and existing policy measures at various levels - national, regional and local (only the biggest cities). We try to analyse the extent, rationale and content of there measures. We also look in more detail on implementation of proposed activities within these documents.

The next part of the research was done through the form of sectorial and regional case studies of different creative sectors in different regions of the Slovak Republic under the project "Creative economy – national and regional conditions and stimuli". The whole project team realized more than 70 interviews within the project with different companies from various creative industries in Slovakia in order to evaluate also their educational needs and compare it with existing support. Interviews were more broadly oriented, but we will concentrate only on education related issues in this article. We choose these 6 sectors, which are listed in Table 2. It is important to mention that we concentrated purely on profit based companies in all sectors and exclude non profit activites and employers such as e.g. theatres.

These creative industries have all key specific charactersitics mentioned in the introduction. They are highly concentrated with predominantly self-employed work force. More details we could see in Table 3.

Table 2 Main charasterictics of selected industries

	Percentage of self-employed	Number of firms	% in Bratislava region
Advertising	49,1%	7332	44,3
Architecture	46%	1847	36,2
Fashion and Design	44,7%	536	46,5
Information technologies	42,9%	3416	42,2
Performing Arts	65,2	1074	38,2

Source: Balog 2014

Interviews were mostly done with owners of the companies. The companies were from whole Slovakia. Size of companies varied from self-employment to company of 200 employees. We try to identify the key needs of these sectors and also present support policy measures in the field of skills improvement and human resources development. We also try to identify the role of support policies and role of education in the success stories within these industries. We also try to identify factors realted to success of selected companies. The results presented later represent a summary of conducted interviews across the broad research of creative industries.

3 Education as Tool for the Development of Creative Industries in Slovakia

The role of creative industries is taking shape in Slovakia just in recent years. Despite the fact, that there is no systematized support of creative industries, the starting steps were made. The first document in Slovakia was submitted to the government for approval in year 2011 under the title 'Initial Concepts for Supporting Cultural and Creative Industries in the Slovak Republic' by the Ministry of Culture of Slovak Republic (MCSR, 2011). It was the first conceptual political document in this country, which contains an introduction to the given issue, provides statistics about the country regarding to the development of creative industries. This strategic document presents the planned intervention and possible types of measures for supporting this sector in Slovakia (MCSR, 2011). One of the priorities is related to education which ultimately leads to creativity. However, there is no clear and detailed plan how to do it and why to do it. Strategy was updated in 2014 and more detailed activities are planned from cohesion policy budget in the next programming period to implement this strategy. Some strategies also exist at regional and local level, mainly in few bigger cities Bratislava (Bratislava, 2012) and especially in Košice as previous capital city of culture 2013 (Košice 2008; KSK 2011). Most of them consider importance of workforce, but nearly no concrete support measures have been implemented in the field of education so far.

The result of the conducted research through the interviews is an evaluation of successful companies in terms of their human resources and education support. We mainly try to identify possible factors of their success at regional level. In this context occurs often a similar pattern. The driving force of the company and probably main reason for their success is its owner, which is in the most cases the business owner for over 10 years. He/she is the carrier of creativity and new ideas. The owner is responsible for the most profitable contracts for the company. The majority of the surveyed companies started with a small number of employees while the most successful of them already employs entire teams of creative people. Despite of that, the position of the owner of the company is still crucial for the success of the whole company. However, most of the owner consider themselves are "creative enough" to feel a need for future training in this field.

This above mentioned position of the owner also diminishes the role of universities in the education of creative workforce. The cooperation with universities is very limited and due to lack of needs there is also no pressure from private companies to the universities to produce more skilled people. Formal education plays a very minor role in the success stories in the creative industries. The Performing Arts sector was the only one where university plays more important role and there are many ties with business, partly because many of teachers have of work for private business in the segment. The lower role of universities in formal education could be also results of very narrow teaching with quite strict curriculum while creative profession needs much more interdisciplinary approach. Partly it is also a problem of much diversified structure of creative industries, so universities often do not have an adequate partner (larger companies or industry associations) to cooperate with.

Due to very high number of small companies and different sectors in the case study, we expected fragmented requirements for creative workforce skills supplied by formal education. Surprisingly, there were nearly none. Most of the owners do not have any requirement or is not able to formulate special requirements for their creative workforce. The companies usually have special requirements only in the case of some professions which are not directly connected with creative work such as accountant, economist or

machine operator. For such professions, according to the managers of companies, important are a university degree and some specific knowledge related to their work.

On the contrary, for a creative workers is required to be creative and having talent. This are expected results, but they do not consider them as requirements from formal education system. Moreover owners or managers often related to creativity also skills and abilities as ability communicate and properly understand with clients or ability to balance possible outcomes for clients and costs to achieve them. These characteristics are much more substantial than a university degree. In addition to these skills, according to respondents, are the flexibility and ability to work with specific software programs very crucial. This is also reflected in the selection of employees where informal contact and previous work references and experiences play much more important role than formal education in the field. It is even more supported by the fact that many of companies' owners also do not have formal education in the field of their business (except architecture).

According to the interviews conducted, the additional or formal education of creative employees is nearly totally missing during their work. They basically do not participate on training, conferences or any similar education activities. Again, these formal trainings are typical only for the non-creative fields of company's action such as training on legislative changes or new ICT tools. Most of respondents state "learning by doing" as a form of improving their creative skills. They learn by internal brainstorming and communication with clients or other employees during their creative work. This could lead to support policies strengthening cooperation and exchange of knowledge as good way to stimulate and extend creative capabilities of labour force. Another reason for low level of training could be high financial fees for life long training provided by private companies, especially when the rate of change in technology and business is very rapid. This fact also makes much harder to identify the needed skills for a job applicant in such a company.

Without identification of these skills, any formal support, training programs or educational activities cannot be properly designed and may be probably a waste of public money. Also most of the interviewed respondents are much more concerned with legislative boundaries for development of their business as for the quality of workforce and their skills. This could also be related to present situation in most of industries where informal contacts and networks are consider much more important to get a contract as actual abilities. This may have two reasons. First, it is much more difficult for companies to understand positive contribution of creative industries. If manager in traditional industry require a machine, clearly know how fast or productive this machine needs to be. In creative industries, it's very difficult for managers to understand difference between for example two design suggestions. So they try to more rely on informal contact and get a job rather people "they believe in" as to really consider and comparing competitive alternatives. Second reason that was mention was corruption. However, in this case we were not able to clearly identified relevance of this point. Generally, this problem was identified in several interviews, but no one mentioned concrete examples that could be verified.

This is also partly related to the problem of public procurement. Most of public companies try to make public procurement selection process based only on one indicator – price. It could work very well for obtaining e.g. paper, but in case of creative industries is lead to support of cheap solution with low quality. As example, you could take design of webpage. It could be done for one hour without thinking, but you deliver output. So this "habit" force creative companies to offer cheap services and it consequently lead to lower need for qualify workers.

There were only two exceptions regarding to the requirements and needs of companies operating in the sector of creative industries. Companies require skills in information and communication technologies (ICT) and entrepreneurship skills to a significant extent. Most of managers consider the creativity of their employees and themselves as sufficient, but in reality is they creativity limited by their ability to 'translate' their creativity into real outputs. To be able to do this, they need proper ICT skills. Entrepreneurship skills are missing mainly in the case of self-employment or small companies. Many small entrepreneurs consider themselves as very well trained in their own field (e.g. architecture, design, fashion), but they do not know how to sale their products, how to identify market niches or how to analyze the competition. Without these skills they are much less competitive, especially compared to foreign companies active in their field. Fashion designers are a clear example of this. They are substantially skilled, but they do not know how to build their own branches, so they usually have only their own selected customers and are not able to expand more. Another issue related to business skills is very limited export. Nearly none of the interviewed companies is able to done or expand their business abroad. They consider this a very hard and risky step, so their businesses are limited to their region or Slovakia only. The support of business skills related to export or of companies itself may be also good way to strengthen abilities of creative industries in Slovakia. This measure, although quite indirect to education itself, could have very positive influence on bringing present creative industries in Slovakia to next stage of their development and abilities. It could also have very positive regional spillovers, which is not a case for most of these industries now.

Similar to the above mentioned, a career managements is a particular issue within creative industries workers. There is no 'clear' career path in creative industries; jobs have been changed very regularly. Missing requirements for workforce could also indicate lack of proper knowledge to expand further. Most of companies have only local or regional customers and do not try to expand into new territories or even abroad. They are 'locked in' in the sense they do not feel they need to have more knowledge or capabilities. Their contribution to local development is rather limited; therefore the effect of public support oriented directly to them is quite questionable.

Generally, the existing success stories in creative industries in Slovakia suggest that instead of concentrating effort on 'creative education' could be much more effective to focus on searching for talents. The most of the respondent from interviews came to the conclusion that creativity should be born, but it cannot be learn. Also it looks like the personality of owners is crucial for success, but vast majority of them was not formally trained in creative industries. This also leads to prefer policies to search for talents rather than formally educate them. The aim of policy should be to identify creative entities and support their development and additional entrepreneurship skills rather than trying to 'teach' creativity to everyone.

Conclusion

The majority of the identified needs of creative industries in the field of education in Slovakia are similar to previously founded facts in other studies. We found out that the most important support should not be related to creativity itself, but more on complementary skills as ICT or entrepreneurship. These two skills were the only, where the public support could play substantial role. We suggest creating support schemes for creative skilled workers to be able to participate on these educational activities. Otherwise,

the public support should be focused more on creation of proper legislative and business environment.

The role of formal education is very limited at present time. Universities must play more active role in development more flexible curricula and increase cooperation with private companies. We must also take into account, that support of creative industries cannot be considered automatically as good for economic development. It's also important to understand relations among creative industries, policy support measures and external spillovers to other part of the economy. Government should ensure adequate funding for research in disciplines relevant to the creative industries. It is also important to include social science research into the nature of the creative economy (Universities, 2010).

The level of development of creative industries in Slovakia is still in the beginning and all requirements could be managed within existing schemes rather than to create new ones especially for these sectors. Also the support of creativity in traditional sectors which are export oriented could be more effective way to achieve higher economic development.

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Human Capital And Potential To Increase Its Creativity

Marcela Galovská

Abstract

Article highlights the contribution of human capital, which is currently important for every business entity. In order to be an effective organization, it must have a human capital with creative potential. Creativity largely influences work and personal life balance and language skills. Therefore, in the first part of this paper, I concentrate on possibilities of increasing creativity of human resources and discuss the notion of human capital and creativity. Currently, if a business entity wants to be competitive and efficient, it must possess creative human resources. What are the possibilities of increasing creativity? Due to the global economic crisis, businesses prefer to reduce the cost of education. This tendency seems to be a very weak one, even a dangerous one! The paper deals with the effectiveness of creative thinking and with the use of part of existing global environmental undertaking. The paper investigates in particular the language skills of human resources. I have compared the Slovak and Chinese language, as when operating on a given language, except others, human being is familiar with cultural differences in that particular language and can think within this framework, which creates a new perspective on problem solving in general, with a particular use in the respective organization (firm). In this article, I discuss and analyze the knowledge of human resource management and human capital theory. I use mainly comparative method and relational content analysis. The contribution is processed on the basis of Human Capital report (21). The main scientific objective is to highlight the language skills of the human resource and its link to creative thinking. Important issue seems to be a balance between professional and personal life, which forms an important basis for the development of creativity and creative thinking. Within the language skills, a specific highlight is dedicated to chromatic adjectives (colors) that are currently used in these languages, but also the idioms and phrases that are not possible to translate into another language.

Keywords: Creativity, human capital, creative thinking

JEL Classification: M12, M19, M 54

Introduction

It is indisputable that human capital is a source of creativity. In the current global environment, human resources communicate in foreign languages, with positive side effects supporting their creative thinking. They know the language syntax, culture, values. Paper also points towards “human capital development index”, whose “values” should businesses follow if they want to be creative, successful and subsequently efficient. Using the comparative method and relational content analysis, we partially conclude that creative thinking is significantly affected by the level of foreign language personnel, as well as the balance between professional and personal life. Businesses must have those human resources that are able and willing to impart their knowledge. Generation Y, which will constitute the labor market in greater representation, more and more prefers to balance professional and private life.

1 Possibilities of increasing creativity in human resources

The new millennium brought new challenges, new opportunities and changes in demography, social and economic sphere, but also the growth of creative industries. At the beginning of the last century, there was prevailed physical work constituting new working methods, In the 1930s, the first significant savings became a reality, also among ordinary people having first time the opportunity to invest. 1960s in the US and other developed countries were considered as “golden” years - a golden period. People have had sufficient financial resources and more intensively started to “invest” some values to leisure and education, too. The service sector had a growing trend especially in the 70's of the last century. Globalization started to prevail gradually and the main source of production was becoming a human capital. New economic development has brought the balanced satisfaction of human being in material and nonmaterial consumption. In the past, physical work prevailed and consumption was rising up, but the increase of a mental work started - people prefer more and more non-material consumption (preferred cultural, sports, entertainment, social, environmental and other events). Factors that influence thinking about human resources are represented by the existing balance between professional and personal life, and language skills. In this contribution, Slovak and the Chinese languages are being compared, where the main distinction is that Latin characters in a script have differences in idioms and phrases. Given difference is reflected in the different understanding of reasons why some words and/or idioms, human resources used in more foreign languages will be more successful in creative solutions of the problem, having different points of view on the situation to be solved. Additionally, human resources should carefully distinguish professional and personal lives, because the effective differentiation of professional and personal life supports favorable conditions to develop creativity. Emergence of the Generation Y, which will provide up to 2025 the bulk of the working age population, being accompanied by different ideas, opinions and problems, and prefers investments in ourselves - in our education. The typical characteristics of Generation Y is: Being economically active, having higher standard of living, greater responsibility for social security, maximum utilization of all potential job offerings; on the other hand, the willingness to sacrifice his/her personal life is not very common, generation Y is characterized by long-term effects by both - personal and professional life. Learning, gaining experience and meaningful work is very important for them. Starting a family issues are postponed to a later time by Generation Y. The issue “money” means “indebtedness “.

As already mentioned, to enhance the ability of creative thinking, it is necessary to increase the level of language learning. If the human resources are capable of talking in a foreign language, when they are forced to think in it - it represents a wider potential for creativity. For example, when I speak a foreign language, I am forced to think in that language and I can have a view on the issue in the broader dimension. When creating European Union, one of the basic pillars was reliance on history and culture of individual members and nations, and in this direction, the European Union should move on further. Generally, if we expect creative industries to become a successful concept, they must have a strong foothold in the traditions and cultural and creative inspiration - and the European Union has such potential! Population aging in general represents higher governmental expenditures, but it appears as an opportunity for creative industries. Elder people can provide their customs, traditions and transfer their experience to the younger generation what can be prosperously used in traditional fields - theater, entertainment industry, gastronomy, and many more.

Creativity is affecting:

- human capital,
- social capital,
- organizational capital,
- cultural capital,
- structural capital.

Human capital is the greatest asset for a business entity, because it is the only factor capable of creation of added value. Human capital management refers to gathering, analyzing and reporting of information how the management of ongoing strategic investment and operational decisions really works. It is a tool for measuring the quality of management, emphasizing competitive advantages achieved via strategic investment in manpower - people through the acquisition and stabilization of employees, via talent management application and special learning and development programs.

1.1 Human capital

The term human capital comes from Schulz, Vojtovič (17), who developed the concept in the following form: “take into account all human capabilities, either innate or acquired, properties that are valuable and can be an investment expanded, and those create the “human capital “. Human capital is the factor for an organization, which is a kind of combination of intelligence, knowledge and skills. The human mind is capable of learning, creating changes, innovations, and similar creative efforts, thus ensuring long-term benefits for the organization. Human capital theory emphasizes the added value that people contribute to the organization. According to the given theory, “people” are considered as a property and points out that investing in people is very efficient and rewarding.

Sources of human capital: in a narrower concept: only formal education and economic revenues for output are considered to be source of human capital more broadly: human capital impacts the complete training of a person, impact of all types of education and cultures. Outputs of human capital are not only economic profits but also psychological, medical, social, cultural and other gains. Human capital - represents stocks and flows of

information that are available in the organization. These can be considered as intangible resources (assets) related with people and together with material resources (money, property, etc.) constitute the total value of the company. Social capital - is a component of intellectual capital. It is formed by knowledge, derived from a network of relationships, norms, expectations and obligations within the organization and beyond, and which allow participants to work together more effectively and to achieve the objectives with the higher efficiency.

Organizational capital - these are skills that actually an organization owns, and/or are stored in databases, manuals, etc. Often is used their designation as "structural capital". According to May, Vojtovič (17), management of human capital - creative members of society - understands "people" as wealth and assets, and management of human resources (all members of society) as an expense. Management of human capital is characterized as "shift of type" - shift from the traditional approach to managing human resources. Management of human capital is to understand as the analysis of processes involved in the management and measurement of human capital and the preparation and submission of information and reports about it. Human capitals as well as physical capital are factors of economic growth. There are several important characteristics that distinguish the concept of human and physical capital, in which:

- human capital is non-transferable,
- human capital is a property of one particular person,
- human capital - its mobility is limited by a particular person,
- human capital is hardly storable,
- human capital is not universally interchangeable; it cannot be exchanged for other goods or other human capital.

Human Capital Index is composed of the rate of employment, unemployment, long term unemployment, education, and taking account of the crisis in the country concerned. According to the Human Capital Index 2015 the Slovak Republic has a 75.48 score. The following table shows the index of human capital:

Table 1 Human Capital Index 2015 - rankings by regions

Asia and the Pacific			Europe and Central Asia			Latin America and the Caribbean		
Rank	Country	Score	Rank	Country	Score	Rank	Country	Score
5	Japan	82.74	1	Finland	85.78	45	Chile	71.80
9	New Zealand	81.84	2	Norway	83.84	47	Uruguay	71.18
13	Australia	80.22	3	Switzerland	83.58	48	Argentina	71.01
24	Singapore	78.15	6	Sweden	82.73	49	Panama	71.01
30	Korea, Rep.	76.84	7	Denmark	82.47	53	Costa Rica	69.75
46	Philippines	71.24	8	Netherlands	82.30	58	Mexico	68.50
51	Mongolia	70.75	10	Belgium	81.12	61	Peru	68.13
52	Malaysia	70.24	11	Austria	81.02	62	Colombia	67.63
57	Thailand	68.78	12	Ireland	80.59	67	Trinidad and Tobago	67.10
59	Vietnam	68.48	14	France	80.15	70	El Salvador	66.89
60	Sri Lanka	68.19	15	Slovenia	79.95	73	Bolivia	66.46
64	China	67.47	16	Estonia	79.88	74	Jamaica	65.95
69	Indonesia	66.99	18	Lithuania	79.33	75	Paraguay	65.68
80	Iran, Islamic Rep.	63.20	19	United Kingdom	79.07	77	Barbados	65.09
87	Bhutan	61.11	20	Iceland	78.86	78	Brazil	64.60
97	Cambodia	58.55	21	Luxembourg	78.79	79	Guyana	64.17
99	Bangladesh	57.62	22	Germany	78.55	81	Dominican Republic	62.79
100	India	57.62	23	Latvia	78.39	86	Guatemala	61.34
105	Lao PDR	56.16	25	Czech Republic	77.60	90	Nicaragua	60.65
106	Nepal	55.77	26	Russian Federation	77.54	91	Venezuela	60.51
112	Myanmar	52.97	27	Cyprus	77.33	96	Honduras	58.93
113	Pakistan	52.63	28	Poland	77.06			
			31	Ukraine	76.21			
			32	Hungary	75.82			
			33	Malta	75.77			
			34	Slovak Republic	75.48			
			35	Italy	75.44			
			36	Croatia	75.37			
			37	Kazakhstan	74.56			
			38	Portugal	74.50			
			39	Romania	73.94			
			40	Greece	73.70			
			41	Spain	73.30			
			42	Bulgaria	72.81			
			43	Armenia	72.50			
			44	Kyrgyz Republic	71.82			
			50	Serbia	70.97			
			55	Macedonia, FYR	69.31			
			63	Azerbaijan	67.58			
			65	Tajikistan	67.24			
			66	Albania	67.20			
			68	Turkey	67.09			
			71	Moldova	66.81			

(Cont'd)

Source: The human capital report 2015 (21)

Slovakia is located at position 34, having the worst position among the V4 countries. Slovakia, on the other hand has a better score than China.

1.2 Creativity

Every person has certain ideas, but some of them influenced by the ideas - this refers to the "creative personality". According to Amabile (1), creativity is a way of solving problems in a new, useful, correct and beneficial manner. An approach towards task solving is more heuristic (original, entailing new solution) than the algorithmic one. Human beings differ from the animal kingdom in thinking and creativity!

Guilford (6) as one of the first thinkers defined the concept of creativity. He understood it as “a property of man, starting from specific needs and is manifesting via mental processes leading to a defined objective”. Guilford defined creativity by using a combination of categories of his structural model into four different types:

- figural creativity: sculptural, artistic, and other works,
- symbolic creativity: mathematics, music, ballet, and others,
- semantic creativity: journalism, literature, and others,
- social creativity: psychology, public activities, and others.

According to Žák (18) model of creativity is a multiplication of the following elements:

$$C = Att \times Ab \times Pr$$

C – Creativity, **Att** – Attitude, **Ab** – Ability, **Pr**– Inventive process

Speaking about creativity, it is essential to determine the boundaries, respectively criteria, which have to determine what is and is not creativity. The ability to be creative is based on individual dispositions to particular person, environment, education, and other factors. Psychologists consider creativity as actions like, thinking, speculating that meets criteria of:

- originality,
- accuracy,
- applicability,
- value - benefit.

In developing creativity, there are important competences - attitudes, skills and creative process. To be successful in creativity, every person depends on whether he/she will be open to new ideas, willing to take some risks of a possible refusal and is sufficiently patient and persistent.

Molnár (14) explains, that “the creativity is a human ability which omits conventional ways of thinking, performance, practice and behavior, and creates brand new and usable ideas – affairs, things, etc. It is a human ability (capability) to provide something new – something what was not “existing” until now“. Mechanism “to provide, to create something new” arises only in one’s head - so that there is a previously non-existing bond - the link between the two elements (knowledge), which had previously been linked. Specifically, in processes like learning, study, experience, etc., a person receives information into his knowledge base, so that if you learn them, information is stored in the subconscious as knowledge. In the process of creative activity that may be purposeful or spontaneous, there is a connection between the two (or. more) pieces of previously unrelated knowledge, and thus there is something new, as yet unknown – labeled as a process of creative creation - a completely new knowledge that has been known since Greek Archimedes in connection with the term “eureka”.

2 Increasing creativity through language level

Globalized environment has brought the opportunity for creative thinking in human resources, especially for the increasing cultural diversity in the respective organization. I further characterize comparison of associated chromatic adjectives in Slovak and Chinese languages. In particular, a comparison will be made in real language use. Chromatic (color based) adjectives, such as “red”, “yellow”, “blue” and “green” are the highest used in both languages, as evidenced by comparison of the incidence chromatic adjectives in Slovak and Chinese languages (refer to the Table 2).

Table 2 Comparison of chromatic adjectives in Slovak and Chinese language

Colour	white	black	red	green	yellow	blue	brown	purple	gray	orange	Total
Amount in Chinese	73	46	127	119	124	71	42	57	39	-	698
%	10,4	6,5	18,19	17	17,76	10,17	6	8,16	5,59	-	100
Amount in Slovak	41	29	74	69	71	68	75	28	44	15	514
%	7,9	5,6	14,39	13,42	13,81	13,22	14,59	5,45	8,56	2,92	100

Source: Chen Liang, Comparison of chromatic adjectives in Slovak and Chinese language (9)

The highest percentage of chromatic adjectives is in Chinese language red and yellow colors, which can be influenced by their culture. Red color considered lucky and their biggest yellow - the Yellow river. The Slovak language refers to the brown and red colors.

According to Chen Liang (9) equivalent idioms and phrases related to chromatic adjectives in Slovak and Chinese:

- he/she has red cheeks like an apple ,
- he/she is pale as a sheet ,
- he/she has a heart of gold ,
- he/she is the red as pepper.

Table 3 Idioms and phrases related to chromatic adjectives that have no equivalent - translation

Slovak language	Chinese language
It is as black as a chimney sweep. Chimney sweep profession in China is not.	背黑锅. Wearing a black wok - an innocent man who wrongs.
It is red as beetroot. Beetroot is not a common vegetable in China.	老黄牛. Old yellow bull - modest and diligent man.
He has hands like a red lobster. In Chinese: a hand as red carrots - from the frost.	绿帽子. Green hat - as in English "Deploy husband antlers".

Source: Chen Liang, Comparison of chromatic adjectives in Slovak and Chinese language (9)

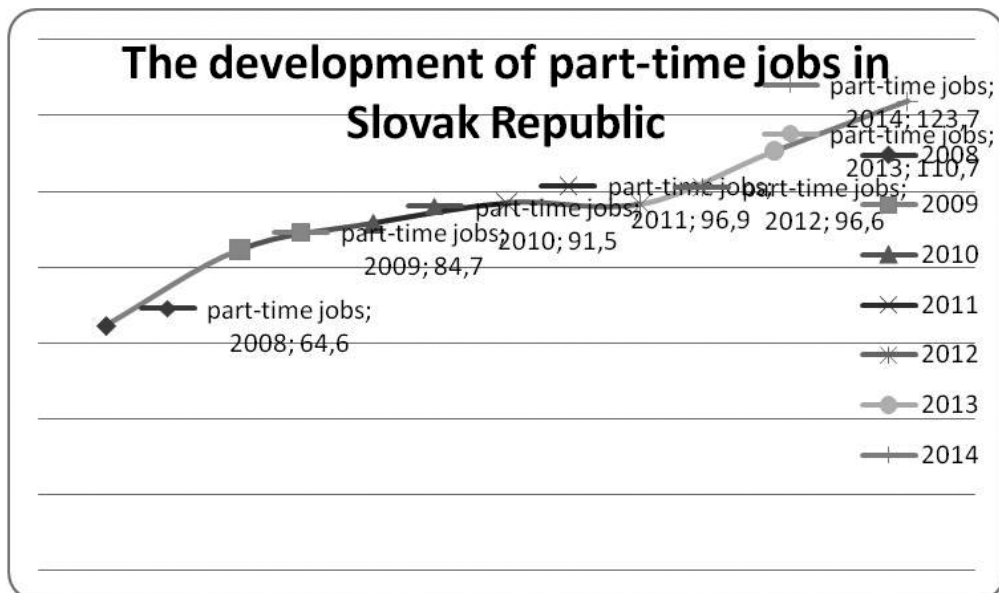
As mentioned before, an important actual factor for the development of creative thinking seems to be a balance between professional and non-professional life. This requires efficient and competitive organizations to assist to their employee in a search for an appropriate balance between to both parts of a human's life. Balance between work and private aspects of life is individual; every employee has his/her own problems in a non-working life. A typical situation is that employees are often overworked, extremely loaded by stress, such situations are usually triggers of conflict situations both at work as well as households, worsening physical health and mental health, leading towards burnout syndrome.

Entrepreneurial subject - (organization) should decide on an individual and group functioning within the work-life balance. According to Armstrong (2) a major cause of not using the balance between professional and non-professional life in the production process are concerns about the reaction of managers as well.

Measures of balancing professional and non-professional life include:

- shortened time jobs,
- flexible working hours,
- working at home,
- job-sharing,
- benefits (sick days),
- e-learning courses,
- career breaks.

The following chart shows one measure of the balance between professional and non-professional life - specifically the example of the development of a part-time jobs in Slovak Republic, which has a growing tendency.



Source: Own processing on the basis of data from Eurostat (22)

Graph 1 Development of part-time jobs in Slovak Republic

The development of part-time jobs shows increase after the global economic crisis, and the subsequent is rising up after 2012. This is impacting on the development of balancing in personal and professional life, and based on the presented content of the paper, it contributes to increasing the ability of creative work.

Creativity increases the value of human capital, which represents increased competitiveness for the company. Another possibility to develop creativity of human resources is to start thinking and communicating in foreign language. Based on the above mentioned, it can be concluded that in the process of development of creativity, a significant contributions are made by:

- balance in professional and non-professional life
(preferred Generation Y) - basis,
- the quality of the foreign language - depth,
- communicating in a foreign language - width

Conclusion

Creative industries of today will largely affect the country's economy. It is evident and necessary that countries without sufficient mineral resources prefer and promote creative industries. Creativity is inexhaustible; people have new ideas, learn from the others, especially in a globalized and open environment! The immanent imperative is in increasing the level of education! Creativity is today (creative human brain) considered as a weapon. We can increase creativity in some specific ways, mentioned in the paper. The best way how to develop a creative potential, is by increasing creative competencies that each person, a human being, as the only creature in the animal kingdom, has. If we want to develop and enhance creativity, it is important permanently to strengthen its importance and to realize the training of creativity. The end of the (compulsory) school attendance usually terminates creative writing and reading for most adults. As creative human resources represent the wealth of organizations, the organization has to take permanent care on their targeted development. The supporting factors affecting creative thinking include the ability to communicate in foreign languages and right balance in personal and professional life. In this paper, I drew attention to certain specific features of Chinese and Slovak languages, which can directly assist in the enhancement of the creative potential in the individual businesses. The above is reflected for example in the use of adjectives – colors, differences in using idioms and phrases, in cultural differences within languages, but also in thinking in foreign languages, etc., which opens more space for human resource and problem solving in the broader dimension.


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Market-Based Approach In Shift From Linear Economy Towards Circular Economy Supported By Game Theory Analysis

Martin Dolinsky, Stephan Maier

Abstract

Purpose of the article is to partially describe underpinning economics for the circular economy. A circular economy (closed-loop system) is an advancement from the linear economy (open-loop system) which behaves according to the hierarchy of 6R, preferring reuse, remanufacture or recycle solutions instead of disposal (known also as a „linear dead-end“). This new approach is a trigger of new business models seeking many times various kinds of support from the side of government. However, governmental support is not neither the only option nor the most functional one. Underpinning economics for the circular economy can be based also at market-based tools. What we have in mind under this term for the purpose of this paper is the game in the market being played between buyers and sellers. Methodology: We have analyzed this interaction using game theory tool (interactive decision theory). The scientific goal of our paper was to suggest a quick market-based solution how to support circular economy business models whilst helping to the society to solve certain social problems. Our findings have led to a newly proposed way, how the current game in pricing could be changed. An emphasis shall be placed on strategies how to rise prices of linear economy products whilst offering wider social benefits to small sellers of such products. The price increase of linear economy products is considered in this paper as a market-based incentive to support recycled, remanufactured ones, whilst circular economy products are becoming more economically feasible in comparison with more expensive linear economy products.

Keywords: | *Game theory, circular economy, linear economy, market-based approach, web-based tool*

JEL Classification: M14, M16

Introduction

The role of a game theory in this paper is to replace standard approach which was in some cases very useful, but on the other hand, with typical side effects jeopardizing full functionality of such incentives. At this point, we have in mind command-and-control tools like taxation, subsidization, duties and limitations posed by government. The goal of environmental tax is to change the behaviour of tax subject instead of providing state authorities with additional revenue. The typical drawbacks of environmental taxation are depicted in Figure 1. In given example, there is uniform environmental tax rate imposed (300 EUR/t), companies are paying for excessive CO₂ emissions (CO₂ emissions are only one type of harmful emissions). Tax is being calculated for additional mass of emissions released. As it is evident from the Figure 1, there is an individual Marginal Abatement Cost curve for every company. When emissions reach individual threshold, it is becoming cheaper for companies to pay the tax than to abate emissions. Our proposed market-based solution is designed to overcome barriers typical for command-and-control mechanisms:

- Every producer differs in terms of work organization and technology, even if we consider the same industry. Uniform environmental tax rate application leads to different results per company – we may find companies for which it is cheaper to pay the tax than to mitigate additional tons of emissions. From this, it is evident that uniform solutions do not work well and individual adaptation to every single company is not possible from the perspective of central authority (maybe only in case of small regions or small economies like e.g. Slovenia),
- command-and-control mechanisms require controlling of their functionality from the side of state authority or institutions like Environmental Investigation Agency, which imposes additional costs and consumes time,
- the time gap between invention and realization is too wide in case of command-and-control mechanisms. This is mostly caused by the length of legislation process,
- etc.

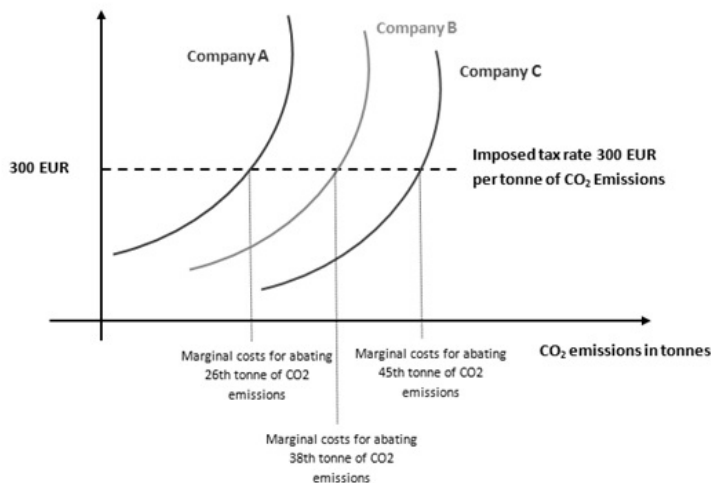


Figure 1 Marginal Abatement Cost curves, Source: Own elaboration

1 Game theory supported market-based solution

Using web-based game theory tools, better conditions for underpinning economics leading to further development and future implementation of business models that facilitate the transition towards a circular economy could be created. Our two suggestions belong to market-based mechanisms influencing, in our case, entire chains of production. The first tool is changing the game in pricing, having multiple effect:

- To raise prices of linear economy products in order to help suppliers to receive adequate payments for their work (wider social sustainability benefits)
- By raised prices of linear economy products, to push manufacturers into search for alternative, circular economy solutions

Transformational change is required from corporate sector and from government (rethinking taxation and pursuing more suitable set of regulations). Production efficiency efforts are negated by rising consumption and material dependence. Recently, many companies have begun to notice that linear economics ("take - make - dispose" pattern) increases their exposure to risks, most notably, higher resource prices, the start of the new millennium marks the turning point when real prices of natural resources began to surge upwards, essentially erasing a century's worth of real price declines (Ellen MacArthur Foundation, 2013). The situation is well documented by the Energy return on investment indicator. Oil for instance, once gave over 100:1 EROI with easily available oil deposits that were rich, high quality, and of vast quantities, today that number is closer to 7:1 (when the ratio comes to 1:1, it is no longer profitable or cost effective to pursue) . According to McKinsey Global Institute report (McKinsey, 2011), those are reasons causing excessive depletion of natural resources:

- The low level of resource prices, relative to labour costs, has also created the current wasteful system of resource use,
- reusing materials has not been a major economic priority, given the ease of obtaining new input materials and cheaply disposing of refuse,
- the biggest economic efficiency gains have resulted from using more resources, especially energy, to reduce labour costs,
- etc.

The emergence of circular economy idea dates back to early 1980s and its further development is accompanied by the commodity price increase (see figure 2).

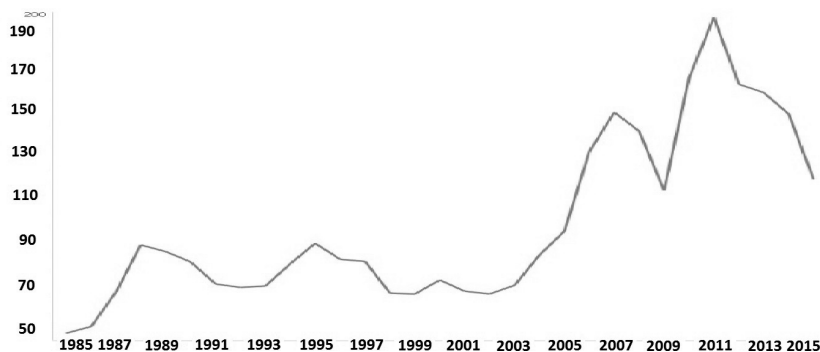


Figure 2 Industrial inputs primary commodity prices, Source: IMF eLibrary Data

The world industrial inputs price index (the reference year 2005 = 100%) rises steep, several factors that may cause commodity price increase:

- Tighter environmental standards,
- resource scarcity,
- increased demand for raw materials (if marginal cost curve is steep, small shifts in demand may cause large price swings),
- weather patterns (e.g. global warming),
- inflation, political risks,
- game theory tools (our 1st tool)
- etc.

Our 1st suggested web-based tool is built-up at sensitivity of company managements towards price volatility. When commodity prices rise, companies report a hit on profits due to sharp increases in input costs. Shifting from linear economy solutions towards circular economy value chain is one of the ways how to offset those losses. Position of our game theory tools within circular economy “butterfly” is depicted in the figure 3.

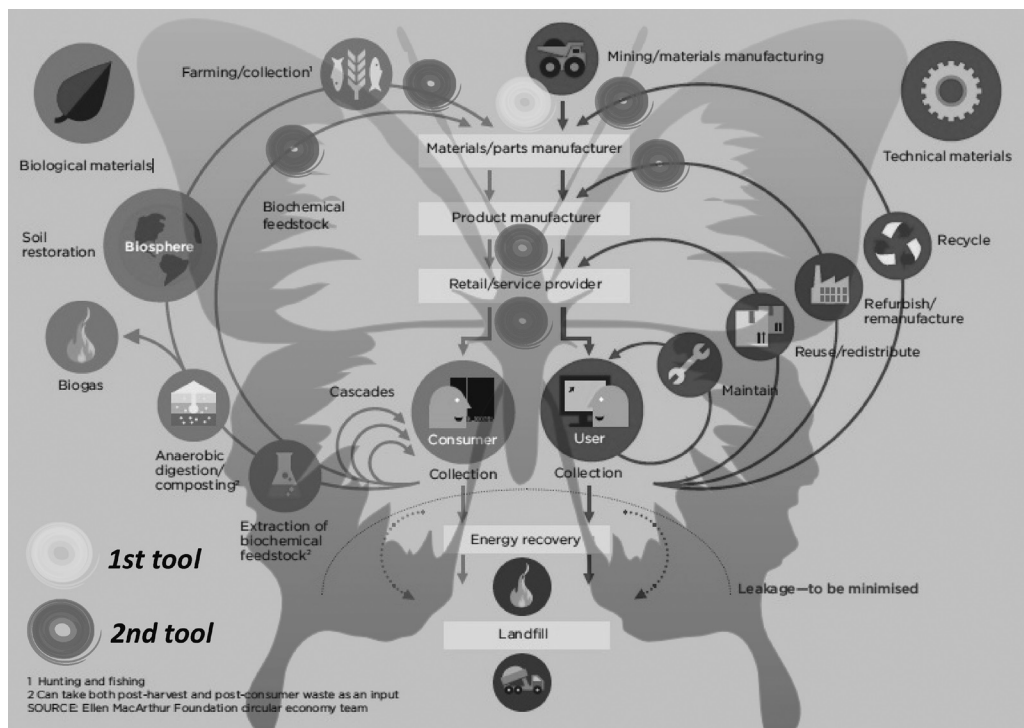


Figure 3 Circular economy “butterfly” with game theory tools, Source: McKinsey Global Institute

2 Examples of open-loop system suppliers benefiting from the 1st tool

Generally, the current societal problem not only in the European Union is income inequality caused by excessive profits on one hand and by insufficient earnings on the other hand. Model cases are for example cocoa workers in rainforests (e.g. ADM, Cargill & Nestle case from 2005) or small cloth producers in Slovakia. Slovak suppliers to European cloth companies are being paid minimum wage, whilst their products are being sold as luxurious in the European Union. The basic problem in these and similar cases is the low bargaining power of small suppliers – with their limited access to international market, they depend only on those multinational companies with distribution channels penetrating their disadvantaged regions. Poor salaries and wages of African cocoa workers are caused by the game played between farmers and wholesalers, where purchasing price is being reduced due to the low bargaining power of farmers. Similar cases like this are in almost every industry.

2.1 Functioning of proposed tools

The first driver our tools are based on is “Changing the Game” in way, how purchasing price is being negotiated. Within web-based platform, we will enable to the offer to meet the demand. The suggestion is to realize this in a smaller scale as a pioneering step – players will be from three selected industries. The played interaction is modelled firstly as a game with perfect information – where all information sets in the tree contain just one node, a singleton (Figure 4) and the final state is being depicted as a game with imperfect information (using behavioral strategies) (Figure 5). Information set of player i is a collection of player i 's nodes among which i cannot distinguish. In figure 5, buyer doesn't know the previous decision of a supplier – whether a supplier started negotiation with other potential buyer or not. In our game with finite horizon, we have two players, player I. represents buyer of non-recycled material - a player with higher bargaining power (usually bigger manufacturing company) and player II. represents supplier side - players with lower bargaining power. The supremacy of buyers is also derived from the fact that there is usually a lower number of them in comparison with the amount of those willing to sell their material. Nodes are being explained in Table 1.

Table 1 Nodes in the played game

	Player I. – Buyer of non-recycled material		Player II. – supplier of non-recycled material	
Abbreviation of player's decision	U (Up in game theory jargon)	D (Down in game theory jargon)	l (Left in game theory jargon)	r (Right in game theory jargon)
Description of player's decision	Player (buyer) offers fair price	Player (supplier) starts negotiation with other buyer	Player (supplier) does not start negotiation with other buyer	Player (supplier) does not start negotiation with other buyer

Source: Own elaboration

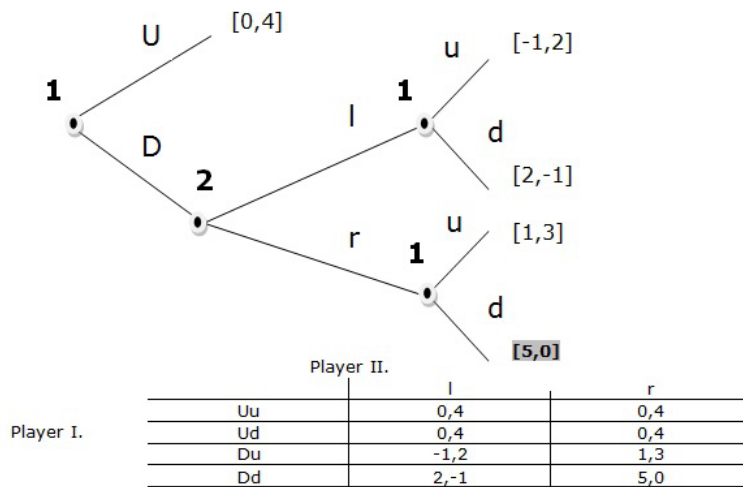
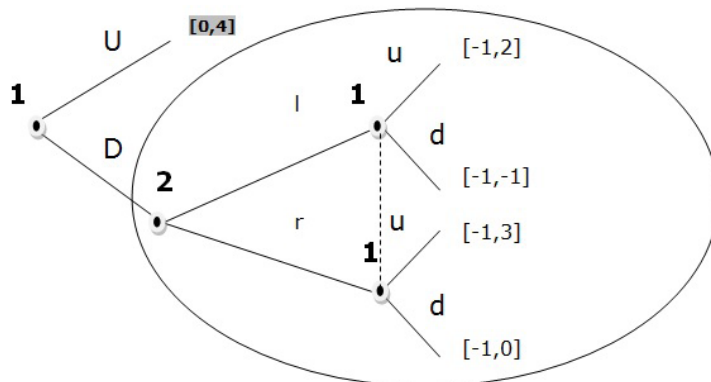


Figure 4 Subgame perfect equilibrium without the use of web-based game theory tool - equilibrium in pure strategies

The price negotiation game we know today is being depicted in Figure 4. Buyer offers price, which is unfair (player I. plays Down), whilst supplier does not have an option to start negotiation with other potential buyer (there are various reasons for this, e.g. supplier is not informed about actual needs of other buyers), therefore, player II. plays right. Sequentially, it is then turn of player I., who plays Down – offers unfair price to the supplier. The price negotiation game was analyzed using game theory. With our web-based tool, we are changing the game in price negotiation. The negotiation will take place on-line using web based tool. Buyers will not be given information how many suppliers logged in – in the game, they will not be able to distinguish, whether supplier started negotiation with other buyer. Avoiding monopolies and respecting antitrust principles, buyers will neither be informed about each others' presence in the game (web-based tool will reveal neither identity of players, nor their number). Under such conditions, the game theory analysis shows, in the whole game, the equilibrium situation in the node with payoff vector [0,4] – buyer is immediately offering fair price to the supplier at the beginning of the game and the game ends up like this. For the whole game and subgame, see the figure 5.



		Player II.	
		l	r
Player I.	Uu	0,4	0,4
	Ud	0,4	0,4
	Du	-1,2	-1,3
	Dd	-1,-1	-1,0

Figure 5 Subgame perfect equilibria in pure strategies

Subgame perfect equilibrium is every strategy profile, in which player 1 plays U with the probability 1, and player 2, after history (D), plays r with probability 1. The outcome of the game in every subgame perfect equilibrium is the terminal history (U) with payoff vector [0,4]. Subgame perfect equilibria in pure strategies are (Uu,r) and (Ud,r).

3 Step-by-step description of the use of the 1st tool - interaction between suppliers (farmers, SMEs, sole traders) and producers (manufacturing companies)

1. Every manufacturing company has a database of its suppliers and in almost all cases, there is a higher number of suppliers of one single commodity (buyer is selecting from them). Manufacturer of metal products from Brescia has for example a list of 22 suppliers of stainless steel to be selected from – from this fact, a higher bargaining power of buyer is derived.
2. Buyers and suppliers will log into the web-based tool. They will be both explained the rules of the game: 1) Identities of suppliers and buyers remain unknown. 2) Game has rounds, if there is remaining unsold quantity at the end of the round, another game is played. 3) Buyer will not be informed about prices offered by other buyers. 4) The highest price wins – opportunity to sell will be equally distributed among all participating suppliers – they will all be offered to sell equal proportion to buyer offering the highest price.
3. Players remain unknown to each other avoiding monopolies and respecting antitrust principles. When offer match the demand, they will receive certificate with agreed amount and purchasing price and they can officially conclude the business deal. This is not a pure cooperation, but a cooperative attitude and novelty of this economic system is expressed by the fact that since a business deal is equally distributed among all (wider social sustainability benefits), this is not anymore a “zero-sum game”, a case when one’s win is automatically another one’s loose.

The simplified example of the game is depicted in the table 2. Three manufacturers from metal industry are purchasing stainless steel. They need 200 kilograms each, in the first round, the highest price offered by buyer (manufacturer) 1 was accepted by suppliers as a fair price (every supplier from the group of 20 suppliers supplied 10 kilograms, based on the equal distribution of opportunity). The total offer is 520 kilograms. In the following round, the fair price is announced to buyers who didn’t make a deal in order to allow them to adapt the price. In this case, remaining two buyers filled their need in the second round only up to 80% because suppliers altogether didn’t possess 200 kg of stainless steel for every buyer.

Table 2 *Example of the game played*

Buyer's acronym	Buyers' actual need of recycled steel in kg	First round		Second round		Satisfaction of demand in %
		Offered price per kg	Purchased amount	Offered price per kg	Purchased amount	
B1	200	4.0	200	x	x	100
B2	200	3.5	0	4.0	160	80
B3	200	2.2	0	4.0	160	80

Source: Own elaboration

4 2nd tool – Interaction between producers (manufacturing companies) and end consumers + Interaction between suppliers (farmers, SMEs, sole traders)

Entire production chain typical for circular economy represents a “vicious” circle. There are (at least!) two points, where product enters the market (see Figure 6):

1. As a finalized product
2. As a recycled material

Our second tool uses game theory as a tool of prognostic cogitation. It helps to project real market situation which is a very important step in terms of underpinning economics enhancing transition towards a circular economy. There is always a problem for company managements to predict salable quantities of their products. Unsold products are worsening financial situation of a company and represent environmental burden. There is a well-known “post-Christmas sales effect”, when products are being sold undervalued. This is a solution of how to circumvent the problem of the scarcity of resources by providing companies with guidance (tool) on how to better match the production setup to the customer's needs. An application of the game theory (Cournot game) would lead to less energy resources being consumed since it would help a company to better prevent excessive (not needed) production. The Cournot game tool was developed in cooperation with the management of PintInox, S. p. A. Economic advice given by the 2nd tool is as follows:

- What is the saleable amount of production?
- Is there a chance to reach break-even point?
- What could be the ideal size of the business?

The tool is aimed at the most important phase of the product life cycle – market penetration where the value of the product is set up and where the customer/consumer (civil society) represents the decision maker - the one who decides about the success or failure of the eco-innovation process.

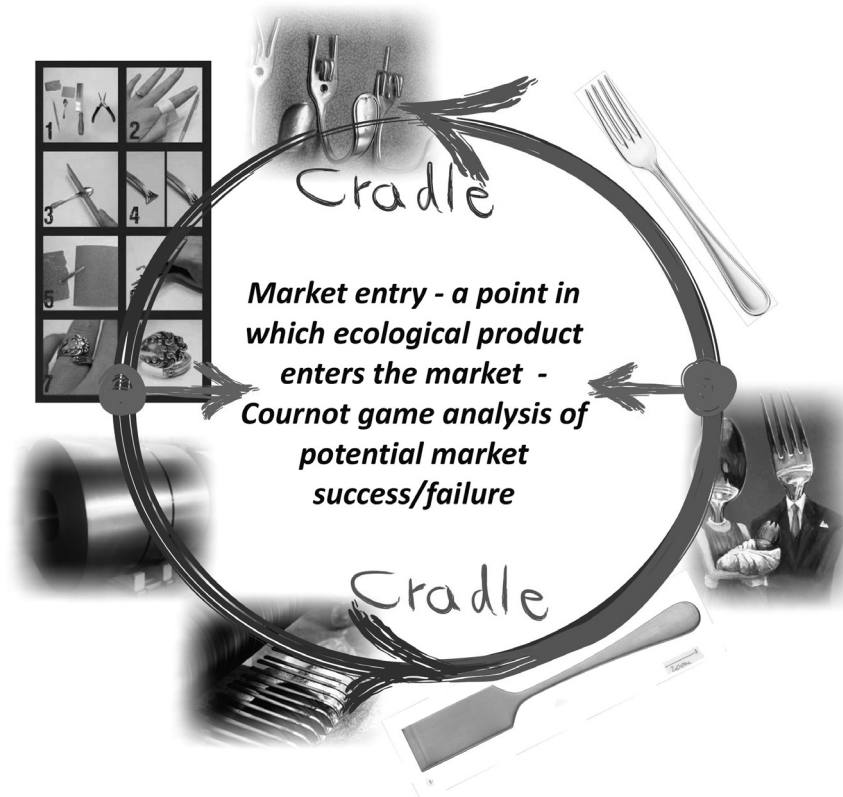


Figure 6 Two points in a “vicious” circle where we need to use game theory as a foresighting technique

Following Table 3 offers links to the detailed description of the 2nd tool.

Table 3 Detailed description of the Cournot game

Method description	http://www.energysustainsoc.com/content/5/1/6#sec2
Detailed calculation	http://www.energysustainsoc.com/content/supplementary/s13705-014-0030-8-s6.pdf
Residual demand function calculation	http://www.energysustainsoc.com/content/supplementary/s13705-014-0030-8-s4.pdf

Source: Dolinsky, 2015

The final outcome from using the Cournot game is the ability to identify a sustainable system which is in this case an amount of production fitted to the market needs (i.e. the saleable quantities). Company managements receive a tool which protects them from overproduction. The Cournot game helps to diminish the difference between both the produced/overproduced and sold amounts. Table 4 gives an overview, how the Cournot game could work as part of the web-based tool.

Table 4 Step-by-step description of how the 2nd tool works in practice

	Step-by-step description of how the 2nd tool works in practice	
	Interaction between producers (manufacturing companies) and end consumers	Interaction between suppliers (farmers, SMEs, sole traders) themselves and manufacturing companies
(1) Purchasing price determination	Manufacturing companies will determine their willingness to deliver specified amount of products for respective price	The system will work with purchasing prices determined by the 1st tool
(2) Participants	Manufacturing companies in the role of sellers and end consumers (households, B2B partners) in the role of buyers.	Farmers, SMEs, sole traders and other collectors, producers of recycled material to be used by manufacturing companies in the role of suppliers and manufacturing companies in the role of buyers.
(3) Personal data protection	Respecting the antitrust principles and avoiding monopolies, players within the system will not be mutually informed about each other's identity. However, this does not preclude players from cooperation outside of the process of sell/purchase . The paper is aimed at promotion of cooperative behaviour of companies, but the sell/purchase phase remains excluded from this philosophy.	
(4) Identification of demand	The demand is based at preferences of final consumers.	The demand is based at preferences of manufacturing companies. Those preferences are already entered into the system by the 1st tool
(5) Position within the chain of production	The demand is based at preferences of manufacturing companies. Those preferences are already entered into the system by the 1st tool	This interaction examines purchase of material to be used for production of finalized product

Source: Own elaboration

Conclusion

Presented paper has shown how game theory analysis looks like in the field of sustainable development, when thinking about possible ways, how to make shift from linear economy system towards circular one much easier and feasible. Based on many documented situations favoring sustainable societal development collaboration among different organizations before competition, game theory explains to entrepreneurs how and why to assign higher value to collaborative initiatives in their external surroundings. To name a few opinions confirming supremacy of collaborative mode over the competitive one, we could start with Jean Jacques Rousseau and his Stag Hunt Game (type of the game theory). This game tells us that two players (hunters) can achieve greater success if they collaborate than in a situation when everyone is acting individually. A well-known rebound effect or take-back effect in all sustainability initiatives happens when technical innovation is not linked to behavioural strategy. Paradox of W. S. Jevons from 1865 tells the story how higher efficiency in coal burning has led to higher coal consumption. Game theory links new models and economic incentives for circular economy business to entrepreneurial behaviour, whilst promoting collaborative attitude (see figure 7). We are living an epoch of constant change; the current industrial revolution is labelled as Industry 4.0, being accompanied by Web 2.0 and CSR 2.0 paradigm shifts. Industry 4.0 foresees collaboration tendencies in order to better adapt mass production outcomes to individual consumer needs.

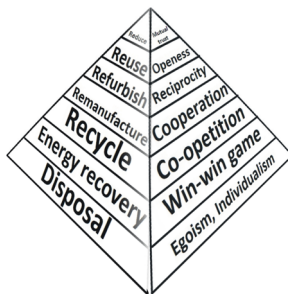


Figure 7 Entrepreneurial behaviour in Circular economy, Source: Own elaboration

Web 2.0 is, among other improvements, introducing social software for companies enabling peer-to-peer tracking of activities of partner's company. Network issues are generalized as "Internet of things and services". Under this term, we understand processes like for example: Dynamic business and engineering processes enabling last-minute changes to production and delivering the ability to respond flexibly to disruptions and failures on behalf of suppliers, or optimised decision-making, resulting in new ways of creating value and novel business models¹. Latest trends tell us that business models in circular economy will be internet/web based, the purpose of the paper was to provide reader with information how pre-steps before creation of a concrete model look like. In a pre-step, we were using game theory as a methodology assisting us with analysis of players – companies and consumers in linear and circular economy. With game theory, we created scenarios how the web-based tool could function. This was the first, research phase of the project we plan to realize with partners from abroad. Before smaller-scale applications of new ideas, game theory is being used for theoretical analysis how the situation could develop. The next step is the search for already existing web-based solution, where a game could possibly be applied. If it is a completely new kind of interaction invented, then the web-based tool will be a pioneering realization of an idea.

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Ukraine: Facing Default Under Conditions Of Global Uncertainty

Zhuk Pavlo

Abstract

Ukraine faces a threat of full-fledged default and deep financial and political crisis. The current deep recession is the country's second major economic crisis in ten years. Ukraine was severely affected by the global financial crisis in 2008, with its economy shrinking by 15% in 2009. The economy remained weak in the aftermath, as former government caused the business climate worsening. The lack of reforms limited growth of GDP to just 0.3% in 2012 and remained static in 2013. By the end of 2013, Ukraine was already on the brink of collapse. The conflict in the eastern part of the country has further exacerbated the recession. Today the sources of economic growth in Ukraine have been exhausted, and the country is strongly increasing its debts trying to attract foreign investment. The government's reform efforts have so far failed to significantly improve the country's business climate. Ukraine is ranked 83rd out of 189 countries in the latest World Bank's 'Doing Business' 2016 index. This score is the second worst in Europe. Ukraine is still considered the most corrupt country in Europe as well (rated at number 142 out of 175 by Transparency International in 2014). The persistent state of war has disrupted industrial production, which is mainly located in the eastern part. The article elucidates recent events in Ukraine as well as gives a brief historical overview. The influence of misleading governance of economic situation is revealed. The positive scenario, in which Ukraine overcomes default, is unlikely to happen unless the firm measures are to be taken.

Keywords: | Default, crisis, national economy, external debt.

JEL Classification: H630, H620

Introduction

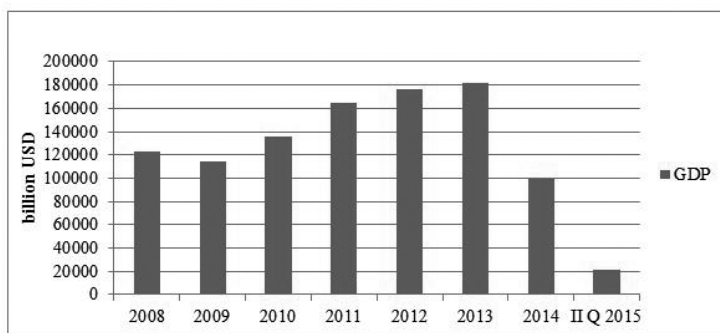
During the 2008-2009 crisis a number of European countries got in the debt trap, including Greece, Ireland, Portugal and Spain. All these states have a huge amount of foreign loans that they simply could not repay, and Ukraine is in a similar situation.

Today Ukraine's economy is in a desperate situation. In the east of the country there is still hostility, all economic ties with Russia are destroyed and overall national economy seems to be on its last breath.

Over the last two years, GDP fell by 23%. Ukraine's external debt currently stands at 158% of GDP. In early October, Fitch announced a partial default on Eurobonds in the amount of 500 mil. USD, after country missed a scheduled payment on September 23. [4]

1. When it all started?

In 2013 statistics recorded zero GDP growth in Ukraine and the general trend of its decline during the following periods. (Graph 1) Kiev was in a great need, not only for investments, but in reducing the gas price. The high cost of gas makes Ukrainian products expensive and uncompetitive even in the CIS (post-soviet) markets.



Source: State Statistic Service of Ukraine

Graph 1. GDP of Ukraine, 2008- II Q 2015

In addition, in 2013 Ukraine was experiencing a sharp shortage of funds: in the international market money were at high interest rates to borrow. Russia was not eager to invest in country with unpredictable political course, and the IMF demanded to increase gas prices for the citizens. In the same year the president of Ukraine was speeding up the process of European integration. Kiev was about to create a free trade zone with the EU, but at the same time not to lose the Russian market. Russian leadership warned that if Ukraine joined European market, the latter would lose economic preferences in the market of the Eurasian Customs Union and the CIS.

For the first time Ukraine had to choose between the political ambitions of its leadership and economic efficiency. And the choice was made: Ukraine turned away from EU free trade zone and stepped forward with Russia. In December 2013, Russia decided to place in Ukrainian securities the reserves of the National Wealth Fund (NWF) on 15 billion USD. Russia had transferred only 3 billion USD before Ukrainian government had changed.

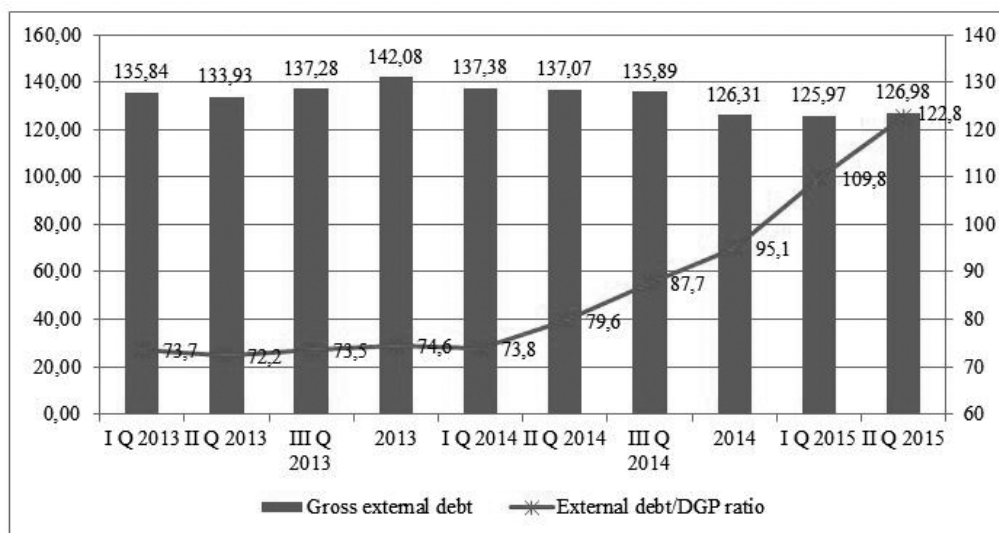
For some time new leadership was managing struggling but still alive economy. The new government introduced the so-called market-based mechanisms. At first launched

devaluation of the hryvnia, which was unpredictable and unstable: 150% since the beginning of March 2014 till nowadays. [6]

Then Ukrainian export shut down causing lack of foreign currency within the country. Because of the lack of available currency, exchange rate was raising non-stop that caused a panic among the population. People hurried to take back their deposits and to exchange the hryvnia for dollars or euros. Banks were not ready for such a turn: in 2014, 20 banks bankrupted. In addition, Deposit Guarantee Fund suffered, which had to pay a fixed amount of the deposit to clients of the insolvent bank.

Since 2014 the Cabinet of Ministers was trying to break economic ties with Russia completely. The real victim of the conflict, besides the population of Eastern regions, has become the real economy: engineering, industry, food industry, metallurgy, etc. In 2014, Ukraine's balance of payments recorded a deficit of 13.307 billion USD. [7]

To supplement the budget, the government was intensively asking for loans from the IMF, European Union and other international organizations, getting more and more in a debt trap.



Source: National Bank of Ukraine

Graph 2. Ukraine's gross external debt in 2013-2015, and the percentage of GDP

In 2014 external debt grew due to the loans Ukraine had been granted under international assistance programs, including IMF, EU, European Bank for Reconstruction and Development and loans granted by particular countries such as the US, Japan and Canada.

In 2014 the value of Ukraine's external debt decreased, however the external debt to GDP ratio increased. This was mainly due to a drop in the country's GDP and the depreciation of the hryvnia. According to the NBU's data, at the end of the second quarter of 2015 gross foreign debt in total fell to 127 billion USD, which represented 122.8% of the country's GDP. (Graph 2)

Thus, not the policy should rule the economy, but vice versa. One may seek and find the reasons for such a sad situation, but to obtain a satisfactory result it is needed to change the rules of the game: the needs of the economy should dictate policy agenda.

2 Governance misleading

For the half a year, Ukraine has not carried out any economic reform that, in fact, has caused political upheaval in the country. The absence of these reforms escalated the financial situation in Ukraine and its ability to pay debts.

The mission of the IMF, which reviewed the implementation of Ukraine's commitments for obtaining the next third tranche of the Extended Fund Facility (EFF) in 1.7 billion USD, left Kiev disappointed. The IMF was not satisfied with the way of reforms, fighting corruption and restoring the banking sector. The IMF questioned large pension fund deficit, the budget deficit and the system movement of expenses and income. Raising taxes is unlikely to give a rapid influx of revenue, so government should find other compensators. [3]

In January-August 2015 the consolidated budget of Ukraine recorded a surplus of 28.309 billion UAH. For the same period last year, the budget deficit reached 28.634 billion UAH. [9] Positive dynamics of budget income largely resulted in inflation and devaluation processes, which reached a peaked in January-April this year.

The total income of the consolidated budget of Ukraine in January-August is 411.7 billion UAH, which is 116 billion or 39.2% more than in the same period last year. In January-August state budget has received 337.7 billion UAH, which is 107.1 billion UAH or 46.5% more than last year.

As for the cost - the total amount of expenses of the consolidated budget of Ukraine in January-August were 382.8 billion UAH, which is 18.6% or 60 billion UAH more than in 2014.

The main items of expenses in January-August were: public debt service; general functions; defense; public order, security and judicial authorities; health and education, etc.

Ukraine sequential raised military expenses and the development of strategic partnership with NATO. Thus, according to the Ministry of Defense, the defense budget of Ukraine in 2015 is about 2 billion USD or 2.7% of GDP, which is 1.7 times more than last year. In May this year, defense and law enforcement agencies of Ukraine appealed to the government to provide additionally almost 769 million USD due to the increased size of the army. [5]

Ministry of Defense of Ukraine expects to have allocated about 87 billion UAH in 2016 (about 4.1 billion US dollars), which is twice more than the sum allotted to military spending this year. As part of a new national security strategy needs annual funding for the military sector will be increased to 5% of Ukraine's GDP.

An example of an inefficient use of state funds may be a purchase of gas for domestic consumption. In the heating season 2015/16 Ukraine needs 1.3 billion USD. Today the government buys Russian gas not directly from Russia, but through European traders. In the II quarter of 2015, Gazprom supplied gas to Ukraine at a price of 247.18 USD for 1 thousand cubic meters. At the same time the average price of gas imported from Europe, including the transportation costs is 275 USD per 1 thousand cubic meters. So, gas from the same source cost Ukraine up to 11% more just because it was supplied by Naftogaz Ukraine, rather than Gazprom. On purchase of a „European“ gas Naftogaz has spent in the II quarter of 737 million USD, while from Russia only 393 million USD. Due to the anti-Russian policy, Ukraine is overcharged by European traders and loses Gazprom as

a partner, which is the only one who is interested in maintaining Ukraine gas-transport system. [8]

The fact that the policy is ahead of the economy is proved by the following. Cooperation with Russia in the field of defense-related products has been dropped on the initiative of Ukraine. There is no problem for Russia: today 90% of the Russians import is satisfied. And now it is more a problem of Kiev, not Moscow. First of all, because the components that the Russian party used to buy, are no longer wanted by any other country. But Ukrainian budget received a serious income from these deliveries. The destruction of the cooperation ties with Russia is an irreversible process. [15]

Leaders of Ukraine, the Government and the National Bank do not cope with the management of the country. Even the blackmail of Russian creditors proves it. Dealing with the debt restructuring, the authorities refuse to pay Russia 3 billion USD. To note, this is not a commercial, but the sovereign debt. The Prime Minister even announced his intention to go to court if Russia refuses to restructure sovereign debt. In fact, because of their own incompetence, the Ukrainian government creates a precedent, offering to break the core rules of the IMF. [1]

3 Advantages and disadvantage of default

Ukraine is rapidly progressing towards default, expecting a number of serious complications.

Cons of default:

- The loss of the country's image. Even just a hint of the possibility of default immediately impairs the international reputation of the country and encourages investors to capital withdrawal.
- Dramatically reduced exchange rate. Followed by the import fall and real income decline. Slowing down of production that depends on imported raw materials and components. As well as unemployment rise.
- Shrink of the banking system of the country. Banks are deprived of the opportunity to use foreign loans, due to the devaluation and decline in economic activity in the country. It is more difficult to service loans already made. Some banks go bankrupt, some of them freezes accounts of citizens and companies. Overall lending to the real economy by the banks becomes much more complicated.
- There is a "domino" effect, i.e., after a sovereign default, not only banks lose solvency, but also the participants of the securities market.
- There is a growing distrust of the state from its own people, other countries and international organizations.

Looking at this list of troubles, it is visible that they are already present in Ukraine.

Pros of default:

- Currency saving due to the "credit holidays".
- Reducing the budget deficit. The country has an opportunity to use more money

for solving internal problems.

- As a result of the financial sector fall, speculative sector bursts and real production gets more importance. But growth may be noticeable only in a long perspective since country still suffers from shortage of money.
- Due to the devaluation of the national currency depreciation takes place for domestically produced goods, thus increasing the competitiveness of exporters.
- A consequence of the termination of external financing and import restrictions is that the state becomes more aware of concern of internal consumption and sources of funding.

The advantages of the default are minor and in every case the costs of default should be considered. State defaults have been rare in advanced economies in recent decades. Sovereigns mostly choose whether or not to default and political economy rather than pure economics can explain not just the incidence of default, but also often the timing and nature of it. [13]

4 Lessons from Greece

The situation in Ukraine is very similar to the one that recently experienced Greece. By joining the euro zone in 2001, the Greeks have forgotten what it means to live within your means. The increase in salaries and pensions in Greece were also ahead of the possibility of the economy. Greece was gradually increasing deficit of the current account balance. Greece couldn't align it due to devaluation, as monetary policy depends on European Central Bank.

In 2008 it became impossible to ignore the other traditional shortcomings of the Greek economy - the high level of the shadow economy and inefficient public sector. In April 2010 to avoid bankruptcy Greece was forced to turn to the EU for financial assistance. European Central Bank, European Commission and the IMF provided Greece unprecedented assistance amounting to 240 billion euros. [2] In exchange, the Greek government was demanded to introduce harsh austerity measures: tax increases, and the retirement age, reduce the budget deficit and increase the efficiency of the public sector.

There were slow steps toward reforms. In 2014 there were the first signs of economic recovery. For the first time in six years, GDP grew by 0.8%. But Greeks couldn't put up with a decrease in the level of prosperity. And Greeks took a radical position against creditors. In a referendum more than 61% of voters were against their requirements.

However, after long negotiations, the Greek government accepted creditor's conditions. The law, approved by the Parliament, introduced a series of increasing taxes, raising the retirement age to 67 years and toughens penalties for violation of tax legislation, large-scale privatization around 50 billion EUR. These measures will allow Greece to receive the next tranche of 2 billion EUR. [2]

The EU leaders did not accept blackmail and a strict policy of Greece. Ultimately, the latter is to fulfill all conditions, as it is entirely dependent on cash injections from the European Commission, the IMF and the ECB.

Technical prescriptions of the IMF over the past 10 years did not help Greece. The

country's economy continues to fall. Although, Greece followed all the demands of creditors in 2012 and 2013, but in the end the situation became even worse. [12]

Greece cannot handle inflation, current account balance or put barriers to goods and services from the EU Member States. The logic of the IMF is the same in all countries. Due to the loans provided by the Fund macroeconomic stability may be gained and then GDP begins to grow. Eventually the country gets a chance to reduce the national debt due to the overall growth of the economy.

In 2014, the IMF failed stand-by program, without reaching any macro-economic stabilization. The cause of the failure is obvious - poor local risks analysis. [11] Obligations to the EU, euro zone membership, absence of any trade barriers from the EU in the Greek market were not taken into account.

Moreover, in 2013 the level of public debt to GDP ratio decreased from 171% to 156%, i.e., Greece was forced to reduce public debt. Although, in order to achieve sustainable economic growth it better to leave the government spending in Greece on a big level. [17]

It is obvious that both the IMF and the EU need to try to find new means for stabilizing the weak economy. "Stuffing" economies with new debt brings situation into dead-end. The experience of Greece and incompetent economic policies of its governments in the years 2004-2012 are extremely useful for the study, as EU membership for countries with such weak economies has not only advantages, but also huge disadvantages.

5 Possibility to overcome the consequences of default

The default is not a disaster and total ruin of the country, but the chance to get ahead. For this chance, one has to pay - and pay dearly, that is citizens and business. Only competent and radical actions of the government can turn the opportunity into reality.

Nowadays, Ukraine has two options to negotiate with creditors. The soft one is a rollover, or at least a reduction of profitability of Eurobonds (that is acceptable for the creditors). And tough one is reduction of the principal amount, i.e. debt forgiveness (as urged by the Ukrainian government).

The restructuring of Ukraine's internal debt is one of the top priorities for the stabilization of the economic and financial situation of the country both in the policy pursued by the Ukrainian government and in the policies of foreign assistance programs, including the key program of the IMF. The IMF expects that these measures will enable Ukraine to return to the international financial markets in 2017, which will allow Ukraine to involve private capital in the economic reconstruction of the country and will enable it to gain access to funding not only from the IMF, but other international financial institutions or countries. (Table 1)

Table 1. The debt restructuring under the IMF program for Ukraine, in billion USD

	2015	2016	2017	2018	In total
Ukraine's financial needs	21.4	6.8	6.9	4.8	40.0
Increase in currency reserves	10.8	3.9	6.3	6.7	27.7
Deficit in current account balance	10.6	2.9	0.7	-1.9	12.3
Financing	21.4	6.8	6.9	4.8	40.0
Total financial support	16.3	3.5	2.5	2.5	24.7
Debt restructuring	5.2	3.4	4.4	2.3	15.3
The share of the debt restructuring in financing Ukraine's needs, in percentage	24%	50%	64%	48%	38%

Source: International Monetary Fund

„Ukraine may declare a default in the event if this is the only way to solve the problem of the debt burden,“ - said a Taras Kotovich, senior financial analyst of Investment Capital Ukraine group. This step is necessary to make in case of failure of debt restructuring and the termination of funding from the IMF.

If the Cabinet of Ministers will insist on writing off debt or to default, it would benefit only in the short term. By reducing the burden on the budget, the country will lose in the long run, as it will be difficult to enter the foreign capital markets. So, the problem of the budget deficit, which the Ukrainian authorities face regularly, over time, becomes even more severe. Also full-fledged default would deprive Ukraine from the IMF funding and all others (World Bank, European Bank for Reconstruction and Development, International Finance Corporation). The pressure on the hryvnia will be enormous: either exchange rate will be frozen, or it will reach 30-35 UAH/USD, and perhaps lower. Since, there would be no currency inflow to the country except from export.

In addition to the collapse of the hryvnia and the inability to obtain new loans, there is also the danger of the arrest of foreign Ukrainian assets in order to pay back creditors. Major creditors can start foreclosure (although this does not happen very often). According to the court's decision property, vehicles (ships or aircraft), consignment, accounts, etc. may be seized.

Conclusion

Currently Ukraine does not have enough financial resources to pay off all of its foreign liabilities on time. The factors which stand behind this are the following: the economic crisis (including low level of foreign-exchange reserves, the recession, a decline in exports, the depreciation of the national currency, the lack of stability of the banking and financial systems, the deficit in the current account balance); hostilities in the east of the country and the conflict with Russia as well as instability within Ukrainian politics (including the lack of a stable political structure in parliament or in local authorities and rivalry between political parties).

What's next? Ukraine will face the sale-off all more or less liquid assets, large-scale privatization, the transfer of tidbits of state property into the hands of either the existing oligarchic clans or in the hands of US and European corporations. Ukraine will have to higher taxes, which are already grown in the last 2 years, raise prices for gas, water,

heating, electricity, cargo and passenger transportation. All that will provoke the fall of living standards and contraction of demand, slowdown of the real economy, investment outflow and standstill of industrial development.

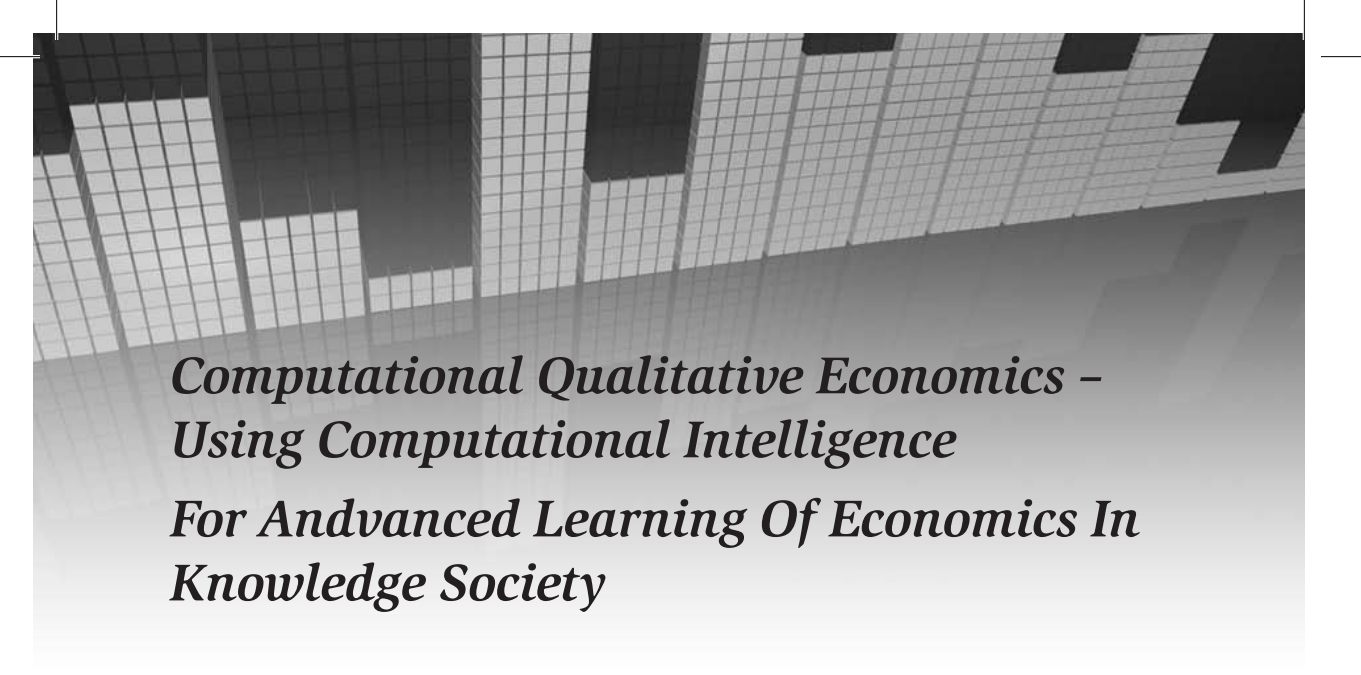
All this is exactly what will happen if Ukraine will not start economic reforms. They are required for not only by the IMF and other lenders. Reforms, in the first place, are awaited by the people that are set up the European integration and searching for a better life.

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Computational Qualitative Economics – Using Computational Intelligence For Advanced Learning Of Economics In Knowledge Society

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Abstract

In economics there are several complex learning themes and tasks connected with them difficult for deeper understanding of the learning subject. These are the reasons originating serious learning problems for students in the form of Virtual Environment because deeper understanding requires high level mathematical skills. Actually the most important feature for discerning this part of economics is the set of qualitative shapes emerging in discrete dynamic systems when they are undergoing iterations and/or experimentation with parameters and initial coordinates of variables. Among such shapes there are: - trajectories in evolving time; - trajectories in R^2 of two variables; - cobweb portraits; - one control parameter bifurcation with first and/or with second variables; - two control parameters bifurcation in R^2 (attractive basin of double controls); - cycles; - basin of attraction of two variables; - one Lyapunov's exponent against some of control parameters; - Lyapunov's exponents with two control parameters in R^2 ; - absorbing area with possibility to create critical curves and/or attractors. The hope is that products of computational intelligence may help them solve such problems. Naturally, the meant complex economic problems and tasks have discrete, qualitative and nonlinear (noninvertible) nature resulting in increased level of difficulties. So with the term used in the head of this paper one has to understand narrowly: "qualitative nonlinear computational economics". For better understanding the very nature of the problem we are using as appropriate example actual simulation of the model of new ICT products monopolies in virtual laboratory built in the routines setting dominantly in the software iDMC.

Keywords: | Complex economic system, Computational intelligence, The Cyclical growth, Experimentation in iDMC laboratory, Monopoly model, Oligopoly model, The Strange economic dynamicity, Virtual economic laboratories

JEL Classification: A23, C10, C18, C35, C63, C93, D21, D42, D43, E32

Introduction

Qualitative computational economics is one of the fresher parts of economics. From the view of very contents its subjects are those economic problems that along to complex economic systems, for example cyclical growth, monopolist's searching, adaptively learning duopoly, multiplier-accelerator dynamics based on the different behaviour of investor (fundamentalists and chartists), etc. On the other hand, from the point of methods and analytical tools this part of economics are using results of progress in qualitative mathematics originated by Henri Poincaré, and for solving models are using PC-simulations, and experimentations in virtual laboratories built in appropriate software's, for examples in MATLAB-SIMULINK, STELLA, VENSIM, SWARM, GEMODEL, Mathematica (Wolfram), and other too, including EXCEL spreadsheet processor. The most important feature for discerning this part of economics is the set of qualitative shapes emerging in discrete dynamic systems when they are undergoing iterations and/or experimentation with parameters and initial coordinates of variables. Among such shapes there are: - trajectories in evolving time; - trajectories in R2 of two variables; - cobweb portraits; - one control parameter bifurcation with first and/or with second variables; - two control parameters bifurcation in R2 (attractive basin of double controls); - cycles; - basin of attraction of two variables; - one Lyapunov's exponent against some of control parameters; - Lyapunov's exponents with two control parameters in R2; - absorbing area with possibility to create critical curves and/or attractors.

The students in economics must face up to wide agenda of complex phenomena in learning process. Deep understanding such complex learning matter is based on high level mathematical skill of students and on their ability to use appropriate tools. But such requirements aren't fulfilled in every case. So the efficiency and quality of understanding and mastering meant subjects isn't assured. In such situation it is at hand very simple and suitable solution: experimentation in virtual laboratories. On the other hand, those methods aren't panacea. But, at least, can successfully help them better understand usage of abstract methods of cogitation and in deeper penetration to using efficient mathematical tools in complex system analysis. Based on experiences we come to the end that from the methodical and didactical point of view there are two dominant stage of progress achieved by using virtual laboratories in education process: the first is possibility for the student follow dialogue with complex problems mastered as a model in virtual laboratory by teacher, that is the students doing approval of his imaginations by experimentation, the second one and more efficient is building own authentic model by student and afterwards doing experiments with in.

The instigate purpose and goals of author is grasping opportunity supplied with this essay and take off spread among wider community with using virtual laboratories for better and deeper understanding complex phenomena. In actions with those problems they are using phenomenological and/or entirely qualitative approaches to meant subjects for elaborating preparatory basis needed for creation mathematical and/or simulation models of authentic learning subject in economics and other partial branches of economic science. The author demonstrates explicit examples of virtual laboratories, experimenting in them and shows graphical snapshots of returns coming back from that process. He are use some topics from economics (model of duopoly, monopoly, cycles), ecology (Lotka-Volterra relations), and explores a few snapshots reached by experimentation in virtual economic laboratories created in such software as STELLA and iDMC, but only for visual impressions and methodical imprints.

Further purpose of this essay is to distribute out of authors opinions with using virtual laboratories for better and deeper understanding complex phenomena in various learning

disciplines. He uses phenomenological and/or qualitative approaches to meant subjects for elaborating preparatory basis needed for creation mathematical and/or simulation models of authentic learning subject in biology, ecology, economy and other ones. The author demonstrates only few explicit examples of virtual laboratories, experimenting in them and shows graphical snapshots of returns coming back from that process. The intention of this paper is to show how graphical result of experimentation in virtual economic laboratories helps in understanding of complex behaviour in dynamic non-linear economic systems too. The paper is based on more than 20 years experiences of author and his team with using virtual laboratories in education and research.

2 Complexity of real economy: the need of experimentation with complex non-linear model of economic dynamics in virtual economic laboratories

However on first sight, some real economies have complex and non-linear dynamic character. So their model must to be non-linear dynamic too. In such cases non-linear economic systems are very interesting for economist but on the other hand are extremely difficult for exact analyses. It is truth that exact, closed-form solution is rarely available or more really, such solutions are nil at all. There is no other way than to adopt another strategy, for instance to combine analytical, numerical and graphical methods, or to use advanced methods of experimentation in virtual laboratories. There arising need to study of orbits of non-linear dynamics systems an to give attention on emerging invariant sets, such as fixed points, periodic, and/or quasi-periodic, more over (deterministic) chaotic sets. The properties of those sets can be investigated from a professional geometric-topological point of view but such approaches are difficult first of all for students. Experimentation in virtual economic laboratories can help in understanding such confused processes going on in evolution.

Non-linear dynamic models are useful to explain very irregular, large-amplitude, fluctuations that appear in complex economic and financial systems such as cyclical economic growth, monopoly, duopoly, oligopoly, stock prices and exchange rates. There are however emerging several mathematical difficulties with their analyses. Not every student can work with such model in current natural way. Goodwin, Hicks, Kalecki, Kaldor, and Samuelson are among those economist (that is the first post-Keynesian economists) introducing non-linear dynamic models with locally unstable steady states and stable limit cycles to account for the persistence of business cycles. Surprisingly the duopoly model seeming as very simply, may generate very confused and strange dynamical behaviour. Inspired by the rapid development of deterministic chaos in mathematics and physics, there is a renewed interest in non-linear endogenous business cycle models in last two decades in our day. At present there are some possibilities in using advanced product of software creators that helps in construction of virtual laboratories in common PC and/or in notebooks. Fortunately, there are several software's usable for creation virtual economic laboratories, currently. Experimentation in virtual economic laboratories helps in better understanding of complex behaviour in dynamical economic systems. Visualisation of the evolution helps us to see what kind of behaviour is realised in that one or another model evolution.

As a first step of description we begin with virtual laboratory (built in iDMC) experimentation with duopoly model. Subsequently we are exposing laboratory built in STELLA.

2.1. Experimentation in virtual laboratory created in iDMC with qualitative duopoly model

The duopoly model originated by A. A. Cournot is appropriate example for demonstration of our experiences with experimentation in virtual laboratories. In spite of seemingly simple nature of that model his behaviour may be very complex, namely if we capture into account some learning approaches of two players. For explanation of this occurrence of learning players we shall use their adaptation on one step backward information. The map with adaptation of players has the subsequent mathematical forms

$$T: \begin{cases} x' = (1 - \lambda)x + \lambda \left(\sqrt{\frac{y}{c_1}} - y \right), \\ y' = (1 - \mu)y + \mu \left(\sqrt{\frac{x}{c_2}} - x \right). \end{cases} \quad (1)$$

and by shifted coordinates into the centre (into the fixed point) is

$$M: \begin{cases} x' = x + \lambda \left(\sqrt{\frac{y}{k}} - x - y \right), \\ y' = y + \mu (\sqrt{x} - x - y) \end{cases} \quad (2)$$

and in those base we can create virtual laboratory in iDMC) for these purposes.

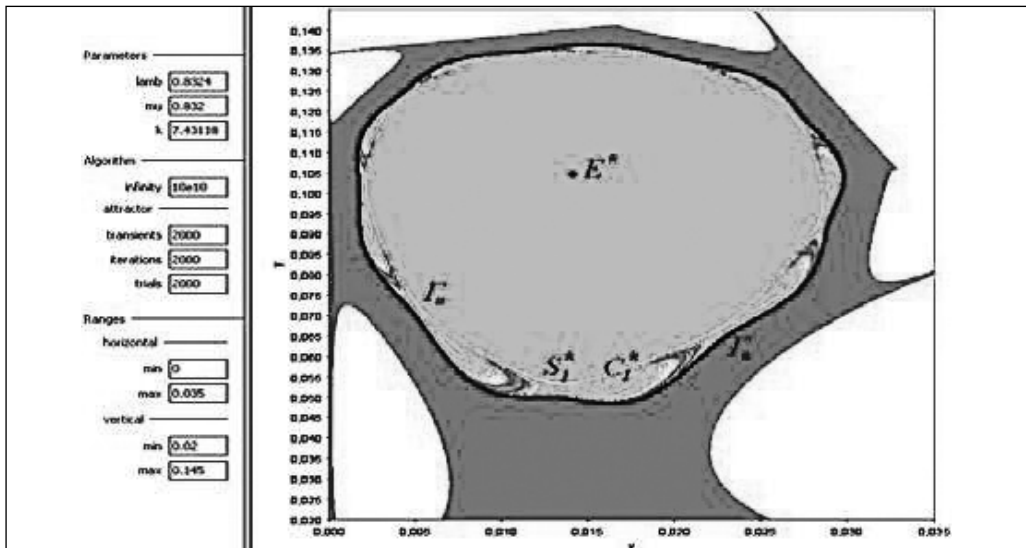


Figure 1 Basin of attraction of Duopoly with adaptation of players

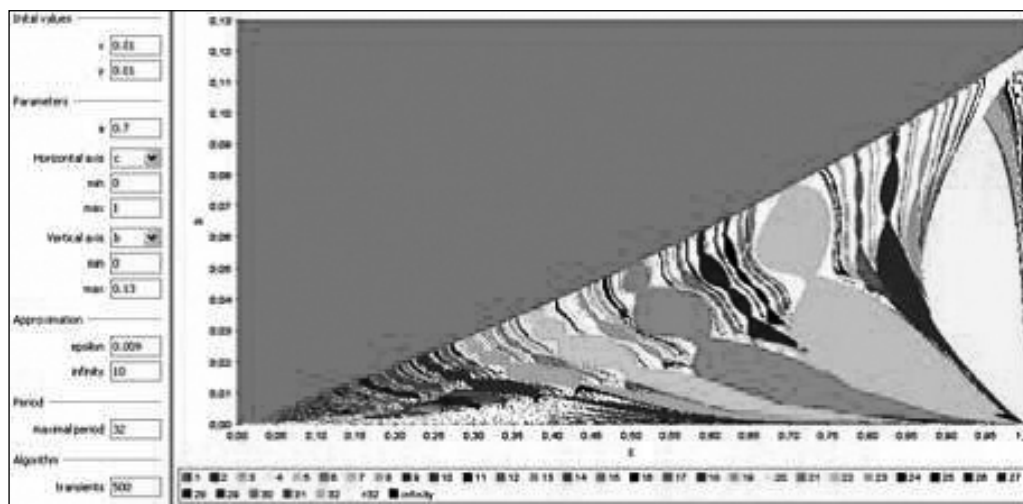


Figure 2 Double bifurcation map (two parameters basin of attraction) of Cournot duopoly model with adaptive players: “Arnold’s tongues” - red area showing equilibrium and the coloured tongues showing the numbers of periodical points of the orbit

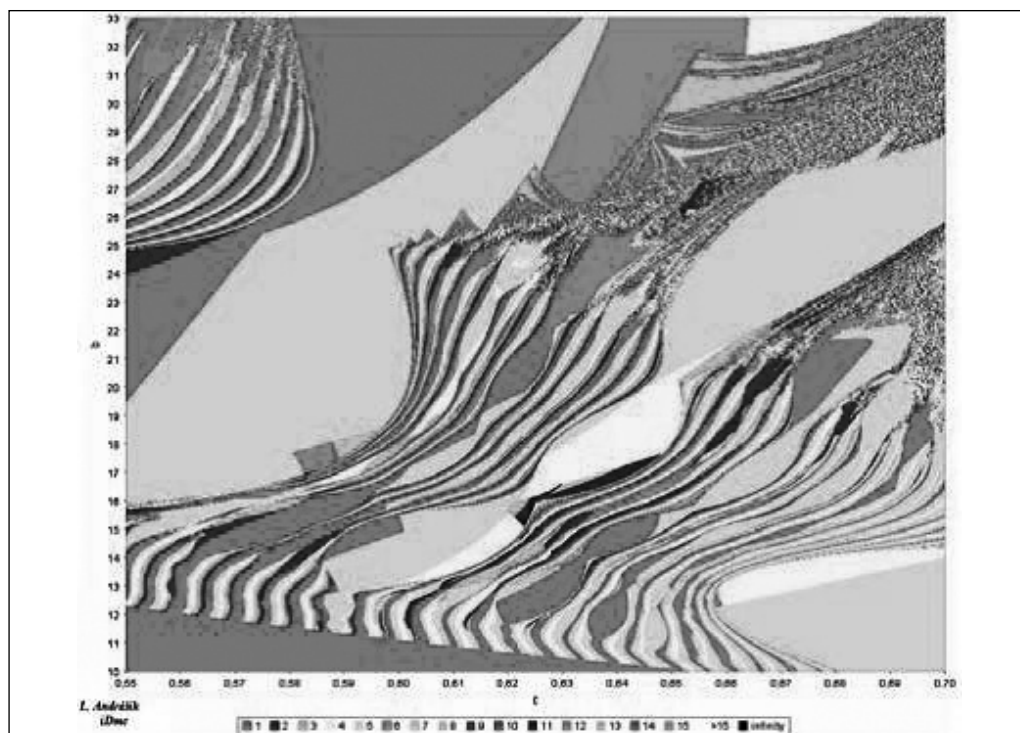


Figure 3 Detail insight to double map: “Arnold’s tongues”

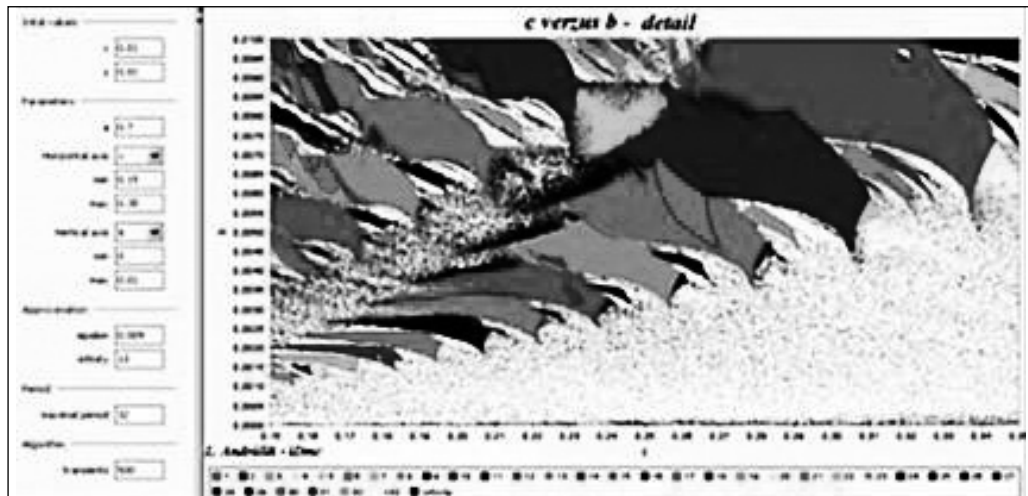


Figure 4 Double bifurcation map very deep insight into map

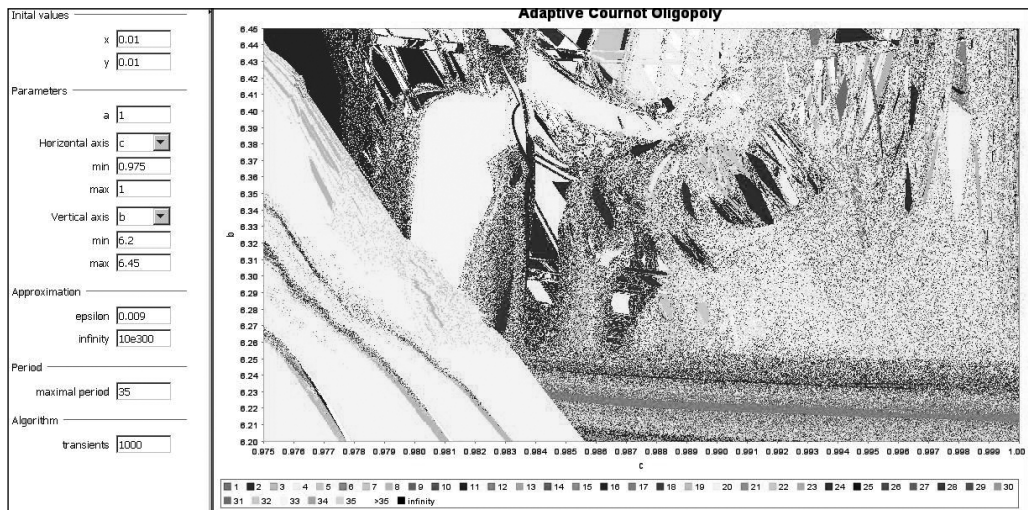


Figure 5 Other insight into double-bifurcation map, b versus c

2.2. Experimentation with specimen monopolist searching model taken from book of T. Puu

For illustration of possibilities of dealing with computational intelligence products in economics we are exhibiting another interesting economic model: that is monopolist searching for optimal price and amount of his goods because of lack of market signaling. In the subsequent pictures there are some snapshots from experimentation in virtual laboratory we developed in iDMC on the base of Tõnu Puu's specimen. One can see partly attractors and partly critical lines in absorption area.

Originally T. Puu [12] chosen next parameters for searching: $A=5.6$; $B=2.7$; $C=0.62$; $D=0.05$; $E=2$; $F=0.3$ and $G=0.02$. Searching process with those parameters can be defined by difference map

$$x_{t+1} = f(x_t, y_t),$$

$$y_{t+1} = g(x_t, y_t),$$

where

$$f(x, y) = y,$$

(3)

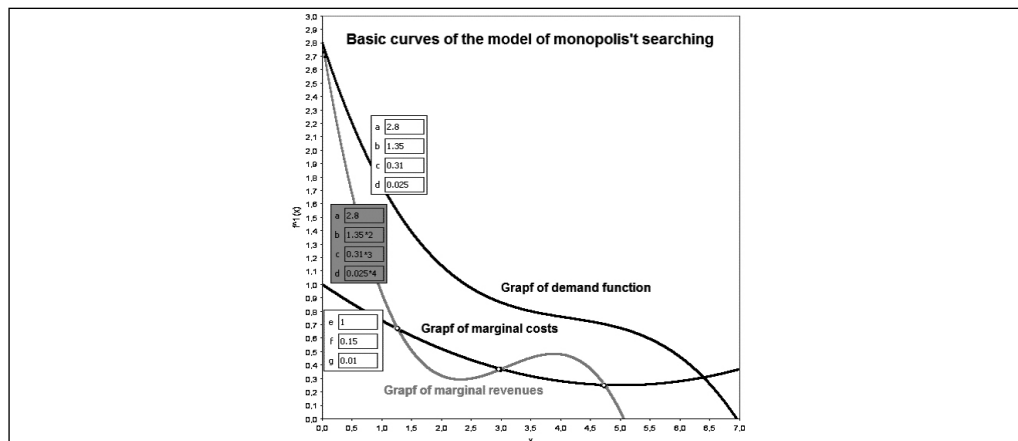


Figure 6 The basic curves of monopolist searching model: demand function graph, graph of marginal costs and graph of marginal revenues (this snapshot we created in Excel)

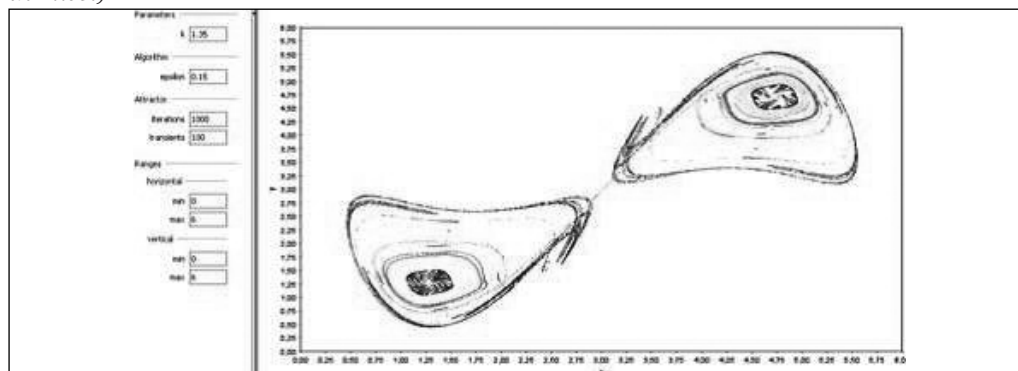


Figure 7 Set of attractors and several critical curves created

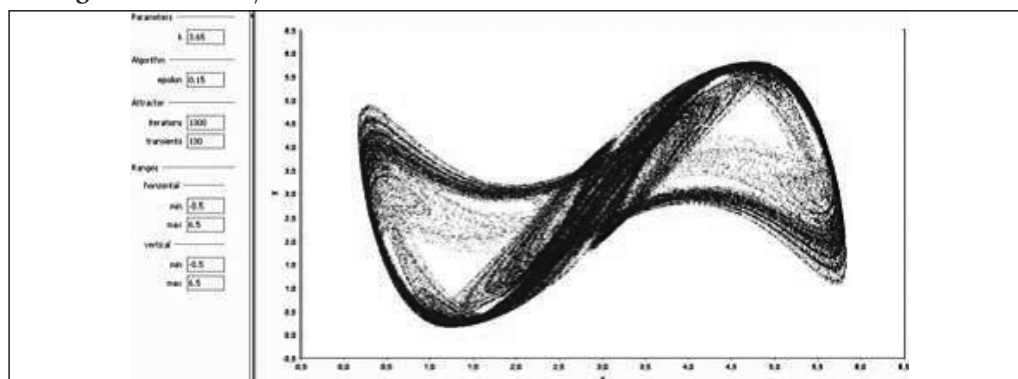


Figure 8 Absorbing area with attractors (blue in coloured snapshot)

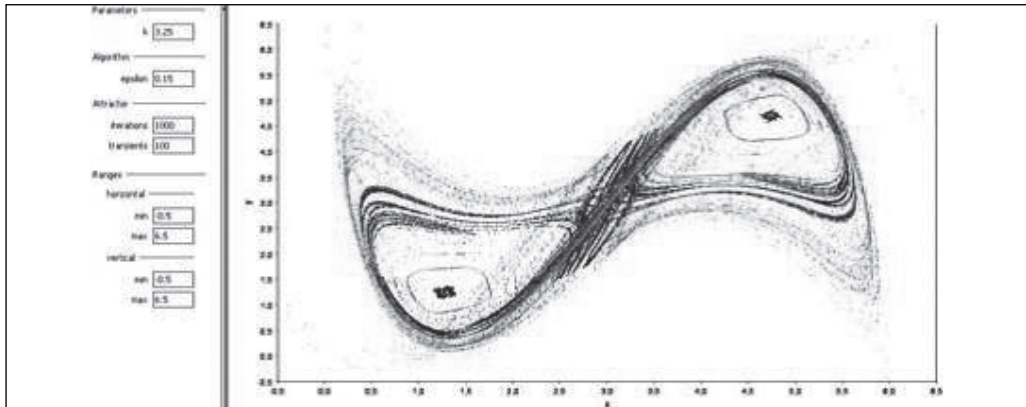


Figure 9 “Puusian” model of monopoly: Lone attractors set (blue) plotted in attractor algorithm of iDMC absorbing area routine and the critical lines (red) – the combined upshot from our virtual laboratory (it is chaotic orbit)

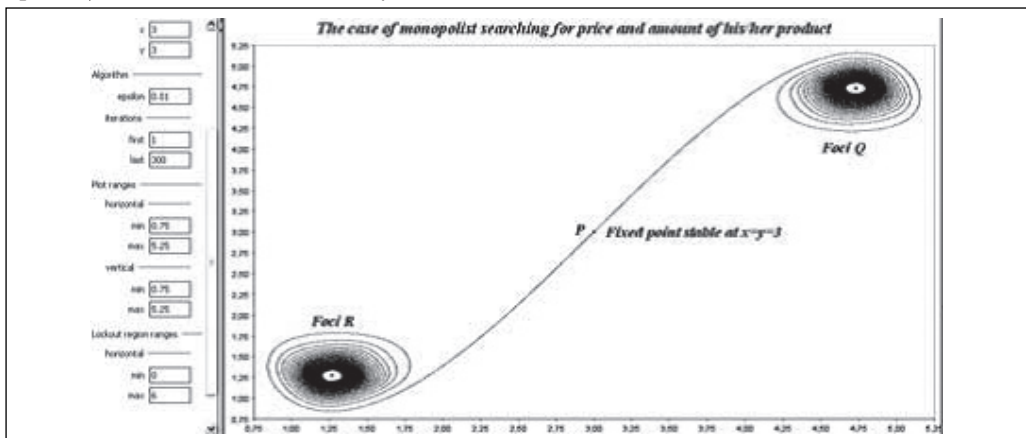


Figure 10 The Manifold is evolved to stable focuses Q and R

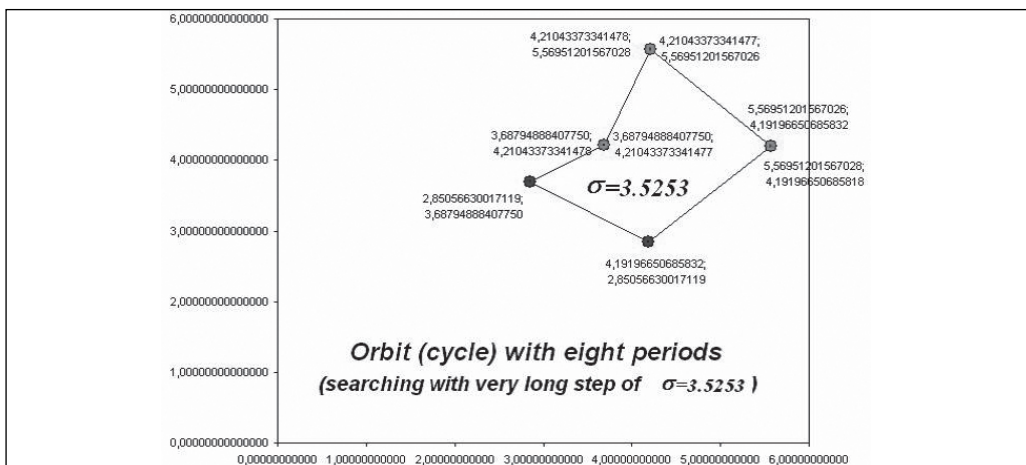


Figure 11 Orbit with 8 (3 red points from 5 blue overlapping 3 upper of them) period in left upper segment by variation of parameters in absorbing area – this case we made in Excel for understanding what is happening in basin

2.3 Experimentation with Kaldorian model of cyclical growth (Evolution of model of cyclical growth built on Kaldorian theory base)

For other illustration of *CI* possibilities in dealing with qualitative economic systems we are exhibiting behaviour of Kaldor like model of cyclical growth as thirds from those specimens that bring difficulties in cognitive process for students. The virtual created in iDMC again. We are describing of laboratory in LUA-JAVA language as follows:

```
--@@@
name = "Kaldorian model"
description = "See Model references"
type = "D"
parameters = {"a", "b", "c", "d"}
variables = {"Y", "K"}
function f(a, b, c, d, Y, K)
    Y1 = (1-b-a)*Y+math.atan(K)
    K1 = -c*b*Y+(1-c*d)*K+c*math.atan(K)
    return Y1, K1
end
function Jf(a, b, c, d, Y, K)
    return
    1-b-a, 1/(1+K^2),
    -c*b, 1-c*d+c/(1+K^2)
end
```

We are used model formalism that is motivated by (Agliari at all. 2007, [2]), that is, we are using theirs two - dimensional discrete-time dynamic model (as topological map):

$$W: \begin{cases} Y_{t+1} = Y_t + \mu[\sigma\alpha + \gamma\left(\frac{\sigma\alpha}{\delta} - K_t\right) + \arctan(Y_t - \alpha) - \sigma Y_t] \\ K_{t+1} = (1 - \delta)K_t + \sigma\alpha + \gamma\left(\frac{\sigma\alpha}{\delta} - K_t\right) + \arctan(Y_t - \alpha) \end{cases}$$

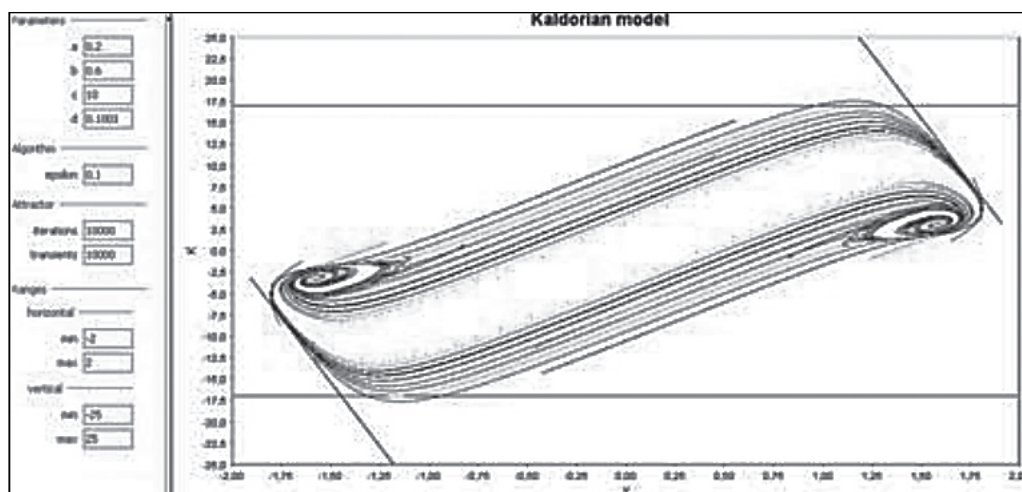


Figure 12 Snapshot of multitude of critical curves in absorption area: model on Kaldorian base

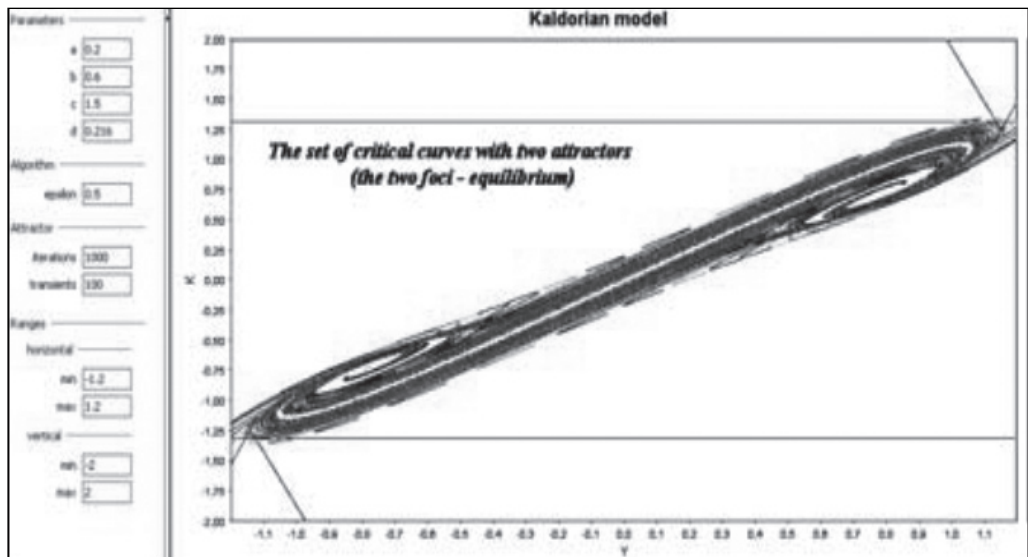


Figure 13 The multitude of critical curves presenting attractive and repulsive evolution process (Kaldorian model behaviour)

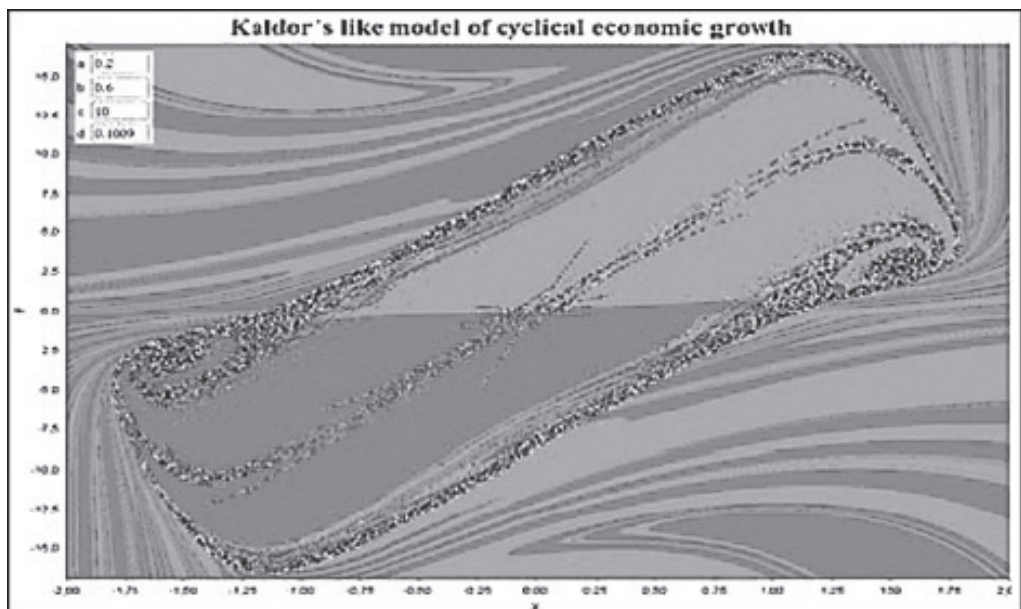


Figure 14 The great number of trajectories achieved by variation with starting values of variables x and y (the enormous set of discrete dots in front); in background there is a basin of attraction (Made by overlapping the two slides in paintbrush)

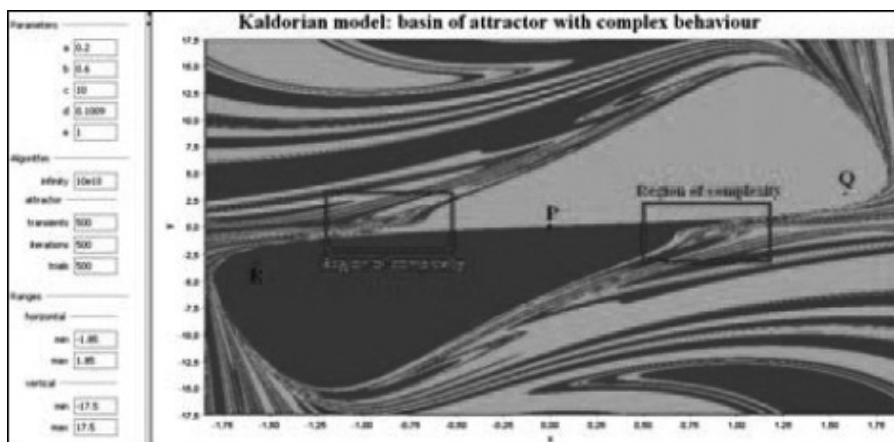


Figure 15 The basin of attraction of cyclical growth: the emergence of complexity when the parameters are in suitable level

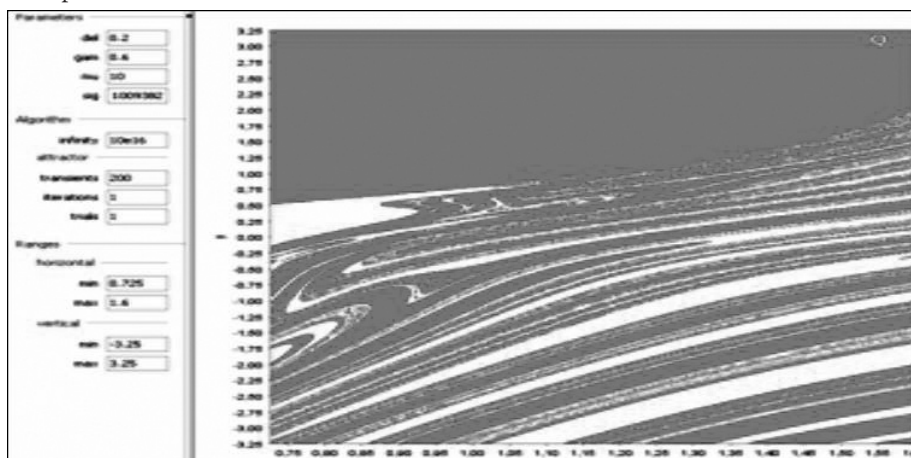


Figure 16 The enlarging of former snapshot - the strange (right - near to point Q) region

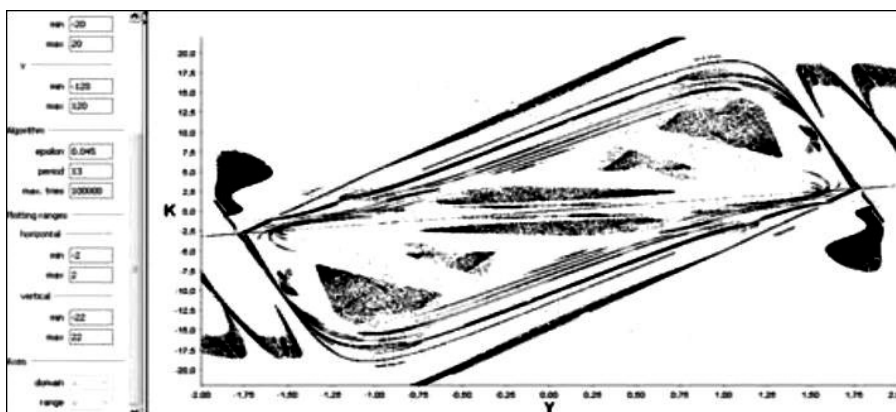


Figure 17 Exhibition No. 1 of possible using of routine „Cycle „in iDMC

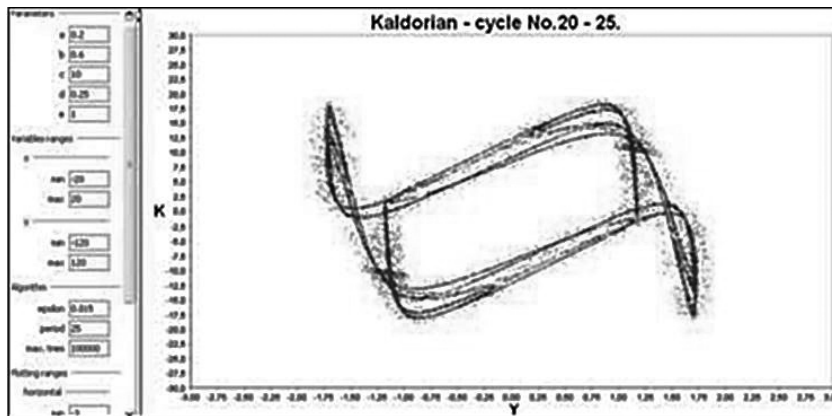


Figure 18 Exhibition No. 2 of possible using of routine „Cycle „in iDMC

Conclusions

The author would like to advocate for wider using of advanced products of computational intelligence for investigation in complex economic and societal phenomena appropriate for building virtual laboratories and for building virtual co-developers living in appropriate software useful to researchers, teachers and students in economic science. He proposes the idea of integrative approach of advanced *CI* in this essay. Namely because only integrative methods aided by sophisticated *CI* products is able completely deal with new, unprecedented process emerging in contemporary global knowledge society. In the virtual laboratory simulation of dynamical behaviour of economic systems with nature of sub-critical Neimark-Sacker bifurcation is very important for understanding hidden complexities in them. In virtual experiments, the emergence and existence of a repelling invariant closed curve which bounds the basin of attraction of the stable fixed point implies for economic scholars fundamentally important disposition the very process. Those is lying in fact that small perturbations of the system have no effects on its dynamical behaviour, while large enough disturb may drift the system to another attractor. In this sense the system after small perturbation keeping on structurally stable state forever. The system after such perturbation is keeping on topologically equivalent state and/or dynamical regime. In such situation upon the whole system the basic fixed point governs. We are exhibited that those qualitative regimes realizing such motion is either stable node, and/or stable focus depending on the longevity size of probing step parameter. But the situation, first of all for conventional (main stream) economist's buildings their theories, is not as optimistic as it like in first sight. Unfortunately, the size of disturbances, even sometimes there are in clusters, emerging in real economies are outlying from one that we may called "small" as we do above. In such situation our attractive fixed point losing his attractive force and delivering it to closed invariant curve. But descript situation is a little more complex. If the shock is so large enough that may drift the system to another attractor the scholar have to reveal hidden coherences, such as requirements of the coexistence of the fixed point with a different attracting set are. We are doing some effort to exhibit how experimentation in virtual economic laboratories can help in gaining better, more effective and efficient, more perpetual knowledge of complex behaviour in non-linear economic systems. We based those exhibitions on several years experiences achieved in education in Slovak university of Technology Bratislava. That task is difficult not only for very contents of this branch of economics and decision making process's but in first plane for the truth that exhibit in written on paper form those achieve-

ments of possibility directly watching of running experiments is basically impossible. So we must limit our effort only for exhibition of finished product of experimentation in a static graphical form such as trajectories, bifurcation maps, and basins of attractors, manifolds, cobwebs animations, critical curves and attractors in absorbing areas and so on. In such circumstances we focused attention only on registration the facts that such devices, tool and methods is available and everybody can use it on cognitive processes in minimal claims for former special mathematical education. We focusing attention in one hand on general aspects of the object without concretization of inherent content of tasks, and on the other hand we are reveal proper economic content of three particular economic theory and/or model: first - monopoly, second - duopoly and third - cyclical growth, unfortunately only in inequitable non continuous part inputs. In circumstance of monopoly and monopolist we can, at least by way of joke, said that we have for them two messages: one good message and the other bad one. The good SMS-message is that he/her can independently set the price and amount of their product for market. The bad e-mail is that he/her doesn't know how and what level and/or volume have to set down. As T. Puu noticed in his book (T. Puu, 1999, p.130) it may be a bit hard for economists, nourished with textbook monopoly theory, to digest that the monopolists does not know all about the market and may even behave in a way seeming erratic. He admits that it can be prohibitively expensive to get all the information the monopolistic firm needs, and that the knowledge acquired may be only local. We can, pragmatically think, parallel with T. Puu, that monopolist might have no idea, at all, of the true global outline of the marginal revenue curve (see for example Fig. 9-16), as to how many humps there are and where they are located, etc. It is known that economics and economists recognize two opposite market forms: monopoly and perfect competition. We can, similarly at least as a joke, say that competitive market is wiser than monopolist. Such markets "know" the appropriate price and amount (because of unseen hand of market is still in work). But beside these two opposite market form there is third form too: the duopoly and/or oligopoly ones. The problem is, that duopoly, though contextually the first step from monopoly towards perfect competition is analytically not a case of intermediate complexity, but more complicated than before mentioned extremes (see Puu [12], 1999, p.133-158). From this point of view A. Cournot was a natural first founder of the theory of iterated two person game. Simulation in virtual laboratory helps in understanding that complicated process too. In third case we have considered a particular version of the Kaldor business cycle model in discrete-time, which has been proposed in group of Italian economist-mathematicians Agliari et al. (See Agliari et al., 2007). The part of this essay focused to exhibition of the snapshot of the global bifurcations of attracting and repelling invariant curves which are associated with phenomena of coexistence of attractors and intricate structures of the basins of attraction. This has been illustrated within the nonlinear framework of the Kaldor model. It has partly shown, that bifurcation sequences involve homoclinic (or heteroclinic) tangles (like general approach visualised in Fig. 17-23), associated with saddle points or saddle cycles of different period, and that the "intermediate" scenarios are of necessity accompanied by complex structures of the basins of attraction. This strengthens the role of homoclinic bifurcation theory (which has been recently introduced in economics in order to explain the routes of complex attractors which are often observed in numerical experiments) as a tool of analysis of global dynamic phenomena. Finally we would like to thank all members of, as we tray named them, "Italian group" for their excellent achievements in that branch of economics and, first of all, warm thank is belong to professors Anna Agliari, Laura Gardini and Marji Lines for helps with solving several problems of these complex topics in the learning processes at Slovak University of Technology, Bratislava, at University of Economics in Bratislava.

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Legislation On Intellectual Property In The Russian Federation: Novels Introduced In 2014

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Abstract

Purpose of this article is to tell foreign readers about novels made in Russian intellectual property law in 2014. As is known modern Russian revolution in the field of intellectual property legislation occurred January 1, 2008 when Russian intellectual property legislation was codified, included in the text of part fourth of the Civil Code (CC) of the Russian Federation. Part fourth of the Russian CC (Federal law №230-FZ, 2006) entered into force on January 1, 2008. At the same day seven sectoral intellectual property laws were repealed. Second Revolution in this field took place during 2014: Federal law №35-FZ, 2014, substantially amending the Fourth part on the CC, entered into force on October the 1st of 2014. Scientific aim: The essence and evaluation of these amendments is the subject matter of this paper. Methods: The research is based on the analysis of the new amendments and articles added to the part fourth of the CC. Findings: Codification of the sectoral legislation en bloc in CC is a unique phenomenon. The author believes that such a construction of intellectual property law was made correctly and at the proper time. Factually the Federal Law №35-FZ (2014) is the eleventh law amending the text of the part fourth of the CC. But all previous amendments were small and not substantial. As far as amendments introduced by the law №35-FZ (2014) are concerned, they are numerous and very, very substantial. Before entering into force of the law №35-FZ (2014) (thereafter - law 35-FZ), the Part fourth of the CC contained 328 articles. The law 35-FZ amends 169 articles of it and adds seven new articles. I am convinced that the law is a rather big step towards building a modern system of intellectual property legislation in Russia. Conclusions: More than 150 amendments were introduced by the law №35-FZ. Author estimates about 80% of them as positive and about 20% as negative and erroneous. These amendments do not contradict the international intellectual property agreements signed by the Russian Federation. Generally their purpose is to enhance and clarify the Russian intellectual property legislation and to narrow the gap between Russian and European intellectual property laws. The author of this article deals with intellectual property laws more than 50 years on. This paper is a short English version of various articles on this topic published in Russian, in journals: «The business and the law» (Chozjaistvo i pravo) and «The patents and licenses» (Patenti i licenzii).

Keywords: | Property, law, holder, industry, patent

JEL Classification: K 22

Introduction

The previous text (consisting of 30 articles) was supplemented by one additional article, 20 articles were amended. Article 1227 is devoted to correlation between intellectual rights and property right. New title of it: «Intellectual rights and rights to a thing» became broader and more correct than the previous title. A new provision was included into this article: «No provisions of Division II of the present Code shall be applied to intellectual rights, unless otherwise provided by the rules of the present Division». Division II of the Code relates to the rights of property.

Property rights are similar to intellectual rights: both kinds of rights are absolute and exclusive. Besides, legal provisions concerning property rights are numerous and much better elaborated than those of intellectual rights. Therefore the new provision included into art.1227, seems to me, contradicts with one general principle of the civil law: application of the norm to similar relation (analogous use of a norm - art. 6 of the CC).

Article 1229 para.3, deals with the cases when the exclusive right belongs to several persons jointly. The previous norms, ordering, that disposition of the exclusive right (i.e. - concluding an alienation of rights' or license contract) belonging to several persons shall be made by right holders jointly unless otherwise provided by the present Code, were supplemented by adding the words: «and unless otherwise is provided by the agreements among them».

Consequently the norm became a dispositive one, rights of the rightholders are became much broader. One may suppose that such a conventional agreement between (or among) rightowners will be an agreement that any rightowner has the right to give non-exclusive license or has the right to alienate his (or her) share of the exclusive right.

Another novel - addition to para.3, art.1229 a new subparagraph: «Every rightowner has the right to defend his (or her) right independently from the other rightholders».

Strictly speaking this provision should be included into General Provisions of the CC. Nevertheless its appearance in this place of the CC should be welcomed. But on the other side as far as practical application of this provision is concerned some difficulties may arise. For instance, it is not clear how is amount of the so called «alternative compensation» (art. 1301, 1311, 1406-1, 1515, 1537 of the CC) to be determined by the court when the exclusive right is infringed, but payment of the compensation demanded not by all rightholders but by some of them only.

Art 1232 of the CC orders state registration for exclusive rights relating to some protected objects (indicated in the CC - inventions, industrial designs, trademarks etc.) as well as state registration for transactions relating to these objects. Details of the state registration were readdressed to normative acts of a lower level.

Some Rules on this subject matter were adopted by the Government, but they were unsatisfactory, they did not embrace all situations. The law №35-FZ adds some important details to the state registration of rights. In particular, the law included in the CC provision that the application to make the state registration of the contract may be filed by all parties of the contract or any party of the contract.

The application must be supplemented by, on applicant's choice, the text of the contract or notarized extract from the contract or by signed by contact's parties information concerning disposition about exclusive rights which took place. All new provisions included into the text of the CC are undoubtedly a good regulation of these complicated questions.

Art. 1233, para. 5, provides now the possibility of owner of exclusive rights to partially disclaim from his/her rights.

In connection with these new provisions, a general question is arising: whether it is possible to any rightowner of any civil right (right to a thing, property right, exclusive right, obligatory right etc.) to disclaim (give up) his/her rights in whole or in part?

This general question in the present Russian legislation (and in the doctrine too) remains unanswered.

But let us return to our muttons: art.1233, para 5, of the CC now prescribes for the owner of exclusive rights for works of scholarship, literature and arts or the owner if rights for objects neighboring to copyright to partially disclaim their rights to use.

Such a disclaimer should be announced in a statement of the rightholder, which is advertised on Internet on an official site of a «Federal body of executive power».

Contents of the disclaimer are as follows: Any person has a right to, free of charge, use of the object during the period of time and on the condition mentioned in the disclaimer.

I suppose that the disclaimer may be a narrow one or a broad one, including right for reworking of the work and right of inviolability of the work.

A person who used the work or the object of neighboring rights within the limits prescribed by the disclaimer is not obliged to inform the rightholder about his/her actions. But if a dispute arises the person is obliged to prove that his/her actions were legitimate.

In connection with inclusion into para 5 of art.1233 of the CC of a possibility to disclaim from a part of intellectual (exclusive) rights, some general questions relating to the sphere of the civil rights arise:

- Why these provisions relate to some categories of such rights only?
- Why in the civil law (in particular, in the CC) there are no provisions about the possibility to disclaim any intellectual (exclusive) right as a whole?
- Whether a rights holder of any civil right (that is - any private right) has the right to disclaim his/her right?

I suppose that such general provisions are permitted and must be included into part one of the CC.

License agreements (contracts) are the most widespread form of contracts relating to disposition of the exclusive rights. According to this type of contract the owner of an exclusive right (the licensor) grants to the other party (the licensee) the right to use (within the limits provided by the contract) of a result of intellectual property (or a means of individualization).

Until recently the legislation in force did not contain any provisions concerning the question whether the licensor himself/herself reserve the right to use contract's object within the limits provided by the contract. It was obvious that the parties of a contract had the right to answer this question in the contract. But if so was not done, the answer to this question remained unclear.

In practice such a situation occurred frequently. In connection with it some court's orders were adopted which were equal to legislative norms. But adoption of such legislative

norms is beyond the competence of the courts.

Therefore adoption of the following addition to the art.1236 of the CC should be welcomed. The new addition reads:

«Licensor himself has no right to use the result of intellectual activity or the mean of individualization in the limits granted to the licensee as provided by exclusive license, unless otherwise provided by the contract».

The above cited provision relates to the exclusive license only. As far as the simple (non-exclusive) license is concerned, it is supposed that the licensor retains the right to use the license's object himself/herself.

Art. 1246 of the CC contains general provisions concerning amounts and rules about payment of compensation for some objects of exclusive rights. Most of them are introduced by the Federal law №35-FZ, which entered into force from October 1, 2014.

At the same date art.12 of the law on putting the fourth part of the CC into effect was repealed. This article provided rules concerning payments of remuneration for employment invention and employment industrial design.

New provisions included in art. 1246 are not the provisions which may be applied as such (directly). They give to the Russian Government the right to pass the following normative acts:

- 1) on rates, rules and terms of payment of compensation for employment inventions (utility models, industrial designs);
- 2) on minimal rates, rules of collections, distribution and payment of compensation for some kinds of use of the works, performances and phonograms in the cases when they are used with the consent of rightholders;
- 3) on rates, rules concerning collection, distribution and payment of compensation for the use of works, performances and phonograms in cases when the use of the objects is carried out without the consent of the rightholders but under the condition of payment of compensation.

1 On compensation for employment objects of patent law

When an employee creates the so called employment invention (utility model, industrial design) then the exclusive right to such an object shall belong to the employer, if he desires so.

In these cases the author (employee) has no more exclusive right for the employment object created by him; he retains the right to compensation only. The compensation must be paid independently from payment of a salary; it cannot be included into salary.

Taking into account that the employer and the employee are not of equal standing, one may assume that any free contract between them will be harmful for the employee, that the state must somehow defend the weakest party, e.g. by establishing minimal rates of the compensation.

Alas, from the October 1, 2014, any rules concerning such a compensation were abolished:

If and when any contract concerning rates and other conditions relating to the payment of compensation for employment invention (etc) is concluded, it is considered to be valid and effective, irrespective of the rates for compensation and other rules containing in it.

And only in cases when no contract between employer and employee is concluded, Government's approved rates and rules must be applied. But absence of such a contract presumes that a dispute between employer and employee has arisen. In such a case one usually recommends to the employee to start searching another job.

Special attention in this regard should be paid to works made for hire (WFH) as objects of intellectual property.

Russian legislation in force regulates the following types of WFH:

- 1) work of authorship,
- 2) performance,
- 3) inventions,
- 4) utility model,
- 5) industrial design,
- 6) selection invention
- 7) topography of integral circuits,
- 8) trade secrets.

Author supposes that the full and universal definition of WFH does not exist. As Russian CC puts it, WFH is a work of authorship made by employee within his duties according to employment agreement (art. 1295).

Usually an employee is given a specific task and the employee creates the work in line with it. Therefore employee makes WFH within his employment functions. Nothing that exceeds these employment functions can be considered as WFH.

If the task goes beyond employment duties it must be given in a written form. In this case, if employee accepts it for execution it means that his employment duties were widened in an appropriate manner and employee creates work for hire within his [changed] duties.

WFH belongs to an employer (binding provision) but the author must be rewarded. Reward is usually included in the salary.

Compared to the work of authorship made for hire, the invention made for hire is an object made by employee in close relations to but beyond his labor duties (art. 1370). Creation of invention cannot be included in labor functions.

Even if it happens it wouldn't have a negative effect on worker's rights because copyright transfer is possible only in case when employer is interested in invention and "accepts" it (takes steps to accept invention made for hire according to the law).

Therefore provision regulating copyright transfer in this case is a dispositive one. If employer "accepts" invention, he must reward an employee independently from payment of salary with a fee fixed in a contract between them.

The author considers that utility models, industrial design, selection inventions and trade secrets can be created both within and beyond employee's labor functions.

In case if these objects created within employee's labor duties reward for their use can be included in salary.

In case if these objects created beyond employee's labor duties reward for their use should be paid independently from salary and according to additional contract.

The author of this article is proud to introduce in scientific discussion in Russia the term "pseudo-invention made for hire". Pseudo-invention made for hire is supposed to be an invention created with the use of employer's assets, facilities or equipment but not in relation to employee's labor duties or tasks.

As para. 5 art. 1370 puts it, such inventions are not considered as made for hire.

It means that right to obtain a patent (and exclusive right) does not automatically pass to the employer.

Nevertheless, employer can ask for gratuitous non-exclusive license on such pseudo-invention made for hire or claim for compensation for expenses. Anyway such claims should be fixed in a written contract.

There is also a theoretical question: who holds the rights on a new invention? And do they exist at all?

Russian CC mentions contracts to transfer the right to obtain a patent (art. 1357). It has sense only if the invention is patentable (look art. 1370-1373) and author or user has intention to obtain it, in other words we're talking about potential exclusive right.

Such contract can be concluded even if the author has not yet applied for a patent. It means that potential exclusive right exists before the application and may be even before the creation of invention itself. In case of ordering agreement author-to-be and his contractual counterparty already have rights and duties according to the contract (civil rights as it puts art. 8 CC).

The subject of such a contract may be order for future invention and transfer of exclusive rights on it or transfer of rights on already created invention.

There are many different risks. For example, author may fail to create such invention. This kind of a breach of contract should carry no recovery of damages (it's not author's fault and there should be no liability).

Another risk is a failure to obtain a patent due to loss of novelty or no inventive step etc.

Art. 1357 proclaims that (unless elsewhere defined in agreement) potential user of a patent carries this risk according to contract law principle "Caveat emptor", or "Let the buyer beware".

But parties may agree that author could be held liable in case of his fault in a failure to obtain a patent or that agreement would be cancelled.

2 On compensation for authors whose works are performed publicly

In the field of copyright legislation (as well as in the field of neighboring rights), when a copyright protected work (object) is publicly performed, a special system is in use. The name of the system: Collective administration of Copyright rights and Neighboring rights (art.1242 - 1244 of the CC). The system based on a fundamental and irrefutable fact that the rightholders in this sphere (public performance) cannot exercise their exclusive rights individually.

Therefore exclusive rights practically in this sphere can be exercised by Organizations for the administration of rights on collective basis, especially by such state accredited organizations.

The CC provides that the Russian government has the right to establish minimal rates of compensation to be paid to authors and other rightowners in cases of public performance, as well as rules concerning collection and distribution of the compensation so collected (para.6 of art. 1246 CC).

If in this field of public performance the exclusive rights for the object which is used are ceased to exist, then this new legislative provision is good and suitable to the occasion. But if (as follows from the now existing legislation) authors and other rights holders retain their exclusive rights (in the system of collective administration of rights) then this new legislative norms are not suitable, because rates and rules concerning compensation may well be fixed in the agreement. And no minimal rates and other rules ordered by the Government are needed.

Special attention should be given to the following question: do exclusive rights still exist in case if work of authorship was passed to the system of collective rights management?

Or does it cease to exist and is replaced by the system of fair use plus obligatory basic fee?

This is a widely known question.

For example, an author wrote a song. It was released to public and an artist (performer) uses it. The author is a member of copyright collecting society "Russian Authors' Society". He registered his song in this collective body and he receives copyright royalties from "Russian Authors' Society".

Generally, if the song is popular then other artists start performing it too and royalties are getting higher.

But occasionally the author or the first performer proclaim that song can be publicly performed by only one artist (the first one) and set restrictions that would prohibit other artists from performing the song in question.

Within the system of collective rights management that would be impossible. At least the author must exclude this song from the system of collective rights management (para. 4 art. 1244 CC) and in this way restore his exclusive rights on that song.

It means that within the system of collective rights management exclusive rights do not exist. Therefore all contracts made between copyright collecting societies and organizations-users cannot be considered licensing by their legal nature.

3 The «Fault» principle and the protection of intellectual rights

Para. 3 of art. 1250 of the CC until recently read, inter alia:

«The absence of fault of an infringer shall not free him from the obligation to stop infringement of intellectual rights and also shall not exclude the application to the infringer of measures directed to the protection of such rights».

This provision born many critical remarks, because principle of «fault» is the generally applicable principle of the liability in the civil law: «no fault - no liability». New provisions included into this article of the CC (they entered into force on October 1, 2014) are aiming at amending the previous ill-worded norm. They worded as follows:

«Provided by the present Code measures of liability for infringement of intellectual rights shall be applied if there is the fault of the infringer, unless otherwise is provided by the present Code. The absence of fault shall be proved by the infringer».

Inclusion of these provisions into the text of the Code is a great victory of logic. Strictly speaking it is a repetition of the general principles of the civil law as a whole, they ought be included into part one of the Civil Code «General Provisions».

The new provision introduced into art.1250 of the CC, however, accompanied by exceptions which, seems to me, are wrong:

The next sentence of para.3, art. 1250, provided that when infringement takes place in the course of realization of business activity then compensation for damages and alternative compensation (para.3, art.1252) may be applied regardless of the fault of the infringer.

This provision is absolutely new for the field of intellectual property (and for the field of civil law as a whole).

I personally believe that the new provision (concerning liability irrespective from the fault) is applicable to non-contractual relation only; it cannot be applied to violation of a contract, because these relations belong to the field of obligations, and in this field there is no notion of intellectual (exclusive) rights.

4 Question relating to the so called «alternative compensation»

As is known the Russian legislation provides (para. 3, art. 1252 of the CC):

«In cases provided by the present Code for individual types of results of intellectual activity or means of individualization, in case of infringement of the exclusive right the rightholder shall have the right, instead of compensation for damages, to demand from the infringer payment of [alternative] compensation... In such case the rightholder applying for the protection of a right, shall be freed from proof of the amount of damages caused to him».

The main merit of such alternative compensation (it is very similar to statutory damages which is well known in many foreign countries) is no need to prove the existence and the amount of damages caused by the infringement. Therefore the alternative compensation can be collected much easier and quicker than the compensation for damages.

This kind of compensation was provided for infringement of copyrights and neighboring rights (from 1993), and for infringement of trade marks and names of places of origin of goods (from 2002).

From January 1, 2008, when the Forth part of the CC was put into effect, sphere of application of the alternative compensation was enlarged. At last, on October 1, 2014 this sphere was again enlarged, and now it includes exclusive rights on inventions, utility models and industrial designs.

The alternative compensation in practice is applying very often, especially as far as exclusive rights for works of copyright and for trademarks are concerned. In fact these are three types of such compensation (available to the plaintiff at his option):

1) in the amount from ten thousand rubles to five million rubles determined at the discretion of the court;

2) in double the amount of the values of copies of the material carrier, in which the respective object of intellectual property is expressed (the reference is to copies which were fabricated/used by the infringer);

3) in double the amount of the value of the right to use of the protected object, should the infringer apply for such a right.

5 Patent law

Patent law is regulated by provisions formulated in chapter 72 of the Russian Civil Code. The federal law №35-FZ (2014) amended 48 articles, contained in chapter 72 (it included in total 63 articles) and added to this chapter two new articles.

Main amendments are:

1. Inventions relating to «new use». Until recently the first sentence of article 1350 of the CC was formulated as:

«A technical solution in any area related to a product (including a structure, substance...) or a means a process of conducting actions on a material object... shall be protected as an invention».

Now this provision is supplemented by words: related to a product of a means, «including the use of a product or a means for appointed purpose».

This addition restores the so called inventions «for use», which were known in the previous Soviet legislation and are known in patent legislation of various foreign countries.

Introduction of the category of «inventions for use» is a positive step. Nevertheless this introduction gives ground for renewal of an old dispute: whether destination of an invention is one of its legal characteristic or not.

2. Industrial design: how to determine scope of the exclusive right.

From the beginning of 90-th, last century, the scope of exclusive right of patents for industrial designs was determined by:

1) essential characteristics of the industrial design that found expression in the illustration of the manufacture, and

2) in literal list of essential characteristics of the industrial design.

Nowadays the list of essential characteristics of industrial design is excluded from the application for an industrial design and also lost its significance.

The scope of exclusive right of a patented industrial design is determined now by external appearance of the industrial design only, as it is done in Europe and many other foreign countries.

3. Utility models: term of protection shorter, substantive examination of application introduced.

Both novels, seems to me, are very negative.

The general term of protection for patents for utility models became shorter: now it ends after ten years (from the date of filling of the application). Previously the term was 13 years. Besides, substantive examination of application concerning utility model patents was enacted.

In connection with these two novels, patents for utility models will be issued two or three years after the date of filing of the applications and for the remaining shorter term. Therefore patents for utility models in many cases will be meaningless.

4. Depended objects of patent law (art. 1358-1 of the CC)

Cases of overlapping of various patents are described in the patent legislation: para 2, art 1362, para 4, art 1358 of the CC.

But, regretfully, the general rule concerning such situation in the present CC is absent: it remains unclear whether holder of a patent has the right to use the patented object as prescribed by the law, when simultaneously this act to use in is in fact act of use of another patent belonging to another person (that is the notion of «patent overlapping»).

Whether the procedure of invalidity of any patent in such a situation of «double patenting» can be initiated, is another question.

The modern Russian patent legislation gives the following answer to the question:

«The holder [of the dependent patent] has no right to use his patented invention (utility model, industrial design) without concert of another patent owner, who has another patent with earlier priority date», – art. 1358-1 of the CC.

5. Abolishment of obligatory minimal rates of compensation to be paid by the employer to the employee for employment inventions, employment utility models, employment industrial designs (art. 1246).

6. Introduction of alternative compensation for infringement of exclusive patent rights (art. 1406-1 of the CC).

There are two kinds of the compensation:

1) in the amount from ten thousand rubles to five million rubles determined at the discretion of the court.

2) in double the amount of the value of the right to use of the patented object, which, in comparable circumstances, is usually paid for the lawful use of the patented object.

6 Right to a secret of production (know-how)

Protection of trade secrets (know-how) is provided in Chapter 75 of the Civil Code, as well as in the Federal law 2004 № 98-FZ «On commercial security».

The protection of trade secrets (know-how) lies somewhere between civil law and labor law. Besides it is regulated by unfair competition law. In a word-legal regulation of this object is really a hard-nut. But the Russian existing legislation lays down the existence of the exclusive right for this object, which obviously is a mistake.

We should look more closely at this erroneous approach of the Russian law on trade secrets as special objects of intellectual property rights.

Trade secret is an information held in secret, it's unknown; therefore it cannot be regulated by civil legislation. Trade secret should be protected by civil laws only in case of its infringement.

Of course, in case of contractual relationship trade secret is an object of a contract but it is not a secret for both parties.

Know-how is protected by civil laws from unfair business practices.

At the same time, exclusive rights on trade secret would be impossible to exercise without disclosing a secret.

Taking into account that trade secrets play a rather important role in practice, one must mention a big improvement introduced by the federal law № 35-FZ.

This improvement is:

As from October 1, 2014 trade secrets receive civil law protection irrespective of any formalities concerning documents (material objects), containing trade secrets.

The formalities were established in art. 10 of the federal law «On commercial security». The notion of secret of production (know-how), contained in art. 1465 of the CC, until recently, prescribed, that the holder of know-how must introduce in respect of such information «the regime of commercial security».

In means that every document (physical carrier) must have clear indication «Commercial secret of [name of owner]», etc.

Nowadays the notion of commercial secret is changed: the holder of such information must take reasonable measures concerning preservation of confidentiality of the information. This exclude necessity to comply with the formalities prescribed by art. 10 of the abovementioned law.

Conclusions

In this article the author tried to tell the foreign readers about novels made in Russian intellectual property law in 2014.

As is known modern Russian revolution in the field of intellectual property legislation occurred January 1, 2008 when Russian intellectual property legislation was codified, included in the text of part fourth of the Civil Code (CC) of the Russian Federation.

Part fourth of the Russian CC (Federal law №230-FZ, 2006) entered into force on

January 1, 2008. At the same day, seven sectoral intellectual property laws were repealed.

Second Revolution in this field took place during 2014: Federal law №35-FZ, 2014, substantially amending the Fourth part on the CC, entered into force on October the 1st of 2014.

Codification of the sectoral legislation en bloc in CC is a unique phenomenon. The author believes that such a construction of intellectual property law was made correctly and on time. Factually the Federal Law №35-FZ (2014) is the eleventh law amending the text of the part fourth of the CC. But all previous amendments were small and not substantial. As far as amendments introduced by the law №35-FZ (2014) are concerned, they are numerous and very, very substantial.

Before entering into force of the law №35-FZ (2014) (thereafter - law 35-FZ), the Part fourth of the CC contained 328 articles. The law 35-FZ amends 169 articles of it and adds seven new articles. I am convinced that the law is a rather big step towards building a modern system of intellectual property legislation in Russia.

More than 150 amendments were introduced by the law №35-FZ. About 80% of them the author estimates as positive and about 20% as negative and erroneous.

These amendments do not contradict the international intellectual property agreements to which the Russian Federation is a party. Generally their purpose is to

enhance and clarify the Russian intellectual property legislation and to narrow the gap between Russian and European intellectual property laws.

The author of this paper deals with intellectual property laws more than 50 years on.

This paper is a short English version of various articles on this topic published in Russian, in journals: «The business and the law» (Chozjaistvo i pravo) and «The patents and licenses» (Patenti i licenzii).

Notes

The Civil Code of Russian Federation consists of four separate Federal Laws. They are entitled: The Civil Law of the Russian Federation, part one (1994), part two (1996), part three (2001) and part four (2006).

The Fourth Part of the Civil Code was signed into law by the President of the Russian Federation on December 2006 (Federal law №230-FZ).

The Part Fourth of the CC was put into effect from January 1, 2008.

The Federal Statute of March 12, 2014, №35-FZ amended the Fourth Part of the Civil Code substantially.

It entered into force from October, 1, 2014.

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The Federal Statute of March 12, 2014, №35-FZ “О внесении изменений в части первую, вторую и четвертую Гражданского кодекса Российской Федерации и в отдельные акты Российской Федерации” (О внесении изменений в отдельные законодательные акты Российской Федерации) (О внесении изменений в часть первую, вторую и четвертую Гражданского кодекса Российской Федерации и в отдельные акты Российской Федерации)
On introduction of amendments into parts first, second and fourth of the Civil Code of the Russian Federation and into separate legislative acts of the Russian Federation – Собрание законодательства Российской Федерации, 2014, №11, ст.1100 – Собрание законодательства Российской Федерации [Collection of Legislation of the Russian Federation], 2014, №11, item 1100).

My short English material presented here is based on voluminous publications (alas, in Russian).

They appeared:
1) in a well known Russian scientific journal “Хозяйство и право” (Chozjajstvo i pravo – Business and law), 2014:

- №7 (on trade secrets),
- №8 (on general provision concerning intellectual property law),
- №9 (on copyright law),
- №10 (on patent law),
- №11 (on consequences of non use of trade mark);

■ 2015, №2 (on selection achievements, in co-authorship with professor V.Sinel'nikova);

2) in a scientific journal “Патенты и Лицензии. Интеллектуальные права” (Patenty i lizenzii. Intellectual’nie prava. – The patents and licenses. Intellectual rights), 2014:

- №4 (on designation of origins of goods, in co-authorship with K.Gavrilov),
- №5 (on industrial designs),
- №7 (on rights to thing in the thing in the part fourth of the CC),
- №10 (on employment inventions).

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Continuation Of The Tradition Of European Sustainable Development Symposia At The Pan-European University In Bratislava

Martin Dolinsky

Abstract

Purpose of the article is to describe purpose of symposia oriented at sustainable development, existing achievements of the Pan-European University in organization of such events and future plans. Methodology used in this manuscript is simple observation. Manuscript discovers potential of the Pan-European University to come up with further similar events in the year 2016 and summarizes fulfillment of goals we have given to ourselves for the period 2014 - 2015. Concluding remarks are that described activities fully conform into the vision of the Pan-European University to become a well-known institution within the Global Research Area, traditionally elaborating research and scientific collaboration across national borders. Sustainable Development Symposium follow-up events organized in Slovakia are becoming a platform for cooperation between various organizations active in the field of sustainable development: EKOrast, Slovak Business Agency and Slovak Committee for Scientific Management.

Keywords: | *Sustainable Development Symposium, Pan-European University,
follow-up events*

JEL Classification: A20

Introduction

An idea of annually organized Sustainable Development Symposia was born in 2011 in Ireland. Young people pursuing their academic careers in an interdisciplinary field of sustainable development decided to come out with an annual platform where they could meet and work for the future of our descendants, for the future of mankind. The Trinity College in Dublin was first institution that “gave voice” to these young people. The event was then taken to Austria, where young researchers grouped around professor Michael Narodoslawsky prepared second series of this annual event. The event lasts for three days and contains thematic sessions. Every presentation day is enriched by invited foreign keynote speakers. Sustainable Development Symposium is organized by young scientists and is backed-up by their professors. The third symposium came to Italy thanks to enthusiasm of students from the Parthenope University of Naples. Based on competitive selection process, the preference to organize 2014 series was given to the Pan-European University in Bratislava. Rights to organize 2015 edition were given to the team around professor Elisabete Freire from the Faculty of Architecture of the University of Lisbon in Portugal. The 2015 edition was held from 15th to 17th June 2015 with 70 participants on board coming from all over the Europe. The Pan-European University in Bratislava was represented by academics appointed as scientific board members (assoc. prof. Martin Šperka – Faculty of Informatics and assoc. prof. Pavol Molnár – Faculty of Economics and Business) and one of the keynote speakers was from the Pan-European University in Bratislava. Invited keynote speakers are summarized in the table 1.

Table 1 Summary of Invited Keynote Speakers

Keynote Speaker	Home Institution	Country
Eveline Durieux	LEADER European network	Belgium
Alan Belward	Institute for Environment and Sustainability, Joint Research Centre	Italy
Martin Dolinsky	Pan-European University in Bratislava, Journal on Creative and Knowledge Society	Slovakia

Source: Own elaboration

1 Emerging tradition of post-symposia in Bratislava

Besides active participation of Slovak Sustainable Development Symposia organizers in following editions abroad, there is successfully emerged tradition of post-symposia happening in Bratislava in the years 2014 and 2015. Until now, we can praise ourselves with three international events organized in Bratislava (see the table 2).

Table 2 Summary of post-symposia events

Date	Official thematic aim	Speakers
12 November 2014	Is There a Way Out From the Global Financial and Societal Crisis?	Karl-Heinz Slabschi (Economy for the Common Good, Vienna, Austria), Karl-Heinz Kettl (Styrian Energy Agency, Graz, Austria), Pavol Molnár (Faculty of Economics and Business, Pan-European University)
19 January 2015	Could a Citizen Be the Trigger of a Societal Change?	Karl-Heinz Slabschi (Economy for the Common Good, Vienna, Austria), Gisela Heindl (University of Salzburg, Austria), Pavol Molnár (Faculty of Economics and Business, Pan-European University)
3 December 2015	Green Business as a Competitive Advantage and Investment into the Future.	Janka Ružická (EKOrast, Bratislava, Slovakia), Stephan Maier (Graz University of Technology, Graz, Austria), Pavol Molnár (Slovak Committee for Scientific Management, Bratislava, Slovakia)

Source: Own elaboration

An approach we decided for is to devote every post-symposium to a current societal problem, to ask foreign speakers about possible solutions and to confront their idea with ideas of domestic speakers. When we were starting to organize these events, the target audience was composed of students of the Pan-European University. But soon after, our initiative attracted attention of various stakeholders in Slovakia and the fourth symposium in Bratislava was already co-organized by the Slovak Business Agency (an institution established and supervised by The Ministry of Economy of the Slovak Republic), EKOrast (Slovak NGO organizing the Green Day in Bratislava on a yearly basis) and Slovak Committee for Scientific Management. The target audience was now, besides students of the Pan-European University, represented also by entrepreneurs and wider public. The Scientific Journal on Creative and Knowledge Society acts as a media partner ensuring that scientific community will be informed about this symposium tradition. Stephan Maier from the Graz University of Technology was presenting links between industrial revolution (Industry 4.0) and web-based software solutions used in sustainable development initiatives, invented by the Institute for the Process and Particle Engineering. Such web-based tools do represent a revolution in the way how companies are using software. Today's web based tools are labelled as social software making cooperation between companies much easier.



Source: Own database

Figure 1 *Green Business as a Com-petitive Advantage and Investment into the Future - December 2015*

Pavol Molnar then presented innovation processes in the circular economy. The main point of the presentation was additional complications awaiting those entrepreneurs who are active in the field of circular economy. Janka Ružická from the non-governmental organization EKOrast then talked about approaches used in marketing of green products tested with the sustainability measurement metrics. Representatives of the Slovak Business Agency were presenting funding possibilities for Slovak entrepreneurs. The concluding presentation was about new business idea of a green delivery company, using bicycles as a green form of transportation. The set of presentations demonstrated the adaptation of the complete value chain to conditions of the circular economy.



Source: Own database

Figure 2 *Green Business as a Com-petitive Advantage and Investment into the Future - December 2015*

The Symposium had two language mutations – Slovak and English, the afternoon session was devoted to foreign Erasmus students of the Pan-European University. Those students were originally from Brasil, France, Vietnam, Portugal, Kyrgyzstan, Italy, Spain and Turkey.

Conclusion

Future ambitions regarding participation of the scientific Journal on Creative and Knowledge Society in organization and presentation of Slovak tradition of the Sustainable Development Symposia in front of scientific community involve engagement of editorial board members. Similarly like during editions 2014 and 2015, we plan, on a yearly basis, to invite selected foreign editorial board members to present their work in Slovakia. This is the way, how our interdisciplinary scientific journal builds up an active international scientific community mutually exchanging know-how and last but not least, offering workable solutions to professionals across various industries. Another ambition of the International scientific Journal on Creative and Knowledge Society is to appear in at least two international events held outside of Slovakia in order to prepare special thematic editions related to these events. Editorial board members will appear in the scientific committee of the 6th edition of the Sustainable Development Symposium organized in June 2016 in Granada, Spain.

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