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THE RELEVANCE OF TEACHING ECONOMICS: THE EXPERIENCE OF POST-COMMUNIST BULGARIA

Zoya MLADENOVA

Abstract

The paper deals with the relevance of teaching economics in post-communist Bulgaria. The period of development of Bulgaria since 1990 is divided by the author into two sub periods. The author argues that during the first one – the transition from plan to market, the teaching of economics in Bulgaria lacked relevance, because the transition economy is different from the market economy. During the second period – the post transition, the problem about the relevance of university economics courses appears again, as a result of some shortcomings of modern economics. The criticism of economics and of teaching economics in the light of the last global crisis is revealed. A conclusion is made, that at present a process of reform of the economics curriculum has started worldwide and Bulgarian teachers need to be an active part of it.

Keywords: teaching of economics, relevance, criticism, reform.

The relevance of economics in the process of education should be one of its main characteristics and is reasonably considered very important. The essence of the idea refers to the understanding that the courses in economics, which the economists teach at universities, should give the students clear and reliable knowledge about the world, in which they live. The focus of this paper is on the issue of the relevance of economics courses at the university level of education from the point of view of a transition/post transition country, more particularly from the point of view of the experience in Bulgaria.

1. Teaching economics and the transition from plan to market

The transition to market economy started in Bulgaria at the beginning of the 1990s and it brought about a fundamental transformation not only in the economy and society, but also in the field of higher economic education. Part of the reform in high-

1 The article is based on a paper, presented by the author at the international conference “Teaching Economics in the 21st Century”, Berlin School of Economics and Law, November 26-28 2015, Berlin, Germany.

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er economic education and its orientation towards the requirements of the market economy was the introduction of the standard courses in economics (the theory of market economy) – Microeconomics and Macroeconomics. We, the teachers in economic theory in Bulgaria, began this reform from the year 1990, but within few years we started to realize that the standard courses in economics do not give an idea to our students about the world, in which they live, because the transition economy is different from the market economy. The solution to the problem was to introduce a parallel course in Economics of Transition.

Both tasks – developing and introducing courses in economics and a course in Economics of Transition, turned out to be not so easy. First, if we talk about the new courses in economics (new to the education system existing in Bulgaria), although worldwide there exist plenty of textbooks in economics (Microeconomics, Macroeconomics), to introduce the new lecture courses was pretty difficult because of some circumstances, which must not be disregarded. The transition to market economy in Bulgaria started very unexpectedly, which is popularly admitted by the researcher of the process (Nenovský, 2011, p. 2), and the teachers in economic theory were completely unprepared for what followed. They lacked corresponding education – no one had university education in economics. The new courses in economics were based on a different methodology and way of thinking, compared to the Marxist Political economy, which was taught previously. Finally, only very few of the university lecturers knew English and had access to the available textbooks in economics. As a result, the introduction of the new economics courses (a process, which in Bulgaria became known as “the change of the paradigm in higher economic education”) took quite a lot of time and more or less occupied the whole first decade after the beginning of the transition.

The efforts of the majority of university teachers in Bulgaria to introduce the standard courses in economics until the end of the XX Century influenced considerably the introduction of a parallel course in the Economics of Transition. The problem was not discussed; most of the teachers did not even realize the necessity to teach Economics of Transition. Or did not have the capacity to do so, engaged with self-education in economics and with the teaching of economics. It must be admitted, however, that the preparation of a university course in Economics of Transition during the 1990s was an extremely challenging and difficult task. On the one hand, the theory of the transition from plan to market was under way of developing, because the transition is a unique process, which has no precedent in history. So, while the analysis of the process was still under way, it was necessary to teach the issue to the students. There were no textbooks available, at least during the first years of the trans-
The relevance of teaching economics: the experience of post-communist Bulgaria

It turned out also, that the course in Economics of Transition should be organized in a different way, compared to the courses in economics. The reason is, that while the theory of market economy (economics) is focused over the central idea about the market, the transition is a process, not a state of affairs, and as such the key transformation is the reform of property rights (the transformation of public property into private, or privatization), which should be the focus of a course in Economics of Transition. This in turn puts forward the problem about the methodology, on which a university course in Economics of Transition should be based. All these circumstances together are responsible for the result that from more than 30 institutions of higher economic education in Bulgaria only in 4 of them courses in Economics of Transition have been introduced. These are Varna University of Economics, The University of National and World Economy in Sofia, The Business Faculty of the University of Sofia “St. Kliment Ohridsky” and the American University in Bulgaria in Blagoevgrad. In each of the Departments of Economics of the above mentioned universities only one teacher was engaged with the teaching of Economics of Transition.

It can be concluded, that during the transition the students at universities in Bulgaria universally received theoretical knowledge, which at best gave them knowledge about their future (the market economy) but not about their present. The teaching of Economics of Transition was greatly underestimated, knowledge about the transformation from plan to market was rarely transferred to the students, which can be considered quite misfortunate, since the Transition is our near past, which continues to influence many processes which we witness today.

In 2007 Bulgaria became a full member of the European Union. This historical event was accepted in many circles in the country – political, business etc. and in the social sciences as well as the end of the Transition. The lecture courses in Economics of Transition were abandoned. What students listen to at universities in Bulgaria nowadays are only the standard courses in economics. The idea that the Transition is over with the full membership in the EU is however questioned by some economists, not only in Bulgaria, but also in other ex-communist countries. It is questioned also by some highly respected international institutions, for example the EBRD. The Bank continues to publish every year Transition Report; the Transition Report 2013 was obviously with a reason entitled “Stuck in Transition?” (EBRD, Transition Report 2013). The European Commission continues to exercise monitoring over some key areas and their development in Bulgaria the same way as it was before 2007, which is by far not accidental. The present Bulgarian economy continues to be specific (from
the point of view of the characteristics of market economy) which again puts forward the problem about the relevance of what we teach.

Of course, it is out of question that the national economy is acquiring more and more the features of a market economy. Even if we don’t go into the discussion problem about whether the Transition is over or not, it is no doubt that during the years after 1990 a considerable progress has been achieved in the transformation from plan to market. Gradually the Bulgarian economy is becoming a true market economy, which today shifts the focus of interest in Bulgaria towards the theory of market economy or economics and its relevance to contemporary reality.

The teaching of economics, however, came recently under a very serious attack and a pressure for reform.

2. Current criticism towards the teaching of economics

The last global financial and economic crisis 2008-2009 had a very serious impact on economics and on the teaching of economics. Economics was subjected to a severe criticism on the ground that it failed to predict the crisis. Not only that the crisis turned out to be a devastating one, but it came as a surprise to society and to the community of the economists. In a meeting with the staff of the London School of Economics (LSE) on November 5 2008, the Queen of England expressed the discontent of society towards economic science by asking the question: “Why no one saw it coming?” This question was repeated by journalists, politicians, practitioners and spurred a wave of criticism towards modern economics.

The economists also turned to this question and tried to find a satisfactory explanation why economics failed to warn society about the upcoming economic disaster.

One of the first to answer the question of the Queen of England was Nobel laureate P. Krugman (Krugman, 2009). In an article, published in The New York Times, he wrote: “Few economists saw our current crisis coming, but this predictive failure was the least of the field’s problems. More important was the profession’s blindness to the very possibility of catastrophic failures in a market economy.” According to Krugman, the main reason for the failure of economics to predict the crisis is the state of modern economics, characterized by the excessive use of mathematics, dominance of formal models, as a result of which economics has lost its connection with reality. Krugman puts it in the following way: “....the economics profession went astray because economists, as a group, mistook beauty, clad in impressive-looking mathematics, for truth. …economists fell back in love with the old, idealized vision of an economy in which rational individuals interact in perfect markets, this time gussied up with fancy equations.”
The same point of view was shared by other influential economists. In his fame-
it bluntly, the discipline of economics has yet to get over its child-like passion for
mathematics and for purely theoretical and highly ideological speculation, at the
expense of historical research and collaboration with the other social sciences.”.

According to D. Colander and a group of economists from France, Germany and
Denmark, economics overlooked the crisis because it disregarded key economic
factors, which might lead to a credit crunch and a severe recession. The reason is that
the dominant theoretical models are too abstract and simplified, they “fail to account
for the actual evolution of the real-world economy” (Colander at al, 2009, p. 2).

A group of ten leading British economists in a letter to the Queen of England, in
which they try to provide an answer to the question of the Queen, argue that modern
economics has become largely transformed into a branch of applied mathematics,
with little contact with the real world. According to the authors, the preference for
mathematical technique over real-world substance has diverted many economists
from the analysis of the real-world market economy. They, however, identify a deeper
reason for the failure of economics: this is the education in economics. The ten econ-
omists uphold that the narrow training of economists – which concentrates on math-
ematical techniques and the building of empirically uncontrolled formal models – has
been the major reason for the failure of the economics profession to give adequate
warning about the economic crisis. The signatories⁴ point out: “Models and tech-
niques are important. But given the complexity of global economy, what is needed is
a broader range of models and techniques governed by a far greater respect for sub-
stance, and much more attention to historical, institutional, psychological and other
highly relevant factors.”⁵ The ten professors call for a broader training of economists,
involving allied disciplines such as psychology and economic history, as well as
mathematics.

Thus the criticism of economics, caused by its failure to predict the global crisis,
was partly directed towards the teaching of economics.

The vision, that university education in economics needs to be reconsidered in
the light of the last economic crisis, is supported by many economists (Shiller 2010;
Passaris 2011; Reardon 2012). Immediately after the crisis the issue started to be
discussed on the pages of The New York Times, Financial Time and Guardian, con-
ferences have been organized by leading universities (LSE, conference “What Kind
of Economics Should We Teach”, Jan. 20 2010) and by scientific organizations
(World Economics Association, conference “The Economics Curriculum: Towards a
Radical Reformation”, March 2013) etc. So far as to the directions, in which university education in economics must be reformed, this problem is highly debated.

One of the aspects of the reform, upon which however there is a broad consensus, is that the teaching of economics must be brought closer to reality. The criticism towards economics as a scientific discipline (turned into a branch of applied mathematics) has its reflections in the discussion about the teaching of economics. Many university professors share the opinion that modern economics does not give the students a satisfactory knowledge about how the market economy really works. This means that the teaching of economics is recognized to be, at least partly, irrelevant to contemporary economic realities and needs to be improved.

Many suggestions have been launched how to bring the world back into the classroom. One of the ideas is to pay greater attention to economic history in the teaching of economics. P. Ormerod (2013, p. 3) is right, pointing out that “One of the problems with macro, indeed with almost all mainstream theory, is that it is essentially timeless. I use the word “timeless” here to mean that the theory is taught without reference to historical events. In this sense, it operates out of time. It is this which needs to be changed.” The idea is not to transform economic theory into economic history, but to use key events in economic history to illustrate theory. This approach has the advantage of emphasizing to students that theory needs to be able to explain empirical reality, it is not an abstract intellectual exercise.

The process of improving the economics curriculum requires acknowledging the academic value of inter-disciplinarity. The real-world economy is embedded in society. As a result, the economic system is closely connected with the political system, the legal system and with all social interactions. Teaching of economics, adequate to realities, requires these social connections and interactions to be considered in the subject of economics. “The contemporary requirement for inter-disciplinarity is a response to societal pressures in defining the new parameters for academic mutation and intellectual discourse. Inter-disciplinarity provides contemporary relevance and a pragmatic approach. There is no denying that civil society has become more complex and multifaceted and it is not possible to understand it from within the boundaries of one discipline.” (Passaris, 2013, p. 7).

The real-world market economy is evolving. It changes all the time, new phenomena constantly appear. The theoretical models however do not change, at least the fundamental ones. The teaching of economics, at least on undergraduate level, is static. In this way the evolution of market economy is left outside the teaching of economics. As a result of this approach some very important new economic processes and phenomena can be disregarded and the students may remain ignorant about them.
For example, the economy and economic policy have changed profoundly during and after the crisis of 2008-2009, but very little of these changes are reflected in the economics textbooks (Madsen, 2013).

Reconsideration is also needed in respect to the tools of analysis, applied in the pedagogy of economics. Some economists underline that mathematical techniques gain meaning from solving actual empirical problems, not as an end-aim by itself, and should be taught in that context. In order to increase the relevance of teaching economics students need to be taught inductive and empirical methods as well. This does not mean more of the statistical analysis of large data sets taught at university econometrics courses, but rather thinking about what evidence is needed to answer a specific question, and working out how to assemble it and collect data.

In April 2012 a conference was organized in the UK, sponsored by the Bank of England, with the objective to discuss the teaching of economics since the last financial and economic crisis. The conference reached some shared conclusions about the way young economists should be trained (Coyle, 2013). There was broad agreement that students need:

- Greater awareness of economic history and current real-world context;
- Better practical data-handling skills;
- Greater ability to communicate economics to non-specialists;
- More understanding of the limitations of modeling;
- A combination of deductive and inductive reasoning (Coyle, p. 20).

On the basis of the above analysis a conclusion can be made, that in the developed and developing countries with long traditions in the teaching of economics, at present a process of reconsideration of the university education is taking place. There is a wide recognition that in the teaching of economics a better balance is needed. In particular, the emphasis is on the mutual dependence of theoretical categories and empirical evidence. The relevance of the economics courses needs to be increased, especially in respect to the realities of the economy of the XXI century.

3. Teaching economics in the XXI century: the sustainable development issue

The relevance of economics should not be understood narrowly as only how it corresponds to the processes and phenomena of contemporary economic reality, but also how it reflects the problems which society is facing today.

From such point of view, the aim of this part of the article is to provide an illustration which justifies the criticism towards the teaching of economics, exposed
above. A small research is made for the purpose, using the example of the sustainable development issue.

The idea about sustainable development was launched first in 1987, in the famous report of the Commission Brundtland, but it received a serious support later, by the Global forum on sustainable development in Rio de Janeiro (Brazil) in 1992. Since then enormous efforts have been put forward by the United Nations to change the trajectory of development and to lead society on the path of sustainable development. Today the concept of sustainable development is an official and universally recognized concept for the present and future of modern civilization. At the same time the progress in changing the model (paradigm) of development and achieving sustainable development is pretty modest and until now quite disappointing. According to the prevailing estimates, the social and ecological parameters of development continue to deteriorate. Contemporary development continues to be unsustainable (Worldwatch Institute, State of the World 2014), which calls for urgent and decisive measures in order to change the model of development and provide a future for the next generations. Because of this it is reasonable to ask the question how economics, as part of social sciences, is reacting to this situation and the urgent necessities of social development. Is the issue of sustainable development part of the economics curriculum? Do the university courses in economics give the students knowledge about this vital problem of contemporary development?

If we turn our attention to the teaching of economics, the first place where we would expect to come across the idea about sustainable development is in the textbooks in Macroeconomics, more particularly in the definition of the goals of macroeconomic policy. It is well known that the concept about sustainable development is a new paradigm of development, which will not come into being as a result of the automatic play of the objective forces (mechanisms) in the economy and society. Sustainable development is something entirely different – it is a result and realization of a particular vision of mankind as to the world in which we all wish to live. The concept of sustainable development thus needs conscious and purposeful efforts. It will come true as a result of policies – policies and the activity of the institutions. From such point of view, if we expect to find the issue of sustainable development in modern economics courses, the first place to look at is the definition of the goals of macroeconomic policy.

In order to find out how the goals of macroeconomic policy are defined today, I did a research within the following most popular and widely used textbooks in Macroeconomics (Economics):
The Relevance Of Teaching Economics: The Experience Of Post-Communist Bulgaria

5. Samuelson, P. and W. Nordhaus, Macroeconomics, 18th ed., 2009

The result of the search is the following: sustainable development is not present among the goals of macroeconomic policy. The goals of macroeconomic policy continue to be defined in the textbooks in a traditional way: focused on economic growth, high employment (low unemployment respectively), price stability and balances in international relations.

An objection can be raised here that we cannot make judgments in respect to the relevance of economics to the fundamental problem of contemporary development – that of sustainable development, only on the basis of the textbooks, because the textbooks normally lag behind scientific development. A well known fact is that the new ideas normally develop first as new scientific ideas, and only afterwards and with a delay they are transferred from the field of science to the field of education. As such, the next question to ask is: does economics (the neoclassical theory) deal with sustainable development in scientific research?

In order to provide an answer to this question, I did a second research. I looked into the published papers (the contents) of five of the leading journals in economics for the last ten years: from 2006 till 2015. The list of these journals is presented below.

1. Quarterly Journal of Economics
2. Journal of Political Economy
3. Econometrica
4. American Economic Review

The investigation allows the following conclusion to be made: the scientific problem “sustainable development” is missing from the list of articles published in the above mentioned journals during the period under consideration. However, there are available publications which refer to some aspects of sustainable development, such as climate change, pollution, ecological policy, but it should be pointed out immediately that these publications are very little in number or they are a rare phe-
nomenon on the pages of the enumerated journals. A conclusion can therefore be made: the sustainable development does not rank among the priority research problems within the neoclassical paradigm, it is far from that. On the contrary – if it exists as a scientific problem in this theoretical stream, it is left somewhere at the periphery of research interest, or if I allow myself to be more direct, the issue is not perceived by the neoclassical economists.

The way the situation was described above does not allow us to make an inference that the issue of sustainable development is missing from the teaching of economics, because the process of education is normally delayed compared to scientific research. The opposite is true – sustainable development is missing from the science “economics” and as a result of this it is missing from the teaching of economics. Modern economics (as a scientific subject and as a university subject) is completely disregarding the most important and crucial problem of contemporary development – that of sustainable development. And as the situation is, we cannot expect that the issue will appear in the textbooks, at least not in the near future.

The question why sustainable development is missing from the research agenda of economics is a very serious and at the same time a very important one, which refers to fundamental theoretical and methodological problems. A brief answer to this question can be restricted, according to the author, to the following two explanations:

First, as it was pointed out above, the concept about sustainable development was launched first in 1987. Almost 30 years have passed since that moment, but there continue to be some ambiguities around the concept, which itself continues to develop. A very important step in this direction was the decisions of the Global Forum of the UN for sustainable development in Rio de Janeiro in 2012. It was then decided to unite the Millennium development goals for the period 2015-2030 with the Goals of sustainable development (UN Conference on Sustainable development, 2012), an objective which is already fulfilled. Even though the concept about sustainable development continues to develop, it is obvious that the analysis of this concept requires the united efforts of all social sciences, or that it requires an interdisciplinary approach. For now, however, there are no signs that economics has started or will start to develop in this direction.

Second, the neoclassical theory has always developed as a positive science, whose purpose is to study the objective trends and mechanisms in economic life. Within its boundaries economics does not have a theory of development, which allows an active role for people – so very much active as to allow a change in the trajectory of development (which sustainable development presumes).
The consequences of the fact that sustainable development is missing from the teaching of Economics should be taken seriously. As was pointed above, sustainable development requires a change in the individual and public consciousness, requires a new way of thinking and a new valuation system, for the establishment of which the education system is very important. Realizing this, in 2005 the United Nations initiated a Decade of education for sustainable development 2005-2014 (UN, UN Decade of Education for Sustainable Development, 2005). Education was identified as “the engine of change”. During the World Forum on sustainable development in Rio de Janeiro in 2012, a new initiative of the UN started, named “Sustainability in higher education”, which calls for actions on behalf of universities in order to assist and foster the transition to sustainable development. Economics courses are taught in thousands of universities all over the world, which means that economics influences the mind and way of thinking of many people. The fact that economics completely disregards the problem “sustainable development” means that for now the discipline stays aside the most urgent and compelling problems of contemporary development. Economics cannot be qualified as a discipline or a branch of science, which contributes for the change, which today is needed so much in order to carry out the transition to a sustainable model of development. The social function and role of modern economics is as a result seriously undermined.

**Conclusion**

The analysis above reveals that the teaching of economics in Bulgaria during the transition from plan to market lacked relevance, because the realities of the transition economy are different from the realities of market economy. In the post transition period the problem about the relevance of the university courses in economics appears again, because modern economics does not correspond very well to the processes and problems of the XXI century. University professors from all over the world are engaged at present with the reform of the economics curriculum. The teachers in economics in Bulgaria must be well informed about this process and be included actively in the improvement of the academic courses.

**End Notes**

1. It was not until the end of the first decade after the beginning of the transition, when the first results of the change of the economic system from plan to market were reported, that there came the understanding that the main shortcomings of the transition so far come from the underestimation of the role of institutions and institutional transformation. (See for example UN, ECE, *Economic*
Survey of Europe, 2003, № 1; WB, Transition. The First Ten Years. Analysis and Lessons for Eastern Europe and the Former Soviet Union, 2002). This put forward the problem about the applicability (limitations) of the neoclassical methodology to the analysis of the Transition (economic reforms in the majority of transition economies were based on this theory and methodology), about the role of institutional analysis etc.

2 At the Varna University of Economics it was the author of this paper. I first presented the course Economics of Transition to American students – in 1995/1996 I taught this course at the University of Texas in Austin, USA, where I was a visiting professor under the Fulbright program for academic exchange. When I returned to Bulgaria, I offered the course to the Bulgarian students as well.

3 G. Kolodko in Poland (Kolodko, 2010), L. Csaba in Hungary (Csaba, 2009), Z. Mladenova in Bulgaria (Mladenova, 2012) and others.

4 Among them are G. Hodgson, S. Dow, P. Earl, J. Foster, G. Harcourt etc.

5 http://www.journaldumanss.net/?Her-Magesty-the-Queen

6 A problem which is traditionally present in many Macroeconomics textbooks. In some textbooks the goals are defined as “priorities” of macroeconomic policy.

7 The title of the outcome document of the last Global forum on sustainable development in Rio de Janeiro in 2012 is indicative in this respect: it is “The Future We Want”.

8 A more detailed information in respect to articles, which deal with some specific aspect of sustainable development (climate change, pollution, ecological policy) reveals the following picture: for the last ten years there is not a single article with such title in Quarterly Journal of Economics and Review of Economic Studies. There is only one article of such character in Econometrica and two articles in Journal of Political Economy. In The American Economic Review after 2010 one can find few papers on the subject.

9 The 70th Session of the General Assembly of the United Nations which took place at the end of September 2015, approved the new development agenda for the period 2015-2030. It is available in the document “Transforming Our World: the 2030 Agenda for Sustainable Development”, in which 17 integrated objectives of sustainable development have been defined.

10 I join that group of scientists, who are persuaded that the concept of sustainable development requires in the first place seriously reconsidering the relationship between mankind and nature. It requires rethinking of the role of human civilization in the surrounding world. Sustainable development presumes new concept about development and new criteria for the valuation of progress. To integrate
successfully the economic, social and ecological goals of development requires also a new way of thinking and fundamental transformation of individual and public consciousness. In order to face all these problems, interdisciplinary approach is necessary.

References

7. Letter to the Queen – http://www.journaldumanss.net/?Her-Majesty-the-Queen
SUSTAINABLE ECONOMIC DEVELOPMENT THROUGH SUSTAINABLE ECONOMIC POLICY: IS BULGARIA READY FOR A REINDUSTRIALIZATION POLICY?

Stefan PETRANOV¹, Ivelina HRISTOVA²

Abstract

The need for a new industrial policy is felt both at European and Bulgarian level. Recent theory recommends that such policy should follow “soft” and horizontal measures that enhance collaboration between government, industry and cluster-level private organizations and focus on creating a competitive environment. This understanding is contrary to old-fashioned industrial policy involving subsidies to specific sectors, bail-out of uncompetitive firms and sectors, tariff and non-tariff barriers aiming at import substitution. This article analyzes the degree at which Bulgaria is prepared to implement the new industrial policy and in particular, how the country might fit into a common European policy. The analysis and data provided point to the fact that there is a misunderstanding of the “soft” and horizontal measures, distorting the concept of a new industrial policy. The arguments in the paper also suggest that in sectors defined as priorities in Europe, our country considerably lags behind, therefore, Bulgaria is at a lower stage of preparedness for implementation of a “new” industrial policy as a whole.

Keywords: new industrial policy, reindustrialization, competitiveness, European economic policy, economic growth.

Introduction

The European economy has failed to recover fast enough from the recession after the financial and debt crises and it is losing competitive positions against USA, Japan, and in some cases, the BRICS countries. This provoked a heated debate among academics and practitioners over strengthening economic growth, competitiveness and sustainability in the European Union. The European Commission has proposed the implementation of an adequate program and industrial policy instruments. In this context, several questions have been posed being of immense significance for Bulgaria. Does the country need a reindustrialization policy and is it ready for it? Are

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the necessary conditions for effective implementation of such a policy in place? If such policy is going to be implemented, on what principles it should be built so that sustainable results be achieved? Which are the main problems to be resolved? The current paper takes into consideration the above questions.

The first section presents a recent theory about the implications of an active industrial policy and its dimensions. The second section summarizes the ongoing debate on the industrial policy in Europe, whereas the third and fourth sections present arguments for and against it, accordingly. The fifth section provides insight into the requirements for a successful industrial policy in the context of Bulgaria, while the sixth section presents the possible objectives for Bulgaria and their compatibility. The seventh section outlines priority sectors, industries and businesses selection criteria. The final section offers conclusions.

1. Industrial Policy: Rationales and Measures

The industrial policy in Europe follows several phases: postwar intervention and nationalisation, sectoral policy (from sectoral planning and state aid inter alia via Marshall Plan assistance) and currently, dominance of horizontal or competitiveness-oriented policy enhanced by EU policies. The current policy includes tariff reduction and state aid, internal market and deregulation policy, and research framework programmes, whereas future industrial policy is expected to consist in a Systemic Industrial and Innovation Policy (SIIP) (Aiginger, 2011).

Von Mises (1998) argues that the economic policy of interventionism is unable to lead to a sustainable system of economic organization: interventionist measures create market distortions such as unemployment, depression, monopoly, distress and are in general not Pareto optimal as they serve the interests of a minority at the expense of the majority. Among others, von Mises analyzes interference by restriction and price control, conduct of inflation policy and credit expansion, confiscation and subsidies, and the presence of corporativism and syndicalism. One reason why governments conduct such a policy is to “compensate by further interventions for the shortcomings of earlier interventions” and in that way they hamper the economy even further.

Additionally to correction of already implemented policy that led to market distortions such as rent-seeking, Rodrik (1993) provides more rationales for trade and industrial policy reform in developing countries. His arguments include improvements in static resource allocation; dynamic benefits in the form of learning, technological change, and growth; improved flexibility in the face of external shocks; and improved capacity utilization in the face of bottlenecks and macroeconomic policy
failures (Rodrik, 1993). Rodrik also claims that industrial policy might actually have beneficial influence on the economy.

Furthermore, Aghion et al (2012) present evidence that a competition-friendly sectoral policy, including subsidies, tax holidays and tariffs can boost total factor productivity and growth. Their empirical analysis suggests net positive impact of subsidies that are allocated to competitive sectors and in a way that preserves or increases competition, e.g. vertical innovation rather than differentiation between firms.

Rodrik (2007), Harrison and Rodríguez-Clare (2010), Reis and Farole (2010) and Aiginger (2011) suggest different models opposed to old conceptions of industrial policy. Rodrik (2007) claims that the right model for industrial policy is the “strategic collaboration between the private sector and the government with the aim of uncovering the most significant obstacles to restructuring and discovering what interventions are most likely to remove them”. Therefore, the focus should not be on the outcome of the policy, which by far is unknown ex ante, but the process itself, the design of the setting. Finally, specific measures or targeted industries come as a by-product of this process.

Similarly, Harrison and Rodríguez-Clare (2010) argue that “soft” interventions that would target the coordination failures within the sectors or clusters with comparative advantage, rather than “hard” interventions such as tariffs, export subsidies and tax breaks for foreign corporations would be more beneficial for a developing economy. “Soft” industrial policies target the creation of a process in that government, industry and cluster-level private organisations cooperate in interventions that directly enhance productivity. Such policies might be directed at supply of skilled workers, technology adoption and regulation and infrastructure. The benefits of “soft” over “hard” policies is that the former reduce the risks of rent-seeking and corruption, and are also more compatible with multilateral and bilateral trade and investment agreements.

They also argue that infant-industry protection is justified either way: providing there is a latent comparative advantage in this industry or in case the international price for this industry exceeds the warranted by the true opportunity cost of this good abroad. However, more efficient policies exist: contrary to protection, production subsidy would not cause temporary consumption losses and would work even in the presence of sector-specific coordination problems. Furthermore, R&D subsidies can target externalities as a consequence of innovation spillovers, while promotion of entry into new industries can target information spillovers associated with the discovery of new profitable activities.

Furthermore, Reis and Farole (2010) recognize the risk that old-style industrial policy, expressed in picking winners, managing unrealistic exchange rates, import substitution, and protection can lead to market distortion and reduction of competi-
tiveness and undermine recent gains in trade liberalization. However, they admit the critical role of government in overcoming market failures and in creating opportunities for the private sector to respond to market opportunities and enhance growth. This competitiveness approach might translate into unlocking the constraints that discourage innovation, investments and export diversification; and in facilitating the capacity for economywide adjustment due to investments in human capital, sound macroeconomic foundations and basic institutions such as property rights, the rule of law and effective regulation. Furthermore, Reis and Farole (2010) propose three pillars that would describe the competitiveness policy framework:

- aligning macro incentives (tariff and nontariff barriers, real exchange rate misalignment and a distorting tax regime; overall fiscal health of the economy, efficient labor market, product and factor market, property rights, regulation and ease of firm entry and exit);
- reducing trade-related costs (backbone services and inputs such as energy, telecommunications, finance; capacity and coordination of government agencies, international transit arrangements, regional and multilateral agreements; policy reforms for more competitive markets for international transport, logistics, and other);
- establishing proactive policies that aim to overcome government and market failures (technology creation and adaptation, product standards and certifications, trade finance, industry clusters, special economic zones and other spatial developments and coordination of economic actors as well as links and spillovers to the local economy).

It is worth mentioning that contrary to common understanding, Japanese industrial policy has been for a long time a “soft” one. According to Okuno-Fujiwara (1991), postwar Japanese industrial policy was transformed toward the end of the 1960s. Since then, the main focus of policy seems to be correcting market failures, including promoting private research and development (R&D) efforts and assisting in the structural adjustment of the economy.

Finally, Aiginger (2011) points to the importance of the so-called “matrix approach” by Aiginger and Sieber which comprises both vertical and horizontal policy measures. An example is given with the primarily horizontal approach of the European Commission that also acknowledges that general measures influence differently the various industries and should be complemented by sector-specific strategies.

2. The Debate on the Industrial Policy at European Level

There is a heated debate among academics and practitioners over strengthening economic growth, competitiveness and sustainability in the European Union and in
turn, the European Commission proposes the creation of a relevant program and policy instruments. The initial impetus from Brussels can be traced in a number of documents, the first of them dating back to 2010 and 2012 (European Commission, 2010, 2012). The topic was discussed in great detail in 2013 and 2014 (European Commission, 2014, Committee on Industry, Research and Energy, 2013). In the meantime, some member states, including France, Germany, Britain and Spain have already managed to identify appropriate strategies and industrial policies at national and regional level.

The active industrial policy is justified in the documents of the European institutions by the necessity to boost the growth and competitiveness of the European economy which has been failing to recover fast enough from the recession and is losing its competitive position against USA, Japan and in some cases, against the BRICS countries. The strong industrial base is of great economic importance, both direct and indirect through its related activities. In stimulating the industry, the European institutions recognize a catch-up opportunity. The European Commission aims to reverse the decline by increasing the industry share and taking promotional measures whereas the target share of industry in the gross domestic product (GDP) of member states is expected to increase from 15.6% in 2012 to 20% in 2020.

This is a challenging target but its achievement is not certain at all. Many analysts believe that such a target tends to be over-ambitious and rather unrealistic. The reasons can be the higher potential of other economic sectors, the over-capacity of some sectors of the European industry, the rapid development of the service sector, the overall loss of competitiveness in many countries, the promotion of green policies that would lead to more expensive electricity and others (Heymann and Vetter, 2013). Such analyses lead to the conclusion that the share of industry cannot increase significantly in terms of European economy.

However, this does not eliminate the discussion on industrial policy. The discussion about industrial policy should be approached not so much as a matter of figures but as an important issue since the industrial sector is of significant importance to the economy and will remain so in the foreseeable future. Taking into account current trends which are not so favorable, measures for preservation and development of the European industry are to be taken.

In this context, the priorities of the European Commission in the area of industrial policy are as follows (European Commission, 2014):

- continue the process of deepening the mainstreaming of industrial competitiveness in other policy areas to sustain EU economy and its competitive value, given the importance of the contribution of industrial competitiveness to the overall compet-
itiveness performance of the EU. For instance, special attention must be paid to increasing productivity in business services to increase industrial competitiveness and competitiveness of EU economy in general.

- maximize internal market potential by developing the necessary infrastructures, offering a stable, simplified and predictable regulatory framework which favours entrepreneurship and innovation, integrating capital markets, improving opportunities for training and mobility for citizens and completing the internal market for services as a major contributing factor to industrial competitiveness.

- implement the instruments of regional development via national and EU instruments in support of innovation, skills and entrepreneurship to deliver industrial change and boost the competitiveness of the EU economy.

- encourage investment as businesses require access to critical inputs, and in particular, energy and raw materials, at affordable prices that reflect international cost conditions. The design and implementation of policy instruments for different objectives both at EU and national levels must not result in price distortions that imply disproportionately higher relative prices for these inputs. Action should also be taken in the internal market and at international level to ensure adequate provision of these inputs as well as to increase energy and resource efficiency and reduce waste.

- do the utmost to facilitate the integration of EU firms in global value chains to boost their competitiveness and ensure access to global markets in terms of more favorable competitive conditions.

- Finally, the objective of revitalization of the EU economy calls for endorsement of the reindustrialization efforts in line with the Commission’s aspiration of raising the contribution of industry to GDP to as much as 20% by 2020.

In line with the understanding of the necessity of an industrial policy aimed at achieving the above mentioned priorities, the European Commission proposes the creation of a relevant program and policy instruments. However, such program could only consist of general guidelines. It is practically impossible to make specific policy recommendations at European level due to the heterogeneity of the European industry in terms of stage of development and level of specialization of the member states. A decline in the share of industry in the gross value added and in the number of industry employees has been observed practically in all countries in the last 10-15 years. However, quantity and quality are quite different among the member states. The Czech Republic holds the highest share of industry in gross value added with 24.7%, followed by Ireland (23.3%), Hungary (22.7%) and Germany (22.4). Except the expected Luxembourg (6%), Cyprus (6.3%) and Greece (9.7%), other countries such as
The conception of the European Commission suggests that member states should have the primary role in the implementation of the reindustrialization policy according to their own views, though in compliance with the EU framework. **The latter shifts the debate on a national level and therefore, it becomes imperative for Bulgaria to conduct a thorough debate in order to make the right strategic decisions.**

So far, such discussion has not yet taken place. In most cases, the issue is discussed with a certain degree of misunderstanding of the conception of the European Commission, there is also a distortion in the direction of the political status quo and particular daily topics and quite diverse interpretations. The debate also focuses on whether such a policy is necessary at all. So one of the first tasks is to weigh up costs and benefits of an active industrial policy in the country.

**3. Active industrial policy – supporting arguments**

Policies for business support, for employment or productivity growth are widespread and frequently implemented around the world, including the European Union (Criscuolo et al, 2012). Most of the developed countries have implemented or are currently implementing industrial policies in one form or another (Chang, 2002).

The theory suggests that such policy can be appropriate because of market failures (i.e. inability of the market to find an optimal solution), the necessity to protect industries in their initial phase of development, latent comparative advantage, positive effects from the diffusion of know-how from foreign investors to local producers, increase in export opportunities and last but not least, strategic considerations.

Moreover, the recent economic literature examines three further lines of argumentation.

- The first one is due to the necessity to avoid adverse climate changes. It is widely agreed that global warming will have disastrous consequences without government intervention towards clean production and clean innovation. As a result, many governments engage in policies to stimulate alternative production and consumption technologies.
- Another line of argument follows the experience of the last financial crisis when the problems of the financial institutions were transmitted to the real sector of the economy.
- Finally, a number of researchers pay attention to the fact that completely liberal economic policies (laissez-faire) lead the developed countries into
specialization of countries in research and development (R&D) activities and services. Accordingly, the latter outsource their manufacturing processes in developing countries with lower labor costs which in turn leads to employment issues in the developed countries.

The practical tools for the implementation of industrial policies are numerous – direct subsidies, indirect subsidies, tax breaks, preferential loans, duties, non-tariff barriers, favorable treatment of certain categories of investors, building infrastructure, subsidies on raw materials and on labor costs, guaranteed production prices, and many others.

The European Commission however, is not oriented to measures such as those mentioned above but rather to “soft” tools that do not distort the competitive environment. The main idea of reindustrialisation is to find a new platform for common policies in Europe after recovery from the global financial and economic crisis. The focus is on higher competitiveness, further growth and jobs. In this context, the European Commission proposes the following pillars of industrial policy (European Commission, 2014):

A. An integrated, single European market: creating an attractive place for enterprises and production:
   A1. Completing the integration of networks: information networks, energy and transport;
   A2. An open and integrated internal market in goods and services;

B. Industrial modernization: investing in innovation, new technologies, production inputs and skills:
   B1. Stimulating investment in innovation and new technologies; priorities:
      ➢ advanced manufacturing
      ➢ key enabling technologies (KETs)
      ➢ bio-based products
      ➢ clean vehicles and vessels
      ➢ sustainable construction and raw materials
      ➢ smart grids and digital infrastructures
   B2. Increasing productivity and resource efficiency and facilitating access to affordable production inputs:
      ➢ access to finance
      ➢ energy
      ➢ raw materials and resource efficiency
B3. Upgrading skills and facilitating industrial change.

C. Small and medium sized enterprises and entrepreneurship:
C1. Regulatory and administrative costs; clusters.

D. Internationalization of EU firms:
D1. Market access
D2. Standardization, regulatory cooperation and intellectual property rights.

How such measures would affect the Bulgarian economy? Some of them might be very effective in the Bulgarian context. For instance, the setting up of a single energy market could lead to a fall in prices of imported energy sources. Modernization through investments in innovations, resource efficiency, new technologies and skills, and facilitating access to finance are considered lasting weaknesses of the industrial enterprises in Bulgaria. Furthermore, regulations certainly need to be simplified and the public administration needs to be more effective. The promotion of small and medium sized enterprises would be very helpful as well, including their internationalization.

4. Active industrial policy – arguments against

Neither theory nor practice considers the implementation of industrial policies unambiguously. Theory denies it most frequently because the government intervention in the economic system hinders competition and distorts markets. Furthermore, government intervention creates corruption incentives because the administration has the opportunity to select winners ("national champions") and losers in the competitive struggle, often led by purely corporate interests. Moreover, the public administration cannot always understand and predict the dynamics of the markets and favoring individual firms and sectors in practice is often a product of certain lobbies. It is hard to say that all these arguments are irrelevant to the contemporary Bulgarian economic system. From this perspective, the role of the state of the economy should be limited to horizontal policies that would stimulate the supply side in a balanced manner.

Another objection is that a high share of industry to GDP or gross value added (GVA) does not necessarily determine a prosperous economy. In recent years, the share of industry in gross value added has declined substantially in many countries without affecting their growth in the period before the crisis or hindering them to manage the crisis successfully. For instance, the share of industry in gross value added declined in virtually all countries but especially in Finland it dropped by 10 percentage points and in Sweden and Belgium by 6 percentage points between 2000 and 2012 (Eurostat). However, other sectors such as services (finance, telecommunication) or transport can also create well-paid high-tech and stable jobs.
The third objection is that the current structure of the European economy is not a result of the coordination function of the market price system but rather a result of a lot of political interference. Perhaps the undisturbed market would allocate more resources to the industry and less to other sectors of the economy. One should make a difference between an industry growing due to some authentic comparative advantages that Europe has against the world and an industry growing because of the EU subsidies. The artificial stimulation of the industry will cause additional disbalances and may, through the distribution of subsidies and the introduction of various constraints and preferences, even undermine the very foundations of the EU – the free movement of goods, services, capital and individuals.

Weighing up the various arguments and experiences accumulated over many years leads to the conclusion that certain industrial policies could be successful in increasing competitiveness and stimulating economic growth. However, such policies need to be carefully designed in accordance with the national specifics and at the same time, avoid possible negative effects coming from government interventions. So, the debate "for" or "against" industrial policy should not be based on whether it should be implemented at all. The productive debate should focus on how to organize and conduct such policies that promote competition and increase productivity and lead to the acceleration of economic growth.

5. Requirements for a successful industrial policy in Bulgaria

Attitudes towards implementation of a reindustrialization policy, planning and resource allocation do not guarantee the best possible outcome. To be of a real benefit to society, the reindustrialization policy should be conducted under certain conditions.

The first condition is successful fit of Bulgaria in the context of a common European policy. Bulgaria cannot (or at least it would be very difficult) conduct an independent industrial policy because of certain resource constraints and because of possible conflicts with the European legislation on state aid. Therefore, it is of importance that the interests of the Bulgarian economy be included as much as possible in the formation of the European policy. A possible national policy must fit within the European framework which would most likely reflect the priorities of the countries with the greatest ability to influence the decisions of the European institutions.

Indicative in this respect is the understanding of the European documents calling to conduct an active industrial policy and recommended measures and policies in this direction. In Eastern Europe, particularly in Bulgaria, many specifics in the recognized problems and proposed actions, along with a number of common situations, require different understanding and, above all, different content of the active industrial policy.
The same applies to the purely quantitative target set by the European Commission – the share of industry in GDP within the EU to increase from 15.6% to 20% by 2020. Looking only at the figures, Bulgaria (with a share of industry in GDP of around 24%) would have to follow its current policy while countries with “underdeveloped” industry like Great Britain and France (with shares of industry in GDP of around 10%) should significantly develop their industrial sector and are therefore likely to receive substantial support from European funds.²

Another important condition for the success of the industrial policy in the country is to be incorporated in a sound strategy with clear and consistent objectives, and with the right measures that will lead to the implementation of such strategy. The sectors, activities, procedures or products that would be stimulated should be selected in a strategically correct manner and the measures should be aligned to their objectives. This is not an easy task for the public authorities, especially when they lack proper expertise and capacity or when they are subject to political influence/pressure. In such cases they may misjudge the market dynamics and the outlook for industrial production respectively and thus public funds may be allocated to support futureless subjects. Section 6 below, presents possible targets of the industrial policy.

Third, it is important to recognize correctly the possible effects of government stimulation of certain activities in terms of the overall economic system. For instance, the promotion of electricity production from renewable sources was imposed by European policy to diversify energy sources and to ensure environmental protection. But its implementation in Bulgaria (and elsewhere) proved to be disproportionate and leading to a number of adverse outcomes. The high cost of the produced electricity reduced the industrial competitiveness and increased the cost for households. This is the result of a poorly implemented strategy for stimulating “green” electricity production – a strategy that does not take into account the dynamics of the process, does not monitor the market saturation and does not account for the effects on other market participants.

The promotion of certain sectors will inevitably attract resources to them. So it may be the case of artificially supported growth of some sectors compared to others because of resource reallocation from the former to the latter. Engineering and technical personnel, financial or natural resources can be simplistically reallocated and lead to higher growth in the supported industries at the expense of others without increasing the growth of the economy as a whole. Although the agricultural sector is not industrial, the current system of subsidies in Bulgaria can be used as an example in this regard. Grain production is stimulated at the expense of vegetables and fruit
production, resulting in the fact that many lands and other resources suitable for perennial crops are used for annual crops. As a consequence, the raw material base of the food processing industry is largely limited and unstable.

Fourth, the policy should be elaborated and implemented by public authorities with the corresponding capacity and transparency. The very fact that improving the public administration is one of the first priorities of the proposed European policy for reindustrialization confirms that this condition is not always granted – neither in Bulgaria nor in other countries.

Taking into account the differences and conditions for success mentioned above, the fit of Bulgaria into the EU-wide trend for an active industrial policy is not as simple and unambiguous as it seems. The reindustrialization in general and as well as active industrial policy cannot be the target themselves but rather they should be a tool to achieve specific goals – growth of GDP, income and employment among others, at a specific place under specific conditions in a specific period.

6. Objectives and their compatibility

The focal point of any strategy for industrial policy are the objectives that this policy aims to achieve. In the context of the common European objectives and priorities, Bulgaria has so far not defined its own objectives and priorities unambiguously. Different views put emphasis on different objectives: strengthening the innovation potential and restructuring of the economy towards high value-added and knowledge-intensive sectors (Advisory Board to the Industrial Stability Pact, 2013), development of high-tech industries (Civil Association for Reindustrialization of Bulgaria, 2014), preserving the high share of industry in gross value added, creating new jobs and an increase in employment in industrial sectors, income growth of employees in industrial sectors, building a competitive industry at global level through R&D activities (Ministry of Economy, Energy and Tourism, 2014).

Each of these objectives is important and worth pursuing, but a proper strategy should set clear objectives that are consistent and not conflicting because in many cases desirable objectives cannot be achieved simultaneously due to incompatibility. Therefore, proper objective setting should be the foundation of a future industrial policy.

7. Priority sectors, industries and businesses selection criteria

Once the objectives of the industrial policy have been defined, one should select the priority sectors (productions, products) that must be promoted as well as the supporting tools.
The rational approach suggests the following criteria: the relevant subjects are to be:

- participants in an emerging market or a market that is expected to grow;
- participants with a strong market position, competitive advantages (prominent or latent) on solid technological, academic and commercial basis;
- users of affordable and manageable technologies and resources.

Individual industries should be objectively ranked according to the above criteria and then classified according to their complex indicators.

At this stage, a final analysis based on the above criteria is not officially presented by the administration of the country but a draft of an Action Plan for the Reindustrialisation has gained publicity (Ministry of Economy and Energy, 2014). This project suggests a number of measures in a wide range of problem areas, but it is noteworthy that most of them have deadlines by the end of 2014 or even at the end of 2015, which carries the risk of delay and loss of certain opportunities. An Innovation Strategy for smart specializations should have been adopted by the end of 2014 as a precondition for the Partnership agreement with the EU. The strategy was supposed to outline the priority sectors with competitive advantage in Bulgaria as well as the projects and programs in the field of innovation to be funded until 2020. Such a Strategy was finally adopted at the end of 2015 (Council of Ministers, 2015) with monitoring procedures which are supposed to be ready by the middle of 2016. This is an obvious delay.

In the context of the expected reindustrialization policy various institutions in Bulgaria have proposed priority sectors. But a common feature of all proposals is that the selection criteria are not precise. These proposals have many intersections, but they also have many differences. The intersections, in terms of selection, are usually the importance of global markets, technology and specialization, growth, placement of the industrial production (export) compared to global demand and (national) resource availability. Also, the specific outcomes such as employment and income growth as a consequence of the development of industries selected on these criteria are not considered. It is rather implied that they will be achieved on their own as part of the main goal: economic growth. Possible effects on non-supported industries or other possible side effects are not considered either.

In particular, electronics, electrical engineering, transport equipment, machinery, chemicals and plastics, food processing, logistics, information technology, outsourcing, healthcare and pharmaceuticals, clean technology and biotechnology are proposed as priorities for attracting foreign direct investments (Ministry of Economy, Energy and Tourism et al, 2011).
Software and hardware products, artificial intelligence and related supplying industries, cosmetics and the music industry are identified because of the availability of human capital. Clothing, shoes, food processing and furnitures, household and kitchen articles are existing but need more innovation. Last but not least, nanotechnology is recommended as a promising industry (Civil Association for Reindustrialization of Bulgaria, 2014).

According to other views, priority should be given to greenfield investments in new high-tech industries, no matter whether foreign or domestic, modernized with foreign assistance (microelectronics, manufacturing, wine, food processing, etc.). Some politicians having in mind the problem of employment in the country have suggested the recovery of parts of old industrial giants which are now out of operation. At the same time, there are proposals for promotion of non-industrial sectors such as spa, wellness, and cultural tourism (Civil Association for Reindustrialization of Bulgaria, 2014).

The recent Innovation strategy for smart specialization (Council of Ministers, 2015) sees the following industries as upbeat: mechatronics and clean technologies, IT and communications technologies, biotechnologies, nanotechnologies, creative industries, pharmaceuticals, food industry.

Actually, various viewpoints seem to overlap over the following industries: information and communication technology, electronics and engineering, chemistry and pharmaceuticals, food processing. At the same time, the factual picture of the Bulgarian export outstandingly differs as it shows that currently the country exports mainly low-tech products. The problems with the listed industries which are mainly high tech are well illustrated in Graph 1. It compares the high-tech export as a percentage of total export in Bulgaria and the EU. On average, the high-tech export amounts to around 16% in the EU, while in Bulgaria it is about four times lower (Eurostat). Leading countries such as Ireland, France, the Netherlands, Hungary and the United Kingdom are significantly above the EU average.
Graph 1. High-tech export as a percentage of total export. Lower line – Bulgaria, upper line – EU average. Source: Eurostat

Factual data also shows that raw materials represent a great share of the Bulgarian export (Yarliyska and Dimitrova, 2012), which means that the competitiveness of the targeted priority industries (mainly high-tech) is problematic and their stimulation does not necessarily guarantee future success.

As can be seen from the brief review, the vision for a potential reindustrialization policy is not clarified yet either in terms of its goals or in terms of its objectives. Indeed, certain efforts need to be made in order to come to a right and logical scheme, which is one of the above mentioned conditions for success.

**Conclusion**

There is a heated debate on the rationales and validity of industrial policy in Europe, seeking to find ways how Europe can regain its competitive advantage against other countries. As an EU member-state, Bulgaria is expected to fit in the European context and comply with the new industrial policy proposed by the European institutions. Sadly, Bulgaria is not yet ready for the conduct of an efficient policy for reindustrialization aiming at improving competitiveness and fostering economic growth.

The conditions under which a reindustrialization policy for Bulgaria is likely to succeed are analyzed in the paper. In view of these conditions, the presented arguments lead to the following conclusions:

- Bulgarian interests are not well integrated in the European framework;
the debate in Bulgaria is directing its focus away from the new type of industrial policy based on “soft” and horizontal measures;
- the strategic goals of a reindustrialization program are not clearly defined;
- priority industries are not identified according to precise criteria, although many have been proposed and publicly promoted.

As a result the country is still not prepared to conduct a sustainable reindustrialization policy and further efforts by the Government, the employers’ organizations, the labor unions and academic organizations are most certainly needed.

End Notes

1 Report on Re-industrializing Europe to Promote Competitiveness and Sustainability by the Committee on Industry, Research and Energy leads to the conclusion that Eastern Europe does not seem to exist. The problems and measures discussed in the report are typical of the highly developed EU members, some specific problems in Southern Europe are briefly mentioned, and there is virtually nothing about Eastern Europe. The draft of the resolution included in this report clearly reflects the positions and interests of developed member states and on many occasions, its recommendations are unacceptable or counterproductive for countries like Bulgaria.

2 In countries like Great Britain and France, there are other sectors, besides the industry, which are highly developed with the respective contributions to the final volume of GDP. For example, the United Kingdom is a global financial center and its financial sector is not proportionally large – it serves not only the British economy, but practically the whole world. As a result the share of industry in GDP is relatively small one.

References

7. Committee on Industry, Research and Energy (2013), Report on Re-industrializing Europe to Promote Competitiveness and Sustainability, Rapporteur: Reinhard Bütikofer
11. European Commission, (2014), 14 final of 22.01.2014, Communication from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions, for a European Industrial Renaissance
12. Eurostat, European Commission
Abstract

Commercial real estates (modern shopping centers respectively) are an integral part of urban structure. Their development as real estate objects can be influenced by many factors. The present paper examines factors which determine the profitability of the shopping centers as commercial real estates and offers a comparative analysis with other European markets on key indicators, and on this basis, summarizes the main conclusions and recommendations on opportunities for development of shopping centers in Bulgaria. For the purposes of study, methods such as critical analysis and synthesis, induction and deduction and comparison and expert appraisal are being used. The results of the study are used to outline the main problems facing the shopping centers development in Bulgaria and necessary actions in this area.

Introduction

Trade is among the oldest conscientious human activities and it has always held a special place both in the human mind and in the structure of human settlements – in the form of market squares, bazaars and other markets for trading goods. Shopping centers as a modern form of retail development combine in an unusual way the original concept of shopping, entertainment and multi-functionality. These were introduced on the Bulgarian market in the middle of the past decade, conceptually following the American model – mainly indoor complex of retail units that are planned, designed, built, owned and managed as a single entity with on-site parking facilities – open air or structured. The emergence of shopping centers was largely predetermined by ongoing changes in market conditions and improved investment climate in the country, a process further enhanced by the expectations of Bulgarian and foreign investors for further market growth.

There are a number of factors which exerted influence on shopping centers and their development. Some authors (Chukleva, R., 2010) generally divide them into two
groups: objective and subjective, depending on whether they relate to the physical object or to the perception of the people. Other authors consider them in greater detail (Davcheva, M., 2013; Kateva, M., 2008). Depending on their scope and power of impact, the above factors can be also classified under the following three groups: macro environmental factors, sector related and specific factors.

In order to study the shopping centers potential for growth as commercial real estates, i.e. investment properties¹, special attention is placed on factors which determine the ability to generate income from the shopping centers operation and those ensuring properties stability. Such factors include: the size and variation in rental rates, financial stability and solvency of tenants, number and purchasing power of target population to name but a few.

In the light of the foregoing/aforementioned, the author’s purpose is to study the factors which determine the shopping centers’ profitability as commercial real estates, to offer a comparative analysis with other European markets on key indicators, and on this basis draw conclusions and recommendations on opportunities for development of shopping centers in Bulgaria. The analysis of the commercial potential of national and local markets examines indicators such as: number and purchasing power of the population, the extent of solvent demand, the density of shopping center space, the average rental rates, etc.

1. Emergence and development of modern shopping centers

The first shopping centers emerged in the USA in the early 1920s as a result of extensive development of urban areas and the need to service the newly grown residential areas in the suburbs of big cities. The concept was brought into Europe much later (during the 1960s) – a fact that largely defines the focus of many studies in this area – namely the evolution of American shopping centers (ICSC; ECSU, etc.).

Today, the role of shopping centers continues to grow and expand in a global sense. But the presence of significant differences in provisions for urban planning and development in Europe and the USA is the main reason for the International Council of Shopping Centers (ICSC) to examine them separately. Thus for example, the US shopping center is defined as “a group of retail and other commercial establishments that is planned, developed, owned and managed as a single property, typically with on-site parking provided” (ICSC, 2016). The European shopping center, according to a study of ICSC Research, is “a retail property that is planned, built and managed as a single entity, comprising units and “communal” areas, with a minimum gross leasable area (GLA) of 5,000 square metres” (Lambert, J., 2006, p. 35).
The modern shopping center concept, or ‘shopping mall’ as it is normally referred to in Bulgaria – was brought into the country in the middle of the past decade and as earlier mentioned, it emulated the American model – as an indoor complex of retail units that are planned, designed, built, owned and managed as a single entity with on-site parking provided – open air or structured. This gives us grounds to offer a broader understanding of the Bulgarian shopping center: a group of retail and other commercial units (located in one or more than one commercial building), planned, designed, built, owned and managed as a single entity (as one commercial property), with on-site parking provided (open or structured) to serve them. Thus defined, the term can be considered equivalent to a “shopping complex” (Stoyanov, S., V. Antonova, 2012, s. 60).

Two main classifications can be used to differentiate commercial real estate – the US and the European shopping centers. Thus, in view of their trade orientation and size, American shopping centers are classified into three main groups: general-purpose, special-purpose, and limited-purpose. The general-purpose shopping centers in turn can be broken down into: super-regional mall, regional mall, community, neighborhood and strip/convenience center (ICSC, 2016). Shopping centers in Europe are classified as follows: traditional (very large, large, medium, small) and specialized ones (retail parks, outlet and theme-oriented centers) (Lambert, J., 2006, p. 35).

A leading organization in the development of shopping centers is the International Council of Shopping Centers, Inc. – International trade association founded in 1957 in Illinois. The Council's purpose is to advance the shopping center industry and to promote its role in the commercial distribution of consumer goods and services by professional training and publications; meetings and other forms of exchange of ideas among its members; statistical and scientific research; professional certification programs and others.

2. Retail space market in Bulgaria – general features

The retail space market in Bulgaria is characterized by rapid growth. For a period of ten years, more than 30 shopping centers have been opened in the country (see Fig. 1) with a gross leasable area (GLA) of approximately 890 000 square meters. Most were built in Sofia (10, GLA: 403 900 sq.m.), Varna (5, GLA: 137 526 sq.m.), and Burgas (3, GLA: 98 300 sq.m.). There is enough evidence of the so-called “ghost” or “dead malls” – shopping centers, which failed to rent out their spaces (Central Plaza Varna, Varna Towers, Mega Mall Ruse), and those who have given up entirely its trade concept (Mall Gallery Varna sold in the summer of 2015). Others, despite of their advanced stage of implementation were kept, due to insufficient demand and intense competition in the sector.
According to a market survey conducted by Forton (a consultancy company) (Forton, 2015/2016), the total retail space in the now operating shopping centers across the country amounted to 718 000 sq.m, by the end of 2015, with value of the same index of 763 000 sq.m a year earlier (see Table 1). The decline observed in the past year was due to the temporary closure of Galleria Plovdiv – for renovation, in view of the new market positioning of the shopping center. The trend has remained unchanged this year (to Q3 / 2016).

**Table 1**

<table>
<thead>
<tr>
<th></th>
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</tr>
</thead>
<tbody>
<tr>
<td>Retail space, sq.m.</td>
<td>632 800</td>
<td>735 000</td>
<td>763 000</td>
<td>718 000</td>
</tr>
<tr>
<td>GLA, sq.m./1000 of the population</td>
<td>86,4</td>
<td>-</td>
<td>105,0</td>
<td>99,0</td>
</tr>
<tr>
<td>Average rent price, euro / sq.m / month</td>
<td>27,0</td>
<td>21,5</td>
<td>20,0</td>
<td>27,0</td>
</tr>
</tbody>
</table>


The index “gross leasable area per 1 000 of the population” also showed a slide at the end of 2015 reaching a value of 99 sq.m. (with an average for Europe on 01.01.2014 - 268.7 sq.m.) (A Cushman & Wakefield Research Publication, 2014).
Together with a rise of offers for retail space in the country, pressure on rental prices also intensified. Traditionally, said prices are much higher in Sofia than in the rest of the country. At the end of 2009, the average rental rates in operating metropolitan malls amounted to 26 EUR / sq. m., while for the projects in development – 18 EUR / sq. m. In view of shopping centers in the country, these values fluctuate in the range of 21-22 EUR / sq. m., or 15-16 EUR / sq. m. (Imoti dnes Varna, 2010). In subsequent years, rents settled and kept levels of respectively 27 EUR / sq. m. for Sofia (for units with a size of 100-150 sq. m.) and 18-20 EUR / sq. m. for the country (the same type of units) (Forton, 2013), and that trend continued in the first half of 2013. During the second half of the year due to market expectations (mainly in the capital) and reduced consumption the pressure on rental prices increased. At the end of 2013 and the first half of 2014, rentals settled at levels respectively 21.5 EUR / sq. m. for Sofia and 12-16 EUR / sq. m. for other cities, even though experts considered the likelihood for further reductions limited (Forton, 2014). In confirmation of this statement, by the end of 2014, a change in rent prices was reported only for the capital, which declined to 20.0 EUR / sq. m., while in the rest of the country rent prices remained at established levels, primarily due to the lack of new projects (Forton, 2015). Rents remained stable during the first half of 2015. With a rising interest in convenient shopping malls locations during the second half of 2015, a hike in rental rates was witnessed by the end of the year, reaching an average of 27 EUR / sq. m. (Forton, 2016). Increase of 4% was recorded in the first quarter of 2016 (in metropolitan malls), while the country rents remained stable (12-16 euro / sq m).

Following an observed increase in yields from commercial real estates in 2010, these gradually settled at levels slightly over 9%, reflecting the general market valuations (see Fig. 2).
Fig. 2. Profitability of investment in shopping centers

3. Commercial potential of national and local markets

In order to analyze the commercial potential of national and local markets it is important to examine indicators such as number and purchasing power of the population served by trade area. To limit the scope of analysis further, attention should be placed on the seven largest cities and Bulgaria (see Fig. 3).

Source: Author’s work.

Fig. 3. Retail spaces in the seven largest cities and Bulgaria
In the study of the retail space density, it is important to define the scope of the serviced area which is directly dependent on the type, trade orientation and size of the shopping center. A similar feature can be found in US shopping center classification presented by the International Council of Shopping Centers, selected data of which are shown in Table 2.

**Table 2**

<table>
<thead>
<tr>
<th>Type of shopping center</th>
<th>Gross leasable area</th>
<th>Trade area</th>
</tr>
</thead>
<tbody>
<tr>
<td>Super regional</td>
<td>Over 800 000 sq. feet (~ 75 000 sq.m.)</td>
<td>5 – 25 miles (8 – 40 km)</td>
</tr>
<tr>
<td>Regional</td>
<td>400 000 – 800 000 sq. feet (~ 37 000 – 75 000 sq.m.)</td>
<td>5 – 15 miles (8 – 24 km)</td>
</tr>
<tr>
<td>Community</td>
<td>125 000 – 400 000 sq. feet (~ 12 000 – 37 000 sq.m.)</td>
<td>3 – 6 miles (5 – 10 km)</td>
</tr>
<tr>
<td>Neighborhood</td>
<td>30 000 – 125 000 sq. feet (~ 3 000 – 12 000 sq.m.)</td>
<td>3 miles (5 km)</td>
</tr>
</tbody>
</table>


Only one of the studied shopping centers (Paradise Center) can be defined as very large or super regional mall, i.e. the trade area extends to 40 km; six shopping centers may be classified as large, regional (Grand Mall Varna, Gallery Plovdiv, Mall Rouse, Serdika Center Mall, and Sofia Ring Mall) as their territorial service range is about 24 km, and the remaining 16 are rather average (community) or small (neighborhood) – within the settlements boundaries. On these grounds, the indicator “retail space per 1 000 people” for local markets in Sofia, Varna and Plovdiv scores significantly lower values than those presented in Fig. 3.

Another important indicator which determines the potential of the serviced area is the amount of solvent demand. Here, the most importance is given to the incomes which showed a growth of over 85% (income per capita – BGN) for the period (2006 - 2015). The largest share is income from wages, followed by pensions (see Table 3). A significant part of the population consumption (over 50%) is still aimed at addressing the needs for food and soda drinks and the running utility costs and transport, while only 10-12% is spent on clothing and footwear; furnishings and household maintenance; leisure, recreation, culture and education, which in turn constitute a major part of the offers in shopping centers.
Table 3

Budget structure – income and consumption per capita

<table>
<thead>
<tr>
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</tr>
</thead>
<tbody>
<tr>
<td><strong>Total income, BGN</strong></td>
<td>2659</td>
<td>3105</td>
<td>3502</td>
<td>3693</td>
<td>3648</td>
<td>3782</td>
<td>4327</td>
<td>4814</td>
<td>4813</td>
<td>4953</td>
</tr>
<tr>
<td><strong>Income structure, %</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Wages</td>
<td>46,0</td>
<td>47,7</td>
<td>51,9</td>
<td>52,2</td>
<td>50,9</td>
<td>51,8</td>
<td>52,7</td>
<td>53,1</td>
<td>54,2</td>
<td>55,0</td>
</tr>
<tr>
<td>Pensions</td>
<td>22,6</td>
<td>22,1</td>
<td>23,2</td>
<td>27,6</td>
<td>30,9</td>
<td>30,1</td>
<td>26,7</td>
<td>25,5</td>
<td>25,8</td>
<td>26,0</td>
</tr>
<tr>
<td><strong>Total consumption, BGN</strong></td>
<td>2377</td>
<td>2857</td>
<td>3264</td>
<td>3335</td>
<td>3278</td>
<td>3494</td>
<td>4058</td>
<td>4466</td>
<td>4509</td>
<td>4666</td>
</tr>
<tr>
<td><strong>Consumption structure, %</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Consumption, incl.:</td>
<td>86,1</td>
<td>85,1</td>
<td>85,2</td>
<td>85,7</td>
<td>85,7</td>
<td>84,0</td>
<td>83,5</td>
<td>83,2</td>
<td>83,3</td>
<td>83,2</td>
</tr>
<tr>
<td>- food and soda drinks</td>
<td>37,6</td>
<td>37,5</td>
<td>36,6</td>
<td>36,5</td>
<td>37,2</td>
<td>36,2</td>
<td>33,4</td>
<td>33,2</td>
<td>32,3</td>
<td>31,4</td>
</tr>
<tr>
<td>- running utilities, i.e. mortgage, electricity, water, sewage</td>
<td>14,0</td>
<td>12,5</td>
<td>13,6</td>
<td>14,5</td>
<td>14,3</td>
<td>14,1</td>
<td>15,3</td>
<td>14,2</td>
<td>13,4</td>
<td>14,3</td>
</tr>
<tr>
<td>- communications</td>
<td>4,9</td>
<td>4,7</td>
<td>4,5</td>
<td>4,5</td>
<td>4,7</td>
<td>4,6</td>
<td>4,4</td>
<td>4,3</td>
<td>4,4</td>
<td>4,3</td>
</tr>
<tr>
<td>- transport</td>
<td>5,9</td>
<td>6,7</td>
<td>6,9</td>
<td>6,0</td>
<td>6,0</td>
<td>5,9</td>
<td>6,3</td>
<td>6,8</td>
<td>7,2</td>
<td>7,0</td>
</tr>
<tr>
<td>- clothing and footwear</td>
<td>3,4</td>
<td>3,5</td>
<td>3,5</td>
<td>3,1</td>
<td>2,9</td>
<td>3,0</td>
<td>3,2</td>
<td>3,5</td>
<td>3,8</td>
<td>3,5</td>
</tr>
<tr>
<td>- furnishing and household maintenance</td>
<td>3,8</td>
<td>3,8</td>
<td>3,7</td>
<td>3,7</td>
<td>3,4</td>
<td>2,8</td>
<td>3,2</td>
<td>3,4</td>
<td>3,7</td>
<td>3,7</td>
</tr>
<tr>
<td>- leisure, recreation, culture and education</td>
<td>3,5</td>
<td>3,6</td>
<td>3,7</td>
<td>3,9</td>
<td>3,5</td>
<td>3,5</td>
<td>4,1</td>
<td>4,5</td>
<td>4,7</td>
<td>4,9</td>
</tr>
</tbody>
</table>

Source: Author’s work on data from the National Statistics Institute, Households budgets (available from: www.nsi.bg/bg/, accessed 02.05.2016).

The main indicators concerning purchasing power and welfare of the population are the actual individual consumption and the GDP per capita. On both counts our country occupies the bottom places with values around or slightly below 50% of the average EU-28 adopted as 100% (Eurostat, 2015).

Extremely expressive in this regard are the data concerning the minimum wage in the country, published by Eurostat at the beginning of 2015 – Bulgaria occupies the
last but one place (in EUR) and in terms of purchasing power (taking into account differences in price levels using the purchasing power parity) it is followed only by Albania (Eurostat, 2015). In addition, it should be noted that more than 10% of those working full-time in Bulgaria have been employed at the minimum wage (KNSB, 2015), which is directly reflected in the amount of solvent demand.

4. The place of the Bulgarian retail spaces market internationally – comparative performance with other European markets

Regarding the place of the Bulgarian retail spaces market internationally (in comparison with other European markets) the following conclusions come in focus (data concerned are presented in Table 4):

- With reference to the indicator “gross leasable area per 1 000 of the population” Bulgaria occupies the 30th place out of 34 countries at the end of 2013, followed by Ukraine, Greece, Bosnia and Herzegovina, and Serbia, with Norway, Luxembourg, and Estonia topping the rankings with shopping center space density of over 450 sq. m. / 1 000 (Malls, 2015);
- With reference to the indicator “gross leasable area” Bulgaria occupies the 26th place out of 32 countries at the end of 2014, followed by Estonia, Greece, Latvia, Serbia, Luxembourg, Bosnia and Herzegovina, with the chart topped by Russia, France, and UK with over 15 million sq.m. of retail spaces (Gerrity, M., 2015; Cushman & Wakefield, 2015);
- With reference to the indicator “average annual rent prices” Bulgaria remains well below the last one (Romania) out of 22 countries covered in the study of Cushman & Wakefield (2014). Russia ranks first with 2 545 EUR / sq. m. / year., followed by Ireland (1 800 EUR / sq. m.), the UK (1 555 EUR / sq. m.) and France (1 263 EUR / sq. m.).

Table 4

Bulgarian retail market from an international perspective – a comparative analysis

<table>
<thead>
<tr>
<th>State</th>
<th>Area, sq.km.</th>
<th>Population</th>
<th>GLA (sq.m.) per 1000 persons – position, interval</th>
<th>Average rent price / year (EUR /sq.m.)</th>
<th>Average yield, %</th>
</tr>
</thead>
<tbody>
<tr>
<td>Norway</td>
<td>365 245</td>
<td>5 136 886</td>
<td>1 m., &gt; 600</td>
<td>865</td>
<td>5,79</td>
</tr>
<tr>
<td>Luxembourg</td>
<td>2 590</td>
<td>556 319</td>
<td>2 m., 500-600</td>
<td>1050</td>
<td>5,63</td>
</tr>
<tr>
<td>UK</td>
<td>241 930</td>
<td>64 559 135</td>
<td>16 m., 200-300</td>
<td>1555</td>
<td>5,00</td>
</tr>
<tr>
<td>Country</td>
<td>2015 Population</td>
<td>Retail Space Density</td>
<td>Retail Spaces From 100-200 sq.m.</td>
<td>Index</td>
<td></td>
</tr>
<tr>
<td>-----------</td>
<td>-----------------</td>
<td>----------------------</td>
<td>----------------------------------</td>
<td>-------</td>
<td></td>
</tr>
<tr>
<td>France</td>
<td>66,217,509</td>
<td>17 m., 200-300</td>
<td>1263</td>
<td>5.50</td>
<td></td>
</tr>
<tr>
<td>Germany</td>
<td>80,970,732</td>
<td>24 m., 100-200</td>
<td>548</td>
<td>5.08</td>
<td></td>
</tr>
<tr>
<td>Romania</td>
<td>19,904,360</td>
<td>26 m., 100-200</td>
<td>370</td>
<td>9.30</td>
<td></td>
</tr>
<tr>
<td>Bulgaria</td>
<td>7,223,938</td>
<td>30 m., 100-200</td>
<td>258</td>
<td>9.25</td>
<td></td>
</tr>
<tr>
<td>Greece</td>
<td>10,869,637</td>
<td>32 m., &lt; 100</td>
<td>-</td>
<td>-</td>
<td></td>
</tr>
<tr>
<td>Serbia</td>
<td>7,129,366</td>
<td>34 m., &lt; 100</td>
<td>-</td>
<td>-</td>
<td></td>
</tr>
</tbody>
</table>

**Source:** Author’s work on data from the World Bank (available from: data-bank.worldbank.org/, accessed 02.05.2016) and market research of Cushman & Wakefield (available from: www.cushmanwakefield.com, accessed 02.05.2016).

By the end of 2015 the trend persisted - Bulgaria kept its last place on density of retail spaces (less than 100 sq.m / 1 000), while on the developed West European markets the index reached 926.3 sq.m / 1 000, largely favored by climatic conditions in the Nordic countries (see Fig. 4).

Currently, three shopping malls are expected to open (Plaza West, Markovo Tepe Mall, and Galeria Plovdiv) but the lack of new projects will inevitably result in shortage on the market for retail spaces in the coming years. In response, some traders are turning already to ground floors of office buildings and mixed-use buildings.

**Source:** Author’s work on data from the market research of Cushman & Wakefield (available from: www.cushmanwakefield.com/en/research-and-insight/2016/european-shopping-centre-development-report-april-2016/, accessed 06.05.2016)

**Fig. 4. The five countries with greatest and smallest density of retail spaces in Western (left) and Central and East (right) Europe**
5. Future problems and development opportunities of the commercial real estate in Bulgaria

In view of the present study, the main problems that lie ahead acting as a deterrent to shopping centers development in Bulgaria as commercial real estates may be summarized as follows:

1. **Low consumer demand** which comes as a result of the low purchasing power and income of the Bulgarian consumers;

2. **Low rent rates**, which during the period fluctuated according to supply and demand for retail space and the market situation at national and local level;

3. **Expectations** of both Bulgarian and foreign investors which have not been justified with regard to the development of retail market and the economy as a whole.

As a major factor accounting for the low income levels we can point out the inefficient Bulgarian economy in terms of inefficient allocation and use of resources (at company and sectoral level), and in low labor productivity. In order to increase the efficiency and competitiveness of the Bulgarian economy, it is crucial to encourage investment, innovation and technology development with a focus on production and services with high added value and stimulate employment in sectors which experience a rapid growth.

Labor productivity as an economic indicator is used to compare production outcomes (newly created product) with labor inputs into the production process. In the long term, increased productivity is seen as the key to achieve sustainable economic growth and generate higher incomes. Some areas that should become a priority in overcoming obstacles to increasing productivity are suggested in the World Bank report “Productivity in Bulgaria: Lessons from the past, opportunities for the future” (2015), initiated by the Ministry of Finance. Such areas, according to the document, are: improving qualification and skills of Bulgarian workers, unlocking the potential of Bulgarian entrepreneurs for innovations, reducing regulatory uncertainty and burden, creating fair opportunities for all companies and market players, and reforming the legal system so that it becomes more effective and a guardian of the inviolability of property rights and contract agreements.

In setting rental prices, the interests of owners and investors should be taken into consideration in their capacity of landlords on the one hand, and traders and producers of goods and services, as tenants – on the other. Establishing and maintaining low rents comes as a consequence of reduced consumption and specific market conditions even though it has a direct impact on the profitability and sustainability of the shopping centers as commercial real estate (investment property). To overcome these negative effects, we consider as appropriate the following measures:
- wider use of the so-called income related rents, i.e. linking rent to turnover in view of a minimum threshold;
- more flexibility concerning the terms of rent contracts – up to date, contracts have been signed on a long-term basis for 5, 10 or even 15 years.

Linking rent to turnover in our opinion will encourage traders to develop new locations, even in the presence of weak consumer demand, which can further ensure their stability. It is also necessary to seek a balance between the interests of owners and tenants by entering clauses that require a periodic rent review allowing for a rise of rentals in accordance with changes in market conditions, but also providing for contract early termination.

To stimulate consumer demand on the other hand, it is essential to fine-tune the commercial mix, the quality of products and price levels so that they can correspond to the income levels and the magnitude of solvent demand in the serviced areas. Still, a significant portion of the offerings of shopping centers aim at consumers with high and medium incomes.

A good solution here is to introduce different categories of retail outlets using different rebate or discount schemes, such as: clearance (seasonal sales), outlet (goods offered directly from manufacturer, usually at lower prices), discount (revalued goods), off-price (brand goods at reduced prices) and others, as well as various combinations thereof.

And last but not least – unjustified expectations of both local and foreign investors for the development of the Bulgarian market, as these did not foresee the major negative impact of the global financial crisis of 2008 and the ensuing economic recession in Europe.

The macroeconomic growth and a series of reforms since the beginning of the past decade have uncovered the extraordinary potential of the Bulgarian economy. Many new jobs have been opened and local income started to approximate the average in Europe (World Bank, 2015). The global financial crisis of 2008 however, and the ensuing economic recession in Europe are still a deterrent for the successful economic growth of Bulgaria. Economic growth is slowing, unemployment is rising and improvements in the standard of living of the majority of the Bulgarians remain stagnant. This situation is further aggravated by the demographic crisis and the ageing of the population.

Taking the above into consideration, we think that owners of real estates in Bulgaria should take the following actions and measures as appropriate:

1. Offer an accurate assessment of the potential of each of the shopping centers in the country in order to secure optimum management of costs, effectiveness, tenants mix, etc;
2. Expand the social functions of shopping centers by organizing and mounting various cultural and sporting events, such as exhibitions, expositions, fairs, etc;

3. Develop flexible marketing strategies in order to position the shopping centers as main tourist destinations.

**Conclusion**

We can conclude that despite the dynamic development of the retail market in Bulgaria during the period of study, our country legs behind other European countries in terms of gross leasable area and density of retail space. Among some of the most serious problems facing the development of the commercial real estate in the country are the following: low consumer demand, low rental prices and failed investors’ expectations and projections for macroeconomic growth. The actions that we believe need to be taken pertain to the following areas:

- achieving a balance between the interests of owners and tenants in making the basic terms and conditions of lettings;
- matching supply of shopping centers with the nature of consumer demand in the region;
- evaluating the potential of active shopping centers in order to improve their effectiveness.

**End Notes**

1. According to the National Accounting Standard 40, Accounting for investment property, *investment property* is a property (land or building, or part of a building, or both) held (by the owner or by the lessee under a finance lease) with the purpose rather to earn rent or to increase the capital value, or both.

2. The *commercial potential* of the national and local markets, resp. commercial real estates, is determined by the ability to generate income from the operation of the shopping centers, ensuring their stability.

**References**


7. NSS 40 – Ochtitane na investitsionni imoti.


SPILLOVERS FROM FOREIGN DIRECT INVESTMENT IN BULGARIAN AUTOMOBILE PARTS INDUSTRY

Miroslav MANEV

JEL F21, F23

Abstract

Presented are the results from a conducted survey for analysis and evaluation of horizontal and vertical spillovers from foreign direct investment (FDI) in automobile parts production. Foreign-owned companies can hardly manage to protect all knowledge of the use of modern technologies and practices so part of those are being absorbed by local firms. The research goal is to determine the impact of transnational corporations’ affiliates in sector C 29.3 “Production of automobile parts and accessories” on the enterprises from the local economy. The most significant horizontal spillover effects result from the new practices and technologies, which can be copied through the methods of demonstration and imitation. As the most serious threat for Bulgarian firms within the sector is rated the possible labour mobility towards foreign-owned companies. The most significant vertical spillover effects to Bulgarian suppliers are realized through the degree of cooperation support, staff trainings, economies of scale and the set requirements for joined efforts. Due to the lack of market relations with Bulgarian clients and distributors “forward” vertical spillovers could not be identified.

Keywords: foreign direct investment, automobile industry, horizontal and vertical spillovers.

Introduction

Over the last decade Bulgaria has become an attractive territory for investment through realization of foreign projects in the automobile production sector. The main incentives for transnational corporations are qualified and cheap labour, low taxes and favorable location towards their markets. A young and fast growing sector of the Bulgarian economy is being formed, striving at turning the country into “a regional and strategic center for production of parts and accessories for the automobile industry” (Plevneliev, 2013). The lack of realistic evaluation and notion of the effects of foreign-owned companies’ activities in the sector, renders it necessary to measure the above mentioned phenomena, in order to create a relevant policy about their future stimulation and maximizing the ensuing benefits.

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A foreign direct investment creates many direct effects for the host country through creation of jobs, higher wages, tax incomes, increased exports, technology transfer, capital, etc. Foreign-owned companies can hardly manage to keep all knowledge on the use of modern technologies and practices and part of those are being absorbed by local firms. This represents the spillover effect of dissemination, which in certain sectors can outdo the direct effect of the initial foreign investment. Although direct effects are of utmost significance, especially for specific sectors and countries, a group of researchers (Blomstrom, Kokko, Zejan, 2000) state, that an even higher influence can be created through these spillover effects in a long-term plan.

The research goal is to determine the impact of transnational corporations’ affiliates in sector C 29.3 “Production of automobile parts and accessories” on the enterprises from the local economy.

A methodology is formed for measuring the spillover effects, taking into consideration and evaluating the specific channels through which they arise. Prepared are different questionnaires, aimed at surveying the relationships with local suppliers, distributors, clients and firms of local ownership from the same sector, which determine the level of influence from foreign direct investment by themselves. Research methods also include induction and deduction, comparative analysis, statistical methods including specialized software for analyzing of received data, personal meetings and interviews with representatives of foreign investors, observation of research objects, etc.

1. Theoretical aspects of spillover effects from FDI

There are many publications about FDI, treating the ensuing spillover effects. Driffield (2001) points out that incoming investment flows per se are not enough for realizing indirect benefits to the host country. Their scale and scope depend on the activities (motives) of the transnational corporation and from the abilities of the local economy to assimilate this new knowledge. According to Fisher (2004) whether countries will get advantage of TNC’s technologies depends on their ability to inculcate them and on the material, intellectual and financial resources available. Meyer (2004) shows them from the perspective of the foreign investor (forms, motives for realization of FDI, type of activity) and the host country (absorption capacity, level of entrepreneurship, existence of clusters). Dunning (2008) adds the local economy’s condition, technology gap and the specific advantages of TNC. It is appropriate to bring together the separate opinions, and present them in three groups (see figure 1): those of the local economy; those of the foreign investor and common ones. At this step the following clarification has to be made that separate factors and
groups of factors do not influence formation of FDI spillover effects the same way. The main prerequisite is the existence of sectoral differentiation – listed factors have different weight depending on the specific sector.

Factors “from the side of the local economy” can be determined as the possibilities of the host economy to acquire and assimilate new knowledge from production, market, technology, financial and other matter. Factors “from the side of the foreign investor” can be determined as the intentional willingness or unwillingness of transnational corporations to develop the potential of the local economy. The main motives for TNC are formation of strong business partners and publicly stated social responsibility, which can indirectly increase their competitiveness. Preconditions for realizing spillover effects on the basis of the “common” factors can be determined as the mutual interfaces between an investor and host economy.

Source: Author’s research.¹

Figure 1. Factors, determining the formation of positive spillover effects

According to the type of linkages which foreign owned companies form, there can be differentiated intrasectoral horizontal spillover effects with local competitors and other firms from the same sector and intersectoral vertical spillovers with suppliers, distributors and clients. This is a classification, used by
all authors studying those effects. (Nicolini and Resmini, 2010; Aitken and Harrison, 1999; Djankov and Hoekman, 2000; Javorchik, Saggi and Spatareanu, 2004)

![Diagram showing possible linkages for formation of horizontal and vertical spillover effects](image)

**Figure 2. Possible linkages for formation of horizontal and vertical spillover effects**

There has to be made the clarification, that unlike the direct effects, which have a direct impact, the spillover effects are revealed in a slightly different way. Their character is rather that of a potential – there exist many possibilities for influence, but not all are realized. In order to explain the ways that spillover effects arise, we have to reveal the channels for their appearance. The perceived approach for their review is expressed through the following scheme:

![Diagram showing potential of channels for formation and detecting spillover effects](image)

**Figure 3. Scheme for detecting the spillover effects from FDI**
In the science literature we can observe certain differences in the views of separate authors regarding the potential channels for transfer of horizontal spillover effects. In recent publications (Castellani and Zanfei, 2006; Sinani and Meyer, 2004) the most popular view is that those effects can arise through: increased competition, labour mobility, imitation and demonstration of practices and technologies. Apart from these classic ways, on which consensus is found, different authors add others. Blomstrom and Kokko (1998) describe the market access (exports), which the foreign-owned company can indirectly reveal to its local competitors, from which those can benefit. Hu and Zhao (2012) describe the participation in local trade organizations and clusters and the occurring informal contacts, which can also lead to indirect influence on other member companies. The level of wages in the sector is another potential channel for indirect influence towards local companies.

On this basis an attempt I made to summarize and enrich the classification of horizontal spillover effects and channels through which they can arise. It is necessary to formulate an additional channel – cooperation between competitors, through intentional exchange of information.

**Figure 4. Possible channels for formation of horizontal spillover effects**

**Vertical spillover effects** are based on a much more objective rationale than the horizontal ones (Meyer, 2004). He reveals the following groups of mechanisms for creation of vertical spillover effects “backward” (for increasing of productivity, for setting a higher requirements regarding quality and from increasing the demand for intermediate products) and vertical spillover effects “forward” (as “similar”).
In examination of the practices, occurring between transnational corporations and their suppliers, in Indian economy Lall (1980) reveals 10 basic areas of influence: cooperation in creation, location, procurement, management, pricing, distribution, finance, differentiation, information and technical assistance. Although for the time it is a very exhaustive classification, the author admits that the list might not be completely full, as it is based on the linkages formed in a single country. Chen, Chen and Ku (2004) in turn focus on 6 areas of mutual cooperation with local suppliers: supply, marketing, human resources, research & development, finance and subcontracting. According to Belderbos, Kapennelli and Fukao (2001) if backward vertical linkages are formed through delivery of materials and components from local suppliers, this can lead to a significant transfer of know-how and development of the local supplying sector. If these connections are further developed the labour potential is increased, new jobs are created, economic development is accomplished.

Figure 5. Vertical spillover effects according to linkage type

We suggest considering the common vertical spillover effects for all local partners of a foreign-owned company and the specific ones along the chain of local suppliers, distributors and clients (see figure 5). A distinctive feature of these linkages is that they tend to deepen with time. On the other hand strong linkages with local economy are a kind of commitment of the foreign-owned companies, which makes the investment much more sustainable and prevents its eventual withdrawal. Through
such influence, the benefitting local firms can fully upgrade their work methods, which will be reflected in their operations towards all their business partners on a national and international level.

2. Methodical basis for analysis and evaluation of FDI effects

Because of its specific character, the empirical measurement of spillover effects of foreign direct investment is an extremely complex topic, and no straightforward solution seems to be found. Rodrik (1999) mentions that the science literature on this matter is full of unreasonable statements for positive spillover effects from foreign direct investment, but the proof found is questionable. Krugman (1991) confirms the statement for the difficulty of their measurement, because “knowledge flows don’t leave paper marks, through which they can be followed and found”. Driffield, Munday and Roberts (2002) define the need of research in this field as extremely necessary in order to be justified the significant expenditures made by governments to attract foreign investment.

There can be presented the following conclusions and comments regarding the used methods for measurement of the existence of FDI spillover effects:

- The usage of econometric indirect indicators doesn’t reveal the reason behind the arising of relevant change in local firms productivity. The change in the levels of productivity can be due to the desirable transfer of technologies from the TNC’s affiliates, as well as from the increased efficiency of used technologies on the basis of increased competition.

- The usage of questionnaires and interviews is typical for the inclusion of a single case or a single investment project. In most cases this kind of surveys are conducted unilaterally – the respondent is a representative of just one side, most often the manager of the given foreign affiliate. The results of those surveys cannot be generalized, but give just a general notion and a good starting point for formation of an all-embracing methodology.

The adopted econometric approach in the empirical surveys largely avoids the question of how exactly the spillover effects are formed. Generally speaking, what is measured is the existence of higher productivity, wages or export capabilities in sectors with a higher degree of foreign-owned companies.

For this purpose a methodology is formed for measuring the spillover effects that accounts for and evaluates the specific channels, through which they arise. A restriction here is the lack of statistical information, on the basis of which can be formed a methodology for conducting the empirical survey. In this case what is most appropriate for the measurement of the spillover effects is using the method of
questionnaires. We have prepared different questionnaires, aimed at surveying the linkages with local suppliers, distributors, clients and firms with local ownership from the same sector, which determine the level of influence from foreign direct investment by themselves. All questionnaires, the results of which are presented and analyzed in this paper are conducted within the period 01.11.2015 – 15.02.2016.

The developed methodology is based on the following principles and restrictions:

- Local firm respondents determine by themselves whether their enterprise is influenced through the mentioned channels and to what degree, when there is a significant impact. We used a modified five-degree scales and a sixth one “zero” for evaluation of the existence of spillover effects. They measure the degree of influence, whereby through the transformation from five to six degrees we seek an effect of the lack of an average answer option.
- Most of the mentioned channels for formation of spillover effects mark a positive trend, however there are also questions of a negative character.
- For evaluation of the channels for achieving spillover effects closed questions are used.
- The chosen research object, all companies from sector C 29.3 “Production of automobile parts and accessories” by “NACE.BG-2008” does not exhaust all possible producers of automobile parts and accessories in Bulgaria. There are other existing enterprises with partially similar activity, which are formally reported to other groups and sectors according to “NACE.BG-2008” and for this reason cannot be included in the research object.
- The focus of the spillover survey is only on the directly connected local companies. Spillover effects are also possible upon other indirectly connected firms in the Bulgarian economy, which however can hardly be traced and respectively measured.
- Measured are only the effects, realized at a company level, with spillovers to other type of organizations being ignored.

The final rating for the indicator “level of horizontal spillover effects from foreign direct investment” ($HS_{fdi}$), is determined as an arithmetic mean of the calculated ratings for the different indexes, as the value is within the interval between -1,43 to +4,29 (see table 1):

$$HS_{fdi} = 0,143*(Comp+DemImi+Mob+Export+Cluster+InfoExchange+Wage); \quad (1)$$
Table 1

Degree of influence of foreign-owned companies upon local firms from the same sector

<table>
<thead>
<tr>
<th>Value of HSfdi</th>
<th>Degree of influence</th>
</tr>
</thead>
<tbody>
<tr>
<td>From -1,43 to 0</td>
<td>Negative influence</td>
</tr>
<tr>
<td>From 0 to 0,5</td>
<td>Insignificant influence</td>
</tr>
<tr>
<td>From 0,5 to 1,5</td>
<td>Weak positive influence</td>
</tr>
<tr>
<td>From 1,5 to 3</td>
<td>Significant positive influence</td>
</tr>
<tr>
<td>From 3 to 4,29</td>
<td>Strong positive influence</td>
</tr>
</tbody>
</table>

The final rating for the indicator “level of vertical spillover effects on local suppliers” (VSSfdi), is determined as an arithmetic mean of the calculated ratings for the different indexes, as the value is within the interval between -2,00 to +5,00 (see table 2):

\[
VSSfdi = 0,20 \times (Ssupport + Staining + Stransfer + Sdeliveries + Srequirements) \quad (2)
\]

Table 2

Degree of influence of foreign owned companies upon local suppliers

<table>
<thead>
<tr>
<th>Value of VSSfdi</th>
<th>Degree of influence</th>
</tr>
</thead>
<tbody>
<tr>
<td>From -2 to 0</td>
<td>Negative influence</td>
</tr>
<tr>
<td>From 0 to 0,5</td>
<td>Insignificant influence</td>
</tr>
<tr>
<td>From 0,5 to 2</td>
<td>Weak positive influence</td>
</tr>
<tr>
<td>From 2 to 3,5</td>
<td>Significant positive influence</td>
</tr>
<tr>
<td>From 3,5 to 5</td>
<td>Strong positive influence</td>
</tr>
</tbody>
</table>

3. Results from the conducted empirical study

3.1. Horizontal spillover effects

The rating of the indicator “level of horizontal spillover effects from foreign direct investment” is based on a conducted survey among 20 enterprises. Respondents who evaluate this rating, are representatives of Bulgarian-owned companies with main economic activity from sector C 29.3 “Production of automobile parts and accessories” according to “NACE.BG-2008”. As of April 2015 in sector C 29.3 there are actually 47 Bulgarian ownership production enterprises functioning. The percentage of correctly filled in questionnaires, compared with the total number of possible respondents reaches 42,55%. The interviewed enterprises form 72,99% of their revenues from operating activity, which ensures a highly representative survey.
The value of horizontal spillover effects from incoming foreign direct investment in production of automobile parts is equal to 0.625. Such level of the indicator corresponds to „weak positive influence” upon the companies producing automobile parts with wholly Bulgarian ownership.

The included group indexes are characterized by a radically different degree of ratings. This reveals the specific channels of influence of foreign direct investment upon producers of auto components of wholly Bulgarian ownership. As most positive and significant are evaluated the new practices and technologies, which can be copied through the methods of demonstration and imitation ($DemImi=1.775$). As a biggest threat is rated the possible mobility of human resources from and to foreign-owned companies within the sector ($Mobility=-0.875$).

**Table 3**

**System of indexes for evaluation of indicator “level of horizontal spillover effects from foreign direct investment” (HSfdi)**

<table>
<thead>
<tr>
<th>Evaluation indexes</th>
<th>Abbreviation and effect direction</th>
<th>Weight</th>
<th>Intermediate rating</th>
<th>Final rating</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Increased competition; 1.1. Pushing local firms out of the market; 1.2. More effective usage of existing technologies; 1.3. Modernization of technologies.</td>
<td>Comp; (-)/(+) CompOut; (-) CompEff; (+) CompMod; (+)</td>
<td>0.143 -0.50 0.25 0.25</td>
<td>2.05 2.90 2.50</td>
<td>2.05 2.90 2.50</td>
</tr>
<tr>
<td>2. Demonstration and imitation of new practices and technologies; 2.1. Copying new production technologies and practices; 2.2. Copying effective management and organizational practices;</td>
<td>DemImi; (+) DemTeh; (+) ImiP; (+)</td>
<td>0.143 0.50 0.50</td>
<td>1.75 1.75</td>
<td>1.775 1.775</td>
</tr>
<tr>
<td>3. Mobility of human resources; 3.1. Mobility of “foreign” experts and managers; 3.2. Mobility of “local” experts and managers;</td>
<td>Mobility; (+)/(-) Foreign; (+) Local; (-)</td>
<td>0.143 0.50 -0.50</td>
<td>0.30 0.30 2.05</td>
<td>0.15 -0.875 -1.025</td>
</tr>
<tr>
<td>4. Export capability.</td>
<td>Export; (+)</td>
<td>0.143</td>
<td>0.75</td>
<td>0.75</td>
</tr>
<tr>
<td>5. Participation in clusters, organizations, public initiatives.</td>
<td>Cluster; (+)</td>
<td>0.143</td>
<td>0.80</td>
<td>0.80</td>
</tr>
<tr>
<td>6. Exchange of information.</td>
<td>InfoExchange; (+)</td>
<td>0.143</td>
<td>0.75</td>
<td>0.75</td>
</tr>
</tbody>
</table>
Consideration of the included sub indexes provides a starting point for identification of the most significant positive and negative channels for influencing the local companies. To the utmost degree the incoming foreign direct investment in automobile industry forces local firms to increase their efficiency through using of existing technologies \((\text{CompEff}=2,90)\). Another option for them is to modernize their activity, and thus increase their position on local and international markets \((\text{CompMod}=2,50)\). Those positive results however are accompanied by increased competition \((\text{CompOut}=-2,05)\), which is leading to a loss of market share and pushing out local firms from the sector. Positively rated is the opportunity for copying and implementation of production technologies and practices, managerial and organizational know-how \((\text{DemTeh}=1,75; \text{ImiP}=1,80)\). At the same time respondents point out that wages in the sector increase because of the incoming flows of foreign direct investment \((\text{WagePos}=1,45)\).

The most significant negative impact channel is rated with \(\text{Local}=-2,05\), which represents the threat of valuable experts leaking to the foreign-owned companies in the sector. Half of the medium and large enterprises with Bulgarian ownership rate this threat with the highest degree of influence. This fact confirms the difficulties in retaining key personnel among all types of interviewed enterprises no matter their size. On the other hand, the possibility for hiring experts and engineers, trained in innovative and efficient practices within the transnational corporations is rated as insignificant \((\text{Foreign}=0,30)\). Relatively low ratings are given to channels for increased exports \((\text{Export}=0,75)\), benefits from participating in clusters \((\text{Cluster}=0,80)\) and active exchange of information \((\text{InfoExchange}=0,75)\).

Analyzing the received questionnaires we notice, that 25% of the interviewed companies state, that on no occasion is their activity influenced by the incoming flows of foreign direct investment in the sector. They chose a rating equal to “zero”, which responds to “lack of influence” for all the proposed options. A specific feature of these enterprises is that they are micro and small when referring to the staff hired. We can definitely state that such firms are more limited towards forming such relationships and function in a more isolated environment compared to the ongoing globalization tendencies of the automobile sector.
3.2. Vertical spillover effects

In order to determine the level of backward vertical spillover effects we have surveyed 10 Bulgarian companies suppliers to the foreign-owned automobile parts producers, representing 66.67% of the total number of known respondents.

The resulting value for the influence of foreign-owned companies on their Bulgarian suppliers is +2,668, with such a level of the indicator corresponding to “significant positive influence”. Given the presented averages, all index groups have a positive impacts on the interviewed respondents. Differences in received ratings reveal the specific channels of influence of foreign direct investment towards Bulgarian supplier companies.

As most positive and significant are evaluated the economies of scale achieved ($S_{deliveries}=3,30$), because of the increased volume of deliveries to the foreign-owned companies. Significantly favourable ratings are also given to the degree of cooperation support ($S_{support}=2,70$), the staff trainings carried out ($S_{training}=2,73$) and the set requirements for mutual business ($S_{requirements}=2,78$). The poorest evaluation rating is received by the product technologies transfer ($S_{transfer}=1,83$), as such result can be due to TNC’s unwillingness to risk the potential leakage of key assets and/or the low absorptive capacity of local enterprises.

\begin{table} 
\caption{System of indexes for evaluation of indicator “level of vertical spillover effects to local suppliers” ($VSS_{fdi}$)} \label{tab:SSfdi} 
\begin{tabular}{ |c|c|c|c|c| } 
\hline 
Evaluation indexes & Abbreviation and effect direction & Weigth & Intermediate rating & Final rating \\
\hline 
1. Degree of cooperation support & $S_{support}$ & 0,20 & & 2,70 \\
1.1. Expert financial consultations & Finance; (+) & 0,10 & 1,60 & 0,16 \\
1.2. Intense information exchange & Info; (+) & 0,10 & 3,70 & 0,37 \\
1.3. Cooperation with localization of a new enterprise & Localize; (+) & 0,10 & 1,50 & 0,15 \\
1.4. Provision of technical information & TehInfo; (+) & 0,10 & 3,60 & 0,36 \\
1.5. Pricing cooperation & Pricing; (+) & 0,10 & 3,00 & 0,30 \\
1.6. R&D cooperation & R&D; (+) & 0,10 & 1,60 & 0,16 \\
1.7. Stimulating innovations & Innovation; (+) & 0,10 & 2,90 & 0,29 \\
1.8. Provision of international contacts for partnership creation & IntContact; (+) & 0,10 & 2,60 & 0,26 \\
1.9. Assisting with resource provision & Resource; (+) & 0,10 & 2,10 & 0,21 \\
1.10. Feedback & Feedback; (+) & 0,10 & 4,40 & 0,44 \\
\hline 
\end{tabular} 
\end{table}
<table>
<thead>
<tr>
<th>2. Degree of influence of staff training achieved</th>
<th>Straining</th>
<th>0.20</th>
<th>2.73</th>
</tr>
</thead>
<tbody>
<tr>
<td>2.1. Increasing of product quality</td>
<td>Quality; (+)</td>
<td>0.25</td>
<td>3.00</td>
</tr>
<tr>
<td>2.2. Meeting standards</td>
<td>Standards; (+)</td>
<td>0.25</td>
<td>3.00</td>
</tr>
<tr>
<td>2.3. Innovative management and organization techniques</td>
<td>ManOrgTeh; (+)</td>
<td>0.25</td>
<td>2.40</td>
</tr>
<tr>
<td>2.4. Effective foreign production practices</td>
<td>ProdPractice; (+)</td>
<td>0.25</td>
<td>2.50</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>3. Degree of influence of product technologies transfer</th>
<th>Transfer</th>
<th>0.20</th>
<th>1.83</th>
</tr>
</thead>
<tbody>
<tr>
<td>3.1. Transfer of production technologies and know-how</td>
<td>KnowHow; (+)</td>
<td>0.33</td>
<td>1.70</td>
</tr>
<tr>
<td></td>
<td>Design; (+)</td>
<td>0.33</td>
<td>1.60</td>
</tr>
<tr>
<td></td>
<td>Consult; (+)</td>
<td>0.33</td>
<td>2.20</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>4. Degree of influence from delivery volumes</th>
<th>Sdeliveries</th>
<th>0.20</th>
<th>3.30</th>
</tr>
</thead>
<tbody>
<tr>
<td>4.1. Economies of scale</td>
<td>ScalePos; (+)</td>
<td>1</td>
<td>3.40</td>
</tr>
<tr>
<td>4.2. Diseconomies of scale</td>
<td>ScaleNeg; (-)</td>
<td>-1</td>
<td>0.10</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>5. Degree of influence of specific requirements</th>
<th>Srequirements</th>
<th>0.20</th>
<th>2.78</th>
</tr>
</thead>
<tbody>
<tr>
<td>5.1. Quality standards</td>
<td>StQuality; (+)/(-)</td>
<td>0.167</td>
<td>4.00</td>
</tr>
<tr>
<td>5.1.1. Quality standards - positives</td>
<td>StQualityPos; (+)</td>
<td>1</td>
<td>3.10</td>
</tr>
<tr>
<td>5.1.2. Quality standards - negatives</td>
<td>StQualityNeg; (-)</td>
<td>-1</td>
<td>0.70</td>
</tr>
<tr>
<td>5.2. Environmental systems – positives</td>
<td>StEnv; (+)/(-)</td>
<td>0.167</td>
<td>2.90</td>
</tr>
<tr>
<td>5.2.1. Environmental systems – positives</td>
<td>StEnvPos; (+)</td>
<td>1</td>
<td>0.80</td>
</tr>
<tr>
<td>5.2.2. Environmental systems – negatives</td>
<td>StEnvNeg; (-)</td>
<td>-1</td>
<td>0.80</td>
</tr>
<tr>
<td>5.3. Standards on working conditions – positives</td>
<td>StCond; (+)/(-)</td>
<td>0.167</td>
<td>1</td>
</tr>
<tr>
<td>5.3.1. Standards on working conditions – positives</td>
<td>StCondPos; (+)</td>
<td>1</td>
<td>0.80</td>
</tr>
<tr>
<td>5.3.2. Standards on working conditions – negatives</td>
<td>StCondNeg; (-)</td>
<td>-1</td>
<td>0.80</td>
</tr>
<tr>
<td>5.4. Deliveries “just in time”</td>
<td>JiTime; (+)/(-)</td>
<td>0.167</td>
<td>1</td>
</tr>
<tr>
<td>5.4.1. Deliveries “just in time” – positives</td>
<td>JiTimePos; (+)</td>
<td>1</td>
<td>0.80</td>
</tr>
<tr>
<td>5.4.2. Deliveries “just in time” – negatives</td>
<td>JiTimeNeg; (-)</td>
<td>-1</td>
<td>0.80</td>
</tr>
<tr>
<td>5.5. Quality of products and processes – positives</td>
<td>PPQuality; (+)/(-)</td>
<td>0.167</td>
<td>1</td>
</tr>
<tr>
<td>5.5.1. Quality of products and processes – positives</td>
<td>PPQualityPos; (+)</td>
<td>1</td>
<td>0.80</td>
</tr>
<tr>
<td></td>
<td>PPQualityNeg; (-)</td>
<td>-1</td>
<td>0.80</td>
</tr>
<tr>
<td></td>
<td>ModernTeh; (+)/(-)</td>
<td>1</td>
<td>0.80</td>
</tr>
<tr>
<td></td>
<td>ModernTehPos; (+)</td>
<td>-1</td>
<td>0.80</td>
</tr>
</tbody>
</table>
5.5.2. Quality of products and processes – negatives
5.6. Technology modernization
5.6.1. Technology modernization – positives
5.6.2. Technology modernization – negatives

<table>
<thead>
<tr>
<th>Vertical spillover effects to local suppliers</th>
<th>VSSfdi</th>
<th>2.668</th>
</tr>
</thead>
</table>

As most significant sub indexes from the degree of cooperation support with foreign-owned companies are evaluated the channels for information exchange such as: providing feedback ($Feedback=4.40$), intense information exchange ($Info=3.70$) and technical information ($TehInfo=3.60$). Such high ratings can be explained with their key function for realizing of normal market connections. We notice the presence of lower ratings for activities like cooperation in the area of innovations, research and development projects and assistance for international partnerships. Performing such activities can be classified as a key factor for increasing the capacity of Bulgarian enterprises; however, they are connected with deeper level of linkages beyond purely market ones. Foreign-owned companies should be motivated to transfer such type of key knowledge to their local suppliers.

Regarding the degree of staff training, most significant are the channels for increasing the personnel qualification concerning quality of products ($Quality=3.00$) and meeting the set standards ($Standards=3.00$). More intensive cooperation with foreign owned companies in such fields is understandable, as they are directly interested in quality and timely deliveries. At the same time increased provision of foreign management, organization and production practices can further multiply the favourable effects towards increased qualification of the Bulgarian economy’s workforce.

Within the transfer of product technologies the most significant is the channel for providing technical consultations ($Consult=2.20$), because of the necessity of such information for supplying specific components, materials or services. On the other hand, transfer of technologies and know-how ($KnowHow=1.7$) and product design and specifications ($Design=1.6$) receive lower evaluation ratings. Such values can be explained with the presence of a different type of suppliers within the respondent sample and the more specific direction of the questions involved. 100% of the significant evaluation ratings regarding transfer of technologies, know-how and design are given by suppliers of components. An entirely different situation is observed with
suppliers of materials and services, who perceive these channels as “lack of influence”.

When determining the degree of influence of delivery volumes, respondents show unanimity regarding the opinion, that incoming flows of FDI make a positive impact through increased value of supplies. Realized economies of scale themselves provide an opportunity for Bulgarian suppliers to expand production capacity, to create new jobs, to increase their productivity and competitiveness.

In order to evaluate the specific requirements of foreign-owned companies there are two options - one positive and one negative statement for each of the channels, and the positive answers clearly outnumber the negative ones. The most significant evaluation ratings are given to the set quality standards, necessary investment for modernization of technologies, the “just in time” delivery principle, requirements for maintaining a high level of product and process quality. The lower values regarding applying standards for environmental protection and safe working conditions are most probably due to their optional character in the context of the imposed requirements for mutual work. This assumption is supported by the large number of ratings of the “lack of influence” type for those two channels.

**Vertical spillover effects “forward” upon** Bulgarian companies which are distributors and clients of TNC’s affiliates in Bulgaria, producing automobile parts were not identified. As respondent enterprises of this type were not found, at this stage we accept that such spillover effects are not realized in the Bulgarian economy and accordingly their rating is equivalent to zero.

**Conclusion**

Foreign direct investments in Bulgarian automobile industry contain a significant potential for extraction of spillover effects to other companies and sectors of Bulgarian economy, but they also pose the threat of a serious sector decline, should foreign companies withdraw from our market. The presented results are indicative of the insufficiently developed linkages which TNC’s affiliates establish with local companies. Nevertheless, there are also revealed many channels through which are realized positive spillover effects from incoming foreign-owned companies in the sector. If applying a relevant policy for development of the automobile industry and promotion of investments, there are possibilities for extraction of significantly more beneficial effects on the Bulgarian economy. Therefore actions should be taken towards priority attraction of “higher quality” of FDI and upgrading the overall investment environment in Bulgarian. Such measures have to be combined with promotion of deepening the linkages between foreign and locally owned companies.
This way Bulgarian economy can more fully take advantage of globalized production systems and guarantee long term engagement of TNCs’ affiliates.

End Notes

1 The following tables and figures in this publication are based on author’s own research

References

AN APPROACH FOR AUTOMATIC ANALYSIS OF ONLINE STORE PRODUCT AND SERVICES REVIEWS

Snezhana SULOVA

JEL C880

Abstract

One of the advantages of e-commerce systems is that they enable customers and merchants to become acquainted with product and services reviews. Currently in the most popular online stores there are hundreds and even thousands of reviews for certain goods, which contain valuable information about the quality of the offered assortment. This is the reason to look for ways for their computer processing. The article proposes an approach for automated analysis of customer reviews, based on natural language processing technology and application of methods of machine learning. A model for analysis and its implementation with the software product RapidMiner are proposed.

Introduction

In recent years Internet was established as one of the richest and most easily accessible sources of information. The global network has a large amount of documents, data, audio and video files, many recorded customer reviews. All these resources are carriers of knowledge about business and after appropriate computer processing they can contribute more detailed analyses and help to identify and explore new relationships.

In the sphere of e-commerce, core business activities are carried out through dynamic online systems. One of the main challenges for this type of business is making fast and accurate decisions in accordance with the changes in the market environment. The e-commerce systems generate detailed and varied reports which are based mostly on statistical processing of the data stored in the database. Lately for more detailed and in-depth analysis in this area there have been used intelligent business analysis based on both structured and unstructured data.

Practice has proven that nowadays new customers of online stores largely rely on the opinions posted from existing customers. Besides, manufacturers and service providers are also interested in analyzing customers' opinions to improve the quality

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and standards of products and services. All this requires the search for new and effective ways to transform unstructured data, such as customer opinions in detailed reports and analyses.

The purpose of this article is to propose an approach for automated analysis of online store product reviews, based on a study of existing technologies for natural language processing.

I. Theoretical foundations of computer technology for natural language processing

The concept of natural language processing (NLP) is a broad term that can be viewed as a synthesis between artificial intelligence and computational linguistics. It is “more than simple machine translation. It aims at the full understanding of the text, checking syntactic and semantic validity of linguistic input, using the real world knowledge to understand the participant’s goals and beliefs, and also speech acts, conversations and discourse structure.” (Kumar, 2011, p.4). Currently many researchers explore different aspects of intelligent text processing. In general, knowledge discovery in unstructured data in the literature is known as text mining (TM) (Fayyad, Piatetsky-Shapiro and Smith, 1996; Feldman, Sanger, 2007). This process is accomplished through the application of technology for data mining (DM) on unstructured text data. “Typical text mining tasks include text categorization, text clustering, concept/entity extraction, production of granular taxonomies, sentiment analysis, document summarization, and entity relation modeling” (Pena-Ayala, 2014, p.37).

The accumulation of more and more information on the Web becomes a prerequisite for extracting knowledge from Internet sources such as web pages. A new concept of extracting knowledge from web resources - web mining (WM) is born. Etzioni first used the term and defined it as “use of data mining techniques to automatically discover and extract information from World Wide Web documents and services (e.g., on-line travel agents, job listings, electronic malls, etc.)” (Etzioni, 1996, p. 65). Later the concept WM expanded and it now includes techniques for testing and analyzing data on the usability of the web resource. (Cooley, Mobasher, Srivastave, 1997; Markov, Larosed, 2007). Web mining is commonly divided into the following three sub-areas (Cooley, Mobasher, Srivastave, 1997):

- web content mining (WCM) – extracting useful knowledge from the contents of web documents;
- web structured mining (WSM) – extracting useful knowledge based on the structure of web sites;
- web usage mining (WUM) – extracting useful knowledge from data on the use of Internet resources.

Many researchers deal with WCM problems (Kosala, Blockeel, 2000; Navadiya, Patel, 2012; Markov, Larosed, 2007). The researches are differentiated depending on the specific research tasks and type of resources that are used. Automatic classification of web pages appears in scientific publications (Materna, 2008), grouping of documents (Markov, Larosed, 2007), detection of similarity between text documents (Huang, 2008; Lakshmi, 2013), extracting opinions from text and sentiment analysis (Liu 2012; Medhat, Hassan, Korashy, 2014; D’Avanzo, Pilato, 2015; Patel, Prabhu and Bhowmick, 2015).

In recent years, mainly thanks to the development of web applications and social networks, the Internet has accumulated a large amount of customer reviews, shared impressions, feelings, emotions. This is the reason for many researchers to focus their research on two interrelated areas such as: opinion mining (OM) and sentiment analysis (SA) (fig. 1).

**Fig. 1 Web Mining, Opinion mining and Sentiment analysis**

The term “opinion mining” is introduced by Dave, Lawrence and Pennnock (2003). They define it as “a set of search results for a given item, generating a list of product attributes (quality features, etc.) and aggregating opinions about each of them (poor, mixed, good).” After that for opinion mining there are more comprehensive interpretations that involve different types of analysis and evaluation of text. Sadegh, Ibrahim and Othman say that these are techniques to detect and extract subjective
information in text documents. Opinion mining based on technology of natural language processing and focusing on determining the perceptions, views, ideas on a given subject, and automatic analysis aims to extract attributes, characteristics of the objects and on their basis to determine whether comments are positive, negative or neutral.

Sentiment analysis was mentioned for the first time in the works of Das, Chen and Tong (2001). They use the term in automatic analysis and evaluation of text. Subsequently plenty of studies discuss various aspects of the sentiment analysis and in many of them the term is used as a synonym for opinion mining, because emotions moods are extracted from the recorded comments (Pang, Lee, 2008; Sadegh, Ibrahim, Othman 2012; Ankitkumar, Badre, Kinikar, 2014; Rahmath, 2014).

To analyze sentiments in a text Liu (2012) makes a comprehensive study and divides methods depending on parts for analysis - a word, a phrase or the entire document. Document level sentiment analysis attempts to classify the general position in the document as positive, negative or neutral. It helps to establish the overall polarity of the text, but through it one cannot assess the different emotions about certain aspects of the document. Both supervised and unsupervised learning methods can be used for the document level classification (Varghese, Jayasree, 2013). In the sentence level sentiment analysis the polarity of each sentence is calculated using the same methods. Many authors also work on the problems of the word or sentence level sentiment analysis. In literature there are developments related to the grouping of words in dictionaries and lexicons, for automatic classification of words, extraction of keywords and identifying topics and others (Hu and Liu, 2004; Zhang, et. al. 2008; Heerschop, et. al. 2011; Taboada, et. al 2011).

One of the most comprehensive surveys for opinion mining is made by Ravi K. and Ravi V. (2015). They classify existing studies and methods used in them. According to them SA solve problems related to: the classification of text to its subjectivity; sentiment classification; review usefulness measurement; spam texts detection; dictionaries and lexicons creation; aspect extraction. In the presented systematization we cannot make a clear distinction between the first and second groups so we believe it is more appropriate SA tasks to be presented as shown in Fig. 2.
The subject areas of application of opinion mining and sentiment analysis are defined well by Rahmat (2014). This type of analysis is mainly used:

- by customers of online stores when they make a decision to purchase a product or service;
- by manufacturers to improve the quality of goods;
- by marketers for research and analysis of moods and sentiments of customers;
- by analytical discussion groups, forums, blogs and social medias
- in detecting spam content on the web;
- in detecting view points on certain topics.

**II. Approach to automated analysis of online store customer reviews**

As mentioned already in the aim of our study, we will focus our research on analysis of customer reviews, recorded in online stores. The e-commerce systems are dynamic web based applications and they enable interactivity and communication with customers. Recorded customers’ opinions are one of the best measures of whether the e-shop service is good and what shoppers like or dislike, whether
products and services meet the descriptions and presentations, what else customers want to discover in the online store, and what the general clients’ assessments are. Opinion mining and sentiment analysis are important for traders, because they create prerequisites for individual marketing to each customer and to implement better service.

In this article for research and analysis of customers' reviews we suggest the use of the methods of classification, first to distinguish the views of various characteristics of the goods and then to evaluate the polarity of customer reviews about them. The model that we use for analysis is shown in fig. 3.

![Fig. 3. Model for analysis of online store product and services reviews](image)

Usually the process of opinion mining from text data is an unconventional task, because data is unstructured, it’s based on WCM and it is appropriate to analyze online customer reviews following these steps:

1. Collecting and recording product reviews.
2. Text preprocessing of product reviews.

The collection of customer reviews is a feature that is integrated into most e-commerce systems. In some systems the views we recorded directly in a web page in html format, but in others they are recorded in the database. However, regardless of the storage, reviews are unstructured data - text.

Text preprocessing is the process of preparing text for application data mining methods such as: classification, clustering and others. Text documents usually have a large amount of words that are not carriers of useful information and it is not appropriate so analyze all words. Recommended preprocessing steps for customer reviews are:

- tokenization – separating the full text review into a list of words;
- lemmatization – the process of bringing a word into its non-inflected dictionary form;
- stop word removal – these are auxiliary words that carry little information about the content of the text, such as: “for”, ”after“, ”so”, “later”, “back”, “against”;
- text capitalization - transformation of characters into lowercase.

The methods that can be used in text sentiment analysis are well summarized by Medhat et. al. (2014) (fig. 4).

Many of the cited surveys show that it is appropriate to use the methods of supervised machine learning for opinion mining and sentiment analysis for online store customer reviews, of which the most successfully applied methods for categorization of text are: Support Vector Machines (SVM) and Naive Bayes (NB) classifier (Singh, Husain, 2014; Verma, Kiranjyoti, 2015).

Many of the aforementioned studies show that for sentiment analysis for customer reviews for the products and services it is appropriate to use the methods of machine learning - supervised learning, of which the most successfully applied for categorization of text are linear classifier Support Vector Machines (SVM) classifier based on the algorithm Naive Bayes (NB) (Singh, Husain, 2014; Verma, Kiranjyoti, 2015).
Fig. 4. Sentiment analysis methods (Medhat, Hassan, Korashy, 2014)

SVM is an algorithm that builds a model based on a given set of training examples and assigns new examples into one category or another, making it a non-probabilistic binary linear classifier. In classification based on the NB algorithm, belonging to a class is calculated based on the formula for finding the conditional probability of assigning the object to a class. Both methods are suitable for creating and implementing a model for classifying customer reviews into two categories – positive and negative.

To test the automatic classification based on the SVM method we have used one of the most popular tools for data mining and predictive analysis – RapidMiner. It provides interactive graphical user interface and tools for links analysis, analysis of unstructured text and log files. The process of extracting knowledge is realized through the build operators. This software provides more than 400 operators for analyzing data, including classification, clustering, and association analysis.

The data used for testing the proposed approach are online reviews collected from the Amazon.com website for tablets of brand Apple. Training data is a very important element in the realization of machine learning, because validation of the model is based on it. The created Rapid Miner model shows the classification of customer views on polarity (Fig. 5).
Based on the pattern, several posts are successfully tested and the result shows that from the analyzed 6 sample reviews only one was rated as negative (Fig. 6).

**Fig. 5. Classification customer reviews via SVM method**

**Fig. 6. Result of an analysis of posts by RapidMiner**
In practice, this is the last stage of the analysis of reviews. It shows the results and therefore the used software tools and the role of human interpretation of the results are important.

Similarly, the model that is based on the NB algorithm could be built. We made approbation and found that they obtain similar results.

Conclusion

The rapid development of social networking and sharing capabilities that provide many of the applications running on the Internet is a prerequisite for the generation of large collections of consumer reviews, impressions, shared feelings and emotions. Intelligent business analyses of these customer reviews is important to the business and therefore is subject to a research interest in the recent years. Since there is no specific algorithm available for viable search for knowledge in a text, based on the results of existing studies in this paper we propose an approach for analyzing the reviews of online stores’ customers, through which expressed opinions can be classified and conclusions about the quality of goods can be made.

The resulting new knowledge could help to improve the product range and customer satisfaction, and for e-commerce companies it is essential, because sales revenues largely depend on it. Furthermore, this kind of analysis can be used by managers to create successful business strategies based on the resulting in-depth and precise analyses and forecasts. Extracting new knowledge from Internet resources could be an important competitive advantage for companies involved in e-commerce, because in general it contributes to improving their business.

References


NEW HIERARCHY TREE MODEL FOR HANDLING RISK SOURCES

Stoycho STOEV

Abstract

The article offers a version of a model for handling basic sources of potential risk and defines basic components of the structure. From functional point of view are discussed the feasibility for implementation of the model as well as the specifics of setting and conversion of hierarchy tree structure for correct relationship between individual components.

Introduction

The development of modern business processes seeks to optimize economic efficiency. As a part of business ambience risk sources influence to a great degree the process of making business decisions. The risk in general is uncertainty (Chapman, 2003, p.35), and the economy seeks to isolate or avoid unstable environment. In this sense, traditional business processes are increasingly integrated elements of risk management.

The definition of risk management is presented as “coordinated activities to direct and control the Organization of risk” (ISO/IEC Guide’73, 2009, p.2). Successful management of risk implemented in the organization may affect the likelihood and consequences of emerging risks (ISO 31000, 2010, p.10). Therefore, these include benefits associated with better information in decision making, increased operational efficiency, financial reporting, competitive advantage and thus, better market presence.

The goal that we set in this article is to present a new hierarchy tree model for processing the overall risk within the corporeal management in quantification of existing sources of risk in the midst of implementing a software product.

I. The risk as an essential component of contemporary reality

The ISO / IEC 31000 standard discusses the risk (ISO 31000, 2010 as an important factor influencing organizations. It determines the consequences in terms of

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economic efficiency and professional reputation, as well as environmental, safety and social performance. Therefore, risk management helps organizations effectively cope with threats in an environment filled with uncertainty. Risk management is a process (Hillson, 2015, p.60), carried out continuously and integrated into the organizational structure of the company. This necessitates the inclusion of separate risk processing activities in the provision of overall corporate information.

Risk management activities are carried out in three main stages (ISACA, 2009, с.9):
- Identification and description of common risk sources into a register;
- Integration in a common model;
- Taking risk-justified business decisions;

In this sense, the role of different models for quantification of individual risks, as well as a logical link between the different elements within the overall risk increases.

Availability and/or the possibility of accidents-events seen in terms of the dynamics of a particular environment (fig.1). We can divide Business environment in two main fields: static and dynamic. In the static section is defined the concept of vulnerability\(^2\) (Astahov, 2010, p.153) which depends on the current state of the system. vulnerabilities in general have been identified as sources of risk and have some quantifiable dimension. In the perspective of the system changes, the sources of risk are defined as hazards. Due to the alleged nature of the amendment, they can hardly be listed in respect of their variance and value.

\[\text{From an analytical point of view risk vulnerabilities are valuable due to their characteristics (Kerzner, 2009):}\]

- **These are recognizable.** As part of internal company environment, risk vulnerabilities are components of business processes occurring in the company. Therefore they have the potential to be recognized and assessed.

- **Predictable.** Unlike the risk hazards that are outside the corporate environment, risk-vulnerability as part of it and hence predictable. Business knows and manages to a greater extent the environment in which it develops.
- **Company controlled.** The company is able to take preventive measures to reduce risk or respond to the threat of risk occurrence, i.e. business has greater control over the environment.

The organization of the sources of risk in a common system is necessary in terms of its automated processing. The diversity of sources of IT risk involves the use of a complicated system to calculate the overall risk. The main structures used in models of risk management are network and hierarchical ones.

Network structure (Wallace, Keil, Rai, A. 2004) allows building of complex interrelationships between individual risk sources. The major problem is related to the scale of composition. In the realization of networks with large numbers of elements presentation and management of the system are complicated, making it unsuitable for use.

The tree like structure is widely used in risk management. It is implemented in two main trees for analysis: Fault tree analysis, (ISO 31010, 2009, с.61) and Event tree analysis (Hohlov, 2001, p.64).


Complicated pattern of risk sources is proposed by Garvey (Garvey, 2009, p.7), in the system-of-systems hierarchy, which describes the relationship between abstract sets. A system with real components of hierarchy is represented by Mohammad (Mohammad, 1991), where individual subsystems are fixed and it allows flexible inclusion of new components.

In this context, we offer hierarchy tree model distinguished with versatility of the sources of risk and the possibility of practical implementation.

**II. Hierarchy tree model for estimation of risk**

Construction of a structural diagram of connections between sources of risk to define the requirements that it must meet for the purpose of study:

- We adopt that structural scheme must have a hierarchy nature. This will allow prioritization of risk sources, a clearer link between the components, the relationship between the sources of risk, more easily analyze of different sets of risk, etc..

- The structure reflects a snapshot of risk. That interrupts processes in time to examine the current state of the environment.

- The relationship between two or more components of risk to allow the inclusion of complex logic structures such as averaging, minimization, maximization or exclusion. This would allow not only the aggregation of individual values to obtain a total risk, but degeneration of complex logic model, too.
- Implementation of connection methods to quantify risk factors. Ability to use existing methods for quantifying risk structure for common risk analysis in the project.

We are offering the implementation structural diagram of the connections between the elements of risk to utilize tree like structure, and in particular binary tree. First, it must reflect the interaction of the components two by two, which may be linked to a simplified logical connections and secondly, the hierarchy tree structure data clearly visualize it easily and clearly built as a structure.

Used as basis for the realization of the hierarchy tree structure is one of the options of the binary tree to calculate the mathematical expression (Cormen, Leiserson, Rivest and Clifford, 2002). E.g. the following formula:

\[ f=(a+b)*c \]

may be represented as binary tree (figure 2). The content of the tree is determined by two main types of nodes: leaves (end nodes without subordinate components) and nodes connected to one or two subordinate components. To calculate the expression in the establishment of the tree, all mathematical operations are expressed as nodes, while variables are end nodes (leaves).

**Fig. 2. Schematic presentation of an expression through a binary tree**

Therefore, to realize the structure for handling sources of risk, the binary tree must be converted as follows. The leaves are defined as quantifying the various sources of risk, and the remaining units appear connection between them. The risk handling tree versions shown on figure 3.
Fig. 3. Tree structure of the relation between sources of risk

Where $R_{\text{all}}$ is the overall risk as a result of the links between all nodes in the tree.

To scan binary tree is used a recursive algorithm (Davis and Olson, 1988). For calculation under PostOrder method (left-right-root). In the logic of the code it is assumed that the left and right unit are valuable, but the root is a logical function to connect the two values (figure 4).

Fig. 4. PostOrder sequence of getting about the tree
In cases where the two subordinate nodes are also logical, i.e. a function, the result of which is also a numerical value and can be interpreted as a sheet node (i.e. a source of risk). The difference in calculating the part of the tree or the entire structure depends on what unit is passed as a parameter to the algorithm.

**III. Key elements of the tree**

Innovation in the proposed structure is hierarchical differentiation of all elements into two basic types (i.e. the elements of the tree are not homogeneous and are divided functionally):

1. **Information elements.** Nodes containing a specific value for a particular source of risk. As a medium (information carrier) they contain information on the nature of the source of risk, its quantification and other features.

2. **Multiplexer.** The general definition of a multiplexer is “Combinational logic with two types of inputs and one output, which provides connectivity to multiple sources of signal to a receiver”. In its function there are connecting nodes, hierarchically at least one level above the leaves and their role is to afford to build more complex logic between subordinate units.

We divide multiplexers in two main groups (figure 5):

1. Realized simpler logic or processing such as addition, subtraction, averaging, getting larger or smaller of the two input values, etc.

2. Realizing specific logic. That makes it possible to implement complex algorithms to calculate the incoming data, including indirect contact with other nodes of the hierarchy tree.

![Fig. 5. Connection between information nodes and multiplexers](image-url)
Figure 5 illustrates an example of a risk tree with four information nodes R11, R12, R21 and R22, connected through the multiplexers M1 and M2.

More specific is the Rall node, which is the root of the tree and through it will be derived total value of the risk model.

IV. Potential for using the model

The versatility of the model is presented through the implementation of several key features:

- **Multiplication of nodes.**
  In some of the options for structuring the sources of risk it is possible for a single source to influence the overall risk in different branches of the hierarchy tree (Figure 6). The model defines the possibility of replication in different branches of the tree associated with various elements of risk and varying weight of quantification.

Fig. 6. Multiplied impact of the source of risk

- **Decomposition of tree like structure for analysis.**
  The model allows to calculate the total risk, with the exclusion of certain areas of the hierarchy tree structure (Figure 7). This allows a detailed investigation of the influence of the sources of risk and changing the weight of various elements.
Fig. 7. Excluding particular sets of sources of risk

If the tree is built of separate branches of homogeneous sources of risk affecting the environment, the exclusion of individual branches will allow:
- On the one hand, the aim is for the specific medium to determine the influence of only one part of the tree.
- On the other hand, a separate source of risk can be included dependless of risk management level – a common structure.

Figure 8 shows the three main phases in the model for calculating and managing risk sources. At the first phase “information analysis” is carried out selection of significant sources of risk and building the tree. At the second stage are calibrated tree components. At the third phase is carried out assessment of the sources of risk in specific environments through expert analysis. Information obtained is transformed in reverse direction into a tree and at phase 1 are carried out the necessary analyzes.

Фиг. 8. Streams of information
V. Model specifics

In the implementation of the model attention should be paid to several key issues related to its normal functioning. We emphasize on the following specifics:

- **Range of values for a single source of risk.** Operation of model requests for appropriate definition of limits of change of each source of risk. On the one hand it allows controlling the correctness of submitted data and on the other helped to determine the quantitative intervals nodes-multiplexers or overall risk. All values set in the tree are virtually non-negative in the range $[0..1]$.

- **We define the requirements to the structure of tree.** The logical functionality of the tree is subject to the following rules:

  A. Each multiplexer must be connected with two sources of risk, that is to have filled his links. This allows the multiplexer to fulfill its tasks. Otherwise it leads to expression without specific result ($x=y+...$).

  B. The concept model suggests the possibility of an end node (source of risk) connected to the subordinate units. That is, there are two nodes without multiplexer to connect them. The point is to avoid expression without a mathematical operation between them ($x=yz$).

- **Methods for estimation of the overall risk.** For the possible values for the risk, as has been mentioned, is considered the plurality of 0 to 1 (or 0 to 100%). In the implementation of more complex tree structures it leads to unnecessary complication of the process of their construction. In fact, the problem consists not in determining the lower limit of risk, it should always be 0, but rather to set the maximum possible value for risk. We come to the conclusion for two versions of defining the range of possible values for total risk.

  A. **Standard method.** In this method, the overall risk ranges from 0 to 1. To achieve this target, the range of each source of risk is set in a manner in which the calculation of the overall risk does not exceed 1. Although this method is generally accepted to represent the values of the risk, in a developed hierarchical structure with the increase of the number of leaves in the tree, the method is complicated.

  B. **Equated method.** Another possible method is the one of equivalent limits of the value of the overall risk. The basis of the method lies in the preparation to identify possible ranges. In two steps, based on the minimum and maximum values for each source of risk, are calculated both limits for the overall risk of the entire tree. The upper limit is assumed to be 100 percent risk and in future processing of the total risk it is equated to it. For example, if for the calculated interval $(0.23..1.34)$ for certain values of the leaves we get 1.139, this percentage of the overall risk can be presented
as \( \frac{1,139}{1.34} = 0.85 \) or 85%. This method, although the need for preparation, facilitates the construction of more complex hierarchical structures.

- **Import of structures.** Tree like structure allows easy importing partial or entirely external structure to the current one in order to realize a more complex model of the environment. In Figure 9 are demonstrated the steps of connecting the two structures. At the first stage – the root of the second structure (total risk) is reorganized with desired multiplexer, then at the second step the selected source of risk for the first tree is replaced with all second structure.

- **Tracking of risk values in time.** Tree like structure accepts values and allows for calculation of overall risk at different time points (Figure 10). Each filling of the structure represents the instantaneous impact of risk factors in the middle of the given time.

![Fig. 9. Importing an external structure](image)

Time sections of the sources of risk are specific risk vulnerabilities of the environment. Modifications to the common or individual risks are tested in an environment of defined time points or in different specific media in the process of realization of the product. Changed values vary between the minimum and maximum possible limit for individual tested model parameters.

**VI. Conclusion**

The proposed hierarchy tree structure for handling sources of risk is a real alternative to existing models. Tree like structure offers a flexible approach to implement logic suitable for a particular business entity and is also suitable for applying different techniques for analysis of results.
The purpose of the model is to offer a logical foundation for the realization of software for automating processes for risk management.

**End Notes**

1. The importance of risk management is also emphasized in NIST (2002), p. 4.
2. Astakhov accepts that vulnerabilities do not cause direct loss of assets, yet under certain conditions that may represent prerequisites for damages originating from the risk.

**References**

Stoycho Stoev.
New Hierarchy Tree Model For Handling Risk Sources

SOME OPPORTUNITIES FOR STUDYING BANKING RISK CULTURE

Plamen DZHAPAROV

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<td>Although the need to assess banking risk culture increasingly comes to the attention of a number of authors, regulators and consulting organizations, studies in this area face a number of difficulties. However, they should not be regarded as insurmountable barriers to such studies, but as a starting point to defining a relevant research model. Regardless of the applied models, the final result of the analysis of risk culture should be an objective, independent and proactive assessment of the approach of the banking institution to risk and its opportunities and prospects for future action in this area.</td>
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Keywords: risk culture, banks, assessing risk culture.

Introduction

Speaking of studying the risk culture in banks, the opinions of experts range from “It's not that difficult” to “This is an extremely difficult task”. The truth is probably in the middle, but the indisputable fact is that in practice the attempts at such assessment encounter many obstacles. Therefore the barriers to analysis of risk culture in banks should at least be considered at two levels. First, it is necessary to draw up a summary of the challenges faced by the study of institutional risk culture in general. Second, emphasis should be placed on the specific problems in the study of banking risk culture. Only then could one talk about constructing an adequate model for studying the risk culture in modern banking institutions. In recent years a number of authors have tackled this task, but currently it is difficult to talk about complete continuity in the approaches used.

The Object of study in this paper is banking risk culture. The Subject of study are the opportunities for its evaluation and analysis. The aim of the study is to present the key barriers hampering the assessment of risk culture in banks and against this background to summarize and comment on existing models and frameworks for its study.

1. Challenges to the study of risk culture

Many of the difficulties in assessing the phenomenon of “risk culture” in banks are common to all organizations, including those outside the financial sphere. There-
fore, as a starting point of the analysis here we will use one of the most frequently quoted definitions of the term “risk culture” according to which it includes “norms of behaviour of individuals and groups within the organization that determine the way the individuals identify, understand, discuss and tackle the risks that the organization faces and takes” (Institute of International Finance, 2009, p. 32). On the basis of this definition we can conclude that the problems faced by the analysis of risk culture in the broadest sense arise primarily from the nature of this culture (Towers Watson, 2011, pp. 1-2) and in particular the fact that it is an interdisciplinary phenomenon that does not have exactly quantifiable boundaries.

Risk culture is significantly affected by the decisions taken at both the strategic and operational level, i.e. it is their indirect product. With great certainty, however, it could be concluded that at the same time it is also a medium for making the right decisions both by management and by other entities at all hierarchical levels in the organization. In other words, risk culture has a significant impact on the ability of the management to make long-term strategic decisions and that of the employees to make daily decisions (Institute of International Finance, 2009, p. 8).

In addition, risk culture is only one aspect of the overall institutional culture alongside innovation culture, culture of customer service, safety culture (Sheedy and Griffin, 2014, p. 4). Therefore it should not be seen as something separated from the values and attitudes of employees determining their behaviour in any other sphere of activity. In this sense, the evaluation of the effectiveness of risk culture should not be made for its own sake, or in isolation from the company-wide strategies and objectives defined by the senior management.

And something even more important - institutional risk culture by itself cannot be equated either with risk management or with the existing structures for risk management itself, but rather it constitutes the meaning and the priority attached to them by the staff. In the best case, the culture “empowers” these structures, but also vice versa – it can render them ineffective (Sheedy and Griffin, 2014, pp. 6-7). Culture is not positioned “inside people's heads”, but “somewhere between the heads of a group of people where symbols and meanings are expressed publicly, for example in the interaction of working teams, in board meetings, but also in material objects” (Alvesson, 2002, p. 4). It is therefore a much wider structure, reflecting the impact of multiple economic, social, psychological and behavioural determinants. They, in turn, appear in almost all organizational aspects - leadership, organizational structure, process organization, internal communication, incentives and employees training, etc.

In other words, risk culture is the sum of multiple interactions and processes that run continuously within the organization. In this sense, to get an idea of its overall
appearance, it is necessary for all of them to be investigated thoroughly enough. The examination of each of them individually, however, is in most cases too laborious. Another problem that arises here is the lack of guarantees that the sum of the scores of individual components will give a clear picture of the state of the whole. Moreover, in risk management “one plus one does not necessarily equal two” (Deloitte, 2013, p. 18). Besides, by grouping together the data from the analysis of the individual components, on the one hand the general principles and trends easily stand out, but on the other, details rich in information are lost in the process.

One of the most significant barriers to studying risk culture in general, arises from the fact that the dominant part of its elements and characteristics do not allow it to be defined in precise quantitative indicators, but suggest the predominant use of quality parameters. Some of the few quantitative metrics that could be useful are (Ernst&Young and IIF, 2013, p. 14):

- Number of risk limits that have been violated without prior approval “from above”;
- Number of identified in internal audit reports problems, associated with the risk;
- Percentage of declared by the employees and departments problems related to risk control;
- The ratio between the permanent employee remuneration and the variable incentives bound to the risk-weighted contribution of each of them to the Bank's results.

In fact, subject to monitoring here is not the risk culture in its aggregated form, but rather the individual behaviour, which is relatively easier to assess. Naturally, placing it in certain quantitative limits and parameters is also a serious challenge. Therefore, in practice, assessing organizational risk culture reflects the degree of compliance or non-compliance of the behaviour of individual employees with the treatment of risk and the agreed upon strategic level values, norms and practices in this area. The lack of a broad set of quantitative metrics that are directly related to the effectiveness of the risk culture within the organization, largely prevent the use of statistically significant empirical models for analysis and diagnostics. This fact significantly narrows the relevant research approaches and techniques.

So to the forefront in assessing organizational risk culture there come the following qualitative parameters: harmony in the attitudes of management and employees to risk-taking; presence of a single common language for risk; causes of violations of risk limits; completeness and clarity of risk strategies and policies; quality and frequency of staff risk-related training, and so on.

Assessment of these characteristics is largely based on the perceptions of individual members of the organization. In practice, their reporting is done through pre-
designed questionnaires that aim to cover and “capture” the overall vision of each employee of risk and its treatment and management. As already mentioned, risk culture manifests itself in thinking, actions and behaviour of all individuals and groups within the organization. Therefore, its analysis requires that the questionnaires use a wide range of psychological, behavioural, managerial and social variables. Besides, it is necessary to assess not only their isolated impact, but also their combined impact on the overall organizational risk culture. Moreover, for an objective and comprehensive assessment of risk culture in modern corporations, it is necessary to perform a study among representatives of all business fields and hierarchical levels, following the maxim that “risk is the same commitment for all”. However, this is extremely difficult with global corporations that operate in large geographical areas and in various business areas.

Another serious challenge to studying institutional risk culture is the shortage of trustworthy, complete and reliable information. It can mainly be due to the quality of the results obtained from the questionnaire responses of employees. In many cases they can demonstrate ambiguous and contradictory trends. Each employee's assessment of how clear the adopted by the board risk strategies and policies are, for example, is subjective. It depends on his/her qualifications and experience and his/her direct competence and responsibilities in the organization. Correct results of surveys carried out among individual managers and employees may be threatened by deliberately suppressing or distorting information. The reasons for this are usually of a personal nature (PricewaterhouseCoopers, 2011, p. 30). As such there can be identified the following: fear of punishment, lack of motivation, desire for career development, etc.

It is also possible that respondents do not have complete and reliable information on the questions asked or do not understand those well. This usually provokes employees to provide answers from the “positive scale” (Goodsall, 2011, p. 158), which inevitably leads to distortion of the results. This, in turn, causes illusory sense of comfort and security. All these restrictions would lead to “leakage” of the real attitudes of staff and incorrect assessment of the existing at a given time risk culture. This in turn requires very fine refinement of the chosen research approach.

Another problem in assessing organizational risk culture is that it is not appropriate to search for the “ideal” benchmark (Power et. al., 2013, p. 96) that reflects the best practices of each of its key components and is valid for all organizations. Our understanding of “good” and “bad” risk culture largely depends on the specifics of the activities of any particular organization, its long-term strategies and priorities, professed risk management philosophy and leading values.
Undoubtedly, all challenges to assessing risk culture in modern organizations apply fully to banking institutions. Moreover, the characteristics and dynamics of the banking business, together with the fact, that “firms in the financial industry differ from other firms in the extent to which employees typically make decisions regarding risk” (Stulz, 2016, p. 56), generate additional burdens and requirements. National and international regulatory authorities put increasing emphasis on the ability of banks to prove that they have an effective risk culture. Rating agencies and financial markets do recognize that “the status of the risk culture at financial companies strongly impacts their value” (Davidson et al., 2012, p. 12). Therefore approaches to assessing bank risk culture must continuously be brought in line with current regulations in this area, as well as with the best practices.

Undisputed is the fact that risk-taking is at the heart of banking, it is the engine of the banking business, because higher returns require taking more risk. In this sense it will not be an exaggeration to say that taking too little risk can be just as dangerous to the prosperity of the bank as the excessive “rush” into many high-risk transactions. It is the effective risk culture of banks that suggests that the risks taken will inevitably be justified and will be accepted as such by all entities in the banking organizational structure. Therefore, the study of risk culture in the bank should certainly be conducted with a distinction between taking “up-side” risks bidding odds to success and taking “down-side” risks regarded as a synonym for “loss”. Along with that the assessment model must also “take into account” the balance between both the justified and unjustified risks that have been taken.

Besides, traditional divisions of risk categories are currently in many cases not suitable for banking institutions. Risks that accompany banking are modified and increased continuously under the influence of factors such as daily product and process innovation and entry into new markets and territories. Typical examples in this regard are products that combine diverse characteristics (structured products) or cases of correlations and concentrations involving multiple risk classes. In this sense, the analysis of the risk culture of banks should cover the attitudes and behaviour of bank employees to the full range of traditional and new risk categories.

Besides the primary information generated from the questionnaires, fundamental to the preparation of a holistic, objective and impartial evaluation of organizational risk culture is also the collection of relevant, complete and reliable secondary information. It includes, for example, the statement of senior management in connection with the approved risk appetite, risk policy, documented goals and objectives of training programs for staff in relation to risk, etc. In most cases, however, this information is not public in nature, and has its manifestation only in domestic regulations,
policies and guidelines. And the banks are not inherently “open” to external researchers (Power et al., 2013, p. 9). Access to such documents is often very difficult. In many cases the information is even strictly confidential.

In a sense, the study of banking risk culture is facilitated by the presence of very strict regulations on the sector. They require banks to have certain public and internal documents in the field of risk management. But different regulations in different countries in certain situations can lead to contradictions or different interpretations, especially in cases of assessment of the risk culture in separate divisions of a large banking group.

2. Models for assessing risk culture

Currently frameworks, models and diagnostic tools for assessing institutional risk culture have been developed by most of the leading consulting organizations. In the professional practice of large corporations, including banking groups in Europe and the US, these analyses are supplemented also by the work of specialized organizational psychologists. Using statistical and psychological techniques, they identify what employees of the bank think, predict their future behaviour and offer options for adjustment where necessary.

A relatively comprehensive view of organizational risk culture provides the framework presented by Deloitte. Its purpose is both testing the effectiveness of the systems and processes, and behavioural analysis of the subjective factor - the management and employees. For this purpose a system of 16 indicators is used (Deloitte, 2011, p. 19). The evaluation of each of them includes a variety of techniques and approaches, bringing together a number of other quantitative and qualitative indicators. The indicators proposed within the framework are divided into four groups: risk competence, organization, relationships, motivation.

For each indicator there are further identified terminal values in the form of quantitative limits, “good” and “bad” practices, “desirable” and “harmful” behaviour, etc. As “harmful” conduct is considered, for example, the unwillingness to learn from previous mistakes, “rewarding” too aggressive risk taking, “following the herd”, etc. Examples of “desirable” behaviour are: consulting with others in case of doubt, perception of risk management as a personal commitment, fostering constructive and continuous dialogue about risk, etc. (Deloitte, 2013, p. 12).

A similar framework for assessing risk culture is offered by McKinsey & Company (Levy et al., 2010, pp. 5-6). Here the key factors determining risk culture are ten in number and can be set in the range between inadequate (high risk) and successful (low risk). These factors are classified into 4 groups - risk transparency, risk recognition, risk empathy and risk respect.
A similar model for assessing organizational risk culture is offered by Towers Watson & Co. It includes the development of a questionnaire on risk culture, consisting of eight categories of questions. These are: organizational culture; risk appetite, risk strategy and risk policies; commitment of senior management; roles and organizational structure; risk processes and risk control; accountability; technology and infrastructure; tools and methods. Then it notes that for a more comprehensive assessment of the risk culture in large corporations it is desirable that for each category there be drawn up a separate sub-questionnaire (Towers Watson, 2011, p. 3).

A relatively more complete model for assessing risk culture was proposed by the Institute for risk management (IRM). It presents risk culture as “the sum of multiple interactions” (Hindson, 2012, p. 16). Under the proposed model, assessment of risk culture must begin “inside-out”, i.e. first - analyze the personal predisposition to risk of the individuals in the organization. For this purpose, eight personality types are distinguished according to their attitude and predisposition towards risk (Trickey, 2012, p. 29). The analysis is complemented by an assessment of the ethical values of the individuals in the organization. With regard to them, the model includes three sets of questions: conforming to authorities (here is examined the propensity of the individuals to conform to the rules, their adherence to the “spirit of the law”), “ethics of care” (examined are qualities such as empathy, concern, respect), and “ethics of reason” (the focus here is on qualities such as wisdom, experience, prudence) (Lewis, 2012, p. 35).

Thus the individual predisposition of the employee to risk, together with his/her personal ethical values form his/her behaviour towards risk and determine the way he/she makes decisions regarding its treatment. As far as the organization is a group of individuals, its overall behaviour and attitude to risk (its culture) is nothing more than “a combination of the decisions concerning risk of all its members”. At the same time organizational risk culture is in a direct, unbreakable bond with the overall institutional culture. Therefore the authors of the model add new touches to the assessment of risk culture by offering the development of a simple matrix composed of 4 quadrants corresponding to 4 types of institutional culture characterizing the individual business organizations. Two dimensions determine the location of the organizational culture in this matrix – managerial spirit and “imposing agreement”.

The final stage of the IRM-model for assessing risk culture includes diagnosing its specific components. For this purpose, eight key indicators are used, classified into four groups - “tone at the top”, leadership, competencies and decision-making. All these indicators should be managed and implemented effectively to ensure a healthy risk culture in line with the strategic objectives and the business model of the organization (Hillson et al., 2012, p. 25).
Thus, combining the results of several analyses, the IRM-model enables a consolidated view of the risk culture of the organization. It reflects both the individual attitudes and perceptions of the risks of its members and the collective corporate attitude towards risk, reflected in the decisions taken at all hierarchical levels.

*Ernst and Young, Pricewaterhouse Coopers and KPMG*, in turn, also bring their own frameworks representing the main elements of risk culture. In summary, the indicators for assessing risk culture within all consulting agencies are presented in Table 1.

**Table 1**

<table>
<thead>
<tr>
<th>Factor Categories</th>
<th>Deloitte</th>
<th>Ernst&amp; Young</th>
<th>IRM</th>
<th>KPMG</th>
<th>McKinsey</th>
<th>PWC</th>
<th>Towers Watson</th>
</tr>
</thead>
<tbody>
<tr>
<td>Acknowledgement of risk</td>
<td></td>
<td></td>
<td>X</td>
<td>X</td>
<td></td>
<td></td>
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<tr>
<td>Communication</td>
<td>X</td>
<td></td>
<td></td>
<td>X</td>
<td></td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>Compensation and performance management</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>IT Systems</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>X</td>
</tr>
<tr>
<td>Leadership ('tone from the top')</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td></td>
<td>X</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>Relationships (between employees)</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
<td>X</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>Respect for risk</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
<td>X</td>
<td></td>
<td></td>
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<tr>
<td>Responsiveness to risk</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
<td>X</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Risk competencies (of employees)</td>
<td>X</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>X</td>
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<tr>
<td>Risk facilitation (status of risk function)</td>
<td></td>
<td></td>
<td>X</td>
<td></td>
<td>X</td>
<td></td>
<td></td>
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<tr>
<td>Risk management processes and procedures</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>X</td>
</tr>
<tr>
<td>Risk ownership (clear accountabilities)</td>
<td>X</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>X</td>
</tr>
<tr>
<td>Structure of organization and governance</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
<td>X</td>
</tr>
</tbody>
</table>

*Source: Power et al., 2013, p. 94.*

The basic idea of all the models obviously is to quantify (where possible) and evaluate the quality of the risk culture of the organization as an aggregate of the measured elements and on this basis to give priority to those that require special
attention. The “signs” of the risk culture, however imperfect they are, should be benchmarked against a set of agreed upon criteria, allowing for the comparison of the “actual” risk culture with some ideal one. This allows us to identify “gaps” that can then be the subject of further interventions to improve problematic “signs”.

It is obvious that on the surface there are some differences between the frameworks of the individual consulting agencies. For example, some of them (EY, PWC) focus on systems and structures underlying risk management. In contrast to those, with others (Deloitte, McKinsey) the focus is on the behavioural aspects and the relationships within the organization. This discrepancy suggests that still no definite agreement has been achieved on the “indicators” by which to judge the quality of risk culture within the organization.

Despite the different opinions on the focus and specification of the elements that make up risk culture, there is considerable continuity in the approaches. In particular, there is general confidence that risk culture is something that should be investigated and managed and therefore should be monitored in a structured way using different tools. Between the elements themselves there are also more similarities than diametrical differences. So, for example, as a factor in the risk culture in almost all models, there is pointed out the “tone at the top” (leadership). Other common categories are communication, remuneration systems, performance management, risk management and organization of risk management.

All models are united also around the view that in order to obtain adequate, reliable and statistically significant data it is necessary that in the study there participate sufficient number of representatives of all hierarchical levels, business fields, divisions and units within the institution, selected randomly. Secondary data, in turn, are obtained through available public information relating to the structural and process construction of risk management.

As a major “bottleneck” in the reviewed models there can be pointed out the fact that many of their components overflow into more general corporate guiding principles rather than being strictly tied to risk problematics (Power et. al., 2013, p. 95). In the model of IRM, for example, the emphasis is on the purely managerial categories, such as management, competencies, process of decision making. The model of Deloitte, on the other hand, considers the “continuous culture improvement” (Deloitte, 2012, p. 6), by which reference is made to the management concept of total quality management and the philosophy of continuous improvement. Such blurring of the focus is commonplace in discussions of risk culture, which once again proves that it is a complex abstraction of a wide range of interrelated determinants.
In most models and frameworks presented by the consulting organizations, another conceptual problem can be seen. For the most part they consider only the pure “downside” risk, i.e. risk is articulated as something bad that should be reduced by risk culture. In this sense it is seen and presented as a kind of “brake” to pure “downside” risk. This interpretation significantly narrows the scope of the phenomenon of “risk culture” equating it largely to the processes and procedures of risk management, “called” to provide the appropriate degree of avoiding unjustified risks.

Here comes to the fore the question of the suitability of the considered “external” models for the evaluation of banking risk culture. As far as banks can be considered as “merchants of a special kind” (Vachkov et al., 2009, p. 85), the presented models for assessing organizational risk culture in the broadest sense, should produce results in respect to those, too. However, their credibility should not be absolutized. The developed frameworks and models mark the guidelines and parameters for assessing bank risk culture, but they should not be applied “blindly” and immediately. Specifics in the structure and activity of the vaults in general, and of each tested bank, in particular, set additional requirements to the models used.

Besides the models for assessing risk culture of organizations from the practice, here we must also dwell upon the available regulatory and academic publications on the subject. The only regulatory document relating specifically to the assessment of the risk culture of banking institutions is the work of the Financial Stability Board (Financial Stability Board, 2014). The framework includes three main sections: fundamental elements of good risk culture, indicators of good risk culture and common supervisory guidelines. As fundamental elements there are defined risk management, risk appetite and compensations. FSB offers 4 groups of indicators relating to the tone at the top, responsibility, effective communication and opportunities for escalation, challenging and stimulation.

Unlike the practical sphere, in the academic area a deficit of developments relating to the research capacities of banking risk culture is still felt. In one of the few comprehensive scientific studies on the subject even the presence of “academic negligence” on the subject was established (Power et. al., 2013, p. 89). Similar to the approach of consulting agencies is the one proposed by McConnell. In his work he presents six key drivers for assessing risk culture: leadership; strategy; making decisions; controls / checks; recruitment, training, competence; salaries (McConnell, 2013, pp. 58-63). The framework of the author is based on a developed by the FSA methodology for fair treatment of clients in its part devoted to culture (Financial Services Authority, 2007).
A different perspective on the issue of the study of the risk culture of financial institutions is offered by Power, Ashby and Palermo. They present a relatively neutral vision of risk culture, considering that it is not appropriate in itself to talk about “good” or “bad” risk culture. In other publications authors get even farther in their criticism of the existing models for assessing risk culture. For example, they question the significance of the “tone at the top” in the formation of risk culture (Power et al., 2014, p. 7).

The authors base their study on six key “dilemmas” that “determine and are fundamental to the way organizations think about and act on their risk culture”. In other words, risk culture is an expression of the organization's position between the two extremes of the particular “dilemma”. The authors believe that with the institutions taking a balanced position between the two extremes, one can speak of more effective risk culture. The “dilemmas” are: 1) The authority of the risk function: business partner or an independent advisor?; 2) What is based on the relationship between the risk function and business units - informal networks or formal processes?; 3) Risk or control?; 4) Internal change or use of external consultants?; 5) Own risks culture or regulatory culture?; 6) Levers to influence behaviour, ethics or incentives?

Another piece of academic research dedicated to the study of banking risk culture is the work of Sheedy and Griffin. In 2014-2015 they conducted a survey of 30,126 employees from 271 business units in a total of seven major Canadian and Australian banks (Sheedy and Griffin, 2016, p. 4). The study involved employees from all levels, with certain preponderance of middle-level and senior managers, as well as specialists in risk management. The methodology of the study focuses on the assessment of risk culture, but in practice it may be defined as a broader one, covering also behavioural analysis to risk and perception of staff of built structures to support risk management. More specifically, polls consist mainly of statements that require answers on the six-level scale of Likart. Questions are grouped into 5 blocks: demographics, personal risk tolerance, risk culture, perceptions of the risk structures of the bank, behaviour towards risk.

In order to assess risk culture Sheedy and Griffin use a specially developed scale. The process of validation of this scale identifies four main factors of risk culture. It is important to note that the authors do not actually investigate the individual behaviour of each employee, but calculate average factor estimates. They are created as an average of the 3 to 6 related items describing the factor. The four factors regarding risk culture are: evaluation, proactivity, avoidance and management. In another block are evaluated employee perceptions of risk structures in the bank. A third group of questions relates to the behaviour of staff in relation to risk. Here employees appreciate both their own behaviour and their observations on that of their colleagues.
Undoubtedly, the reviewed research model has many contributions in the field of empirical evaluation of the issues of risk and risk culture. It is sufficient to note that it is for the first time that there has been made an attempt at an almost entirely quantitative evaluation of the studied phenomenon based on a number of statistical methods.

However, applying this approach in its full form in other conditions would be very problematic, even after its eventual adaptation locally. This finding is based on several important circumstances. First, the study of Sheedy and Griffin does not focus on part of the widely accepted determinants of risk culture, such as “tone at the top”, the functions of risk committees and the chief risk director, risk communication, etc. The rationale of the authors is that “by these measures the seven banks in the study rate very well” (Sheedy and Griffin, 2016, p. 22). The problem here arises from the fact that at present in most countries there have not been conducted any studies providing grounds to making the same prior assumptions.

Second, although risk culture is at the base of the study, it actually has a different purpose from its analysis, namely “a primary aim of the study is to better understand the relationship between risk structures, culture and behaviour in order to promote better risk behaviour” (Sheedy and Griffin, 2016, p. 16). In other words, risk governance and other structures supporting risk management are seen as something different, but correlated with risk culture. In turn, the structures and culture, together, affect behaviour towards risk, which is seen as a dependent variable in the regression analysis. In our opinion, this approach somewhat “encapsulates” risk culture, putting it too narrowly and isolating it from its important elements such as training programs, remuneration schemes, etc. Third, it is questionable how reliable some of the computed factor scores could be, such as those based on the self-assessment of each employee of his own behaviour towards risk.

Conclusion

Amid all these considerations one thing is certain - to date there is no single and indisputable “right” model to research and analyze the risk culture of organizations, and banks in particular. However, the majority of authors and consulting organizations are united around the opinion that surveys are the most appropriate research method. For this purpose it is necessary to apply an individual approach to the study of banking risk culture. This means that before compiling relevant questionnaires, it is necessary to analyze what is the “common ground” on which the surveyed banks operate and what impact it has on the formation of their risk culture. Furthermore, depending on the purpose and depth of the study, it is necessary to draw up in advance a conceptual framework of risk culture, including a number of categories based
on its components and determinants. Finally, the categories must be sufficiently flexible to be able to adapt to the specific structural and process organization of the surveyed institutions. On this basis we can now proceed to the formulation of the specific questions in the survey.

End Notes

1 In the English literature there are accepted the expressions “measuring risk culture” and “assessing risk culture”, which in Bulgarian translate literally as “assessment of the risk culture.” However, given the characteristics of the category of “risk culture” and the meaning put into the term “assessment” in the theory and practice in our country, we consider it more relevant to speak of a “study” and “analysis” of the risk culture, rather than of its “assessment”, “evaluation”, “measuring”, “diagnosing”, etc. However, in the text there are present the terms “assessment” and “evaluation”. The objective is, on the one hand, to preserve the meaning given in the original source, and on the other - to avoid repetitions.

2 The study draws up the top 10 key factors based on the investigation of over 20 cases involving failures of risk culture in one area or another. Besides financial losses due to bad risk culture, the study examines cases involving multiple deaths of patients due to hospital negligence; failures in security that cost huge losses to organizations; legal solutions that companies resort to in order to avoid future reputational damage; cases of commercial fraud, etc. According to the study the drawn up 10 key factors are found in all organizations and are of generally valid nature.

References


A CONCEPTUAL MODEL OF A WEB BASED SYSTEM DESIGNED FOR DATA MINING WEB RESOURCES

Iva MAKEDONSKA¹

Abstract

This article discusses the disadvantages of the current process of data mining web resources in e-commerce and the reasonable circumstances for the application of intelligent methods. The proposed web-based system aims to overcome existing drawbacks in the process of web mining, bringing together the functions of three separate types of software into one. The key module in the system is a multi-agent system that performs local expertise and web mining based on data collected from various web resources. Using such a web system for analyzing a web resource provides the tools and knowledge necessary for the proper development of the e-store.

Keywords:
e-commerce websites, web resources, web mining, web analytics.

Introduction

In the recent years e-commerce has been gaining more popularity and has seen a remarkable growth in sales and purchases of goods. There has been increasing consumer interest in online shopping, which in turn leads to an increase in the number of e-stores and online transactions. To retain customers and optimize their market position, managers of e-shops must have means of intelligent analysis and forecasts. The process of analysis includes detection of models and links in data, stored in log files in the websites or applications as well as in operational databases. Data mining facilitates management solutions for personalized content, updates the services offered and introduces more qualitative structure of websites.

There are many software products that help owners of e-stores and automate some of the processes in the analysis of traffic to the websites. The main disadvantage of these programs is that making an adequate business decision imposes pooling the obtained knowledge and results of all the products while the use of conventional technologies does not provide it. By contemporary methods from the field of artificial intelligence solutions are offered to many of the IT problems in e-commerce. The implementation of web-based intelligent system ensures the integration of various

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information sources related to the analysis of traffic to the site, the extraction of data and creation of suggestions and forecasts for effective management of e-business.

The aim of this article is to propose a model of a web-based system with technologies from the field of artificial intelligence that compensate for the shortcomings of the existing process of web mining from web resources.

1. Existing solutions for web mining from web resources

Analysis, and more specifically the analysis of web resources, occupies a strategic place in e-business. According to the Gartner’s report (Parenteau, 2015) "Every business is analytical, every business process is analytical and every business user is an analyst." According to this report new platforms for analysis and data mining are required, to allow non-specialists to be able to work by themselves and manage a wide range of analytical processes. The sample characteristics that such a system must contain are:

- Self-service: an opportunity for the users to create their own queries and analyze data based on their needs;
- Flexibility and expandability: the possibility of adding new data sources;
- Orientation: fast and intuitive orientation of the users in the environment when creating reports and various visualizations;
- Connectivity: access to different types of data, such as log files, social networks, files, and more.
- Mobility: access to the application from various devices.

The above listed characteristics are among the main ones that need to be covered in creating systems for the analysis of web resources. We have planned to include exactly them in the proposed model of web-based system.

A key concept in the analysis of web resources and the pursuit of knowledge is business intelligence, which in recent years has been changing at exceptional rates (Rennhackkamp, 2012), (Chen, Chiang, 2012). The use of analyzes is increasing, together with the growing volume of data and their increasing complexity. The trends that can be seen in creating software for analyzing are the transition from descriptive reports and dashboards to analysis of the data and forecast modeling. So far the traditionally used analytical tools such as ETL, data warehousing and reports cannot fully meet the growing analytical demands of organizations. All this is a prerequisite for talking about new modern alternatives.

In the context of what has been described so far, over the last few years more and more large companies such as SAS, IBM, etc., have imposed the term Web Analytics 3.0 analysis (Philips, 2014) (Davenport, 2013) and (Davis, 2016). Its
advantages over its predecessors Web Analytics 1.0 and Web Analytics 2.0 include the ability to apply hybrid technology in the process of analyzing web resources that include traditional and not so familiar techniques as well as analysis becoming an inseparable part of business decisions. In terms of the methods applied intelligent agents and neural networks are increasingly used at different stages to automate some of the processes of analysis of web resources and data mining (Song, Fang, 2010, p. 201).

The standard applications for web analytics that are available on the market today are representatives of Web Analytics 2.0 (Dubois, 2011). The common feature of the systems of this kind is that they are three-layer. The first layer includes the data itself such as log files, social networking and other individual files. The log files are the main source used for data in a large number of applications. The second layer is associated with the method of processing the collected data and how the information obtained will be applied to business. The collected data are represented by a standard or modified dashboard, where the key identifiers reflect different perspectives.

The third layer is the link between the other two, which provides an overview of the development of the company in order to be able to answer questions put before the business. The disadvantage of these systems is the lack of a possibility to support the decision-making process.

Based on the above, we believe that web analytics products for small and medium-sized businesses need to step onto and borrow some of the characteristics set out in Web 3.0 analysis and Gartner report from 2015.

2. Disadvantages of the ongoing process of web mining from web resources

As mentioned in the previous paragraph, most software products for web analytics are representatives of the Web Analytics 2.0 and use as fundamental source of data log files, and as a way to visualize the obtained information dashboard are applied. Log files record every page visit from a website that is hosted on a server. Entries in the file consist of several fields such as date and time of visit, accessible resource, IP address, and browser used (Markov, Larose, 2007, p. 148). Collected data in the files are used to obtain knowledge about navigation behavior of the users in the sites. Therefore the main source of data for web mining and the process of customizing the web services are log files (Losarwar, 2012). The disadvantages of the current process of data mining can be summarized in the following:

• A lengthy process. The process goes through several stages, which leads to slowing it down. It is necessary, initially to define what information sources will be
used, then to integrate them into the system, and finally to identify ways of visualization of the offered reports by a dashboard.

- Use of different software programs. Analyzing only the log files does not give us enough information about the e-store and this requires the use of other products in the process of analyzing usability and data mining. (Croll, Power, 2009, p.353). On the software market for a website analysis there is a variety of products, each of which adds an additional type of analysis. Part of the applications use software for analysis of traffic to the site, others focus on data from social networks, still others, emphasize on the analysis of the advertising and marketing of a given company. Out of the available diversity the user trusts a number of software applications for analysis and uses them to get a complete picture of the current status of their e-business. This in turn requires additional time needed for examining the reports received by the dashboard and extra time for training to work with interfaces of different products. On the other hand, users interpret the obtained knowledge themselves, which leads to subjectivity (Troster, 2016).

- The use of various types of specialized software results in increased costs. As mentioned, the current software applications lack the means to support the process of decision making, such as forecasting tools. At this stage, making, a qualitative analysis of the e-store, which incorporates forecasting numbers and data mining, requires several types of software. The testing of various applications is associated with costs that a start-up business can hardly afford. This is why small businesses prefer to invest in quality analysts and use free software that has limited features (Kaushik, 2007, p. 84).

Thus, it can be summarized that the process of web mining from web resources requires knowledge of various software products and data exchange between them, which is time consuming and accompanied by high financial costs.

It is necessary to find a solution to the problems described above and to propose a new approach to this task. Such an alternative is the creation of a software product which integrates the advantages of products used alone to extract knowledge from web resources with appropriate intelligent methods.

The prerequisites for the creation of such software are several. Firstly to build applications for the analysis of web resources it is necessary to include intelligent methods that can handle, on the one hand, the large volume of incoming data - often incomplete and inconsistent, and on the other hand, to analyze the various data types. Secondly, the growing number of users who do not have deep knowledge of web mining, but are willing to analyze data from their e-store, requires the creation of instruments to help reading the extracted knowledge.
Taking into consideration what was mentioned above, **we believe that software is necessary for analysis of web resources to assist users through intelligent methods in making decisions and providing information in a comprehensible form.**

3. A conceptual model of web-based system for web mining from web resources

The proposed web system should allow for real-time analysis to be carried out and to respond appropriately to changes in the site. As the most significant phase of the system is determined the ability to communicate with the consumer and display proposals for the future development of the website, which in the current process of web analytics is missing.

The created conceptual model (Figure 1) is based on data flows and activities taking place in a web-based system. The conceptual model illustrates that users are able to communicate with each module separately and receive a result depending on their current needs, through which the characteristic “self-service” is executed.

![Figure 1. A conceptual model of web-based system for data mining from web resources](image)
The system includes three modules: Analysis, Multi-agent system (MAS) and Neural network (NN). Each of the modules performs a particular type of tasks which in the currently existing process are committed by various types of software.

The Analysis Module aims to collect data from different informational web sources which the owner of a store uses to analyze the state of their business. Such sources of information can be: the website e-store, social networks and the created fan page of their company or product, applications for the analysis of the log files and applications for marketing campaigns.

Practice shows that monitoring and analysing the e-store does not just rely on one source of information but uses several web resources to be able to cover all aspects of the researched object.

For integration and visualization of data the web system relies on a standard tool called dashboard (Few, 2006, p. 12). Dashboards are interactive tools for visualization of key performance indicators which significantly improve the way of understanding the analyzed data (Lavinsky, 2013). According to the Gartner Group report (Gartner Group, 2013) for business intelligence and analysis platforms “more and more software companies build diagnostic analysis using critical advantages of visual dashboards. This software allows users to understand the different aspects of the data and to discover new knowledge.”

The main functions that implement the module are as follows:

• Gathering and summarizing data from log files and applications to analyze various activities of websites;
• Representation of user’s data in different variations by dashboards;
• Transmission of a summary of the MAS module.

The various activities in the Analysis Module are implemented in separate layers. For creating the triple layer architecture we have investigated the architectures of the three highest-rated software products for data analysis and have used the dashboards – Tableau Software, QlikView, Microsoft software. For example, communication with the consumer can be found in a separate layer. The data, which is obtained from applications, is appropriate to be in a separate layer and its transformation should also be separated. This yields a three-layer architecture, on the base of which the module is created (Figure 2).
Data layer. There are diverse data that are received by the applications to analyze websites in this layer. Except the log files and data from social networks, a data for sales analysis and others are included in it.

Server layer. The layer is composed of two types of servers. One server is used for obtaining the converted requests from users and for displaying data such as images. The other server centrally manages data sources and executes processes on data analysis, and an analysis of the incoming log files. As a result of the executed query the returned data is visualized by various graphs and charts (Hanrahan, 2006).

The role of the connectors is to connect the server layer with the application data. A number of standard connectors for databases such as Microsoft Excel, SQL Server, Oracle and others are also included. There is also a general ODBC connector for systems that do not have their own connector. One of the main advantages offered are the two modes of operation: "live link" and "memory storage." The users choose what mode to work in and which apps to visualize data from. The request is submitted to a router, played by Gateway. In turn it transmits the request to the layer of servers that converts it and submits it to the connectors. The latter in turn connect with the selected applications. In reverse order a response is returned to be submitted in an appropriate form to the customers.

The explored architecture greatly resembles the architecture of the applications of Web 2.0 analysis, where there is a division into separate layers of the information sources and their way of processing. The advantage of this division is the ability to add new sources at any time, which also executes the characteristics of flexibility and expandability. The envisaged module functions overlap with the existing applications used. By adding the other two modules, the process of web analysis could fully meet the needs of the users and help making business decisions.
The model of the web system contains the idea of a **multi-agent** system which performs functions of local expertise, conversion of input and output data, communication with the other modules and the user. Every one of the other modules works with a different type of data and the relationship between them would not be possible without adding an intermediate environment.

MAS is the key to the whole web system because it is exactly where the automated data mining and preparation of proposals for making business decisions is carried out. According to Jones and Jacobs (2000) the cooperation between the agents, the exchange of knowledge and results creates prerequisites for solving a problem.

The composition of the MAS includes 4 agents (fig. 3), each of which performs a different task, and the result is used to achieve the purpose of the entire module. Given the participation of the four agents and the streams of data to be exchanged between them, we believe it is appropriate to choose an organization of agents in the MAS type “team” (Horling, Lesser, 2005) (Argente, 2006). In the team organization several agents “agree” to work together to achieve a common goal.

**Figure 3. A conceptual model of MAC**

The role of the **Web Agent** is to connect with external systems that do not share a common language for communication among the agents in MAS, namely Analysis modules and NMmodule. Thus the results of the two modules of the Web system are transferred for further processing by the agents before the end results are presented to the user.

The **control agent** is based on rules, and based on the information received from various agents, it checks the rules applicable to a given situation and displays the result. It receives the user's query, converted by a communication agent, considers
what data it needs further and sends a request for information resources to other agents. After receiving the necessary data, the rules are triggered and a solution is output and then transmitted to the agent communicating with the user.

The purpose of the **communication agent** is to provide graphical interface for the user interaction with the web system. Once the application is processed a response is returned by the web system.

The main goals of the **Information Agent** are to collect data from other agents, convert them to an appropriate form and take care of their transmission and store them into an information block. It directly contacts the control agent by offering information resources.

Even if one of the agents stops functioning, the work of the MAS will not be compromised (Riekki and Huhtinen, 2003, p. 1188).

The main functions that MAS implements are:

- Communication with the user and understanding of their goals (communication agent);
- Collecting information about the usability of the site from the Analysis module and from the Neural Networks module (Web agent);
- Transformation of data (Information agent);
- Analyzing the information received from Analysis module and Neural Network module, data mining and outputting proposals related to the web site (Control agent);
- Answer the purposes put by the consumer (Control agent).

The agent structure approach that is proposed to build the MAS, enables clear differentiation of the tasks and the functionalities of each of the agents in the MAS. This, in turn, allows for expansion of the MAS, by adding new intelligent units. Thus, the MAS can easily adapt to the changes made and requirements.

The observation of data from different sources and their analysis is often insufficient for the development of an e-store. Important for the business is the ability to predict values and move to different scenarios in order to better understand the state of the e-store. In order to predict certain values we believe it is appropriate to use a **Neural Network module**. The benefit of applying NN is evidenced by a number of examples from the businesses, related to user profiling with various forecasts, pattern recognition, data mining and others. The advantage of combining NN software is the ability to automatically process the data from NN which come from different sources. The connection of the NN module with the user is expressed in two ways. On the one hand, users can import their own files with sample data on the basis of which to build a NN. On the other hand, to submit applications and find predictive values with the already “trained” NN (Heaton, 2010, p. 112). The reverse
communication is expressed in displaying query results and the identified relationships between selected values. The Neural Network module is composed of two parts – “Creating NN” and “Applications”.

The input data for the sub-module “Creating NN” represent files containing tabular data from which to create, train and test NN. The files can be obtained from the MAS or directly from the user. The possibility of obtaining data from various sources ensures that the system will work even if there is an error in the other modules.

Functions that a NN implements are as follows:

- Processing and clearing the noise of received files;
- Creating and training NN;
- Displaying the relationships between variables.

The advantage of using NN is the possibility of files being processed to contain data from different applications. This can capture connections and discover new relationships that by other means could not be implemented. This tool is used especially when connecting data from essentially different software products (e.g. Google Analytics, Piwik, Sales Force and others) used for the analysis of the e-store. Sub-module “Applications” assists the user in the query to NN and putting the results into a type that is comprehensible to the user. It is most clearly visible in this sub-module that a self-service feature is implemented, which was mentioned in the Gartner report of 2015, and namely, that the user himself sets the request depending on their current needs.

Combining MAS with a NN and a dashboard in one web system supports the user into performing a qualitative analysis of information resources for an e-store and data mining, taking advantage of each of the types of software. All of the characteristics of a web system in the Gartner report that we started with, are implemented in the individual modules of the system.

A web-based system is built on a modular principle and brings the advantages of the modular architecture (Homer, 2013). The chosen principle ensures minimum correlation between the components of the system, and thus the risk of failure is limited. The ability of the user to communicate with each one of the modules separately, gives freedom to choose according to specific needs. Based on the described manner of operation of the system and data mining, it is assumed that the system adequately meets the needs of users and provides the appropriate recommendations for future action.
Conclusion

The article proposes a model of a web system, which eliminates the obstacles in the process of web mining from web resources. The proposed system consists of separate modules, which makes it flexible and adaptable to changes. A key role in it have the intelligent technologies that enable operating under conditions of enormous volumes of information (the big data problem), processing different types of data, solving problems for which there is no algorithm and so on. The model was successfully approbated.

The web-based system is designed for companies and individuals that use different web based systems and need forecasts and analyzes of dependencies. The proposed system meets the needs of users, providing cooperation over the steps to achieving the objectives set by means of communication and process automation.

References


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Printing division of the
University of Economics – Varna
ISSN 2367-6957