UDC 334.72:001.895(497.7)
Original scientific paper

Iskra STANCHEVA-GIGOV[*])
Darko BEZANOSKI[**])

INNOVATION AND ITS PERSPECTIVES IN REPUBLIC OF MACEDONIA

Abstract

In contemporary world innovation is equally important factor for competitiveness in both the world and the domestic market. The country's ability to sustain economic growth and competitiveness is in the activation of innovation and learning. Hence, the innovation present a challenge for any one country and company in particular for those companies that are exposed to international competition.

Taking into account the importance of innovation in the modern world, this paper considers the issue of innovation of the Republic of Macedonia as well as opportunities for its improvement. For this purpose is analyzed the data available in several commonly cited and used indexes of innovation. The working hypothesis in this paper is that the Republic of Macedonia regarding the innovation is a typical example of a Southeast Europe region and together with the other countries of the region is far from the innovative leaders and significantly lagging behind the EU-28 average. The major findings of the paper confirm that Macedonia is a "modest innovator", a typical representative of the South Eastern Europe (SEE) countries, and based on the perceived strengths and weaknesses, there is still much to do to improve its current condition of innovation.

[*]) Ph.D., Institute of Economics - Skopje, R. Macedonia, E-mail: iskra@ek-inst.ukim.edu.mk
[**]) M.Sc., E-mail: darko_topce@yahoo.com

Keywords: innovation, indexes, Macedonia, Southeastern Europe, competitiveness, opportunities and prospects

JEL classification: O 31, O 38

Introduction

In the modern world, innovation and knowledge become the most important source of market success and sustainable competitive advantage. Therefore, in such an environment the issue of measurement and understanding of innovation of companies and countries is essential.

The importance of innovation for each country can be perceived also in the large number of studies that have been conducted for the innovative features of the countries and regions. The traditional approach to measuring innovation is based on parameters such as the number of patents and published articles in scientific journals per million people, i.e. investment in research and development. But, with the predominance of understanding that innovation is a multidimensional phenomenon, currently for evaluation of innovation are used complex models based on ten parameters. Using such models, based on innovative features, world economies are ranked by various annual reports.

However, there are two problems. The first problem arises from the fact that there are many definitions of innovation and as result of that there are many different measures i.e. operationalization of innovation. This leads in a number of research results that differ from each other. The second problem is related to the fact that the analysis found in existing reports are mainly associated with the most innovative countries or those with the greatest change in the level of innovation, and that small countries with average features are poorly mentioned in the analysis. But, after a recent study[1] found that innovation in low and middle-income countries have a much greater impact on economic growth than in developed countries, has increased the need for better understanding of the innovative performance of these countries. This result can be better understood if it is known that the innovation activity in low and middle-income countries enables more efficient and faster absorption of imported technology, and thus multiply the effect of growth.

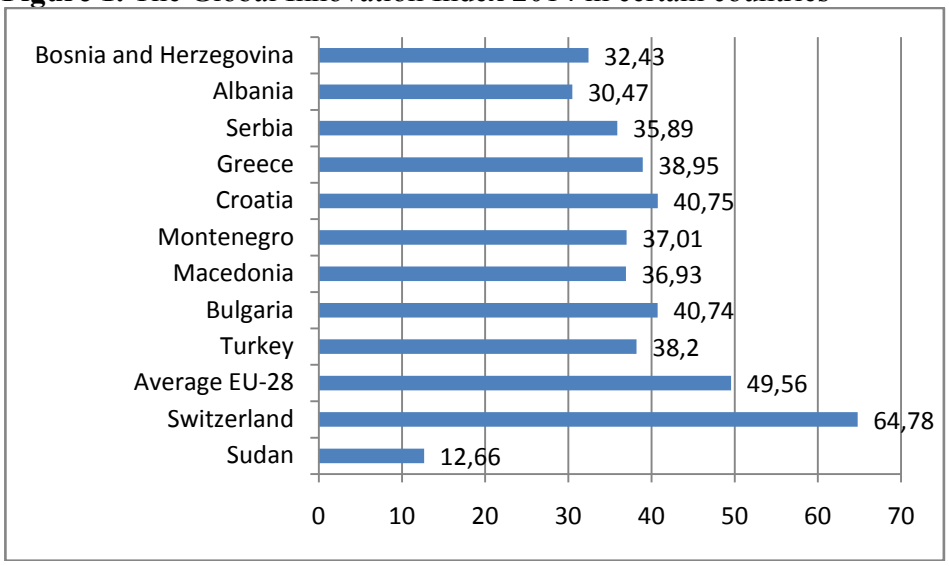
[1] Intelligence Unit, Innovation: Transforming the way business creates, Economist, 2007

Given that the Republic of Macedonia is categorized into countries with medium level of development, implies the need to overcome these problems. For this purpose, on the basis of data from multiple sources, it is necessary to analyze its innovative performance, to compare with the other countries of SEE the region and leading countries, especially those of the EU, and to provide insight into the strengths and weaknesses of the innovative policy and practice. Hence the idea of this paper to answer the question: how much is innovative Macedonian economy? For this purpose are analyzed the data available in several most commonly cited and used indexes of innovation. These are: the Global Competitiveness Index, the Global Innovation Index, the Index of Knowledge Economy and Innovation Index of the EU.

1. The Macedonian innovative potential

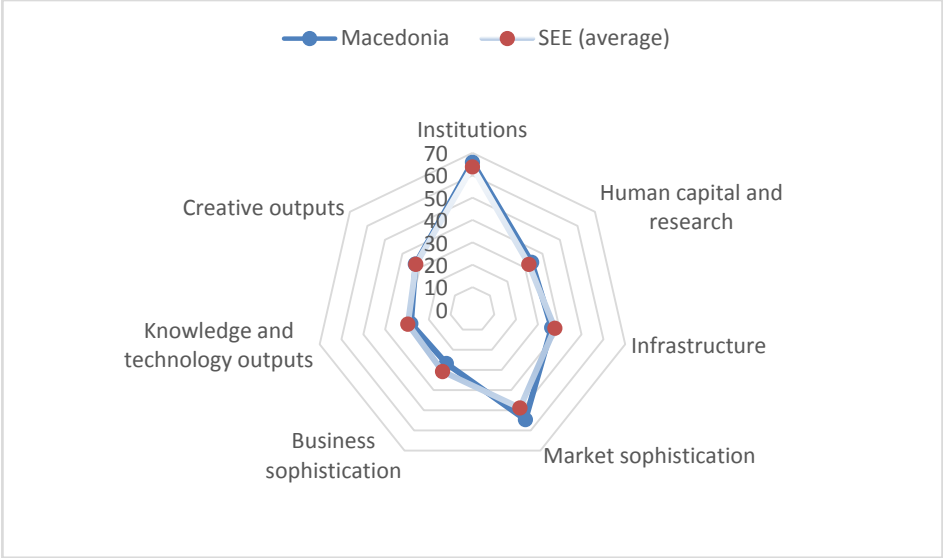
In order to obtain a general idea about the level of innovation development in the country it is first necessary to realize where it is located in relation to the most innovative and most non-innovative country in the world, then compared to the average of the EU-28 (to which it wants to be a part), and compared to the region of SEE that it actually belongs. The Figure 1 presents the values of global innovation index for the world leader in innovation (Switzerland), and the worst-ranked nation in innovation (Sudan) as minimum and maximum values, the values of the average EU-28 and the values of that index for each of the SEE countries separately. Consideration of innovation in the country in these coordinates shows that it is more lagging behind the world leader in innovation than it is before most non-innovative country in the world. Specifically, the difference in value of the innovation index of Switzerland and Republic of Macedonia is 27.85, and Republic of Macedonia and Sudan is 24.27. Figure 1 also shows that the Republic of Macedonia and other countries of Southeast Europe are significantly below the EU-28 average.

Figure 1. The Global Innovation Index 2014 in certain countries



Source: Prepared by the authors based on data from Soumitra Dutta, Bruno Lanvin, and Sacha Wunsch-Vincent, The Global Innovation Index 2014: The Human Factor in Innovation, Cornell University, INSEAD, and the World Intellectual, 2014

Figure 2. Comparison of the global innovation index's elements in the Republic of Macedonia and the South East Europe average



Source: Prepared by the authors based on data from Soumitra Dutta, Bruno Lanvin, and Sacha Wunsch-Vincent, The Global Innovation Index 2014: The Human Factor in Innovation, Cornell University, INSEAD, and the World Intellectual, 2014

Overall globally, according to the Global Innovation Index 2014, Macedonia is in the first half of the countries according to the innovative performance. It is seen as a typical representative of the South East Europe (Figure 2).

According to this index, the relative advantages of the Republic of Macedonia are in the business environment, particularly in the context of ease of starting a business (ranked 3rd place) and as another advantage can be highlighted also human resources, particularly in the area of education, but not in the research system. The weaknesses are evident in the non-participation of industry in financing and implementation of research and development, in the weaknesses of the institutions and political instability, and of course in the insufficient funds allocation, i.e. low gross expenditure for Research and Development (R&D) in the whole economy. Additional problem for Macedonia is of course the general infrastructure.[2]

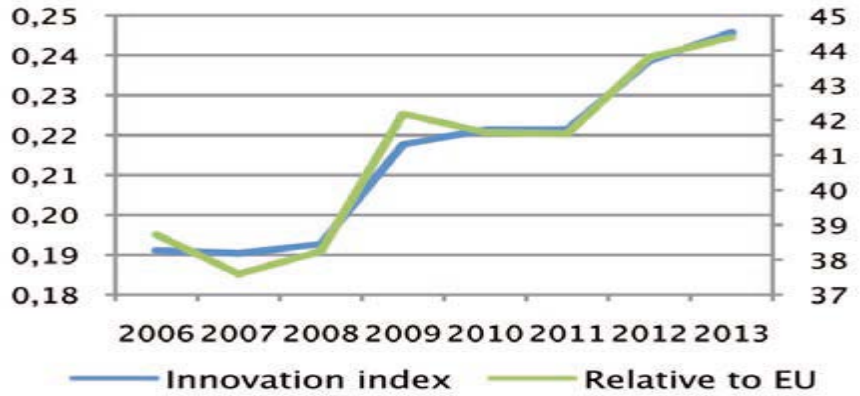
It can also be concluded that according to efficiency innovations in the latest Global Innovation Index the country is in the middle compared to other countries. Namely, it is on 82th place out of 143 countries and is located before the Greece (85th place), Bosnia and Herzegovina (101st place), Montenegro (106th place) and Albania (131st place), but it is far behind Turkey (11th place), Bulgaria (24th), Croatia (36th place) and Serbia (46th place).[3] This index, unlike the index of innovation (which is a weighted average of all seven categories) is the quotient of the sub-index that describes the results of innovative activities (last two categories) and sub-index that describes the investment in innovation (the first five categories). It is independent of the degree of development of the country and shows the capacity of the state to overcome the main weaknesses to achieve better results of innovation activities in unfavorable conditions. Regarding of this index it is particularly important to know that as in any division, a higher result can be obtained in two ways – by increasing the numerator or denominator reduction. In Macedonia's case, the high coefficient of efficiency, unfortunately, is much more a consequence of modest investments in innovation, then the excellent innovation results. Hence, according to the

[2] Soumitra Dutta, Bruno Lanvin, and Sacha Wunsch-Vincent, The Global Innovation Index 2014: The Human Factor in Innovation, Cornell University, INSEAD, and the World Intellectual, 2014, p. 265

[3] ibid, p. 140, 156, 160, 172, 189, 225, 251, 265, 270

results it can be seen that Macedonia does not have a high capacity to overcome the main weaknesses to achieve better results of innovation activities under unfavorable conditions.

Figure 3. Innovation in Macedonia



Source: Innovation Union Scoreboard 2014, The innovation union's performance scoreboard for research and innovation, European Commission, 2014, p. 74

Macedonia under the EU Innovation index is in the group of countries categorized as "modest innovator", which is the last of the categories of innovators determined according to this index. Macedonia is well above average in Youth education (which coincides with the results in the Global Innovation Index 2014) and the Contribution of medium-high-tech product exports to the trade balance (where it is taking 4th place overall) and also its growth performance (3.7%) has been almost double than that of the EU.[4] Innovation performance has been increasing between 2006 and 2013. The country has been catching up to the performance level of the EU: its relative performance improved from 38% in 2008 to 44% in 2013 (Figure 3).[5]

Macedonia is well below the EU average which is very easily detectable by the left side of Figure 4 below. Hence, major weaknesses are found in the following categories: public-private scientific co-publications, Community design, research and development expenditures

[4] Innovation Union Scoreboard 2014, The innovation union's performance scoreboard for research and innovation, European Commission, 2014, p. 28
[5] Ibid. 74

in the business sector and community trademarks. The strengths are far less present and relate to non-research-development innovation expenditures and youth with upper secondary level education.

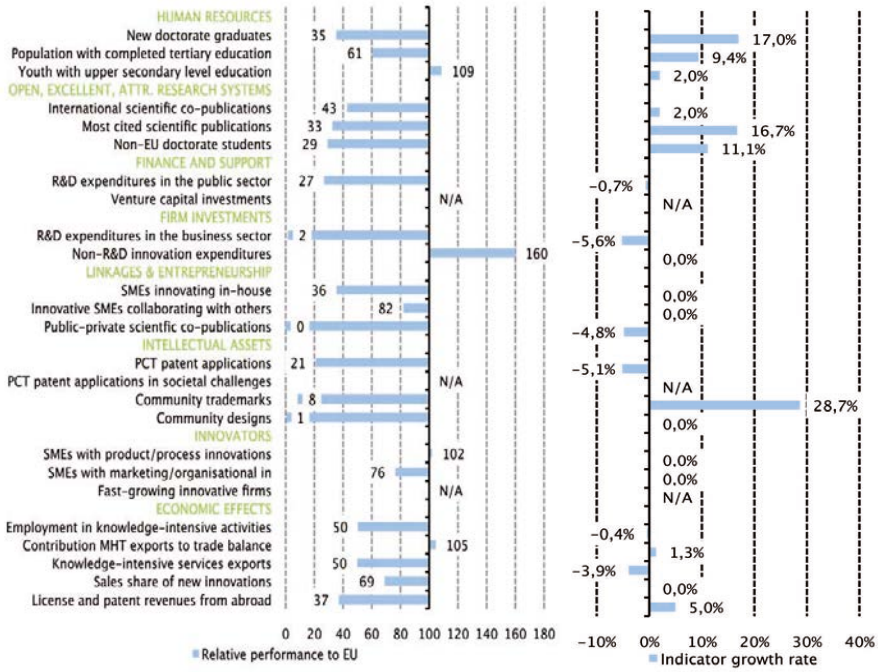
Growth performance in separate categories which is shown on the right side of Figure 4 shows that significant growth rates are observed in Community trademarks, new doctorate graduates and most cited scientific publications. Other high growth indicators are non-EU doctorate students and population with completed tertiary education. A strong decline in the growth is observed in the research and development expenditures in the business sector, PCT patent applications and public-private scientific co-publications.

These not very favorable results for the innovation of Macedonian economy are also confirmed by the Global Competitiveness Index which in a separate pillar measures and expresses the situation with innovation. Also according to this indicator the economy can't much to boast in terms of innovation capacity, the quality of scientific research institutions, the expenditures to companies for research and development (R&D), availability of scientists and engineers, as well as in terms of the number of patents (under the Patent cooperation - Patent Cooperation Treaty (PCT)) per million people.

It is also worthwhile to note and comment the data on innovation in the Republic of Macedonia according to the Index of knowledge economy in 2012.[6] According to this index, Republic of Macedonia in terms of the overall level of preparedness of the country for the knowledge economy is not in remarkable position compared to other countries in the region. Namely, it is positioned on 57 th place, only ahead of Turkey and Albania, and on the 69th place in terms of the pillar that refers to innovation. Thereby Macedonia has moved forward by 16 positions due to the development of its economic incentive and institutional regime (EIR), innovation and ICT pillars, especially pillar economic incentive and institutional regime, which is moved forward by 34 places.[7]

[6] The latest available data are for 2012.
[7] www.worldbank.org/kam, p. 7-8

Figure 4. Relative achievement of innovation in the Republic of Macedonia in terms of EU and growth rates by categories



Source: Innovation Union Scoreboard 2014, The innovation union's performance scoreboard for research and innovation, European Commission, 2014, p. 74

An additional fact about the Macedonian economy's innovation is that compared with developed European countries, innovation potential in the private sector in Macedonia is in a worse position, as follows: market access, funding sources and investing in research and development of new products. It is estimated that the total investment in science in the country does not exceed 0.5% of GDP, according to which Macedonia is still among the countries with the lowest amount of investment in science, compared to developed countries and to the region. This is also evidenced by the very low level of participation of gross expenditure on research and development (GERD) in the GDP in Republic of Macedonia. The share of science in GDP in the country is 0.22%[8], which doesn't show great progress compared to previous years

[8] These are last available data relating to 2010 according to Soumitra Dutta, Bruno Lanvin, and Sacha Wunsch-Vincent, The Global Innovation Index 2014: The Human

when the rate was about 0.18%. Macedonia lags behind EU countries (where the average is 1.67) and other developed countries such as the US - 2.79% and Japan - 3.34%[9]. Worrying fact is that Republic of Macedonia also is lagging significantly in comparison with neighboring countries, i.e. SEE countries which all except Albania (0.15%) and Bosnia and Herzegovina (0.02%)[10], receives more than 0, 4% of GDP, while Slovenia and the Czech Republic already allocated over 1% of GDP and Croatia around 1%. According to these data, we can see that the country is lagging behind the EU when it comes to the intensity of investment in research and development, which is a prerequisite for all of the technological and economic progress of the country. According to these data, we can see that the country is lagging behind the EU when it comes to the intensity of investment in research and development, which is a prerequisite for all of the technological and economic progress of the country. It should also be noted that companies in the country although innovate, they invested few resources in research and development. For example, the gross expenditure on research and development funded by businesses (% of total gross expenditure on research and development) accounted for only 11.5% of total gross expenditures on research and development in 2012, compared with 53 % in the EU.[11] Also, the results of the OECD research in 500 Macedonian companies conducted in 2011 show that half of the companies do not offer any form of training for their employees in the context of innovation.[12] Moreover another interesting fact is that the relationship between companies and universities or research institutions in the country is extremely rare, although firms that have established formal links with academic circles tend to be more innovative.

Factor in Innovation, Cornell University, INSEAD, and the World Intellectual, 2014, p. 307

[9] The data for the EU, US and Japan are for 2012 based on Soumitra Dutta, Bruno Lanvin, and Sacha Wunsch-Vincent, The Global Innovation Index 2014: The Human Factor in Innovation, Cornell University, INSEAD, and the World Intellectual, 2014, p. 307

[10] The latest available data for Albania relate to 2008 and for Bosnia and Herzegovina relate to for 2009 according to Soumitra Dutta, Bruno Lanvin, and Sacha Wunsch-Vincent, The Global Innovation Index 2014: The Human Factor in Innovation, Cornell University, INSEAD, and the World Intellectual, 2014, p. 307

[11] According to the Soumitra Dutta, Bruno Lanvin, and Sacha Wunsch-Vincent, The Global Innovation Index 2014: The Human Factor in Innovation, Cornell University, INSEAD, and the World Intellectual, 2014, p. 332

[12] Innovation Strategy of the Republic of Macedonia 2012-2020, p. 14

Considering all above mentioned results it can be concluded that the country needs a lot of work in the context of improving the innovation of the national economy.

2. Opportunities and prospects for improving innovation in the country

The main findings that are drawn from far analyzes on Macedonian economy's innovation is that although some aspects of the innovations policy are covered by public institutions and strategies still has not developed a comprehensive policy framework for the national innovation system and there are many challenges and opportunities to encourage innovation in the country. Namely, although the companies are making some innovations, they provide a little funds for it, hence the creation of innovation in the country is still at lower level.

First should be noted that for supporting innovation, creating new technologies and the flow of information in the public and private sectors are needed adequate conditions such as human capital, access to finance, legislation on intellectual property rights and business climate.

Regarding the human capital can be noted that there have been made two positive actions in the education system in the country, such as: extending the duration of primary education and the establishment of the Council for Vocational Education and Training and the Centre for vocational training to comply the school curricula with vocational training. This initiative is particularly relevant given that there are important gaps in terms of having skills in the country. But much more remains to be done in the field of adult education because it is considered only in the context of retraining the unemployed and very few employees are trained to maintain and develop their skills while employed i.e. companies invest a little in the training of their employees.

The innovations arising from the creative action of people. Therefore, the development of a set of talented and trained human resources is essential to foster innovation and economic growth in Macedonia. Policies should ensure that education at all levels prepare people for the labor market, by providing capabilities that help businesses to be innovative and competitive. Hence, it is important to adapt the education policy to develop the skills required for innovation, improving the quality of vocational training and the promotion of lifelong learning and greater relevance of university education in terms of innovation.

Innovations and activities related to research and development in research institutions and the private sector are limited by the significant lack of finances. Gross expenditure on research and development (GERD) in the Macedonian economy, as shown above in the paper, represent only 0.22% of GDP, which is low compared to the average share of about 0.5% in the economies in Southeast Europe.[13] In order to resolve this issue, the Ministry of Education and Science predicted opening of 189 sophisticated laboratories, to improve the Macedonian research facilities. From these laboratories, seventy-nine are already equipped. These investments provide an important opportunity, but their use requires the mobilization of human and financial resources, and stronger cooperation between science and industry.[14] The access of companies to finance for their development is perhaps one of the major obstacles, particularly in terms of innovation activities which often carry higher risk and have long-term nature. Therefore financing through alternative sources such as creating a network of business angels and venture capital funds, which are little observed in other countries of Southeast Europe, is one of the possibilities to improve the innovative activity in the country.

The regulatory environment has significantly shaped medium and long term scope and directions of innovation activities. It includes many aspects of innovation systems such as standards, public procurement activities and intellectual property rights. Quality and effective implementation of regulations is crucial to a sound business environment that supports innovation activities of domestic companies and attracting foreign direct investment. For further enhance the network of innovation and competitiveness in the country, there have been numerous efforts to create a favorable regulatory environment for businesses. For example, implemented reforms, such as improving the ease of starting a business, helped Macedonia to rank as a country in the region with the best position. Then it is implemented the project Patent.mk to encourage patenting, cooperation between business and academic circles and innovation. However, although the regulation of industrial property rights is very advanced in the country and has ratified most international frameworks for intellectual property rights still implementation of the legislation on intellectual property rights need to be improved.

[13] Soumitra Dutta, Bruno Lanvin, and Sacha Wunsch-Vincent, The Global Innovation Index 2014: The Human Factor in Innovation, Cornell University, INSEAD, and the World Intellectual, 2014, p. 307

[14] Innovation Strategy of the Republic of Macedonia 2012-2020, p. 13

The innovative activity of companies is particularly important and it has contributed to the success of their operations, which can be seen in the significant increase in turnover and profits and the higher probability that these companies will export more after the introduction of innovations. But in Macedonia although firms innovate, they invested little resource in research and development. As we have seen the gross expenditures of research and development funded by businesses (% of total gross expenditure on research and development) accounted for only 11.5% in 2012 and according to the results of the OECD half of the companies do not offer any form of training for their employees. These are real problems that need to be addressed in the future, and which would have an important contribution to improving current state in Macedonian innovation. Most beneficial for the further development of the innovative potential of the companies would be the existence of plans to support development of staff training or support for the exchange of know-how between the companies. Given that most companies are unaware of existing initiatives to support innovation, increasing the awareness of companies about the importance of innovation and related support measures should be a priority.

Companies rely more on internal knowledge for innovation than the external knowledge, and because of that cooperation between companies and other stakeholders is limited. Research institutions are currently faced with a lack of cooperation with business and lack of labor mobility. Although firms that have established formal links with academic circles are more innovative, however the relationship between companies and universities or research institutions is extremely rare. Hence, the way to increase the innovation capacity of a country is to strengthen links between businesses themselves and between businesses and research institutions. It will facilitate the flow of knowledge. For this purpose it is necessary encouraging business networks and clusters, embed foreign and innovative companies in the national innovation system, supporting cooperation between research institutions and businesses and strengthening relationships with the Diaspora. Although several attempts have been made to increase these relations in the country, there is still need for improvement.

All previously mentioned options leads to the creation of an effective national innovation system, which is created by all stakeholders together and which is open to the world. Considering modern conditions, research and innovation should be at the core of policies of the Macedonian economy. Thus, it is necessary to provide adequate financial

support for all activities that lead to the realization of the following objectives: strengthening the propensity of businesses to innovate, strengthen human resources for innovation, creating a regulatory environment to support innovation and increase the flows of knowledge among the innovation actors.

Conclusion

Previous findings provide a good basis to answer the main question in this paper - how innovative is the Republic of Macedonia? According to the Innovation Index of the European Union in 2014 Macedonia is a "modest innovator" with below average performance. Similar to these are also estimates of the other reports. Overall, according to the Global Innovation Index 2014, Macedonia is in the first half of the countries according to innovation performance and together with other countries of Southeast Europe is far from the leaders in innovation and significantly behind in terms of average EU-28th. Also, Republic of Macedonia in terms of innovation is a typical example of a country in this region, with the exception that more efficiently use the limited resources and have greater market sophistication to achieve innovative results. Having this in mind, the paper proposes a series prospective opportunities for intensification of innovation activities in the Macedonian economy.

The general conclusion that can be drawn from the paper is that the Republic of Macedonia has made some progress in improving the innovation system, but it is insufficient. Available opportunities is necessary to use and well synchronized, in order to reinforce the advantages of the innovative sistem and to overcome the anomalies that prevent its development. All this is provided to improve the competitiveness and economic development in the country based on knowledge and innovation.

References

1. Chaminade, C., Edquist, C., From theory to practice. The use of the systems of innovation approach in innovation policy. Forthcoming in Innovation, Learning and Institutions, HAGE, J. & de MEEUS, Oxford University Press, 2006

2. Chaminade, C., Edquist, C., Rationales for public policy intervention in the innovation process: A systems of innovation approach, in: Kuhl handbook, Cheltenham, UK, 2008
3. European Commission, Final report of the Bussines Panel on future innovation policy, Reinvent Europe Through Innovation, From a Knowledge Society to Innovation Society, 2009, http://ec.europa.eu/enterprise/policies/innovation/files/panel_report_en.pdf
4. Innovation Strategy of the Republic of Macedonia 2012-2020
5. Innovation Union Scoreboard 2014, The innovation union's performance scoreboard for research and innovation, European Commission, 2014
6. Intelligence Unit, Innovation: Transforming the way business creates, Economist, 2007
7. OECD, "The OECD Innovation Strategy: Getting a Head Start on Tomorrow'', OECD, Paris, 2010
8. Soumitra Dutta, Bruno Lanvin, and Sacha Wunsch-Vincent, The Global Innovation Index 2014: The Human Factor in Innovation, Cornell University, INSEAD, and the World Intellectual, 2014
9. www.worldbank.org/kam