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Original scientific paper

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THE ROLE OF INNOVATION AND INFORMATION AND COMMUNICATION TECHNOLOGY (ICT) IN DEVELOPMENT OF ENTREPRENEURSHIP IN THE REPUBLIC OF MACEDONIA

Abstract

More than 20 years Republic of Macedonia based the growth and development of its national economy on a strong commitment to strengthening entrepreneurship and entrepreneurial spirit in society. Although until now many measures and actions are taken in this field, however, expected results are still lacked behind. Some of the reasons for this situation this paper is looking in the low level of innovation and application of information and communication technology by Macedonian existing and future entrepreneurs.

Key Words: innovation, information and communication technology (ICT), idea for new business venture, entrepreneurship, e-business, e-commerce.

JEL Classification: L26, L81, L86, O30, O31,

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Introduction

In the Republic of Macedonia, as in many countries in the world, efforts have been making to better understand the impact of entrepreneurship on the overall economic development and job creation and to identify factors that encourage or discourage it. There are many elements that are important for the entrepreneurship development in a country. Infrastructure, institutional framework, macroeconomic stability, entrepreneurial education, are some of them according to the GEM methodology (Xavier, Kelley, Kew, Herrington, and Vorderwülbecke, 2013) and many other researches done on this topic.

A number of these factors are properly identified in Macedonia and many programs and activities are undertaken and implement for their promotion. So, according to the Doing Business 2013 Report for the situation with the business regulation in 185 countries around the world, the Republic of Macedonia is ranked as 23th, while according to the indicator for assessment of bureaucratic and legal obstacles faced by entrepreneurs seeking to register a new business entity in the country, Macedonia is on a high 5th place (World Bank, 2013). Beside the proven good business climate, there is a general opinion that in Macedonia there is a favorable regulatory framework for issues related to the business and entrepreneurship development which is harmonized with the regulation of the European Union. Also, there are number of institutions in the country (Agency for promotion of entrepreneurship, Department for entrepreneurship and competition in small and medium enterprises, National council for entrepreneurship and competitiveness, and many others), who are dedicated to planning and implementing a wide range of activities for development of entrepreneurship and its practice in the country. No less important are the facts showing that there are a lot of quality financial institutions giving support especially to the entrepreneurial ventures, entrepreneurship is embedded in the programs on different levels of education in the country, and recently, the efforts have been strengthened to build a favorable entrepreneurial culture in the society by intensifying campaigns to raise public awareness for the positive implications of the entrepreneurship and starting own businesses.

But despite all these efforts and dedication, can be seen that on certain issues related to entrepreneurship, Macedonia still has unsatisfactory results. Thus, the new business entry density (number of newly registered firms per 1,000 working-age people (those ages 15-64)),

according to the World Bank Data Catalog (2013), the Republic of Macedonia with 4.12 start-ups per 1,000 inhabitants is quite behind the member states of the European Union, which with 5.8 start-ups per 1,000 people (40% more than Macedonia). According to the number of active firms per 1,000 people in Macedonia for the year 2011 this indicator calculated according to the data taken from the State Statistical Office (2013, 2012) was 33.9. Same year there were 48.4 active firms per 1,000 people in the EU Member States (Eurostat, 2013). In terms of companies in Macedonia that have started their business operations in the last 20 years (since early 1990ies, from the beginning of the transition of the Republic of Macedonia to the market economy), there are no evidence for such firms which have seriously managed to cross the national borders and become recognizable by their own products or services on the international market.

Some reasons for this situation this paper attempts to find in a low innovation level in the country and poor application of information and communication technology by Macedonian entrepreneurs and companies.

Innovation and research and development (R&D) as significant factors of the entrepreneurship

Although the entrepreneurship is not only the process of generating and developing ideas and transforms them into business ventures, however, it is in the essence of that process. This idea for a business venture in entrepreneurship is mostly inspired by specific opportunity that entrepreneur sees by himself or creates. The opportunity, however, stems from a certain change to which he responds or initiates by him. Thus, entrepreneurial process can be described as a process of discovering or creating opportunity; carrying out decision whether to exploit it or not; mobilizing resources and their organization in a new, different way than before; building strategy for the company that has to transfer business opportunities into real benefit (Janevski, 2011). When the entrepreneur comes up with a new idea about how he could use a business opportunity that no one else before him did not notice in such a way, or failed to turn it into a successful business, then he can realize this idea only through a specific innovation. So, it comes to the innovation as one of the immanent characteristics of entrepreneurship, and to the entrepreneur who is the only one able to transform that innovation

through a business venture into an economic value (Bianchi and Henrekson, 2005; Xiaoyu and Steven, 2012). The creativity of the entrepreneur is the one thread that connects entrepreneurial idea with the creation of innovation that is a new product, service or technological process which will obtain a market valuation and will become important for business and for achieving its economic performance (Janevski 2011).

In many countries in the world the innovations are driven by the fundamental and applied scientific research. Thus, in the U.S., innovations arising from fundamental (but also applicable) scientific research are the cornerstone of the economy in the last fifty years. That scientific research as one of the first steps in the process of innovation, contribute to the creation of a huge number of businesses, jobs, new technologies and products (The Science Coalition, 2010).

However, the innovation process (the entrepreneurship as such) is far more complex, though some try to describe it with versions of linear models that depend only on the research that is done at the universities and research centers. It depends not only from how much knowledge is "pushed" by the science through research and development, but perhaps it is more influenced by "pulling" making by the entrepreneurs or by their business activities. Therefore, it is best if the innovation process, as Contesti (2011) states, is treated and encouraged through joined efforts made by the scientific institutions and research centers with the business sector in terms of implementation and utilization of the research and development (R&D) results.

The R&D activities and investments in the world are constantly rising. The increase of these R&D efforts in different countries differently affects growth rates of their development. So according to the latest estimations made by Battelle (2012) the R&D investments in 2013 increased worldwide over the previous year by 3.7% 1.5 billion U.S. dollars. China, however, according to Grueber (2011), with growth of R&D investments from 0.6 % of GDP in 1995 to 1.6% in 2011, during this period has seen an average GDP growth rate of 9.9%, while the United States with a stable average rate of R&D investments for the last five years of 2.7% and Japan 3.2% have average growth rate of GDP of 1.1 % (U.S.) and 0.8 % (Japan). 69.3% of the R&D funds in the U.S. are implemented by companies in various industries, while universities, their laboratories and research centers established by them implement 15.7% (423.7 billion USD) of total R&D funding (**Table 1**).

Table 1 – Spending of R&D funds in the U.S. in 2013

Spending of R&D	Billion USD	%
Industry	293.6	69.3%
Universities	66.5	15.7%
Government	44.7	10.5%
Nonprofit organizations	18.9	4.5%
Total	**423.7**	**100.0%**

Source: Battelle (2012).

The source of these funds is different again, but basically, the forecasts say that in the future R&D investments by the industry will increase, unlike the governmental R&D funding which will decrease significantly. Thus, in 2013, the expectations are that universities, nonprofit organizations, foundations, local governments and other sources of R&D funding will invest only 7.9% of total assets invested in science, research and development (Table 2).

Table 2 – Source of R&D funds in the U.S. in 2013

Funding of R&D	Billion USD	%
Industry	261.7	61.8%
Government	128.8	30.3%
Universities, nonprofit organizations, foundations, local governments	33.2	7.9%
Total	**423.7**	**100.0%**

Source: Battelle (2012).

In Macedonia, there is a strong link between policy for development of entrepreneurship and small and medium enterprises (SME) with research, development and innovation policy. At that level there is a strategic commitment to strengthen the relations between the business sector and scientific research centers, particularly related to the activities committed to SMEs and entrepreneurship development. Thus, the "Revised National Strategy for Development of Small and Medium Enterprises (2002-2013)", prepared by the Ministry of Economy of the Republic of Macedonia (2007), concludes that the current number of active firms per 1,000 inhabitants, the share of SMEs in employment and

in the GDP compared to the EU average, both indicate low level of entrepreneurship and competitiveness of the SME's sector. Therefore, in addition to all other measures, some strategic goals are set to increase the number of SMEs and their role in the added value generated in the economy, as well as giving to the science, technology and innovation significant role in the SMEs and entrepreneurship development. It notes that there are no institutions in the country like research centers and labs that will help entrepreneurs and SMEs in the field of acceptance new technologies and innovations, and promotional activity should be taken in the future to raise awareness of the business sector to increase their R&D investments. Potential increase of R&D investments in the future by the business sector should be encouraged by the introduction of tax incentives for the real sector, i.e. programs for concrete financial stimulations.

Unfortunately it can be concluded that science and innovation as key factors in developing competitive economy based on knowledge, are marginalized in Macedonia, with very small portion of the GDP dedicated for that purpose. Regarding the scientific research funding in the country associated with the topics of entrepreneurship, although planned as a strategic preference, this activity is not intended in the "Program for development of entrepreneurship, innovation and competitiveness of small and medium enterprises in 2012" adopted by the Government (2012a). The program funded by a total amount of 10.89 million denars, did not allocate funds for research projects and activities in the field of entrepreneurship and innovation.

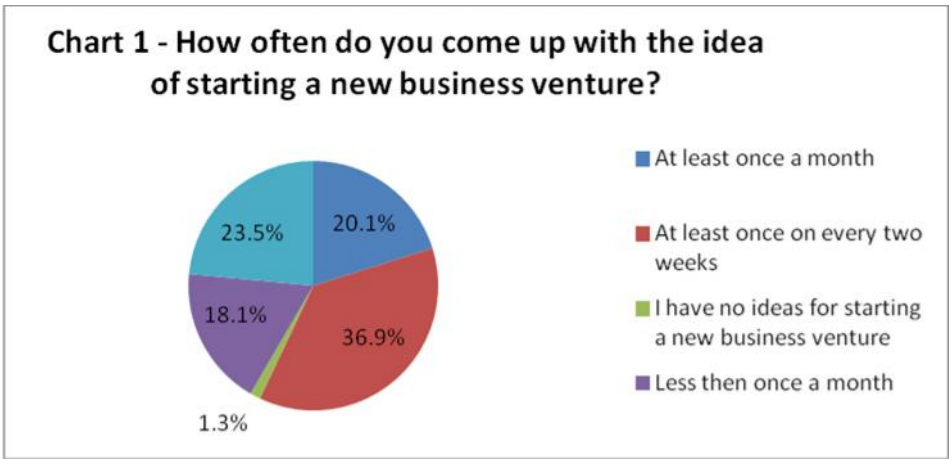
From the other side, the increasing of the business sector participation in the R&D funding in Macedonia is underlined in the "European Innovation Matrix and Matrix Innovative Union for the Republic of Macedonia 2010". Additionally, the "Innovation Strategy of the Republic of Macedonia 2012-2020" adopted by the Government (2012b) provides that efficient implementation of innovation policy in the state should be ensured through a dialogue between the public, private and academic sectors, i.e. the government, business and academia.

The strong need is evident in Macedonia for finding solutions to foster greater commercialization of the results of scientific research realized within the scientific and research centers at the universities. For this purpose, the Ministry of Education and Science of the Republic of Macedonia (2012) in its "Strategic Plan of the Ministry of Education and

Science 2012-2014", based on the "National Programme for the Development of Education in the Republic of Macedonia 2005-2015" defines a program titled "Development of an efficient system of financing higher education" which, among other expected results, which should intensify opening companies by universities and scientific research institutions for commercialization of knowledge and science. This measure is coordinated with the "Innovation Strategy of the Republic of Macedonia 2012-2020" , which is planned by means of the "Fund for innovation and technological development (FIT)" to finance and support the formation of university spin-off companies and regulate entrepreneurial absence of members of research groups from universities that will create and manage these spin-offs. Additionally, with the measure for grants for commercialization of R&D projects, public research institutions are encouraged to conduct research on the needs of the business sector. Currently, via the realization of the Program for realization of the scientific research, and technology-technical development in the country, the support is given to 25 research and development projects, involving cooperation between SMEs and academia (Government of Republic of Macedonia, 2012b).

The role of science in the process of generating quality business ideas

As the innovation (and entrepreneurship) starts from the idea of utilizing a particular opportunity, it is very important how to treat the process of ideas creation and implementation, and how it can be improved through the application of specific scientific knowledge. There are two important aspects of the ideas for entrepreneurial venture: 1) the total supply of business ideas in a national economy, and 2) the quality of business ideas, i.e. how many of them end up with starting a new entrepreneurial venture that will survive and growth on the market. The first aspect was the inspiration for the empirical study conducted in January-February 2013, with survey conducted within random sample of 149 current and potential entrepreneurs in Macedonia. According to the survey, 23.5 % of people in Macedonia come up with the idea to start a business venture every week, 36.9 % at least once on every two weeks, while 20.1% come up with a new business idea at least once per month (Chart 1).

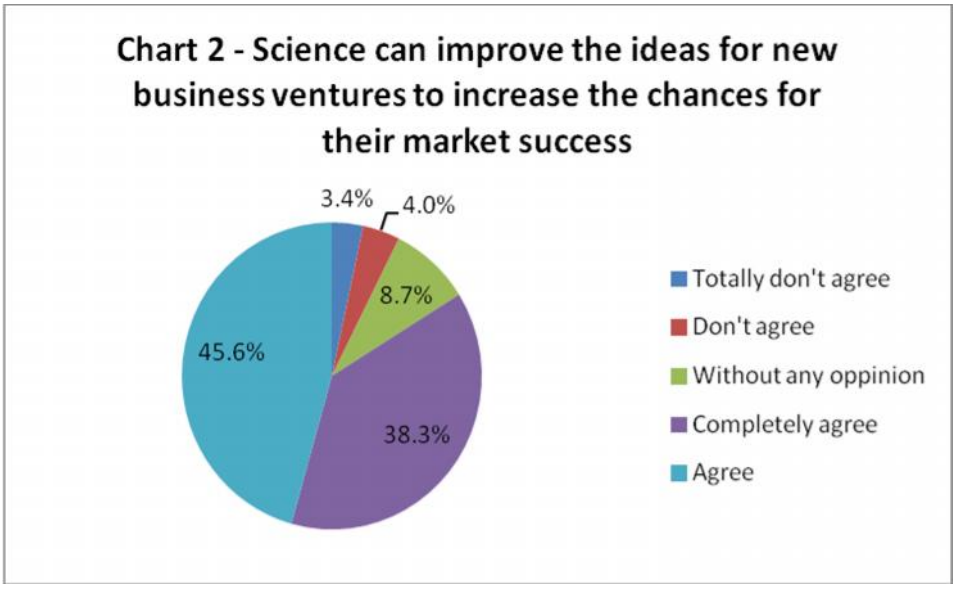


Considering the quantum of such business ideas, the number of working age population in the country (those ages 15 years and above) which is 900,000 (State Statistical Office, 2011) and that according to Zimmerer et al. (2008) on every 3,000 ideas for a new product or service, only 4 entering the stage of research and development, 2 of them being launched in the market, but only one achieves success, then from the total generated ideas for starting a business venture by launching an innovative product or service in the Republic of Macedonia, about 7,000 new businesses should be registered every year. But the survey results indicate that half of these ideas for a new product or service are generated by entrepreneurs who have already started their own business, so theirs new venture is realized within the existing firm. This means that only half of the total business ideas generated in the state are the ideas of entrepreneurs who don't have their own business, but these ideas cause the creation of new firms. On the other hand, question arises about motives for starting their new businesses of almost one half of the yearly new registered firms, when it is obvious that they have no winning ideas for innovation on the market.

All of this stated so far, indicate the fact that there is a shortage of business ideas in the Republic of Macedonia, but also indicates that there is strong need for specific support that should bring to the existing ideas on how to gain greater chance to attain market success. In this direction it is necessary, (despite all other aspects that promote supply side of entrepreneurship in the economy, as: characteristics of the population and its demography (Verheul et al., 2002), and other "push" and "pull" factors (technological, economic, cultural, institutional) researched by Vivareli

(1991), Wennekers et al. (2002) and others) to pay more attention to the inclusion of science, scientific research and its outcomes in all phases of the entrepreneurial process: from identifying or creating the opportunity, through idea generation, innovation, start-up, to the commercialization on the market.

The data obtained from the survey speaks about the need for greater inclusion of the science in the support of existing and prosper entrepreneurs in Macedonia. Even 45.6% of the respondents agree and 38.3% fully agree that the science could improve their ideas for new business ventures in order to increase their chances for market success (Chart 2).



From all respondents who do not agree that the science can help their ideas for new business ventures to increase the chances of achieving success in the market, or do not have any opinion on what contribution could science have on the entrepreneurship, 83% of them have no own business at all. Among the respondents who have their own business, based on their own entrepreneurial experience 95% of them claim that science can help their ideas for new business ventures to gain more chances for future success. It is interesting that 100% of participants who don’t agree that science can improve their business ideas are without any entrepreneurial education. 18.2% of all respondents in the survey say that they have no entrepreneurship formal or informal education at all.

Based on these indications and knowing the growth potential of individual sectors in the Macedonian economy, the science could focus its activity to increase the number and improve the quality of the ideas for new business ventures in the following sectors:

- Renewable energy
- ICT
- Robotics and Automation
- Agriculture[1]
- Tourism[2]
- Wholesale and retail trade, repair of motor vehicles and motorcycles[3]
- Other services.

This paper is focused on one of these suggested sectors only where the science and R&D could help increasing and improvement of quantity and quality of business ideas and innovations.

The role of ICT in growth of the entrepreneurship in the Republic of Macedonia

Technologies and technological development always have a great impact on the economic effects of companies with any size, years of operation, the sector in which they exists. Information and communication technologies (ICT) are those that marked the last years of the twentieth and early years of this century with one of the most profound impacts on economic and social development of man's kind. Especially important is their role in the sector of small and medium enterprises (SMEs) and the development of entrepreneurship and new entrepreneurial ventures. The significance of ICT on companies can be treated considering the following three aspects.

[1] According to the "Programme of the Government of the Republic of Macedonia 2011-2015", subsidies in agriculture for this period are projected on 670 million EUR. In 2011 and 2012, 245 million EUR are already realized.

[2] Although, there is no national strategy for development of the Republic of Macedonia, that would identify the priority sectors which should support the growth of the national economy, many experts and members of the academia agrees that tourism should be one of the pillars and enablers of the Macedonian economy future growth.

[3] According to the State Statistical Office (2013), 33.2 % of all newly registered firms in 2011 are from this sector, and 19.2% of all active firms registered in 2011 belongs to the sector called "Other services".

First, the development of personal computers and their use, and especially the development of Internet and mobile applications are usually the result of entrepreneurial endeavors of individuals and small businesses. There are countless examples of companies that grew into a global businesses conceived in the mind and got out of the hands of an entrepreneur who had an unique idea in the field of ICT. Companies like Microsoft, Apple, Dell, Google, Facebook, Amazon, eBay are just some of them.

Second, in addition to their constant development and implementation of innovations initiated by entrepreneurs, on the other hand, ICT itself plays a major role in facilitating and incentives on new entrepreneurial start-ups. ICT contributes to increasing of the self-employment and creation of new small businesses because it provides facilitated communication, ability to work from home, and ability to focus on less profitable, niche market segments.

Third, with the implementation of ICT, and with use of the Internet and electronic commerce in particular, fixed operation's costs are decreased, which enables the production and delivery of services in smaller quantities (by flexible entrepreneurial enterprises) to be profitable as much as it is the case with large enterprises and their use of economy of scale.

Entrepreneurs are at the heart of the market process. Since information and the access to them determines the dynamics of market adjustment (Casson, 2003), therefore, if entrepreneurs want to gain competitive advantage in this process they need to be the first that will come up to the relevant information. In the midst of economic systems today, beside the flow of goods, services and payments (Mankiw, 2011), information and activities associated with their processing and exchange become key to economic activity. People differ not only by its preferences, but also by their access to information and the way how they use them. Thus, the information becomes one of the most important elements of diversity and being different (to see an opportunity where no one can see it, or decide to launch an entrepreneurial venture when nobody else would make such decision) is in the essence of entrepreneurship. But information has their cost because of the costs of their creation, processing, transmission and use. This, both with the lack of knowledge and skills how to use ICT, further confuse entrepreneurs who don't know how to use it properly, what specific ICT technology to apply, and what are the benefits for their business venture which ICT can

obtain. In fact, there is a high entry barrier for ICT use in entrepreneurial ventures and SMEs. Therefore, it is very important for entrepreneurs to know how to recognize the benefits that can be obtained from ICT in terms of total cost of ownership, i.e., in the time of planning of the entrepreneurial venture they should know how to analyze benefits in terms of cost of the introduction of ICT in their venture (cost/benefit analysis). It can help if they are able to understand the following two business applications of ICT according to Deakins and Freel (2009):

- Stand-alone software applications, such as text editors (MS Word, Writer), spreadsheet (MS Excel, Calc), multimedia presentation (MS Power Point, Impress), and others, and
- Information systems and ERP systems (Enterprise Resource Planning) to automate business processes, based primarily on the use of Internet and electronic business (e-business) and electronic commerce (e-commerce).

According to Porter (2001) both ICT dimensions will gradually cease to be a factor for competitive advantage, because all companies will introduce both of them in their operations. This is especially true for the first ICT aspect related to the standalone applications, together with personal computers and smartphones are not a source of competitive advantage because are already used by all competitors. What puts the second ICT aspect in special position is the huge potential for innovations and new business ideas linked directly to the Internet and e-business technologies. Therefore, when the e-business will complement the creative freedom and innovative power of the entrepreneur, the basis for gaining competitive advantage in this business venture becomes enormous (Janevski, 2011).

According to the "Usage of ICT in enterprises report of the State Statistical Office of Macedonia", for 2013 only 32.4% of the persons employed in enterprises with 10 or more employees used a computer at least once a week at their work routine, and 26.1% of the persons employed used at least once a week a computer with access to the Internet. 94.5% of all companies work with computers, 91.8% has Internet access, but only 54.1% of companies have their own web site. According to the same report, only 9.6% of enterprises with more than 10 employees have e-commerce (e-sales or e-purchases), 15.1% have ERP software package to share information within the enterprise, 16.1% have CRM (Customer Relationship Management) software to analyze

information about its clients, and only 11.9% have CRM to analyze information about clients for market purposes. This indicates that the use of standalone software systems by the Macedonian companies is much higher than the use of sophisticated ERP and other information systems which should improve the productivity and competitive position in the global market.

Conclusion

In Republic of Macedonia the opportunities to improve development of entrepreneurship and enhancing the competitive position of Macedonian companies may require considering three main directions. The first one is through active and more innovative implementation of existing and creation of new entrepreneurship policies, measures and actions, as well as greater accountability in the implementation of the regulation and operations of state institutions working on issues in this field. The second one is to make significant step forward in this regard through a stronger linkage of the national strategic goals with the guidelines contained in the 2020 Entrepreneurship Action Plan (European Commission, 2013). And third, it is beyond doubt that there is a huge need for greater connectivity of science in entrepreneurship and ICT development and application of scientific approach to the development of new entrepreneurial ventures in the country. This is a need to establish a central place where entrepreneurs, existing and future business owners can turn to get all available solutions backed the scientific knowledge of how to launch some innovative idea to the market, depending on the nature and extent of the idea as itself, and how to improve and increase their use of ICT in creation and commercialization of their innovations.

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