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THE IMPORTANCE OF INNOVATION AND KNOWLEDGE FOR ECONOMIC DEVELOPMENT OF THE COUNTRY AND THE COMPETITIVE BUSINESS OF COMPANIES

Abstract

The contemporary world today faces with dynamic technological advances and the great potentials of modern technology for overall economic prosperity, which is accompanied by the increasing digitalization degree of the economy and society. The result of these processes is a fundamental redefinition of the business environment and the creation of knowledge-based digital economy, supported by numerous technological innovations. The article deals with the study of the knowledge and intellectual capital importance for the country`s economic development, analyzing global trends in knowledge creation and transfer, as well as the role of investment in research and development. It also emphasizes the importance of knowledge and technological progress in driving innovation, with the focus on digital innovations. Digital innovations are the basement for the process of economy and society digitalization, and for the digital transformation of business processes and models. Digital innovation enable modern companies to get competitive market position focusing on customers and their personalized needs and preferences. In the concluding remarks, the article turns to the case of Serbia, and concludes that in order to strengthen the competitiveness of its economy, it is extremely important for the domestic development strategy to integrate and support faster development of the digital economy..

Key words: digital economy, innovation, research and development, information-communication technologies, competitiveness, digital transformation..

1. Introduction

The contemporary world faces with the dynamic technological development and its great potential for overall economic prosperity. The digitalization degree of the economy and society is increasing with the growth of information and communication technologies` (ICT) adoption and implementation, as well as the permanent social and economic activities` shift to the Internet (through digital services such as social networks, e-commerce, e-health, and e-government) [1]. The result of these processes is the creation of digital economy based on knowledge and further supported by numerous technological innovations, especially related to the second wage of *disruptive* digital technologies (mobile communications, social media, cloud computing, big data analytics, Internet of Things) and the Fourth Industrial Revolution. All of these changes are essentially redefining the business environment and opening up new opportunities, but also new risks at micro and macro levels of business.

In such of globalized economy and changing business environment, natural resources and physical capital no longer play a key role in economic development and competitive business, but information and knowledge become the basic resource of development. Innovative potentials and the ability to create and apply new knowledge are the basis that enables today`s successful economies and businesses to achieve a high capacity for adaptability and agility to change and to embrace new technological and global challenges.

2. The importance of knowledge in economic development

Joseph Schumpeter considered the importance of knowledge and innovation for economic dynamism and growth in the 1940s. He realized that economic development was largely based on entrepreneurship. The main role in this process belongs to entrepreneur who is not only a manager, but also a person who takes all business and financial risks related to the introduction of new product and technologies. In this way, the entrepreneur carries out an innovative process that is crucial for economic and social development [2]. Since then, key influences and values have shifted form physical assets (e.g. factories, equipment, and machines) to knowledge and intellectual property that rests on their innovative ideas, technology, industrial and intellectual property rights, information systems, corporate and manufacturing brands, goodwill and other forms of intangible assets, while intellectual capital is recognized as a key developmental resource.

There are four dominant trends in creation and transfer of knowledge globally, which have marked the last 20 years [3]:

1) There is a significant growth in knowledge creation thanks to the growth of research and development (R&D) budgets and the availability of increasingly powerful research tools;
2) Knowledge becomes more and more important from many aspects. From the perspective of competitiveness, because the knowledge is the basis in the new information economy and from marketing standpoint, because the upgraded intangible part (knowledge and services) is becoming an increasingly important segment of the so-called extended products offered on the market at the request of increasingly demanding consumers;
3) The ubiquitous process of opening and removing boundaries for the movement of products and people, as well as the development of transportation and communications (especially digital technologies) have created new global opportunities for accessing and disseminating knowledge;
4) There is an increasingly commercialization and privatization of knowledge, so that the use of intellectual property rights protection systems becomes especially important.

These trends are supported by strong statistical data. In absolute terms, global investment in R&D increased from $ 438 billion to $ 576 billion (at average annual growth rate of 4.4%) between 1991 and 1996. By 2013, total R&D investments in OECD countries are growing at 2.7% in real rates to reach $ 1.1 trillion [4]. According to R&D Magazine estimates, global R&D investment in 2018 are growing by 3.4% and reaching over $ 2 trillion in PPP value, while more than 115 countries in the world have R&D investment, which exceeds the amount of $ 100 million [5].

R&D expenditures are geographically concentrated mainly in developed countries, with United States (US), Japan and Germany leading the way. The group of largest R&D investors includes some developing countries, especially China and the Republic of Korea. High R&D investment growth rates in Asia fast-growing economies (China, India and South Korea) are changing the regional R&D investment structure, so that the Asian region now holds a dominant position, with close to 43% of global investment, followed by the North American region with less than 30% share, and Europe with just over 20% share (Table 1) [6].

Table 1 Individual regions` and countries` share in total R&D expenditure, 2014-2017, %

	2014	2015	2016	2017
North America	**29.1**	**27.9**	**27.8**	**27.7**
USA	26.9	25.8	25.6	25.5
Asia	**40.2**	**41.3**	**42.3**	**42.9**
China	19.1	19.4	20.1	20.8
Europe	**21.5**	**21.6**	**21.2**	**20.8**
Russia/CIS	3.1	2.9	2.8	2.8
South America	**2.8**	**2.7**	**2.5**	**2.4**
Middle East	2.2	2.5	2.4	2.5
Africa	**1.0**	**1.0**	**0.9**	**0.9**
Total	**100.0**	**100.0**	**100.0**	**100.0**

Source: For 2014:[7]; for 2015-2017:[6]

For developing countries, a large part of technological and research activities is related to the process of adopting imported technologies, as well as their adjustment (suiting) to local conditions, that is to the advancement and finally applying foreign technologies that become the basis for new knowledge and technological solutions` creating (adaptive R&D). As industrial maturity grows, developing countries are importing increasingly complex technologies, so that R&D capacities become vital for the process of their absorption in the national economy. In this way, thanks to their R&D efforts, developing countries (emerging markets) are also able to follow the development of new technologies in the world. The good R&D potential of a developing country means its greater ability to diffuse new technologies faster and better in the economy, the ability to realize lower technology transfer costs, realization of wider spill-over effects, as well as the benefits from the activities of foreign firms in the domestic economy. Some developing countries also have R&D activities related to the development of new technologies and products for local, regional and global markets [8].

3. Innovation as a result of research efforts

Knowledge and the technological progress are the basis for driving innovation, their sustainability and applicability, which will result in some utility for economic growth and business competitiveness. The first relation to be drawn relates to the relationship between invention and innovation. Unlike inventions, that are findings that may not always be in active use, innovations must be implemented and be available to the public. Innovative activities include all the developmental, financial and commercial activities undertaken by a company or a state in order to improve its development, that is, its business if we analyze micro level. More specifically, innovations play a key role in managing changes and competitiveness of contemporary organizations that entails triggering three key factors: a) changing organizational structure, b) technology development, and c) human resource development. In this way, innovations permanently stimulate the development, progress, and the process of adopting modern organizations to the changing global environment [9].

The fourth edition of the handbook for the innovation data collection and interpretation, which is also known as the Oslo Manual, defines innovation as a new or improved product or process (or their combination) that is significantly different from previous products or processes of observed institutional unit and which is made available to potential users (in the case of a product) or becomes applicable in a unit (in the case of a process) [10].

The European Commission (EC) defines innovation as the use of new ideas, methods or products that have not previously been implemented. More precisely, EC defines it as a new or significantly improved product (good or service) that is introduced to the market, or as the introduction of a new or significantly improved process in an enterprise [11].

Firstly, innovations can be divided into business, product and business process innovations. They can also be seen as product and service innovations, as well as marketing and organizational innovations. Contemporary business is also characterized by *open innovations* as a utilization form of knowledge inflow and outflow streams, whit the aim of accelerating internal innovations and expanding the market for their external use. It is about fostering valuable ideas that can come from inside or outside a company, as well as the flow of internal and external ideas between contemporary firms [12].

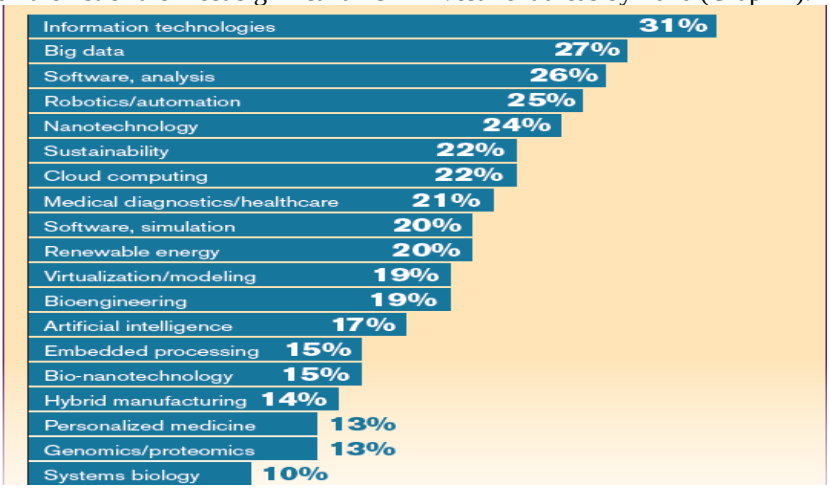
The development of contemporary innovations and the setting up of new technological solutions are becoming more complex in the sense of

financial potential, knowledge, organizational and managerial skills, so that the internationalization process of R&D gains its importance. The complexity of contemporary research causes innovators to join to share research costs and pool knowledge, technology and expertise, namely to collaborate within innovative networks [13].

4. The concept and the importance of digital innovation

Digital technologies are becoming a key driver of innovation in contemporary economies today. Innovations in the field of ICT are a prerequisite that enables the ICT sector to be an engine of economic development, create new jobs, and provide cheaper and more profitable business in all industries and sectors. That is the reason why in most OECD countries, the ICT industry realizes the largest shares of business expenditures on research and development (BERD), accounting for up to 25% of total business investment, and contributing from 0.2% to 0.4% in national economies` GDP. For example, in Finland, Israel, South Korea and USA, the ICT industry accounts for 40% to over 50% of total BERD investments, with ICT BERD contributing from about 0.6% to 1.8% of GDP of these countries. This information reflects the high research intensity of this industry and generally of all mentioned countries [4].

According the research made by Research & Development Magazine in 2017, digital technologies occupy the highest number of leading positions on the list of the most significant R&D investment areas by 2020 (Graph 1).



Graph 1 The most significant technologies for investment by 2020, ranged by percentage of respondents` answers

There is no universally accepted definition of digital innovation. According to Yoo et al. (2010), digital innovation "means innovation enabled by the use of digital technology that leads to the creation of new forms of digitalization" [14], while other authors often treat digital innovation simply as an innovation realized in the digital economy. On the other hand, in their 2005 Oslo Manuel, the OECD and Eurostat believe that digital innovation should mean the following [15]:

- *ICT product innovation* as a digital innovation in the narrow sense which is realized in the ICT sector itself. It is application of new and significantly improved ICT product so it is positioned on the ICT supply side;
- *ICT enabled innovations* are digital innovations in a wider sense. They are possible by the use of ICT as tools that enable or support the application of new or significantly improved products or processes, new marketing methods, or new organizational methods in business practice, in the workplace or in external relations with partners. These innovations arise on the demand side. The need for them is expressed by companies of all branches and sectors that use digital technologies to improve their overall business.

Of course, this demarcation is not strict and there is a lot of interconnection and intertwining. For example, new ICT products are emerging in branches that do not belong to the ICT sector itself, such as defense, space, infrastructure, robotics, logistics, etc. Also, new ICT products bring with them the so-called *spill-over* effects on the rest of the economy as they introduce new *disruptive* ICT products that affect new and changed production methods, the entry of new players into a particular industry, the lunch of the latest generation products, and the like (*ICT enabled innovation*) [16].

When realizing digital innovation through R&D activities, a key step is to put it in use in order to achieve its positive effects on economy and society. The stimulating business environment and a role of the state are important factors in this process. This primarily refers to the regulatory framework in the areas of trade, competition, privacy, and protection of intellectual property rights, as well as the regulation of the commodity and labor markets [1]. Equally important is the story of entrepreneurship, tax policy or corporate governance. They cannot be omitted if we want to fully capture the conditions that contribute to the digital technologies` development and implementation in a country`s economy.

At the macro level, the regulated environment affects the ability of economies to reallocate the limited resources needed to deliver digital innovations and direct them to the most successful companies that will realize them and drive the overall economic dynamic. At the micro level, a competitive business environment rise the level of flexibility of companies to opt for experiments, with the application of *disruptive* digital innovations. In fact, managing the innovation of digital products and services is a great challenge for contemporary managers precisely because of the unique features of digital technology (complexity, rapid pace of development, adaptability, ease of reconfiguration, flexibility, etc.) that allow the emergence of new, fast-changing innovative processes that are difficult to control and predict. For this reason, the International Organization for Standardization (ISO) has also begun to develop new standards for innovation management so that, in an open research environmental systems, participants in the innovation process can successfully collaborate and reach their common goal: new innovation. However, in this context of consideration, it is important to note that the ISO has not yet developed standards specifically related to digital innovation.

It is about a family of ISO 56000 standards, the most important of which can be represented as follows:

- *ISO 56000 Innovation Management – Basics and Vocabulary* – addresses basic concepts and definitions in the field of innovation management with the aim of making it easier to apply other standards in this group;
- *ISO 56002 Innovation Management – Innovative Management System* – provides guidance on establishing, implementing, maintaining and continuously improving the innovation management system. The aim of this standard is to support contemporary organizations in developing innovations, to enable them to understand the contemporary business context, and to encourage their integration into the global management system;
- *ISO 56003 Innovation Management – Innovative Partnerships` Tools and Methods* – provides guidance for those organizations that collaborate with each other to drive innovations. The objective of this standard is to facilitate the identification, evaluation, and selection of partners, to provide an adequate assessment of potential partnership benefits and challenges, and to facilitate their relationship management with partners;

- *ISO/TR 56004 Innovation Management – Innovation Management Evaluation* – this standard provides guidance to plan, implement, and continue with Innovation Management Assessment (IMA) activities. More specifically, this standard contributes to a better understanding of the values, reasons and benefits of implementing IMA, the various IMA approaches, processes, steps and effects of IMA, as well as the potential to improve innovation management;
- *ISO 56005 Innovation Management – Intellectual Property Management Tools and Methods* – the objective of this standard is to facilitate the efforts of modern organizations in creating an intellectual property strategy, adequate intellectual property management in the innovation process, as well as the application of intellectual property management tools and methods in the innovation process;
- Other standards – provide further and more detailed guidance on instruments and methods with the aim to support the implementation of an innovation management system.

5. Digital innovation basis for the digitalization of economy and society

Digital technologies are completely transforming the contemporary global economy and business environment, so the successful process of digitizing the economy and the entire social systems is in the focus of attention. The digital economy is usually defined as a new form of digital-based economy and for the most countries today, it represents one of the most attractive opportunities for growth. These growth opportunities are primarily in relation with the potential of digital economy to create new opportunities for investment and innovation, thus opening up new business possibilities for investment and innovation and new business opportunities, and creating new business processes, new business models and new jobs. Investment and innovation are expanding the market and open wider choices of goods and services at lower prices to well-informed and demanding contemporary consumers.

The economist Friz Machlup has developed the concept of knowledge economy half a century ago in his book “The Production and Distribution of Knowledge in the United States” [17], to be further

interpreted and popularized by Peter Drucker in his book [18]. Both scholars used the term *knowledge economy* to differentiate an economy based on the manual production of goods and services from an economy based on the production of new ideas, information, and knowledge.

All governments around the world, weather from developed or developing countries, are striving to maximize the adaption of the ability of their national economy to the new business environment, and to apply modern digital technologies that lead to the transformation of business models, changing the functioning the government and society as a whole [19]. In this way, the national economy enhances the ability of its business to create new values in the future, offering innovative products and services in a choosey and dynamic global market and becoming digitally competitive.

Although technology is a *conditio sine qua non* of the digital economy existence, it is not the only and sufficient condition for its successful development and operation. It is not only about the implementation of digital technologies, but also about the state systems that should be changed in order to position digital technologies in a way that their application could lead to the realization of two important goals [19]: 1) improving efficiency and 2) expanding the scope and quality of services offered to citizens and the business sector. If the state activity framework is changed in this way, at the micro level of the enterprises will be easier to create an organizational tendency to accept digital transformation of business processes and models.

Successful digitalization of an economy or enterprise is therefore not only an *add-on* to existing businesses, but it involves a change in process, organizational structure, personal, and in overall culture. The business ecosystem is changing from the ground up. By shortening innovation cycles, the pace of *disruptive* changes becomes extremely fast. The need to change business models and processes is substantially reduced to just 3 to 4 years, which poses complex challenges for companies. Leaders of such change must have multiple abilities, knowledge and know-how [20].

The digital economy is not emerging at once. All countries in the world are in some stage of introducing and pursuing a digital economy. The developmental levels of the digital economy vary from country to

country, but there is a unique view that its role is one of the most important for the future of the economy and society [21].

6. Digital innovation in enterprises and their positioning in the market

Competitively positioned companies in the demanding global market are mostly those who have realized in their operations the benefits that the introduction of digital element can bring to business, resulting in the growth of agility, speed, and innovation. The key is usually in the ability of such companies to operate simultaneously in areas focused on: 1) consumers and growth, 2) profitability, 3) sustainability, and trust [22].

Consumers and growth – in today`s business environment, traditional growth strategies based on cost reduction, geographical expansion, and growing integration are becoming inefficient in the face of competitive pressures from emerging digital rivals. The answer usually involves brand new divergent business strategies that, at their *core*, have new digital capabilities (cloud-based service platforms, analytics, mobile availability, etc.).

The primary benefit of digital technologies is greater interaction with customers, and the growth of the ability to meet their expectations, which will definitely become a critical element of competitiveness and maintaining the quality of products and services in the next period. Unlike mass production and economies of scale, the digital transformation of the business is shifting its focus to personalized and locally produced products tailored to the needs of the individual user [23].

Profitability – achieving the profitability goal still includes the cost-cutting technique, but with the addition of a new element of linking cost reduction to the company`s sources of further growth. In other words, it means costs` lowering in the areas of work and operations of companies that do not generate new value, while redirecting those funds to areas that are a generator of value creation and further growth in the new conditions. In this way, funds from the entire corporative network are focusing on programs for improving and innovating products and services, investing in people and their knowledge and abilities, optimizing the complete business value-chain, as well as in optimizing revenues [22].

Sustainability and trust – growth and profitability cannot be achieved without business strategies based on sustainability of business dynamics and trust. In doing so, the concept of trust no longer only includes the trust of consumers, employees and stakeholders, but also of the entire society and the responsibilities that the company has towards the social system within its business and operations. For the sustainability of the company`s business dynamics, actions such as waste reduction, improvement of working conditions, investing in areas that are important to their customers, over labor and moral values, to the overall life and work quality become more important. By incorporating social responsibility into its brands, the company acquires loyal consumers, who trust it, and from whom it receives so-called *growth license*. The goal is to introduce a sustainable business strategy that will bring benefits to the people, the Earth, and the profits of the company [24].

7. Conclusion

Digital technologies have demonstrated their revolutionary power of a key catalyzer for change, modernization and innovation. This is why contemporary concepts of developing national economies or competitive business necessarily include a digital element. This element enables them to build and enhance their capacity for coping with sudden changes in a successful way, respond to them, adapt to them and use them for their growth continued dynamics and successful business. The knowledge stock and innovative capacities have priority in this *game*.

Knowledge encompasses the necessary infrastructure that enables digital transformation through the discovery, understanding and learning about new technologies. The dynamics of growth and economic development occur because of the productive transformation process and collective learning. The high-performance economy can be achieved by working simultaneous in two areas: 1) evolving of material economic spheres (i.e. production capacities) and 2) developing intangible sphere (knowledge - high-performance learning habits and education institutions) [25]. The realization of this kind of knowledge is possible only with well-educated staff that has abilities and talents to realize the process of digitalization. Educated work force is closely related to the existence of an adequate education and training system in the country, but also to the continuous learning and training at company level. The third element is in the relation with the research and scientific potentials, as well as the

readiness of an economy or enterprise to invest in science and research as a basis for creating a knowledge economy.

Most of the authors in their research agree that the digital transformation process of enterprises and countries is gradual and that the proper implementation of the digital technologies` potential to achieve economic dynamics requires the setting of three elements: institutional, organizational, and structural [26].

The *institutional element* treats the state and the need for it to continue to make its institution *open and flexible* in adapting to the digitally transformed conditions of functioning, and with the aim to adopt the relevant rules, regulations, norms, and beliefs accordingly.

The *organizational element* treats the level of enterprises that need to be able to recognize, realize, and to anticipate the challenges in their business that new digital technologies bring.

Finally, the *structural element* addresses the level of research, production, and market conditions` adaptability that, through their changes, should best drive and support innovation, new product development, the emergence of new markets, and entry of new subjects into relevant economic sectors.

In the context of the conducted analysis, it is necessary to emphasize in concluding observations that in order to strengthen the competitiveness of Serbian economy, it is extremely important that the domestic development strategy integrates and supports the faster development of the digital economy as a basis for contemporary growth and positioning in the new market environment. Serbia is still on its threshold of entering in digitalization of economy and society, because a speed with which we adopted new technologies was not enough. The rest of the developed world has experienced progress further and faster in digitally supported activities than we did, opening platforms, finding new solutions, experiences, but also creating a direct, new digital economic structure that contributed to faster growth of Gross Domestic Product (GDP). A necessary precondition for such an economic transformation of Serbia is that the national economy develops infrastructural potentials, and each company adopts new organizational and business models based on digital technologies, as well as develops an educated workforce.

Under these conditions, the issue of improving and adopting digital education and training systems, as well as the provision of Lifelong Learning (LLL) becomes a priority in the national economy. Namely, in the knowledge society that is driven by technological changes, it is crucial to train and educate a workforce that will be able to use these modern techniques and tools in business. Specific workforce capabilities in one company are a prerequisite for creating digitally supported innovations.

National development policy makers should especially bear in mind that the lack of local knowledge and capabilities could limit the interactive relationship between Serbian companies and the rest of the world. In this case, domestic economy will not be able to monitor the technological progress in the world and to achieve necessary levels of competitiveness. With investments of less than 1% of GDP for R&D, Serbia cannot ensure that the potentials of digital technologies are properly used in its economy. Without *open innovation* research environment, it is not possible to have new ways of thinking or to ensure the commercialization of the best implementation ideas successfully in the market [23]. Orientation to greater investment in knowledge of both, the state and the business sector, is in particular necessary. Full respect for above-mentioned factors is the only way that can enable the domestic economy to respond more quickly to the challenges of the new digital business environment and to position itself in the global market with quality products and services.

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ZNAČAJ INOVACIJA I ZNANJA ZA EKONOMSKI RAZVOJ ZEMLJE I KONKURENTNO POSLOVANJE PREDUZEĆA

Apstrakt

Savremeni svet se danas suočava sa dinamičnim tehnološkim napretkom i velikim potencijalima savremene tehnologije za ukupan ekonomski prosperitet, koji je praćen rastom stepena digitalizacije privrede i društva. Rezultat tih procesa je suštinska redefinicija poslovnog ambijenta i kreiranje digitalne ekonomije zasnovane na znanju, podržane brojnim tehnološkim inovacijama. Članak se bavi izučavanjem važnosti znanja i intelektuanog kapitala za privredni razvoj zemlje, analizirajući globalne trendove kreiranja i transfera znanja, kao i ulogu investicija u istraživanje i razvoj. Naglašava se i važnost znanja i tehnološkog napretka u pokretanju inovacija, sa fokusom na digiitalne inovacije. Digitalne inovacija predstavljaju osnovu procesa digitalizacije privrede i društva, kao i digitalne transformacije poslovnih procesa i modela. One omogućavaju savremenim kompanijama da se konkurentno tržišno pozicioniranju stavljajući u centar svoje pažnje potrošača i njegove personalizovane potrebe i preferencije. U zaključnom delu teksta dat je osvrt na slučaj Srbije za koju se konstatuje da je u cilju jačanja njene konkurentosti izuzetno važno da domaća razvojna strategija uključi i podrži brži razvoj digitalne ekonomije.

Ključne reči: *digitalna ekonomija, inovacije, istraživanje i razvoj, informaciono-komunikacione tehnologije, konkurentnost, digitalna transformacija.*