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CHARACTERISTICS OF INTELLECTUAL CAPITAL, COMPETITIVENESS AND INDUSTRIAL POLICIES OF INNOVATION-INTENSIVE SECTORS IN SERBIA*

Karakteristike intelektualnog kapitala, konkurentnosti i industrijskih politika inovativno-intenzivnih sektora u Srbiji

Abstract

This paper explores the characteristics of intellectual capital, competitiveness and industrial policies of innovation-intensive sectors in Serbia. It consists of four parts. The first part presents the characteristics of intellectual capital as the basis of economic growth and competitiveness. The second part analyses the characteristics of national intellectual capital and competitiveness of individual countries in the global economy, while the third part of the paper discusses the competitiveness of the Serbian economy and gives recommendations for a new growth model. The fourth part of the paper is concerned with analysis of the characteristics of intellectual capital and industrial policies of innovation-intensive companies in Serbia, presenting also the results of the research study. The paper proposes that the new growth model of the domestic economy should be based on advanced industrial production and services with a high degree of added value, as well as the application of new economic policies, which should be based on a heterodox approach. It is also concluded that the level of development of intellectual capital of the analyzed companies is at a relatively high level, their structural capital is relatively developed, and the surveyed companies have an excellent reputation. Finally, it is concluded that further development of innovation-intensive sectors implies the application of appropriate industrial policies specific for containing the elements of both vertical and horizontal policies which should focus on encouraging development and innovation.

Keywords: *intellectual capital, national intellectual capital, competitiveness, innovation, industrial policies, innovation-intensive sectors.*

Sažetak

Predmet izučavanja ovog rada su karakteristike intelektualnog kapitala, konkurentnosti i industrijskih politika inovativno-intenzivnih sektora u Srbiji. Rad se sastoji od četiri dela. U prvom delu rada date su karakteristike intelektualnog kapitala kao osnove ekonomskog rasta i konkurentnosti. U drugom delu rada proučavaju se karakteristike nacionalnog intelektualnog kapitala i konkurentnosti pojedinih zemalja svetske privrede, dok se u trećem delu rada razmatra konkurentnost privrede Srbije i daju se preporuke za novi model rasta. Četvrti deo rada posvećen je analizi karakteristika intelektualnog kapitala i industrijskih politika inovativno-intenzivnih preduzeća u Srbiji i u njemu su prikazani rezultati izvršenog istraživanja. U radu se predlaže da novi model rasta domaće privrede bude baziran na naprednoj industrijskoj proizvodnji i uslugama sa visokim stepenom dodate vrednosti, kao i primena novih ekonomskih politika, koje treba da budu zasnovane na heterodoksnom pristupu. Takođe se zaključuje da je stepen razvijenosti intelektualnog kapitala analiziranih preduzeća na relativno visokom nivou, da je njihov strukturni kapital relativno razvijen, kao i da anketirana preduzeća imaju odličnu reputaciju. Na kraju rada zaključuje se da dalji razvoj inovativno-intenzivnih sektora podrazumeva primenu odgovarajućih industrijskih politika koje su specifične po tome što treba da sadrže elemente i vertikalnih i horizontalnih politika i koje posebno treba da se bave podsticanjem razvoja i inovacija.

Ključne reči: *intelektualni kapital, nacionalni intelektualni kapital, konkurentnost, inovativnost, industrijske politike, inovativno-intenzivni sektori.*

Introduction

Intellectual capital is an intangible source of gaining wealth and the main competitive weapon. The influence of intellectual capital on economic development and business is very complex. Consequently, intellectual capital has made the 21st century the century of intellectual competition, and the post-industrial society has turned into a knowledge society. Intellectual capital, competitiveness and economic growth are intertwined processes. Therefore, when studying them, it is necessary to first consider the characteristics of intellectual capital, both at the level of a certain national economy and at the level of economic entities. As the level of intellectual capital development significantly influences the level of development and competitiveness of a certain national economy, special attention should be paid to this issue, especially since countries with a high level of intellectual capital development have a high level of competitiveness ranking in the global economy. Regarding the state and perspective of the domestic economy, intellectual capital plays a very important role and will continue in the future, both in the process of its development as well as in the process of improving its competitiveness. Innovation-intensive sectors will have

a special significance for the development of the domestic economy. Therefore, appropriate industrial policies should be defined and directed towards more intensive development and encouragement of innovation.

Intellectual capital as the basis of economic growth and competitiveness

The Greek philosopher Heraclitus in the fifth century B.C. said "There is nothing permanent except change". A change is the most dominant feature of modern business and life in general. There are always new forms, intensities and speeds of changes. While in the First and Second Industrial Revolution human labor and capital played a key role in the development process, nowadays the key development factor is intellectual capital (IC). IC has made the 21st century the century of intellectual competition, and the post-industrial society has turned into a knowledge society [18].

IC has become an intangible source of gaining wealth and the main competitive weapon [29]. Nowadays, IC, based on the knowledge of managers and employees, has become the basis of competitiveness of both companies and national economies. IC has become the basis of

Figure 1: Schematic representation of national wealth and IC
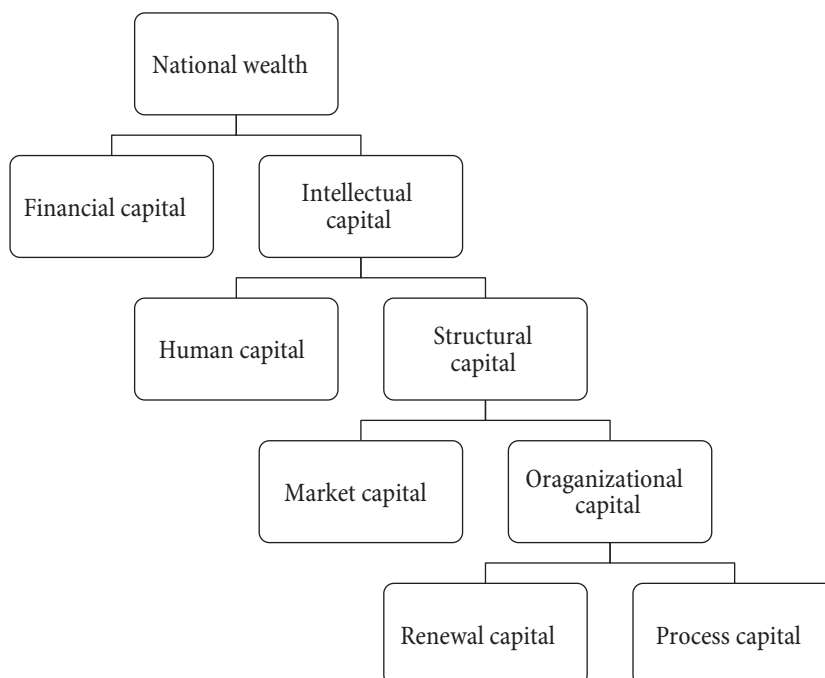
Source: [3, p. 15].

competitiveness and value creation, as well as one of the most significant factors of increasing the value of all economic entities [18].

The characteristics of IC can be observed at the level of a certain national economy, i.e., national IC, and at the level of economic entities, i.e., IC of a company. National IC presents a set of all hidden values of individuals, companies, institutions, communities, and regions. In this way, IC is one of the most essential elements of national wealth of each country and it forms the basis of the current and future country's well-being [3, pp. 14-15]. National wealth can be represented by a map containing 2 areas which take part in the value creation process. These areas are: (1) financial capital and (2) IC, while the subareas of IC are human capital and structural capital. Afterwards, structural capital can be divided into market and organizational capital. Apart from financial capital, all other elements are the components of national IC [3, p. 15].

(1) The first element of national IC is financial capital. Most commonly, available national financial capital is measured with GDP per capita. However, when more countries are to be compared, GDP per capita in purchasing power parity should be used. In addition to GDP per capita, market capitalization of all the stock exchanges within a country is sometimes used to measure financial capital.

(2) The second area of national wealth is IC with its elements and sub elements. Human capital represents the most important element of IC and the intellectual treasure of the citizens of a country. Human capital implies knowledge, education and competencies of citizens aimed at achieving national goals. The knowledge is multi-layered and includes the knowledge of facts, laws, principles, as well as specialized knowledge, the ability to work in a team, and communication skills. The education system, the number of educated people and the quality of their education and to what extent they continue their education after graduating are all the factors that form national capital [3, p. 20].

Structural capital is the second sub element of IC and is divided into market and organizational capital. Market capital, as an IC element, is the ability of a country to provide attractive and competitive solutions that meet the needs of foreign and domestic clients. Market capital

is developed by exporting high-quality products and services and investment in international relations [3, p. 23]. Organizational capital consists of two sub elements: renewal and process capital.

Renewal capital is a part of IC which represents potential future intellectual wealth of a nation. It includes the investment in development and the abilities that the nation possesses enabling it to retain its competitive edge in the future. Among the most important criteria of renewal capital are the level of investment in research and development, the number of patents, scientific papers and researchers (scientists) in the nation [3, pp. 24-25].

Process capital is the element of national wealth and national IC which presents the accumulated knowledge of a nation which is the part of technological, information and communication systems in the form of hardware, software, databases, laboratories, etc. [3, p. 21]. Some of the quantitative indicators of the presence of process capital in IC are the number of computers, telephone lines, radios, mobile phones, televisions, Internet users per capita (or per a certain number of citizens).

The state and perspectives of national IC can be considered from three points of view:

- Investments in national IC which include investments in research and development in the field of education at the national level.
- National IC components and their presence. According to [17, p. 350], national IC consists of four components: human capital, social capital, relational capital, and structural capital. Human capital entails knowledge, competences, wisdom and ethics possessed by the citizens of a country. Social capital implies the knowledge formed through social relations based on the exchange and combination of the existing knowledge. Relational capital involves relations and cooperation with other countries and reflects the relation between national and global IC. It shows how successfully a country uses the global IC to develop its national IC. Structural capital is IC embedded in national and technological structures. Those authors believe that renewal capital, mentioned in [3], is in all four components of the national IC and as such cannot be considered separately.

- National performances which include social indicators (employment rate, life expectancy, quality of life, Gini coefficient), economic performances (GDP per capita, productivity, household disposable income) and environmental performances (ecological footprint, biocapacity, total material requirement, etc.) [17, p. 353].

The study and definition of the content of the national IC and the way in which it is measured depends on the goals of a study, the perspective from which a society is viewed, and the availability of necessary data.

Globally, there are very few studies related to national IC. Some research studies have been conducted for Sweden [28], Israel [25], Finland [17], and Italy [4]. To the best of the authors' knowledge, no research studies related to national IC have been done for Serbia so far. Bontis [3] studied the national IC of ten Arab countries. For this purpose, he constructed the National Intellectual Capital Index (NICI). The index represents weighted average of four sub-indices for each of four components of national IC (human, process, market and renewal capital). Each sub-index is created by defining certain criteria and measures for each component of national IC.

National IC index was also used in one more research [22] to compare national IC of 40 countries. The criteria and measures used by the authors are not exactly the same as the ones used by [3]. The methodology for calculating the index is not precisely defined, and the choice of measures depends on personal opinion of a researcher and the availability of the data. The major downside of the index is that it does not provide the information on how to develop and enhance country's IC, since it only enables comparison and ranking of countries according to national IC level [17, p. 348].

On the other hand, the IC of an economic entity consists primarily of its employees with their knowledge, experience, skills and abilities, the organization of employees, as well as their ability to generate the value that a market will accept and valorize [18]. The level of development of company's IC also determines the level of its overall development and competitiveness, as well as the potential for gaining a competitive advantage [18]. In modern conditions, the influence of IC is significant in the process of creating the value of economic entities. Particularly important are the elements of IC that can be transformed into appropriate types of intellectual property which are the property of the company and remain permanently in it, and if commercialized, become a relatively long-term source of its income [13]. For the permanent development of company's IC, it is vital to adequately manage its resources. IC management in a company can be realized in three phases. In the first phase, a company manages its knowledge and other resources to expand or increase them. In the second phase, a company reaches certain new solutions in a form of product and process innovations, and the emphasis is placed on innovation management, their implementation, expansion, and development. In the third phase, IC management focuses on intellectual property management, maximizing the utility for a company and its stakeholders [1]. In order to be efficient, the development of company's IC needs to be continuous and long-term. Any discontinuity can result in lost revenue and opportunity costs in business activities [19].

National intellectual capital and competitiveness of the global economy

Modern conditions for business activities are characterized by strong competition in all spheres of business. Nowadays, one of the most important factors and elements of competitiveness is IC. This is evidenced by the fact that the majority of economically developed countries are also the countries with the highest competitiveness ranking. Since 1979, the World Economic Forum (WEF) started measuring the competitiveness of some national economies by ranking national economies according to the indicators. The Global Competitiveness Index 4.0 (GCI 4.0) monitors the performance of approximately 140 countries (141 countries in 2019) based on 103 indicators grouped in 12 pillars of competitiveness. Introduced for the first time in 2018, it emphasizes the role of human capital, innovation and agility as well as the role of the driver and key factor of success in the era of the Fourth Industrial Revolution. Based on the analysis of the competitive factors contained in 12 pillars, one can understand the idea of national IC,

investment level in IC and national performance of the countries for which the index is calculated.

According to the methodology, the pillars of competitiveness are grouped in four categories: enabling environment, human capital, markets, and innovation ecosystem. Enabling environment category contains the first four pillars: institutions, infrastructure, ICT adoption, and macroeconomic stability. Human capital category contains the following pillars: health system and skills. Markets category contains these pillars: product market, labor market, financial system, and market size. Finally, innovation ecosystem category contains the last two pillars: business dynamism and innovation capability.

The indices and the pillars of competitiveness can take the values from 0 to 100 and they are interpreted as "the results of progress", since they show how close a country is to the ideal state in which the index value equals 100. The index value represents the arithmetic mean of the values of 12 pillars, meaning that all the pillars have the same weights regardless of the fact which of the four categories they belong to.

According to the Global Competitiveness Index for 2019, it can be concluded that the most developed countries have the highest competitiveness ranking. The top five economies were Singapore, United States, Hong Kong, the Netherlands, and Switzerland. Although Singapore ranked first, its index value was less than 100 – 84.8/100, meaning that there was room for improvement even for the top-ranked country. Chad ranked last (35.1/100), and the average index value for 141 ranked countries amounted to 60.7. Serbia ranked 72nd with the index value of 60.9, therefore belonging to the group of average-ranked countries.

The competitiveness of a country is greatly influenced by the global business conditions. The last global financial crisis had a rather negative effect, aggravating the business conditions. After the global financial crisis of 2007-2008, there was a period of slow growth that has accelerated since 2012. In 2017, global GDP increased by about 3.3%, and in 2018 and 2019 the projected global GDP growth was almost 4% [32, p. 1]. Although the global economy is showing the signs of recovery, policymakers in many countries are concerned about the prospect of long-term

economic development, believing that the ongoing growth is the result of the cycle, supported by low interest rates rather than fundamental drivers of structural growth. Achieving faster economic growth is nowadays hindered by numerous factors, the most important ones being (1) productivity slowdown, (2) challenges posed by innovation, (3) growth of inequality, and (4) decreased volume of international trade [31, pp. 2-5].

(1) Despite the expectations, significant technological advances did not lead to increased economic growth. On the contrary, there was productivity slowdown in both developed and developing countries, for which there are several explanations. The first explanation is that modern technologies do not have the same potential to advance productivity as the inventions in the past did. According to the second explanation, more time is needed for new technologies to affect productivity and to be recorded in countries' statistics. The third explanation is that the reallocation of resources to less productive sectors contributed to the fall in productivity, so policymakers needed to remove regulatory barriers that prevented structural adjustment. The fourth explanation is a long-term decline in knowledge level, especially among younger workers, in the countries where the slowing down of economic growth led to long-term unemployment and the fall in investments [31, p. 3].

When analyzing productivity data, it should be taken into account that the data are obtained on the basis of GDP data of countries, and, therefore, the level of productivity may be underestimated. The traditional way of measuring GDP does not include significant amount of the value created in recent years. For example, search engines, information on the Internet, or the value generated through social media are not evaluated based on the value provided to users, but based on the value generated for these companies by selling advertising space to other companies. Moreover, productivity data do not reflect the improvement of product quality resulting from technological advances as it is the case with smartphones. Finally, the participation of services in economy is increasing, but the value of services is more difficult to measure compared to the value of physical goods.

(2) Innovations have the potential to be a source of growth. There are challenges though. The biggest challenge is how to utilize the potential of innovation to benefit a society as a whole, bearing in mind that they can lead to redistribution of wealth and opportunities for people. In the years to come, it is expected that new technologies will change significantly the way we produce and provide services, which will bring about job losses. Although new jobs will certainly be created, it is uncertain when it will happen and whether their number will match the number of lost jobs.

The development of technology has led to the creation of asymmetrical political and economic environment. There is an increase in concentration in some market structures, which has an impact on productivity, growth, and inequality since economic concentration also enables the growth of political power and influence increasing the risk that economic policies would favor the companies that are well positioned in the industry.

(3) One of the impacts of the development of technology on the competition of legal entities is the fact that technology contributes to the polarization of labor market by increasing the number of low-skilled and highly-skilled jobs and reducing the number of medium-skilled jobs [6, p. 62]. Over the past decades, inequality has declined globally due to faster growth of poor and densely populated countries in Asia compared to developed countries. However, inequality within states increased. In developed countries inequality between rural and urban areas increased. It is not the case in developing countries, although the absolute level of inequality in them is much higher than in developed countries. The combination of decreasing growth and increasing inequality resulted in political discontent and the spread of tension worldwide, which could bring about political and economic problems [31, p. 4].

(4) The volume of international trade declined by about 15% in 2009 as the consequence of the economic crisis and it is still smaller today than it used to be before the global financial crisis. The volume of international trade after 2009 has been slower than the growth of global GDP. Due to the crisis there are new forms of protectionism in many countries, including the USA, based on laws, regulations, border controls, and other types of non-tariff protection measures.

One reason for the decline in international trade is the emergence of declining return on production relocation across different countries whose laws differ. The decline also happens due to the emergence of new technologies, such as 3D printing which can bring production closer to consumers. Another explanation for the decrease of international trade volume is the change of customer preferences, especially of the youth, which led to the fall in the demand for physical products manufactured abroad and, at the same time, increased the demand for local services [31, p. 5].

In practice, economic growth does not guarantee human development, and countries cannot improve the well-being of their citizens without first achieving economic growth. Therefore, economic growth should not be the ultimate goal, but it should help achieve well-being of people and economic progress which would lead to realizing certain values, such as equal distribution of economic benefits, environmental sustainability, and intergenerational equity for young people and future generations.

Competitiveness of the Serbian economy and recommendations for the new growth model

Serbia belongs to the group of European countries with rather low competitiveness ranking. In terms of competitiveness of national economies, European countries can be divided into four groups. The first group is made up of the most competitive northwest region, including Switzerland. The second group consists of a bit less competitive France-led southwest. The third group is made of the northeast region, led by Poland, the Czech Republic, and the Baltic countries. Some countries in this group are equally competitive or even more competitive than some Western European countries. The fourth group consists of the southeast region, including the Balkan countries, which lags behind the other groups [32, p. 17].

According to the report of the World Economic Forum for 2019 [33, p. 498], Serbia ranked 72nd out of 141 countries regarding Global Competitiveness Index.

The index value for Serbia was 60.9/100. Since the data on the competitiveness of countries have not been published for 2020, Table 1 shows how Serbia and the surrounding countries ranked in 2019.

Table 1: Ranking of Serbia and surrounding countries according to the Global Competitiveness Index (2019)

State	Global Competitiveness Index		Difference from the previous year	
	Rank	Value	Rank	Value
Slovenia	35	70.2	-	0.6
Hungary	47	65.1	1	0.8
Bulgaria	49	64.9	2	1.3
Romania	51	64.4	1	0.9
Croatia	63	61.9	5	1.8
Serbia	*72*	*60.9*	*-7*	*-*
Montenegro	73	60.8	-2	1.2
Albania	81	57.6	-5	-0.5
North Macedonia	82	57.3	2	0.7
Bosnia and Herzegovina	92	57.7	-1	0.6

Source: Adapted according to [33, p. xiii].

Table 2: Global Competitiveness Index and pillars of competitiveness for Serbia for 2019

	Rank	Value
Global Competitiveness Index	**72**	**60.9**
Favorable environment		
Pillar 1: Institutions	75	52.5
Pillar 2: Infrastructure	51	73.8
Pillar 3: ICT adoption	77	52.6
Pillar 4: Macroeconomic stability	64	75
Human capital		
Pillar 5: Health system	76	79
Pillar 6: Skills	55	68.2
Market		
Pillar 7: Product market	73	54.6
Pillar 8: Labor market	54	62.1
Pillar 9: Financial system	82	57.4
Pillar 10: Market size	74	51.8
Innovation ecosystem		
Pillar 11: Business dynamism	54	63.1
Pillar 12: Innovation capability	59	40.2

Source: Adapted according to [33, pp. 499-501].

According to the Global Competitiveness Index, Table 1 displays that Serbia is slightly better ranked compared to Montenegro, and significantly better compared to Albania, North Macedonia, and Bosnia and Herzegovina. Romania, Bulgaria, Hungary and Croatia, and especially Slovenia, are better ranked than Serbia. Although the index value for Serbia is unchanged, Serbia is ranked five places lower compared to the previous year. This indicates that Serbia did nothing in 2019 to improve its competitiveness, whereas some other countries, such as Croatia, were rather active in improving its competitiveness.

Rather low ranking of Serbia regarding the global competitiveness is due to its size, as well as its low GDP per capita. Serbia is a small country whose share in the global GDP PPP is only 0.09%. With the population of 7 million, its GDP per capita amounted to $7,243 in 2018. The average annual GDP growth rate in the period 2009-2019 was rather low and amounted to only 1.5%. As the consequence of the aforementioned factors, competitiveness ranking of Serbia is rather unfavorable. Table 2 illustrates the ranking of Serbia regarding 12 pillars of competitiveness.

Based on the analysis of the indicators shown in Table 2, according to all the pillars of competitiveness Serbia lags behind compared to the average of Europe and North America. The largest lagging of Serbia is in

the pillars: financial system, health system, institutions, market size, and product market.

One of the reasons for low competitiveness ranking in Serbia is the current business conditions. The transition to capitalism, which has been going on in Serbia for 25 years, has led to a specific structure of companies classified as the so-called "partocratic sector", the quasi-market and market sectors [10, p. 3]. Partocratic sector dominates Serbia in terms of total assets and equity. The sector consists of public and state-owned enterprises and enterprises with mixed ownership structure. The quasi-market sector consists of privately-owned small and medium-sized enterprises whose major business partners are enterprises in partocratic sector. For the success of these enterprises, political connections are crucial. Finally, market sector consists of branches of multinational enterprises in the field of finance and real economy and large enterprises owned by local entrepreneurs. As for assets and equity, the sector is significantly smaller than the previous two. Out of the total assets of all enterprises in Serbia, about 20-25% enterprises are from the market sector, while their share in the total revenue of all enterprises amounts to approximately 30-35%.

One of the reasons for low competitiveness ranking of the Serbian economy is low investment of GDP in scientific

research. Unlike most developed countries which on average allocate between 3% and 4% of GDP for research and development, for decades Serbia has been spending less than 0.4% of GDP on these activities. In order to make progress in domestic technological development, it is vital to change the approach to financing scientific research not only at national economy level, but also at company level. Changing the approach implies that the investment in research and development should not be treated as an unwanted expense, but as a highly profitable investment in the future [20, p. 484].

The problem of Serbia is also a very unfavorable structure of entities engaged in research and development activities. Actually, 42.6% of organizations engaged in research and development activities in Serbia belong to higher education sector, 30.4% to non-financial sector, 25.3% to public sector and 1.7% to non-professional sector. Research and development activities in Serbia are mainly focused on basic research, yet without a proper link between science and industry. In developed countries, by contrast, most research and development activities have been transferred to large corporations. In the United States, 70% of research and development activities are performed in enterprises. At universities only 15% of research and development activities are performed, whereby half of the total number of scientists are employed or used to be employed in the economy [20, p. 484].

The link between practice on the one hand and science and research work on the other hand is the weakest link in the innovation chain of the domestic economy. Therefore, most of domestic economic entities tend to purchase ready-made tech-solutions. However, their purchase contributes to the achievement of development goals in the short run, but in the long run it leads to permanent technological dependence. Therefore, the most acceptable solution for majority of companies may be to combine purchased technology with their own solutions, further develop and adapt the purchased technology to their conditions and needs [20, p. 485].

The fact that the transition process is not yet complete is also one of the problems of the Serbian economy. Getting out of transition requires complex reforms involving three groups of activities [11, p. 20]. First, the past mistakes need to be corrected through structural reforms and fiscal consolidation. Afterwards, the new growth model needs to be applied along with new economic policies that comply with the paradigm shift in economic theory and new norms such as the Fourth Industrial Revolution. Finally, Serbia needs investment in new areas that are in line with mega trends.

The new growth model of the domestic economy should be based on advanced industrial production and high value-added services, and new economic policies according to heterodox approach. Heterodox approach calls for the harmonization of macroeconomic policies (monetary and fiscal), with industrial policies (horizontal and vertical). Horizontal industrial policies are targeted at the overall economy of a country, while vertical industrial policies are targeted at particular sectors. Free market, infrastructure (physical and digital) and technology are interconnected according to heterodox approach [12, p. 13].

The new growth model has three pillars [9, p. 342]. The first pillar consists of vertical industrial policies targeted at trade sectors. Trade sectors are the sectors where a country can have a comparative, competitive or sustainable competitive advantage. Comparative advantage is based on the possession of the factors of production such as natural resources, labor, financial capital, and location rent. Exchange sectors, the candidates for vertical industrial policies, in which Serbia can have comparative advantage are agriculture, energy sector, automotive industry, fashion industry, and waste management sector [9, p. 346].

High competitiveness ranking and competitive advantage of domestic companies could enable higher prices compared to competitors, conducting business at lower costs or both [23, p. 73]. Trade sectors, the candidates for vertical industrial policies, in which Serbia can have competitive advantage, are metal industry, transport and logistics, wood processing and furniture production [9, p. 346]. Unlike competitive advantage which is short-term, sustainable competitive advantage is a long-term advantage over competition based on innovation that others cannot copy. Trade sectors which are the candidates for vertical industrial policies in which Serbia can have a sustainable competitive advantage are ICT, organic food, and health tourism sectors [9, p. 346].

The second pillar of the new growth model includes horizontal industrial policies. They should be aimed at improving infrastructure, public procurement and education, assisting start-ups and the investment in science, research and development [9, p. 343]. Horizontal industrial policies can be divided in six blocks: (1) measures focused on knowledge enlargement, (2) policies providing better access to finance, (3) policies providing better regulatory framework, (4) policies providing better conditions for export, (5) policies focused on environmental protection and green energy and (6) policies enabling structural changes [30, p. 183].

The third pillar represents a restrictive macroeconomic policy including hard budget constraints, automatic stabilizers, and tax collection. ICT sector and sector of professional, scientific, and technical activities should be at the center of the new growth model based on advanced industrial production and high value-added services [9, p. 346].

The authors such as [16] and [8] investigated the impact of IC efficiency on financial performance of companies that operate within ICT sector in Serbia. The results obtained by [16] indicate that human capital and physical capital partially affect financial performance. On the other hand, the results of the study conducted by [8] suggest that IC efficiency does not affect financial performance of Serbian ICT companies.

Characteristics of intellectual capital and industrial policy of innovation-intensive companies in Serbia

In the following part, an analysis of intellectual capital, competitiveness and industrial policies for a group of innovation-intensive companies in Serbia is performed. The research was conducted based on a survey. The sample included the companies from the territory of the Republic of Serbia from ICT sector and sector of professional, scientific, and technical activities. The companies were established in 2015, they have at least three employees and they submitted annual financial reports as of 2017. There are 320 such companies. The companies with less than three employees were excluded from the survey, because some questions from the survey referred to the views of the founders of the company regarding the majority of employees, and majority implies at least three employees.

In the further analysis of a potential sample, another 96 companies belonging to the sector of professional, scientific, and technical activities were excluded, since

Table 3: Activities of companies participating in the research

Predominant economic activities	Number of companies	
	N	%
A. Information and communication	**16**	**44%**
1. Information service activities	1	3%
2. Cable telecommunications	1	3%
3. Production and broadcasting of television programs	1	3%
4. Production of cinematographic works and audio-visual products	1	3%
5. Computer programming	9	25%
6. Recording and publishing of sound recordings and music	1	3%
7. Computer equipment management	1	3%
8. Web portals	1	3%
B. Professional, scientific, and technical activities	**20**	**56%**
1. Architectural activity	2	6%
2. Activity of advertising agencies	3	8%
3. Engineering activities and technical consulting	6	17%
4. Research and development in other natural and technical-technological sciences	1	3%
5. Business consulting activities	6	17%
6. Other professional, scientific and technical activities	1	3%
7. Specialized design activities	1	3%
Total	**36**	**100%**

Source: Authors' calculations.

in their case it was obvious that they were not innovative companies. The final number of companies meeting the criteria to be included in the research was 224.

The survey was sent to 182 e-mail addresses of the owners (founders) of the companies. The data collection process lasted from December 2018 to April 2019. 36 responses were collected, meaning that the response rate was 19.8 percent. Table 3 shows the activities of the companies participating in the research.

In Table 3, it can be seen that 16 companies from ICT sector and 20 companies from the sector of professional, scientific, and technical activities participated in the research. Most companies in ICT sector are in computer programming. The companies from the sector of professional, scientific, and technical activities are in various activities, the most common ones being engineering activities and technical consulting (6 companies) and business consulting (6 companies).

The regional distribution of the surveyed companies is such that 20 companies have their headquarters in Belgrade and the remaining 16 in various places all over Serbia. At the end of 2017, only one company in the sample was classified as a small enterprise, while all others were classified as micro enterprises. By the end of 2019, two micro enterprises became small enterprises, and the total number of employees increased from 252 to 308, that is, by 22%. By monitoring the movement of the total income of the surveyed companies, we concluded that their total operating income grew annually (Figure 2). The companies in ICT sector generated higher operating income each year unlike the companies in the sector of professional, scientific and technical activities, although their share in the sample was only 44 %.
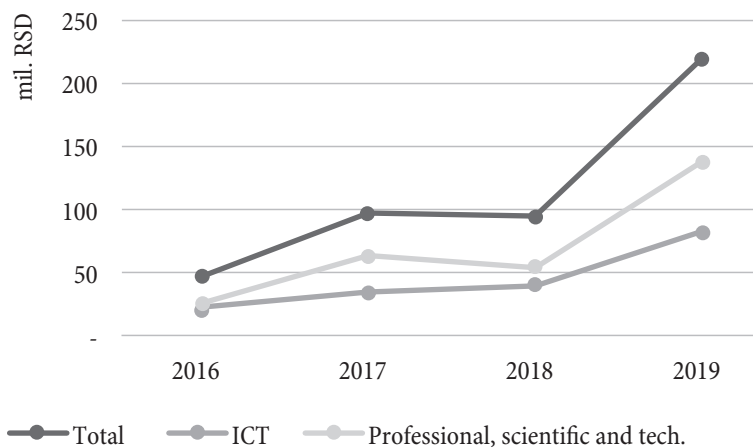
For the surveyed companies, the movement of their net profit in the same period was also analyzed. At the end of 2017, the companies from both sectors achieved

Figure 2: Movement of business income of the surveyed companies (2016-2019)
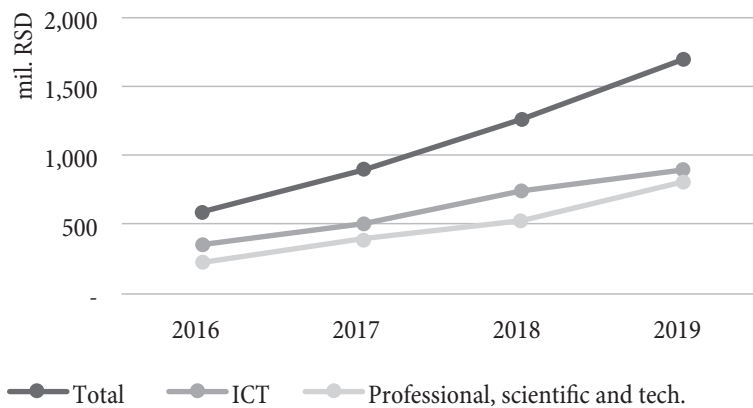
Source: Authors' calculations.

Figure 3: Movement of net profit of the surveyed companies (2016-2019)

Source: Authors' calculations.

significantly higher net profit than the previous year. However, in 2018 net profit decreased compared to 2017, while in 2019 net profit grew rapidly (Figure 3).

When it comes to a comparative analysis of the net profit of the two groups of the analyzed companies, it can be concluded that, although the companies from ICT sector achieved higher operating income in all years during the analyzed period, their net profit was lower than that of the companies from the sector of professional, scientific, and technical activities.

The next subject of the analysis is IC of the surveyed companies. IC of the analyzed group of companies was observed through its three components: human capital, structural capital, and relational capital. This categorization of IC is stated in Guidelines for *Managing and Reporting* on Intangibles (*Intellectual Capital Report*), or MERITUM Guidelines [24]. Similar to [27], [15] and [26], human capital encompassed the elements such as the knowledge of the founder (owner), commitment, motivation, social skills, and the interaction between team members. Table 4 shows how respondents assessed commitment and the knowledge of the founder (owner).

Knowledge, as an element of company's IC, was measured based on education and previous work experience of the owners. The owners of the surveyed companies had an average of 14 years of total work experience when founding their company, 8 years of work experience in the activities of their company and 4 years of work experience in managerial positions. The founders of the largest number of companies (as many as 83%) have a university degree. Commitment to work was measured based on the number of hours the owners spend working in their company, and in this particular case, the number averaged 41 hours weekly. From the data, it can be concluded that the length of work experience of business owners, the type of activities the owners were engaged in, as well as their experience in managerial positions have an impact on the formation of quantum of knowledge, as an element of IC of the companies.

Respondents were asked to assess various statements about motivation, social skills and the interaction between team members. The statements were assessed on a five-point Likert scale (1-strongly disagree, 5-strongly agree). Table 5 shows the number and the percentage of respondents who agree (4) and strongly agree (5) with the statements.

Motivation, as an element of intellectual capital, was also the subject of the research. As for motivation, 92% of the respondents stated that one of the main reasons why

Table 4: Knowledge of the founder and commitment as the elements of human capital

Human capital	Value
A. Knowledge of the founder (owner)	
1. Average number of years of total work experience	14
2. Average number of years of work experience in related business activities	8
3. Average number of years of work experience in managerial positions	4
4. Percentage of founders with university degree	83%
B. Commitment	
1. Average number of hours per week the owners spend working in their company	41

Source: Authors' calculations.

Table 5: Motivation, social skills and the interaction between team members as the elements of human capital

Human capital		N	%
A. Motivation	Cronbach's alpha -0.07		
1. One of the main reasons why I established a company is because I was not able to find a good job. (reverse scoring)		3	8%
2. One of the main reasons why I established a company is because I wanted to implement my personal ideas.		33	92%
B. Social skills	Cronbach's alpha 0.587		
1. I can evaluate other people well.		26	72%
2. I can estimate the right time to ask someone for assistance.		26	72%
3. I can adapt easily to any social situation.		29	81%
C. Interaction between team members	Cronbach's alpha 0.628		
1. Working in the team represents the highest priority for every team member (in comparison with other jobs or free time).		24	67%
2. The communication between team members is excellent.		25	69%

Source: Authors' calculations.

they decided to establish their company was that they wanted to implement their personal ideas, while only 8% of them stated that the inability to find a good job was the main reason for starting the business. Based on these answers, it can be concluded that most of the founders have internal (intrinsic), not external (extrinsic) motivation.

The social skills of the owners are of great importance for the formation of IC and the competitiveness of economic entities. This is also evidenced by [2], who proved that two social skills of the owners - social perception and social adaptability, have a positive effect on the success of start-ups. The authors defined social perception as the ability to judge other people, and social adaptability as the ability to adapt to different social situations. In our case, 72% of the respondents stated that they can evaluate other people well and know when it is the right time to ask someone for assistance, and 81% answered that they can easily adapt to any situation. Therefore, it can be assumed that the owners of the surveyed companies have a high degree of social skills. However, the offered answers should be considered with caution, due to a certain degree of subjectivity of business owners when assessing the social skills.

An important element of human capital is the quality of interaction between team members, since in many companies the owner or owners work in a team with other people. Lechler [21] stated that healthy interaction between team members characterized by communication, coordination and cohesion has a positive effect on the success of the company. The results of the survey prove that 67%

of the respondents believe that teamwork is the highest priority for all members compared to other jobs or free time, and 69% believe that the communication between the members of their team can be assessed as excellent.

As for structural capital as an element of IC, in this research, similar to [15], it is divided into three elements: process innovations, production efficiency, and organizational culture. Respondents were asked to assess various statements on a five-point Likert scale (1-strongly disagree, 5-strongly agree). Table 6 shows the number and the percentage of respondents who agree (4) and strongly agree (5) with the statements about structural capital.

In addition to launching new products and services, it is essential for companies to introduce innovation processes that can contribute to improving productivity. In the analyzed sample, according to the owners, 64% of the companies introduced innovations leading to more efficient operations, and in 75% of the companies, most employees try to continuously improve the processes they perform. We believe that this is a high percentage of the representation of process innovations in business, as well as that the motivation of employees to continuously improve the processes they perform is very positive.

An important element of the structural capital of a company is the efficiency of product and service production. The time required to produce a product or service, as well as the number of errors that can occur in production are important determinants of business success, since they affect the efficiency of production and business, as well

Table 6: Process innovation, production efficiency and organizational structure as the elements of structural capital

Structural capital		N	%
A. Process innovation Cronbach's alpha 0.839			
1. Our company introduced innovations leading to more efficient operations.		23	64%
2. Most employees try to continuously improve the processes they perform.		27	75%
B. Production efficiency Cronbach's alpha 0.790			
1. Most employees are committed to continuously reducing operating costs.		16	44%
2. Most employees are committed to continuously increasing the quality of our products or services.		28	78%
3. We can respond to customer complaints faster than our competition.		25	69%
4. We need less time to develop a product or a service compared to our competition (from an idea to the market).		21	58%
5. We can produce a product or a service faster than our competition.		23	64%
C. Organizational culture Cronbach's alpha 0.625			
1. Majority of the employees participate in making important decisions.		15	42%
2. Most employees agree with the decisions made in the company.		28	78%
3. Customer suggestions lead to changes in the organization.		16	44%
4. Our company quickly adapts its organizational structure to the changes in the environment.		25	69%

Source: Authors' calculations.

as the company's reputation and customer loyalty. The results of the survey revealed that 58% of the business owners believe they need less time to develop a product compared to their competition (from an idea to the market), and 64% of them believe they can produce a product or a service faster than their competition. Furthermore, 69% of the respondents assume their company can respond to customer complaints faster than their competition. As for employees, 78% of the owners believe that most employees are committed to continuously increasing the quality of the company's products. However, only 44% of the owners believe that most employees are committed to continuously reducing operating costs, leading to the conclusion that a significant number of companies need to focus on improving the processes that would reduce operating costs in the future.

Organizational culture, characterized by employee involvement, internal consistency and adaptability, has a positive effect on employee satisfaction and company performance, as indicated by [7]. Those authors define internal consistency as the degree of normative integration, and adaptability as the capacity for internal changes representing company's response to the changes in the environment. As for the surveyed companies, only 42% of the owners stated that the majority of the employees participate in making important decisions. On the other hand, 78% of owners believe that most employees agree with the decisions made in the company. Although 69% of the owners stated that their company quickly adapts its organizational structure to the changes in the environment, only 44% of them claimed that customer suggestions lead

to changes in the organization. In conclusion, the owners of the company do not sufficiently involve their employees in making important decisions in the company. We believe that in the future, owners should pay more attention to customer suggestions and consider the possibility of including more of their employees in a decision-making process.

In terms of relational capital of the surveyed companies, it is divided into the following elements: customer and supplier relationships, support through informal networks and reputation of the company. The division is similar with the authors [27] and [15]. Respondents were asked to assess various statements on a five-point Likert scale. Table 7 shows the number and the percentage of respondents who agree (4) and strongly agree (5) with the statements about relational capital.

The first element of relational capital which is analyzed is customer and supplier relations. The structure of the customers of the surveyed companies is such that 42% of the respondents pointed out that most of their customers are from abroad. As for suppliers, 44% of the respondents stated that their companies mostly rely on local suppliers from Serbia. Although these are successful companies, the results of the research are quite different from the results obtained by [27]. In his research on the impact of IC on the performance of start-ups, this author showed that most successful companies rely on a small number of local suppliers, and that companies that depend only on local customers achieve the lowest growth and profitability in the sample, which is not the case with the surveyed group of domestic companies.

Table 7: Customer and supplier relationships, support through informal networks and company's reputation as the elements of relational capital

Relational capital			N	%
A. Customer and supplier relationships	Cronbach's alpha	-5.60		
1. Most of our suppliers are local companies from Serbia.			16	44%
2. Most of our customers are from abroad.			15	42%
B. Support through informal networks	Cronbach's alpha	0.608		
1. My family and friends provided me with full support when founding and running the company.			26	72%
2. Business partners, acquaintances, and former employers provided me with support when founding and running the company.			22	61%
C. Reputation of the company	Cronbach's alpha	0.812		
1. Most customers would recommend our company's products or services.			33	92%
2. Most customers re-purchase our company's products or services.			34	94%
3. Our company has a better reputation than most competitors.			24	67%

Source: Authors' calculations.

Within relational capital, as an element of IC, support through informal networks was especially considered, which according to some authors has a positive effect on the probability of survival and growth of newly established companies [5]. These authors also showed that the support of those with whom the entrepreneur has strong ties has a greater impact on the probability of survival and growth than the support of those with whom the entrepreneur has weak ties. The results of the survey displayed that 72% of the respondents believe that their family and friends provided them with full support when founding and running the company. 61% of them pointed out that when founding and running the company, in addition to the support of family and friends, the support was offered by business partners, acquaintances, and former employers. The answers indicate that for the domestic surveyed companies support through informal networks is crucial for their survival and success.

One segment of the survey dealt with the company's reputation. The company's reputation is an important element of relational capital since it allows a company not only to attract new and retain old customers, but also to more easily obtain resources and provide additional sources of financing. In the survey, the majority of respondents rated the reputation of their company as excellent. For example, 92% of the respondents stated that most customers would recommend their company's products, 94% stated that most customers re-purchase their company's products, and 67% claimed that their company has a better reputation than most competitors. From the above answers, it can be concluded that the respondents are rather satisfied with the reputation of their company, and even have an advantage over their competitors. However, due to the possibility of subjectivity in the assessment, the answers should be considered with caution.

For testing the reliability of the questionnaire (measurement scale), Cronbach's alpha was used (Tables 5-7). Factors such as process innovation, production efficiency, and reputation of the company have high reliabilities, all Cronbach's alphas are greater than 0.7. On the other hand, factors such as social skills, interaction between team members, organizational culture, and support through informal networks have lower reliabilities, all Cronbach's

alphas are below 0.7. According to [14, p. 675], when dealing with psychological constructs, values below 0.7 can be expected because of the diversity of the contracts being measured. In addition, the value of Cronbach's alpha depends on the number of items on the scale. As the number of items on the scale increases, Cronbach's alpha will increase. Taking all this into account and bearing in mind that the aforementioned factors consists of a small number of items, it can be concluded that the reliabilities of those factors are acceptable. Finally, factors such as motivation and customer and supplier relationships have negative values of Cronbach's alpha. This is due to a negative covariance among items, which means that the reliability model assumptions are violated. This is a serious limitation and the results concerning these two factors should be interpreted with caution.

The development of innovation-intensive sectors implies the application of appropriate industrial policies. Industrial policies for these sectors include a wide range of measures that have impact on investment, financing, taxation, exports, income share, employee training, public procurement, intellectual property rights, etc. [11, p. 36]. Since these sectors are based on technology and knowledge, industrial policies that spark research and innovation are of prime importance. Therefore, state aid should be increased to cover various aspects of the innovation process in the sector [30, p. 185].

The specificity of industrial policy for innovation-intensive sector is that it has the elements of both horizontal and vertical policies. ICT policy-making can be approached in two ways, whereas both of them have advantages as well as disadvantages [11, p. 36]. The first approach is centralized from the top down, enabling better coordination, but on the other hand it gives less importance to local environment and creates implementation problems. The second approach is decentralized and consensus-based, allowing better identification of the needs of those to whom the policy is intended, on the other hand it may lead to delays or stagnation in policy definition. Considering the advantages and disadvantages of both approaches, it can be concluded that a centralized top-down approach is better when defining a policy, and the decentralized, consensus-based approach when implementing a policy.

When designing an industrial policy for innovation-intensive sector, it is desirable to separate it into four pillars so that policy measures and instruments can be more easily identified and adapted to the specific needs of those to whom the policy is intended. These pillars are: (1) infrastructure, (2) regulatory framework, (3) the use of ICT in the public sector, and (4) knowledge and competences [11, pp. 36-38].

(1) Infrastructure covers the measures that support and encourage the development and construction of telecommunications infrastructure enabling companies and households to use broadband technologies.

(2) Regulatory framework should include the measures that encourage the competition between companies providing ICT infrastructure and services, as well as the measures to facilitate the access and promote the use of new technology services. Additionally, legislation is essential since it enables protecting data, privacy, and intellectual property.

(3) Use of ICT and new technologies in the public sector refers to the use of ICT by the government, government offices and agencies to enhance public services and increase the efficiency of public administration. The use of ICT to disseminate information of public importance and provide public services also contributes to wide usage of new technologies by other users such as individuals and households.

(4) Knowledge and competences is the pillar that comprises government activities such as promoting high-tech and innovation clusters, promoting incubators for start-ups, financing research and development activities, and supporting companies which are trying to commercialize their innovations.

In addition to direct industrial policy measures contained in these four pillars, certain indirect measures for support and development of ICT sector in Serbia need to be implemented. These measures imply providing fiscal incentives for research and development, enabling start-ups to easily access venture capital, setting up regional support centers for support and cooperation between small and medium-sized enterprises in the software industry, developing clusters focused on high value-added products and services, and broadening ICT knowledge and skills through various education programs [11, p. 38].

Conclusion

Evaluating the conducted research, it can be concluded that IC today represents the basis of competitiveness, creation and increasing the value of all economic entities. It can also be concluded that IC today is one of the most important factors in the development and competitiveness of national economies, along with the fact that the most economically developed countries have the highest rank of competitiveness. The research showed that according to the competitiveness ranking, Serbia belongs to the last, fourth, most unfavorable group of European countries, with the worst results achieved regarding the indicators of financial system, health system, institutions, market size, and product market. The most important causes of low competitiveness of the domestic economy are: country size, low level and growth of GDP per capita, characteristics of the existing economic system, low investments of GDP in the field of R&D, unfavorable structure of entities in R&D, as well as weak connection of science, researches, and practices. The paper proposes that the new growth model of the domestic economy should be based on advanced industrial production and services with a high degree of added value, as well as the application of new economic policies that should be based on a heterodox approach.

The research based on the survey including the companies on the territory of the Republic of Serbia from the ICT sector and the sector of professional, scientific, and technical activities, conducted in late 2018 and early 2019, indicated that the degree of human capital development of the analyzed companies from innovation-intensive sectors is at a relatively high level, they have excellent reputation and their structural capital can be assessed as relatively developed with the potential for further improvement. In conclusion, further development of innovation-intensive sectors implies the application of appropriate industrial policies, which should include a wide range of measures, from investment to intellectual property protection. It is especially important that these measures encourage development and innovation.

This research, like most other studies conducted by using a survey, has several limitations. The first limitation relates to the reliability of the measurement scale. Some factors such as motivation and customer and supplier relationships have poor reliabilities and the results concerning those two factors should be interpreted with caution. The second limitation refers to the different perception of concepts by the respondents, while the third is subjectivity of the respondents when providing answers, which influenced IC of the company to be evaluated a somewhat better than it actually is.

Finally, the fifth and perhaps the biggest limitation is the fact that this study does not offer the assessment of the interrelationship between IC, competitiveness and industrial policies at the micro level nor at the level of the national economy. This research included only a small number of companies from innovation-intensive sectors in which IC plays an important role in gaining competitive advantage and business success. Although this study suggests that the competitiveness of the national economy is influenced by the level of IC development and the competiveness of economic entities, there is also a reverse effect since the government with its macroeconomic policies sets the framework for the development of IC and the competitiveness of economic entities. This causality could be a very interesting, but also a complex and challenging topic for future research.

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