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ANALYSIS OF THE ICT SECTOR IN THE FUNCTION OF ENHANCING BUSINESS RESILIENCE

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ABSTRACT

In modern business conditions, companies from the ICT sector, which has great potential for the growth and development of the national economy and enhancing business resilience, are increasingly important. From the point of view of future development tendencies, it is important that the structure and quality of the Serbian ICT sector needs to be adapted to the demands of the world market. In developed European countries, which are also the main destinations of Serbian ICT exports, the competitive conditions are getting tougher, so survival and improvement of the position in such markets implies investing additional efforts to raise the level of competitiveness. The permanent development of knowledge, creativity and innovation is the starting point for the growth and success

of these companies and an important tool for achieving competitiveness, which is especially evident in the conditions of global and international business. Most of the companies in the ICT sector are micro and small businesses. What characterizes the largest number of ICT companies, especially those whose main activity is software development, are high costs of human resources due to the specific activity that requires a highly educated, professional and trained personnel profile. Investing in human resources in the ICT sector should be a strategic commitment that leads to stable business and increased profitability.

Keywords: *ICT sector, international market, human resources, Republic of Serbia.*

JEL classification: L1, M3

INTRODUCTION

In today's modern world, services are gaining more and more importance and are an integral part of life and business, bringing benefits to every actor. Services can be defined as "any activity or benefit that one interested party can offer to another interested party, which is basically intangible and does not give rise to any form of ownership" [1, p. 400]. The four specific characteristics of services are: intangibility, indivisibility, heterogeneity and perishability [2, p. 179]. Intangibility means that services cannot be seen, touched, heard or felt before they are purchased. Indivisibility implies that services are simultaneously produced and used. Heterogeneity refers to the variability of inputs and outputs in the service process, which makes their standardization impossible. Perishability means the impossibility of keeping, storing or stockpiling services.

In order to differentiate themselves in the market, manufacturers, distributors and retailers provide value-added services, i.e., excellent customer service. Top service companies adopt "strategic concepts, their top management is consistently committed to quality, establish high standards, shape profit margins, and introduce systems to monitor performance and consumer/customer complaints" [1, p. 422]. The service mix includes pre-sales services (supporting and value-added services) and after-sales services (customer/customer service departments, repair and maintenance services). The fact that the service sector generates large revenues, as well as having an increasing participation in income generation and increasing employment, indicates its increasingly significant role, and the information and communication technology (ICT)

sector stands out among them. ICTs influence economic growth and business operations in three ways: "investment in ICT, the existence of a sector that produces ICT goods and services, and the use of ICT" [3].
Therefore, the authors shall perform the analysis of the ICT sector as the faster growing sector in the Republic of Serbia.

LITERATURE REVIEW

Human resources play a dominant role in ICT companies. The permanent development of knowledge, creativity and innovation is the starting point for the growth and development of these companies and an important tool for achieving competitiveness, especially in the conditions of global and international business. Therefore, SMEs international market strategy needs to be carefully planned in order to enhance organisational resilience, especially in terms of increasing international sales volume and international market share [4].
Seen in the context of modern business conditions, the human resources management function should be strategically responsible in order to contribute to the achievement of the organization's mission and goals. This is reflected in the way in which the connection between human resources management and company strategy is established, that is, in the way in which business needs and plans are integrated and synchronized with all aspects of employee management [5].
In order to be competitive, companies must base their operations on a strategic approach that implies development orientation, encourages proactive behaviour, ensures the development of visions, improves perspective, creates common values and thus reduces uncertainty [6]. They must employ talented people at all levels, who possess the right combination of skills and abilities that imply the right values and attitudes [7]. A company's value does not derive from its tangible assets, but rests on knowledge, skills and intellectual property, all of which rest on people. People are the most valuable resource of the organization that influence the achievement of set goals and performance in work. The previous findings show a positive and statistically significant relationship between individual components of intellectual capital and the business performance of ICT companies [8].

A comparative analysis of employment in the mentioned activities indicates that in the period from 2010 to 2015, the Republic of Serbia recorded the highest growth in employment (14.21%) in this sector compared to selected countries of the Danube region [9]. The structure of the IT market for 2019 [10] is dominated by IT services with a share of 42.1%, IT hardware with 31.9% and finally software with 18.1%. This structure of the IT market, according to European standards, indicates that the market of the Republic of Serbia is still not fully mature. It should be borne in mind that the profit margins of hardware companies are extremely low, and so are their profits. The largest total net profit of the domestic IT industry is realized from the software sector (59.8%), Matijević and Šolaja [10, p. 68] point out that in the
Republic of Serbia in 2018, there were 2,349 IT companies whose individual annual revenue was over one million dinars. In the total number of companies, software (programming) companies participated with 63%, which in absolute terms amounts to 1,483 companies.

METHODOLOGY

Information technology sector have been a significant segment of the service sector for many years. The research examined ICT sector in the period from 2010 to 2019. For the purposes of the research, ITC, UNCTAD, WTO trade in services database based on Eurostat, International Monetary Fund, Organisation for Economic Co-operation and Development (OECD) and relevant national statistical authorities, statistics on the IT services including telecommunication services at the level of the world and the Republic of Serbia were used. Different methods were used in the work in order to ensure basic methodological requirements, reliability, objectivity and systematicity.

RESULTS

The number of software companies in the total number of IT companies in relation to their size in the observed period are shown in Table 1. There were 1,086 micro enterprises, 322 small enterprises, 68 medium enterprises and 7 large enterprises (with more than 250 employees), i.e., 73.2%, 21.7%, 4.6% and 0.5% respectively. Small and medium-sized enterprises are the driving force of IT, and the increase in the number of these enterprises should be encouraged.

Table 1. *The number of software companies in the total number of companies in relation to their size in 2018*

Software companies	Micro enterprises	Small enterprises	Medium enterprises	Large enterprises	Total
Software exporter	182	178	59	7	426
ERP specialists	76	67	4	0	147
Other	828	77	5	0	910
Total	**1,086**	**322**	**68**	**7**	**1,483**
Total (%)	**73.2%**	**21.7%**	**4.6%**	**0.5%**	**100%**

Source: Matijević, M., & Šolaja, M. (2020). ICT in Serbia: At a Glance, 2020. Novi Sad:Vojvođanski IKT klaster. p. 72

In 2018, the Serbian IT industry employed 28,543 workers. Previous research estimates that two thirds of the employee structure are IT specialists and one third are employed in sales, administration and management. If this number of employees is compared with about 1.5 million employees in all companies and institutions of the Republic of Serbia, it seems that the representation of IT experts is modest. However, this is only part of the total number of over 60,000 IT experts, which, in addition to the IT sector, includes employees in the telecommunications sector, companies - IT users and registered IT entrepreneurs [11].

Software exporters contribute the most to the growth of the IT sector. If we look at the year 2018 in Table 2., the largest number of companies are in the programming industry. In this sub-sector, an above-average growth in employment was observed, where 19,414 workers were employed, which is about 68% of the total number of employees in the IT sector. Revenues from programming amounted to EUR 935.8 million, which accounts for 37.35% of total revenues in this sector.

Table 2. *Key features of the IT sector in 2018 according to company activities*

Company activity	Company number	Employees	Income (million EUR)	Capital (million EUR)
Programming	1,483	19,414	935.8	376.9
IT services	534	4,981	627.0	173.1
Wholesale and retail trade	32	820	532.9	74.7
PC equipment	300	3,328	409.7	49.6
Total:	**2,349**	**28,543**	**2,505.4**	**674.3**

Source: Matijević, M. (2019). Perspektive IT industrije. https://www.sito.rs/perspektive-it-industrije/

In Table 3**.** the structure of the export of telecommunications services at the world level is analysed, i.e., the top ten countries exporting these services in theperiod from 2010 to 2019 are shown. The analysis of the export value of the ICT sector by country (Table 3) shows that United Kingdom, the USA and France dominate the export of telecommunication services (ranking in 2019). Looking at average export values (2010-2019), the US is the leading country with:
$13,282.8 million in the first five-year period, $10,362.6 million in the second five-year period, and $11,822.7 million for the entire period. It is interesting that after the leading export, the USA is losing its dominant position, and in 2019 there was a decrease in exports of 28.35% compared to 2010. Also, it is important to highlight the increase in exports of India and China, which is not enough to ensure their more favourable positioning at the world level.

Table 3. *Leading countries exporting telecommunication services at the world level in the period 2010–2019 (in thousands of $)*

Exporting countries	Export in 2010	Average 2010-2014	Export in 2015	Average 2015-2019	Export in 2019	Average 2010-2019	Percentage of increase 2019/2010
United Kingdom	5,817,553	7,311,371	9,540,972	9,254,263	9,462,054	8,282,817	**62.65**
USA	10,921,000	13,282,800	13,277,000	10,362,600	7,825,000	11,822,700	**-28.35**
France	7,186,665 (2011)	6,824,758	5,905,937	5,508,130	4,825,532	6,093,298	**-32.85**
Kuwait	3,558,030	3,404,049	2,707,725	3,125,094	4,814,669	3,264,572	**35.32**
Italy	6,029,492	5,705,401	4,534,135	4,758,861	4,243,529	5,232,131	**-29.62**
Germany	3,556,898	3,725,791	3,360,715	3,799,700	3,706,261	3,762,746	**4.20**
Netherlands	4,619,994 (2014)	4,619,994	4,243,665	4,011,184	3,455,010	4,112,653	**-25.22**
Belgium	3,608,601	3,852,891	3,588,165	3,419,614	3,145,785	3,636,253	**-12.83**
India	1,512,050	1,823,422	2,088,244	2,362,883	2,851,225	2,093,153	**88.57**
China	1,220,069	1,541,234	1,654,201	1,926,644	2,397,411	1,733,939	**96.50**

Source: Authors calculation based on [12; 13, 14, 15]

In Table 4. the structure of the import of telecommunications services at the world level in the period from 2010 to 2019 is analysed.

Table 4. *Leading countries importing telecommunications services at the world level in the period 2010–2019 (in thousands of $)*

Importing countries	Import in 2010.	Average 2010-2014	Import in 2015.	Average 2015-2019	Import in 2019.	Average 2010-2019	Percentage of increase 2019/2010
United Kingdom	5,476,071	6,147,717	7,527,361	6,624,171	6,057,859	6,385,944	**62.65**
Italy	5,727,891	5,499,429	5,338,532	5,609,565	5,526,246	5,554,497	**-28.35**
France	4,970,672 (2011)	5,998,006	6,173,330	5,949,798	5,334,067	5,971,224	**-32.85**
USA	8,077,000	7,514,200	6,795,000	5,872,600	5,105,000	6,693,400	**35.32**
Germany	5,357,221	5,366,961	4,312,677	4,341,513	3,925,052	4,854,237	**-29.62**
United Arab Emirates	2,042,206 (2014)	2,042,206	2,205,582	2,583,526	2,886.317	2,493,306	**4.20**
Netherlands	3,531,022 (2014)	3,531,022	2,744,602	2,811,210	2,787,031	2,931,179	**-25.22**
Belgium	2,774,725	2,961,807	2,936,881	2,740,873	2,548,853	2,851,340	**-12.83**
China	1,137,127	1,322,873	1,055,410	1,479,712	1,781,741	1,401,292	**88.57**
Sweden	1,865,640	1,896,742	1,737,222	1,641,582	1,773,408	1,769,162	**96.50**

Source: Authors calculation based on [12; 13, 14, 15]

The analysis of the value of the import of telecommunication services by country (Table 4.) shows that United Kingdom, Italy and France dominate the import of telecommunication services (ranking in 2019). Looking at average import values (2010–2019), United Kingdom is the leading country with: $6,147,717 million in the first five-year period, $6,624,171 million in the second five-year period and $6,385,966 million observed for the entire period. It is noticeable that after the leading import in 2010 ($8,077 million), the USA is losing its dominant position, and in 2019, a 36.8% decrease in imports was achieved compared to 2010. Also, it is important to highlight the increase in imports from China and the United Arab Emirates.

In Table 5**.** the structure of the export of information services of the ICT sector at the EU level (28) in the period from 2010 to 2019 is analysed. The results of the analysis shown in the above table indicate that the total value of the export of information services, at the level of the EU (28), in 2019 increased by 329.71% compared to 2010. The leading European country is the Netherlands with an average export value of $5,388,398 million (2010–2019) and an export growth rate of 173.56%. High values of the increase in exports of Ireland (from 2,089.56%) and Romania (8,801.42%), as well as Poland (247.80) and Germany (224.67) can be observed.

Table 5. *Leading countries exporting of information services of the ICT sector at the EU level (28) in the period 2010–2019 (in thousands of $)*

Exporting countries	Export in 2010.	Average 2010-2014	Export in 2015.	Average 2015-2019	Export in 2019.	Average 2010-2019	Percentage of increase 2019/2010
EU (28)	5,262,060	7,419,059	14,915,529	18,189,678	22,611,676	12,804,369	**329.71**
Netherlands	2,914,332 (2014)	2,914,332	4,415,879	5,883,211	7,972,540	5,388,398	**173.56**
United Kingdom	3,546,158	3,583,993	4,709,476	5,148,914	5,844,698	4,366,454	**64.82**
Germany	629,528 (2013)	866,092	1,225,342	1,593,628	2,043,914	1,385,760	**224.67**
Ireland	79,657 (2012)	54,442	38,742	764,610	1,744,141	527,887	**2,089.56**
France	545,646 (2011)	806,770	842,353	854,913	944,567	833,516	**73.11**
Belgium	347,338	357,939	664,142	692,119	721,166	525,029	**107.63**
Romania	8,008	139,652	478,888	555.188	712,826	347,420	**8,801.42**
Poland	143,609	207,990	401,485	419,704	499,477	313,847	**247.80**
Sweden	394,194	348,726	263,210	326,417	448,631	337,572	**13.81**

Source: Authors calculation based on [12; 13, 14, 15]

The results of the analysis are shown in Table 6**.** indicate that the total value of import of the information services of the ICT sector at the EU level (28) in 2019 increased by 303.28% compared to 2010. The present oscillatory movements of exports are observed in the first and second five-year periods, and we see that after 2015 there was a further increase in both exports and imports.

The leading European country in terms of imports of this ICT sub-sector is Germany with anaverage import value of $1,753,167 million (2010-2019) and oscillations over five-year periods. High values of increase in imports of Belgium (448.33%) andRomania (1,812.95%) are observed.

Table 6. *Leading countries importing of information services of the ICT sector at the EU level (28) in the period 2010–2019. (in thousands of $)*

Importing countries	Import in 2010.	Average 2010-2014	Import in 2015.	Average 2015-2019	Import in 2019.	Average 2010-2019	Percentage of increase 2019/2010
EU (28)	2,779.533	4,954,451	8,426,804	10,685,363	11,209,361	7,819,907	**303.28**
Germany	932,339 (2013)	1,085,251	1,452,352	2,020,334	2,323,013	1,753,167	**149.16**
Netherlands	1,575,868 (2014)	1,575,868	1,041,722	1,432,853	1,742,116	1,456,689	**10.55**
France	922,866 (2011)	1,073,271	980,809	1,136,736	1,389,508	1,108,529	**50.56**
United Kingdom	1,004.358	1,146,530	1,637.778	1,763,497	1,374,697	1,455.014	**36.87**
Belgium	135,223	152,287	399,425	612,842	741,472	382,564	**448.33**
Italy	206,547	268,695	363,144	448,012	601,741	358,354	**191.33**
Austria	232,979	282,863	292,911	392,292	516,380	337,577	**121.64**
Sweden	321,283	322,071	309,497	443,800	452,634	382,936	**40.88**
Romania	14,021	45,796	120,633	206,527	268,215	126,162	**1,812.95**

Source: Authors calculation based on [12; 13, 14, 15]

The results of the analysis are shown in Table 7**.** indicate that the total value of exports of telecommunications services from the Republic of Serbia in 2019 decreased compared to 2010. At the world level, the decrease is 1.12%, and in EU countries 17.19%. In the first five countries in terms of export value of telecommunication services, there is a decreasing trend, where the decrease in exports to Belgium (81.12%), Canada (57.62%) and Austria (46.91%) stands out.

Table 7. *Markets to which the Republic of Serbia exports telecommunications services in the period 2010–2019 (in thousands of $)*

Importing countries	Import in 2010.	Average 2010-2014	Import in 2015.	Average 2015-2019	Import in 2019.	Average 2010-2019	Percentage of increase 2019/2010
World market	150,086	181,385	167,959	181,385	148,408	166,293	**-1.12**
EU (28)	106,054	132,590	116,504	132,590	87,828	121,411	**-17.19**
Australia	1,327 (2014)	1,327	4,438	1,327	1,106 (2016)	2,290	**-16.65**
Austria	10,605	12,772	7,767	12,772	5,630	10,763	**-46.91**
Belgium	23,862	17,062	9,986	17,062	4,504	13,028	**-81.12**
Bulgaria	1,326	1,333	1,110	1,333	1,126	1,239	**-15.08**
Canada	2,657 (2013)	1,992	1,110	1,992	1,126	1,555	**-57.62**

Source: Authors calculation based on [12; 13, 14, 15]

The results of the analysis are shown in Table 8. indicate that the total value of the export of information services of the Republic of Serbia to the world market is constantly increasing, as is the case with EU countries. However, the most significant increase in exports among the first five countries is in Germany (250.23%). The decrease in exports is present in Spain (15.15%).

Table 8. *Markets to which the Republic of Serbia exports information services in the period 2010–2017. (in thousands of $)*

Importing countries	Export								Average 2010-2017	Percentage of increase 2017/2010
	2010	2011	2012	2013	2014	2015	2016	2017		
World market	/	24	2,599	3,604	6,256	5,007	7,316	8,997	4,829.00	**37,387.50**
EU (28)	/		2,572	2,657	5,308	3,329	5,532	6,756	4,359.00	**162.67**
Germany	/		1,286	1,329	3,981	2,219	4,426	4,504	2,957.50	**250.23**
Italy	/				2,654				2,654.00	/
Spain	/				1,327	1,110	1,106	1,126	1,167.25	**-15.15**
United Kingdom	/							1,126	1,126.00	/
USA	/						1,106	1,126	1,116.00	**1.81**

Source: Authors calculation based on [12; 13, 14, 15]

CONCLUSION

The role of each sector of the economy is measured by quantitative indicators and statistical data for certain categories of services. On the basis of the previously presented information about the ICT sector, it can be concluded that the ICT sector has great potential that should be directed to the growth and development of the national economy of the Republic of Serbia. Most of the companies in the ICT sector are micro and small businesses. Their consolidation would improve the efficiency and profitability of business through the economy of scale and the economy of knowledge, which would have a synergistic effect of improving the competitiveness of the domestic ICT sector in the international framework. As with most domestic companies, companies from the ICT sector are limited sources of financing as the biggest limitation to future growth and development. What characterizes the largest number of ICT companies, especially those whose main activity is software development, are low assets and high costs of human resources due to the specific activity that requires a highly educated, professional and trained personnel profile. In order to ensure the continuity of profitable business, companies from this sector need to provide only computers, network components and licensed software as basic assets, but on the other hand, the highest costs are precisely related to investments in human resources. Based on all of the above, it can be concluded that investing in human resources in the ICT sector should be a strategic decision that leads to stable business and increased profitability.

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