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USE OF ICT SECTOR IN ORDER TO IMPROVE AND DEVELOP COMPETITIVENESS OF EASTERN CROATIAN ECONOMY

KORIŠTENJE IKT SEKTORA RADI POBOLJŠANJA I RAZVOJA KONKURENTNOSTI GOSPODARSTVA ISTOČNE HRVATSKE

ABSTRACT

The aim of this paper is to present the current state of ICT sector in eastern Croatia, and to evaluate or determine the possible future developments. More detailed will be analyzed the number of businesses, labor force participation, level of education within the sector as well as the trends that arise from them. For the purpose of the work will be analyzed eastern Croatian economy in terms of the representation of information and communication sector. Using ICT industry economic indicators show a possibly significant ICT sector influence on economic growth and productivity in eastern Croatian economy. In this paper will also be compared the size of eastern Croatian GDP with number of ICT firms, average salaries in this sector and number of broadband Internet connection. The rapid development of information and communication technologies led to significant changes in the structure of economic activity both in the world and in Croatia. A high level presence of the ICT industry sector and new technologies are characterization of economy based on innovation with a high degree of competitiveness. With Croatian entering the European Union, a new opportunity and incentive for rapid development of information and communication sector came up. In the last ten years, the number of Internet users, personal, portable and mobile computers has multiple increased and the Croatian companies in the reference period have invested significant resources in technological equipment, and thus significantly expanded infrastructure platform for the further development of the economy but the question is: is that enough for needed economic growth?

Key words: *ICT sector, eastern Croatian economy, productivity, average salaries in ICT sector, GDP*

SAŽETAK

Cilj ovog rada je prikazati trenutno stanje ICT sektora u istočnoj Hrvatskoj , te procijeniti ili utvrditi moguća buduća zbivanja . Detaljnije će se analizirati broj poduzeća , sudjelovanje radne snage , stupanj obrazovanja u tom sektoru , kao i trendovi koji proizlaze iz njih. U svrhu ovog rada analizirat će se gospodarstvo istočne Hrvatske u smislu zastupljenosti informacijskog i komunikacijskog sektora. Korištenje ekonomskih indikatora u ICT sektoru ukazuje na mogući značajan utjecaj ICT sektora na gospodarski rast i produktivnost gospodarstvu istočne Hrvatske. U ovom radu će također biti uspoređena veličina BDP-a gospodarstva istočne Hrvatske s brojem ICT tvrtki, prosječnim plaćama u tom sektoru i brojem širokopojasne internetske veze. Brzi razvoj informacijskih i komunikacijskih tehnologija doveo je do značajnih promjena u strukturi ekonomske aktivnosti , kako u svijetu tako i u Hrvatskoj. Visoka razina prisutnosti ICT sektora i novih tehnologija su karakteristike gospodarstva koje se temelji na inovativnosti s visokim stupnjem konkurentnosti. S ulaskom Hrvatske u Europsku uniju, došla je i nova prilika i poticaj za brzi razvoj informacijskog i komunikacijskog sektora. U posljednjih deset godina ,broj korisnika interneta, osobnih, prijenosnih računala i mobilnih telefona višestruko je povećan, a hrvatske tvrtke u promatranom razdoblju su uložile značajna sredstva u tehnološku opremu, te su na taj način značajno proširile infrastrukturnu platformu za daljnji razvoj gospodarstva, ali pitanje je: je li to I dovoljno za ekonomski rast.

Ključne riječi: *ICT sektor , gospodarstvo istočne Hrvatske , produktivnost , prosječne plaće u ICT sektoru , BDP*

1. The first-level heading

The global economy has gone through major changes in recent decades, such as lowering the cost of using information, shortening of product life cycle, because of the fast technological changes and because of the fast changing of consumers habits, accelerated internationalization and liberalization of trade and commercial, financial and cultural interaction. These structural changes to transform society in a way that society is actually becoming 'information society' or 'knowledge economy'.

All economies can be classified into three groups, and these are: the economy based on the fundamental factors, economy based on efficiency and economy based on innovation, where Croatia is currently in transition between models: economy based on efficiency and economy based on innovation. Under the innovation is not meant only on the creation of companies or products of high technology, nor is meant only to research that lead to the creation of new products, but innovation in the broad sense of the new approach to work and the way it is, just as much as it attitude toward business and manufacturing processes and final products. This new knowledge and ideas do not lead themselves creating successful innovations. Successful interaction between businesses, academic community and public administration is becoming critically important for the transformation of new knowledge and ideas to ideas for new products or improvement of existing product, economic growth and social well-being.

The growing importance of innovation and the ability of companies and institutions to innovate, has far-reaching consequences for the economic development strategy of a country. Global competition and technological developments have led to a change in the balance of

forces to international market relations and has become a crucial innovation is an important determinant of competitiveness and success factor in developed and developing countries.

In Croatia, for some time now are discussions about how to improve national competitiveness and the do we need to establish our economy on knowledge and innovation. For this improvement of competitiveness, today is used the term 'knowledge based economy ' to highlight the need to change existing social and economic development model.

2. Croatia Information Techonology profile in 2014.

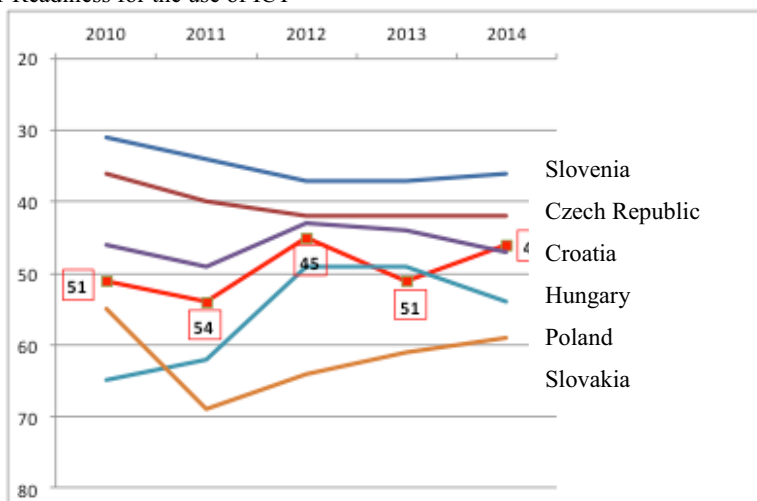
The National Competitiveness Council published the results of a new study of the World Economic Forum (WEF) on information technology, according to which Croatia competitiveness by using Information and Communication Technologies (Information and Communication Technologies - ICT) is on the 46th position.

Information Technology Report provides a comprehensive and relevant evaluation of the impact of ICT on the competitiveness of countries and standard of living. Networked readiness index evaluate the readiness of the economy in the use of ICT in relation to:

1. ICT infrastructure, the cost of approach and the existence of the necessary skills for optimal use,
2. Acceptance and use of ICT by the government, the economy and individuals,
3. Business, innovation environment and the political and regulatory framework,
4. Impact of ICT on the economy and society.

In terms of global competitiveness rankings using information and communication technologies for a number of years Croatia is about 50 th place, while 2014 years climbed to 46 out of a total 148, from which it can be concluded that the state of infrastructure investment and the level of use of new technologies to satisfactory level. But there is a huge gap between the level of use (investment in new technologies) and the innovation development degree and high-tech products and services, which points to the problems of technology transfer and their applications to market. The level of representation of innovative offers, products and services is below the EU average and is disproportionate to the level of use of new technologies and technological development infrastructure.

Graph 1 Readiness for the use of ICT



Source: <http://www.konkurentnost.hr/Default.aspx?art=527&sec=2> available: 27 March, 2014

3. Structure of ICT firms in Croatia and eastern Croatia

Growth in the number of legal entities in information and communication sectors according to NKD is more stronger than the average for all industries. Slavonia region (5 counties) in comparison with the rest of the Croatian ICT sector has a proportional increase with the average Croatian increase, although the structure covers only 5,6% of active legal entities for the year 2012.

The whole Slavonia accounts for 5.6% of active legal entities registered in information and communication sector at the national level while at the national level ICT sector makes only 3.9% of the overall structure of active legal entities. The number of active entities dealing with information and the communication is low and the number of structures respectively in Slavonia is only 5.6% for 2012 as the absolute amount of 0.22%. Number of active ICT companies in Slavonia makes 0.22% of all active entities in Croatia.

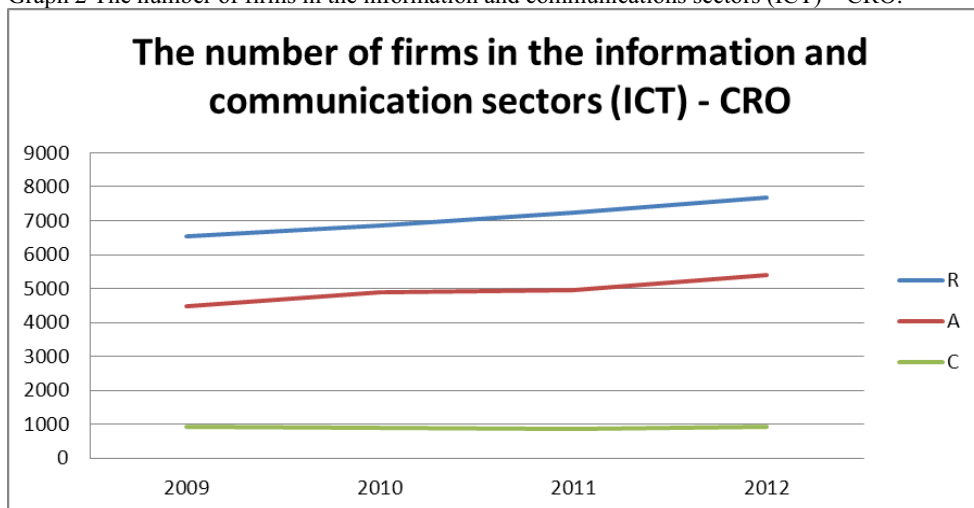
Table 1 Registered and active businesses in the information and communication sector by NKD in 2007th during the period 2009 - 2012 in Croatia.

	R	A	C	Total (A+O)	% change of A
2009	6530	4474	927	5401	-
2010	6871	4886	898	5784	9,2%
2011	7254	4966	881	5847	1,6%
2012	7669	5386	918	6304	8,5%

R	registered legal entities
A	active legal entities
O	crafts and free lances

source: <http://www.dzs.hr/> available: 27 March, 2014

Graph 2 The number of firms in the information and communications sectors (ICT) – CRO.



source: made by authors

As shown in Table 1, number of ICT companies in Croatia has grown over 4 years (2009th - 2012th) and now in Croatia is present 7669 companies in this sector, which is 14.85% more than in 2009th.

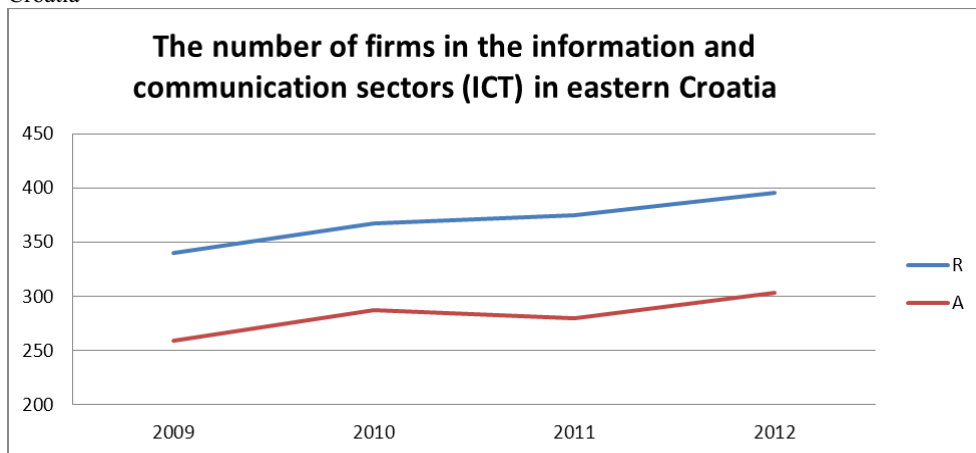
Number of companies in eastern Croatia during the same period (2009th – 2012th) has grown by 14,14%, from 340 firms to 396 firms. Compared with growth in whole Croatia, growth in eastern Croatia is slightly lower.

Table 2 Registered and active businesses in the information and communication sector by NKD in 2007th during the period 2009 - 2012 in eastern Croatia

	R	A	%A	% share in Croatia ICT
2009	340	259	-	5,8%
2010	367	287	10,8%	5,9%
2011	375	280	-2,4%	5,6%
2012	396	303	8,2%	5,6%

source: <http://www.dzs.hr/> available: 27 March, 2014

Graph 3 The number of firms in the information and communications sectors (ICT) in eastern Croatia



source: made by authors

4. ICT structure

The following analysis refers to the development of ICT infrastructure. Data were collected by HAKOM (Croatian Agency for Post and Electronic Communications) at the county level. Available indicators refer exclusively to infrastructure access to broadband Internet service, but that the accessibility of the Internet one of the key elements of the development of ICT infrastructure, very well illustrates the degree of development. According HAKOM the main indicator of the development of broadband Internet access is the density of broadband connections. This indicator represents the proportion of broadband connections in the total population.

The table below shows the number and density of broadband Internet in Croatia. In table can be noticed an increase in the number of connections in the 2012th year compared to the number of connections in the 2008th year of 78.1% and an increase in connections in the 2012th year compared to the previous year to 5.87%. In the 2013th and 2014th the number of broadband internet has also increased due to the increasing use of cloud computing, because fiscalization that requires access to the Internet and the development of mobile telephony, which affects the catering facilities attract visitors by offering free internet.

Table 3 Density and number of broadband Internet in Croatia and their annual changes.

Broadband	Total		Mobile		Fixed	
	NU	D	NU	D	NU	D
2012	1216659	28,40%	326335	7,62%	890324	20,78%
2011	1149229	26,78%	287953	6,71%	861276	20,07%
2010	1132212	25,52%	328389	7,40%	803823	18,12%
2009	937198	21,13%	252238	5,69%	684960	15,44%
2008	683207	15,40%	158524	3,57%	524683	11,83%

NU	Number
D	Density
Mobile	Mobile broadband Internet
Fixed	Fixed broadband Internet
Broadband	Broadband Internet network

source: <http://www.hakom.hr/default.aspx?id=512>, available: 27 March, 2014

In counties in Slavonia can be seen as the highest density of connections has county of Osijek - Baranja, then county of Vukovar – Sirmium, county of Slavonski Brod – Posavina, county of Virovitica- Podravina and the lowest density has county of Požega - Slavonia. Red in table shows the annual change in the density of broadband internet with the 2011th year in the 2012th year.

The number of broadband internet in Croatia is constantly growing , although growth slowed in 2011th and 2012th due to the economic crisis. Based on the number of users, but also by the density of connections in the forefront Slavonia Osijek-Baranja and Vukovar - Sirmium but along the entire Croatian, the number of connections is much lower. For example, the density of broadband connections in the network fixed most developed Slavonia Osijek-Baranja county for 2012 was 18.81 %, while the average for Croatia in this period, 20.78 %, which is 9.48 % lower.

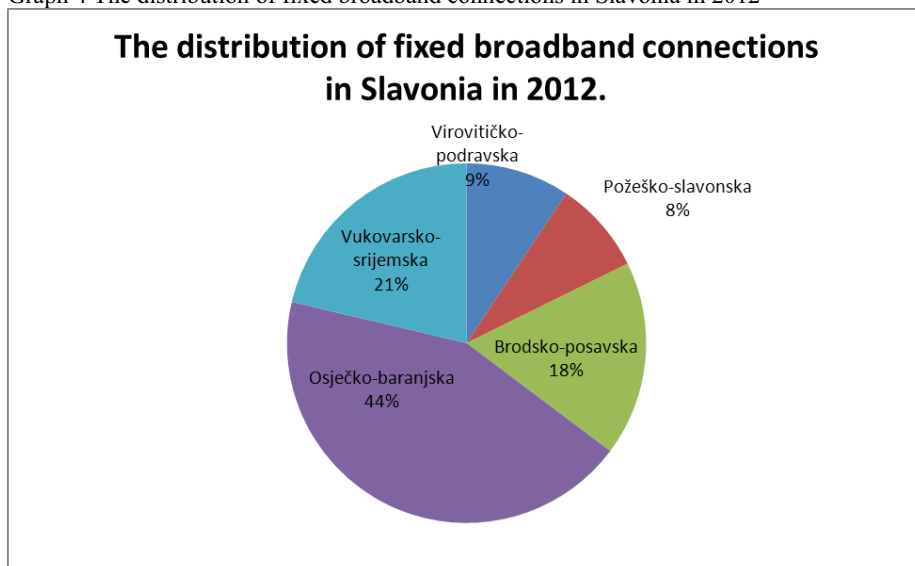
If we compare the average density by county Slavonia he is 15.57 % . What is less by 25.1 % than the national average . As for the increase in the number of fixed broadband connections for Slavonia , the biggest change is in the Brod- Posavina 5.2% while for Slavonia is 3.83 %, which is slightly higher than the average of 3.5 %. In Table 4, an increase in a particular county is marked with red color.

Table 4 Number and density of broadband Internet in the fixed network and its annual change by county Slavonia.

<i>County of</i>	<i>Virovitica-Podravina</i>		<i>Požega-Slavonia</i>		<i>Brod - Posavina</i>		<i>Osijek - Baranja</i>		<i>Vukovar - Sirmium</i>		<i>SLAVONIA</i>	
<i>Broadband (fixed)</i>	NU	D	NU	D	NU	D	NU	D	NU	D	NU	D
2012.	12385	14,60%	11018	14,12%	23170	14,61%	57383	18,81%	28176	15,70%	132132	15,57%
2011.	4,32%	13,97%	2,41%	13,78%	5,20%	13,85%	3,72%	18,11%	3,50%	15,15%	3,83%	14,97%

source: <http://www.hakom.hr/default.aspx?id=512>, available: 27 March, 2014

Graph 4 The distribution of fixed broadband connections in Slavonia in 2012



source: made by authors

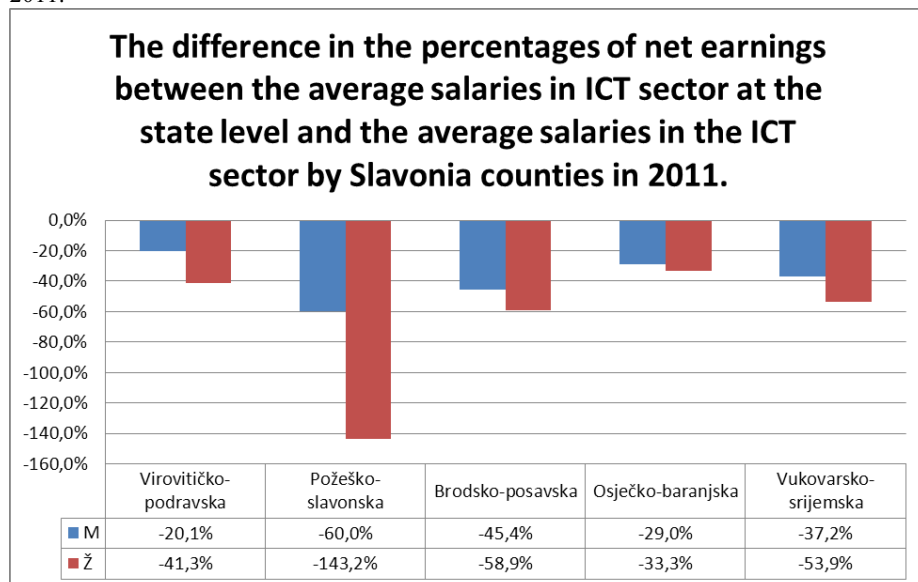
5. Salaries in ICT sector

Although the state-level net earnings in the ICT area larger than the average in the three Slavonian counties this is not the case and that the county of Požega -Slavonia in which men and women earned less than the average wage, while in Brod - Posavina and Vukovar - Sirmium only women earns lower wages than the average salary for a particular county.

If we compare the averages per Slavonia with the national average net wage in the ICT area where we see significant discrepancies. The maximum deviation has Pozesko - Slavonia, where women's wages were lower by as much as 143.2%, compared to the average national wage in the ICT sector, and wages for men are 60 % less. The following are counties of Brod - Posavina and Vukovar- Sirmium.

The differences become even greater when it comes to female sex workers, so that the preceding example in county of Požega -Slavonia which has gap for women salaries of -143.2 %. So not only that in the ICT sector, average salaries are significantly lower than the national level, but there is significantly deepened the differences between workers in relation to gender.

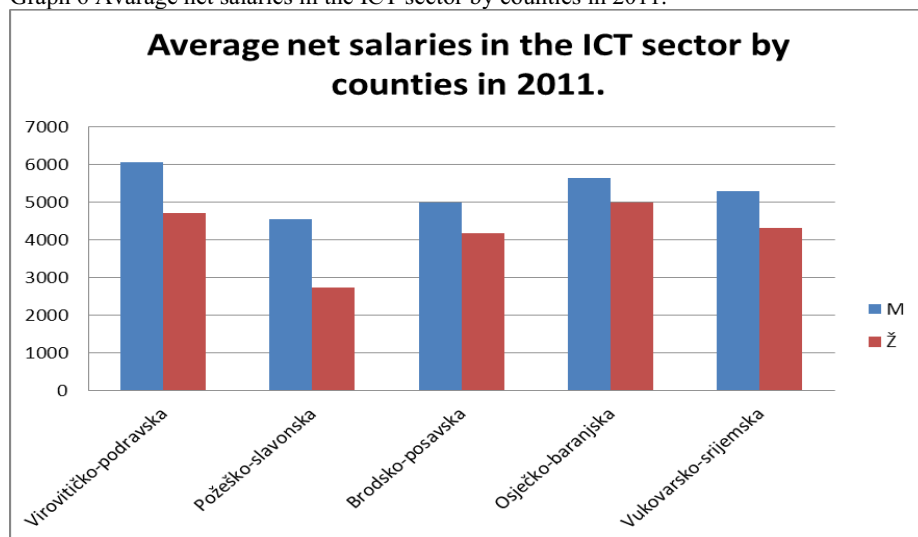
Graph 5 The difference in the percentages of net earnings between the average salaries in ICT sector at the state level and the average salaries in the ICT sector by Slavonia counties in 2011.



source: made by authors

The average net salary in ICT sector by counties is shown in the following graph:

Graph 6 Average net salaries in the ICT sector by counties in 2011.



source: made by authors

Employment in Slavonia in the ICT sector has fallen by only 1.2%, which indicates that ICT is recognized as an important part of development, therefore the employment remained stable or slightly decreased, while only in the county of Osijek - Baranja increased by 3,29%. In Osijek, the number of employees increased in part due to the project launched in early 2012., which are ICT companies merged in order to achieve the goals of increasing the attractiveness of the developer profession, programmers competitiveness and encourage entrepreneurship in the ICT sector in Osijek. So, via Osijek software city they tried to hire trained and motivated worker because the ICT industry is currently ruled by a chronic lack of trained personnel, and that project wants to change it, and it is successful as we can see by increased employment.

Unemployment in the ICT sector by counties in Slavonia is shown in the following table:

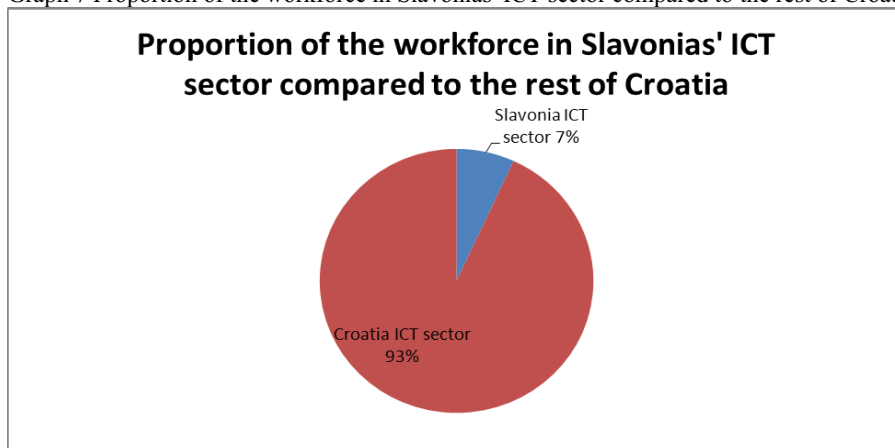
Table 5 Employment by counties in Slavonia in the ICT sector.

County of	2009	2010	2011	2012
Virovitica-Podravina	94	96	96	92
%	-	2,1%	0,0%	-4,2%
Požega-Slavonia	129	205	194	107
%	-	58,9%	-5,4%	-44,8%
Slavonski Brod-Posavina	350	323	318	316
%	-	-7,7%	-1,5%	-0,6%
Osijek-Baranja	1490	1491	1536	1539
%	-	0,1%	3,0%	0,2%
Vukovar-Sirmium	299	301	280	280
%	-	0,7%	-7,0%	0,0%
Slavonia	2362	2416	2424	2334
%	-	2,3%	0,3%	-3,7%

source: <http://www.dzs.hr/> available: 27 March, 2014

Of the total number of employees in the ICT sector in Croatia 7% are employed in the ICT sector by counties in Slavonia.

Graph 7 Proportion of the workforce in Slavonias' ICT sector compared to the rest of Croatia



source: made by authors

6. GDP by counties in Slavonia associated with the ICT sector

All five Slavonian counties make the 12.6% of the total Croatian GDP in 2011. year and Slavonian counties together make up 7.8% of GDP in the field of ICT, therefore, even less than the average, that is 12.6 %, which means that this sector is less developed than the Croatia average.

The largest share of the ICT sector in GDP has county of Požega-Slavonia where the ICT sector accounts for 4.2% of realized GDP, followed by the Osijek - Baranja with 4.1%.

Table 6 Share of GDP that has been made with the ICT sector in the Republic of Croatia and in Slavonia in 2011.

	Information and communication sector	Share of Croatia GDP	The share of GDP in the county that has been made with the ICT sector
Republic of Croatia	13557	100	
County of Virovitica-Podravina	40	0,3	1,2
County of Požega-Slavonia	13	1	4,2
County of Slavonski Brod-Posavina	116	0,9	2
County of Osijek-Baranja	651	4,8	4,1
County of Vukovar-Sirmium	115	0,8	1,6

source: Croatian Bureau of Statistics

7. Conclusion

In Croatia, for a long time discussing the need for changes in current economic development model in the direction of optimizing the competitiveness of the economy and better positioning in the international market. Using the terms "knowledge-based economy", "knowledge society" people wants to conceptually create a positive environment in order to implement the required changes. Changing the model of the development of society and economy based on knowledge and innovation with the aim of increasing competitiveness and innovation has been recognized, but has not been implemented in full.

Croatia by the WEF classification for 2013 is on 75th place competitiveness and is ranked in the transition state between the model economy based on efficiency and economy models to share innovations. Unfortunately, in the interval 2007-2012 competitiveness is continuously falling as Croatia closer to the model state based on efficiency rather than innovation. The weakest point of competitiveness represent an inefficient labor and goods, inefficient institutions and bureaucracy and more. It takes a lot more to do, and especially need to work on innovative capacity, better transfer of knowledge and connecting educational institutions, innovative technology centers with the economy, reducing bureaucratic barriers and increasing the efficiency of markets and commodities.

The current state of development of economic activities in the sector of information and communication eastern Croatian amounts to only 0.72 % of total GDP and 7.8 % of the GDP of the ICT sector (2011). Weighted average net salary at the county level within the ICT sector decreased by 52.2 % of the average net wage of the whole sector. The total number of employees in Slavonia represents only 7 % of the total workforce sector. All these indicators point to the lack of development of the ICT sector of eastern Croatia.

Infrastructure and technological equipment were evaluated with the best competitive position, but the infrastructure itself does not guarantee the development of innovative products and services, but still represents a necessary condition for the development of a highly competitive and innovative society. With Smarr investing, investments and the use of existing capacity and technological infrastructure, economically less developed regions such as eastern Croatia could be used to accelerate the development and progress of the economy. This is supported by the relatively low cost of labor with the national average. But it must be noted though lower labor cost advantage to investors somewhat, it is still the workforce in general very uncompetitive. Chance advantage of future intensive development of the sector of information and communication lies in greater mobility of business processes and manpower provided by the very nature of work. To start the development of the economy of eastern Croatia people need to work especially on the factors that limit the development of innovation and innovative capacity. This can be achieved solid development of the ICT sector as one of the possible future directions of regional development and successful Slavonia.

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