ICT Sector in Vojvodina (Serbia) as a Potential for Mitigation of Crisis Effects

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Abstract
Considering the economic situation in Europe, ICT sector is directly responsible for 5% of European GDP, with a market value of 660 billion Euros a year. The indirect effects of ICT sector are particularly reflected in the overall productivity growth (20% directly from the ICT sector and 30% of investments in ICT) and have a great social impact (more than 250 million Internet users per day). The future economy will be a networked knowledge-based economy with the Internet at its centre. ICT sector in Serbia has shown rapid growth and great potential in recent years. In addition, it is also a key growth factor of other sectors, making ICT sector one of prime targets in the Strategy for Encouraging and Developing Foreign Investment. In Vojvodina (Serbian northern province), there is a conducive environment for research and development as well as for business incubators. Universities in Novi Sad, Serbia, with acc 40,000 students, offer a solid base of knowledge and skills, while research and development activities at universities allow the establishment of new enterprises. The aim of this paper is to present the situation and perspective development of ICT sector in Vojvodina and Serbia, as well as to indicate its future potential for mitigating the effects of the crisis in the economic and social terms.

Keywords: ICT sector, Serbia, Vojvodina, Internet, Economic crisis

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1. Introduction

Information and communication technologies - ICT (Information and Communication Technologies - ICTs) are without doubt one of the key innovations of the last century. ICT consists of a wide range of technologies in domain of products and services, including computer hardware, software and services, and telecommunications functions. Rapid diffusion of ICT has produced significant changes in the way and place for production of goods and provides services, in the nature of these products and services, as well as in the distribution channels. This implies that ICT had an impact on industrial structure and geographical location of regions of different industries, not only in the European Union, but throughout the world. ICT have also affected the relationship between consumers and suppliers, as well as the way of organization for many markets of semi-finished and finished products and services (Mijačić, Kappenmann and Sredojević, 2011).

ICT sector has grown rapidly in Serbia over the past 10 years. This modern industry, especially the segment that refers software services, has enabled the development of business and entrepreneurial activity in general. This resulted from economic reforms and a strong commitment to education. With intellectual and technological potential which reach the level of developed countries, Serbia has competitive attributes for meeting the needs of IT companies worldwide (Arsenijevic and Vemić, 2011). Vojvodina is the most developed part of Serbia, with advanced high-tech culture, quality infrastructure, roads and power supplies as well as telecommunications and Internet access. Although presents approximately 40% of the population and area of Serbia, Vojvodina contributes roughly 40% of Serbia’s GDP (Vojvodina Investment Promotion, 2011).

2. Europe 2020. - Smart growth

At the end of XX century some great changes in the growth performance of the United States (U.S.) against the European Union are detected (European Commission, 2007; Ark, Inklaar and McGuckin, 2003a). In 2000, European Council established the goal of making the European Union the “most competitive and dynamic knowledge-based economy in the world.” European Council explicitly acknowledged the gap between the EU and the USA and announced their intention to catch up within a ten-year period. Generally, it is acknowledged that increase in the gap which emerged in favor of the United States is linked to a higher level of investment in the field of information and communication technologies (Colecchia and Schreyer, 2002; Daveri, 2002), as well as to higher technical progress of ICT USA industry (Ark et al., 2003a; Inklaar, O’ Mahony and Timmer, 2005). On the other hand, in the European Union, there seems to be relative lack of empirical research that examines the impact of ICT on growth (Dimelis and Papaioannou, 2011).

In March 2010 Europe adopted a strategy for smart, sustainable and inclusive development called Europe 2020 (European Commission, 2010). In this strategy, the information communication technology (ICT) has key role in achieving the objectives of the Strategy. Considering the economic situation in Europe, ICT sector is directly responsible for 5% of European GDP, with market value of 660 billion € per year. Furthermore, the indirect effects of ICT are particularly reflected in the overall productivity growth (20% directly from the ICT sector and 30% of investments in ICT) and have a great social impact (more than 250 million users a day on the internet).
3. ICT sector in Serbia

Information technologies, along with education and development, have been recognized by the state as a significant segment for development of Serbian economy. For this purpose the following measures have been implemented: in 2004 the tariff rate is reduced to one percent of the computers and 2007 the VAT was reduced from eighteen to eight percent. These measures have given greater impetus for investments in IT. Modern IT productions in Serbia include: manufacturers and distributors of computers and computer equipment as well as manufacturers and distributors of computer services and computer software (The Chamber of Commerce and Industry of Serbia, 2011).

Number of enterprises in Serbia, engaged in information and communication technologies is constantly increasing every year. The greatest increase in the number of enterprises are recorded in the software development sector, followed by companies engaged in manufacturing machinery and computer companies involved in telecommunications (Fig. 1). Manufacture of computers today in Serbia includes assembles of computer units from imported components and manufacture of industrial computers that are used for managing and control processes (The Chamber of Commerce and Industry of Serbia, 2011).

![Figure 1: Number ICT enterprises in Serbia](image)

*Source: Register of Financial Statement and Solvency, SBRA*

The largest increase was recorded in the software sector, followed by companies for manufacturing of computer machinery and computer companies involved in telecommunications. In the period since 2006 to 2009, the lowest percentages of companies (6-10%) are involved in construction of databases, data processing, and IT consulting. Given the fact that the Serbian IT industry employs a large number of experts (over 60% of high educated), in the period since 2006 to 2009 the rapid growth in the number of employees in the IT sector was achieved. Serbian IT industry employs a large number of experts, from whom most employees are in the telecommunications sector, while the least employs experts are in the field of IT consulting. Based on the structure of the market, is expected that the manufacturing of computers has the highest capital, but the highest growth rate (period 2007-2009) is recorded in software industry (The Chamber of Commerce and Industry of Serbia, 2011).
The largest decreases of revenues in the area of production and distribution of computers and computer equipment are recorded in 2008 until 2009 (Fig 2). However, the software segment has continued to growth in revenues in the same period. Sector of database development and data processing, has had grow in revenues, but this is still poorly developed part of the Serbian IT industry (The Chamber of Commerce and Industry of Serbia, 2011).

Fig. 2. Serbian IT Market and Growth Rates for 2008-2012. (%)
Source: Register of Financial Statement and Solvency, SBRA

In both cases, it can be concluded that the proportion of Serbian ICT industry is in relation to total capital and income of the economy as a whole, after a large fall in the period from 2007-2008 has highly increased in the period from 2008-2009 year. In contrast to the decline in exports of IT equipment of over 20%, exports of services managed to keep the same level in the time of crisis. The structure of exports of computer services have the highest proportion of companies involved in the production of computer programs (45%), followed by distributors (38%) and 13% of embedded system-a. Software development is the most important source of income in high-tech sector in which are dominating embedded software, solutions for enterprise resource planning (ERP) and Java application software for mobile devices (The Chamber of Commerce and Industry of Serbia, 2011).

4. ICT sector in Vojvodina (Serbia):

In Vojvodina, there is a conducive environment for research and development and business incubators. Universities in Novi Sad, with acc 40,000 students, offer a solid base of knowledge and skills, while research and development activities at universities allow the establishment of new enterprises. In Serbia every year graduates about 1,000 students in field of electrical engineering and computer sciences, which represent 7% of the total number of graduates. On the other hand, the AP of Vojvodina provincial government successfully provide support for newly established companies in the ICT sector, namely through the establishment of business incubators as part of measures to improve socio-economic environment (Vojvodina Investment Promotion – VIP, 2011).
Of the three segments of information technology: hardware, software and services, we can say that in Vojvodina, the most promising is software industry. Specifically, in Vojvodina there are a number of small and medium software enterprises. However, since the outbreak of the crisis, their business is seriously threatened. In a similar position are also organizations that provide IT services. They usually sell "complete solution" for the business depending on the circumstances and needs of clients, offering a complete IT system hardware and software. Trade of IT equipment and hardware has declined the most. Since 2009 many companies, distributors and retailers are closed (Vojvodina Investment Promotion – VIP, 2011).

In most of Serbian IT companies some aspect of outsourcing are engaged. Moreover few dozen of companies are almost exclusively engaged in the development of software for the foreign users. Only in 2008 year, foreigners established in Serbia about 70 IT companies mainly engaged in outsourcing activities. Despite strong international competition from neighboring Romania and Bulgaria, our company retain and expand this type of work. Vojvodina has a great competitive advantage for outsourcing, because it has facilities for providing high quality ICT services at low cost. Given the above, the development of outsourcing is certainly one of the options identified in the ICT sector in Vojvodina. However, one should bear in mind that when selecting offshore locations most companies following criteria:

1. costs (salaries, infrastructure costs, and taxes),
2. business environment (country ambient, risk, infrastructure, culture, protection of intellectual property rights), and
3. the availability of people and skills (quality of the service sector, availability of labor, education and knowledge of foreign languages, retention of workers).

Vojvodina is the ideal location for outsourcing in the neighboring state (near shore) because it has the capacity to provide high quality services at low cost and in the same time zone on the two-hour flight from the potential central company from abroad (Vojvodina Investment Promotion – VIP, 2011). Development of web sites is another area where our enterprises are highly represented. For example, a significant percentage of web sites in the Netherlands have been developed and maintained by companies from Serbia. Joint ventures have proved to be an excellent choice for foreign companies in this sector. Some of Vojvodina established joint venture companies have already achieved a global presence in its target niche market. Most of Vojvodina companies operating in the field of ICT in early years were involved in outsourcing. However, many of them used the contacts established at this time to offer their own products. Besides outsourcing great potential in Vojvodina is in partnerships with foreign companies. In the initial phase of this approach, it is customary to start a joint pilot project, and then to make a decision for implementation of long-term investments. Moreover, Serbia is the only state that has a free trade agreement with Russia, which provides access to a market of 210 million potential consumers.

5. The potential for development:

5.1. Business incubators

Business Incubator is a convenient place for development of new entrepreneurial ventures. The incubator is a facility that is consisting of small work units and provides the space and supportive environment for entrepreneurs who are new companies and start working. The goal of the incubator is to
foster the development of new products/services and increase the chance of market success to its customers, by giving them help to introduce business ideas into successful business model (Business incubators, 2011).

The importance of the establishment of business incubators in Serbia stems primarily from the need to rapidly invest in the development of entrepreneurship in all aspects (legislative, financial, institutional, educational, etc), and thus to create opportunities to support every entrepreneur good idea, especially in stage at which the business starts and it needs the most help (Arsenijevic and Vemić, 2011). In countries in transition, business incubators are considered particularly suitable instrument for the development of entrepreneurship because it can help to reduce barriers pooling of knowledge and skills and reducing fixed charges. In countries in transition period there are about 250 incubators, mostly in Poland, where there are 56 (Arsenijevic and Vemić, 2011). In Vojvodina there are 4 business incubators, in Novi Sad, Subotica, Senta and Zrenjanin.

Novi Sad Business Incubator was established by the City of Novi Sad, the Fund for the Vojvodina Promotion Investment, Faculty of Technical Sciences and JKP Informatika to support young entrepreneurs primarily with ideas to develop the products and services that will be successful in the market. The incubator offers its customers modern and equipped office space with high speed internet access. There are also available and common spaces: meeting space for business networking. Services that are available are consisting of:

- Administrative services: receiving and sending mail, receiving and forwarding calls, organizing meetings;
- Services of bookkeeping or legal advice;
- Consulting and mentoring in marketing (new product development, market research and analysis, strategy for market penetration, sales), finance for entrepreneurs and new technologies (www.businessincubatorns.com).

In addition to these services to its customers, incubator can offer a range of other services such as networking, connecting with researchers from universities, connect with potential strategic partners, finding new employees. Novi Sad Business Incubator is designed for those who have innovative ideas in ICT and creative industries. The focus is on ideas that are based on knowledge and new technologies, and potential market which allow the stability of its scope and promise high profits (www.businessincubatorns.com).

Business Incubator Subotica (BIS) was founded in 2006 with the aim to support the development of SME’s and entrepreneurship. Providing technical, business and educational services to its residents, Incubator offers a business environment favourable for growth and development (Business Incubator Subotica, 2011). Business Incubator Subotica offers its residents subsidized rental of office space, administrative and accounting services, support for trades, education and training in current business areas, etc.

Business Incubator Subotica taking newly established enterprises within one year or an individual who, after entering the incubator within three months and wants to establish a company in the field of manufacturing and service sectors - industrial profile. Evaluation of potential residents is based on a business idea, market, and product and business experience.

Business Incubator Subotica (BIS) provides services under the following terms:

- Providing of office space under stimulatory conditions;
Undertaking activities aimed at providing funds / production equipment for the residents for the purpose of performing his activities;
Organizing of planning, monitoring and development of residents, as well as performance measurement and reporting system for residents of the BIS;
Providing assistance in the preparation of technical and other documentation necessary for certification;
Administrative and technical services (sending and receiving mail, copying services, etc..)
Providing consulting services in finance, law and tax policy;
Subsidizing the costs accounting services;
Organization of trade fairs in the country and abroad;
Organizing training and education (making a business plan, marketing, market research, etc..)
Benefits of using audio visual equipment, conference facilities, transport services;
Presentation of the residents on the website (Business Incubator Subotica, 2011) www.bis-su.rs).

Business Incubator in Senta, Senta was established in 2007. year. The incubator provides the necessary services to users who want to build a successful business environment in the timeline planned for incubation. Persons employed in a business incubator and associates will provide users incubators technical, legal, financial and other types of services, such as planning, reporting, accounting, negotiation, marketing promotion, obtaining funds through projects (fundraising), preparation of business plans and other services (Business Incubator in Senta, 2011) (http://www.zenta-senta.co.rs/sr/investirajte-u-sentu/poslovni-inkubator, 2011).

Business Incubator Zrenjanin (BIZ) is a company founded with the intent to support the entrepreneurial process of companies involved in information technologies and encourage their innovation to the level of success of such companies has increased. Only entrepreneurs with sustainable IT projects can become residents of incubator, which will provide them with more models of service, support and resources. BIZ provides formal organizational environment with management, organized system of planning, monitoring and development of the residents, the system of performance measurement, training and education, including assistance in preparing a business plan, marketing, market research, development assistance and other technical documentation, obtaining adequate certificates and others (Business Incubator Zrenjanin, 2010) (www.biz-zr.co.rs).

5.2. Enterprise Europe Network

In order to efficiently and effectively exploiting the potential of small and medium enterprises in the unique European market, the European Commission established in 2008. the European Network of Enterprise (EEN) (The European Network of Enterprise, 2008). European Network of Entrepreneurship, as the largest European network of business support, offers a variety of assistance to SMEs in the European Union and beyond. National Agency for Regional Development coordinates with Network in Serbia, together with partners, to participate in the implementation of these activities within the Programme for EU competitiveness and innovation (CIP).

Enterprise Europe Network Services (www.enterprise-europe-network.ec.europa.eu):
- Directive of the European regulations and recommendations
- Information of the possibilities offered by the European Union market
- Information of the markets of other countries involved in the Network
- Information of opportunities to establish business cooperation
- Information of programs and funds dedicated to SME’s
- Mediation in the transfer of new technologies and knowledge
- Assist in the promotion of companies and find partners in foreign markets
- Stimulation of SME’s to innovate and thus be more competitive in the market
- Support to SME’s participation in the Framework Programmes of the European Union

By affecting Enterprise Europe Network in Serbia and Vojvodina SME’s and entrepreneurs are in a position to obtain information of the conditions for entry into the EU market (the relevant laws, directives ...), export opportunities, procurement, new technologies, potential partners, the possibilities of technological development and the Framework Programmes of the European Union, as well as gain access to new technologies from one place. Right information and right information solutions to the problems of small and medium enterprises will contribute to the development of the SME’s sector and its development in today’s dynamic and open markets. Enterprise Europe Network is active in over 49 countries around the world. With more than 600 partners (agencies, universities, research and technological development institutions, etc), this network is the largest international organization that is promoting and helping small and medium enterprises. Through a network of small and medium enterprises can realize business cooperation with foreign partners (GFA Consulting Group GmbH, 2011).

5.3. Clusters

Clusters are geographic concentrations of interconnected companies, related and various activities, specialized suppliers, service providers and their associated supporting organizations (educational and research institutions, agencies, etc.) that are compete but also cooperate at the relevant field of activity. Cluster linking common interests and needs in the area of procurement, sales, specialized services, labor and other resources.

Vojvodina’s ICT cluster is the one place through which can reach on the top of ICT companies in Serbia. The cluster brings together 28 companies from the sector, the total number of employees is about 1,500 experienced IT professionals. The Association has strong community support, and the five institutions in the field of education, regional development and public services are honorary members. Founded on the initiative of companies in the sector, the cluster was incorporated on May, 2010. year, and started with a activities on October at the same year (table 1) (http://klasteri.merr.gov.rs, 2010).

Table 1. Vojvodina ICT Cluster

| Number of enterprises in the cluster: | 33 |
| Number of scientific research and supporting institutions: | 3 |
| Total turnover of companies in the cluster: | 31,6 M EUR |

Source: klasteri.merr.gov.rs

6. Conclusion:

The greatest advantage at this moment in Serbian IT industry is the scientific and educational institutions and the availability of qualified personnel. However, the country should be more present in the public and the media to emphasize the necessity of education in relation to information technology, and to stimulate students to stay in the country. It must be taken of the curricula at all education levels, especially in secondary schools.
Creating favourable conditions for the IT sector in the country has kept a lot of quality young people and even made a significant means of exporting quality software and IT services. Electronic Commerce in Serbia is underdeveloped, and it could encourage faster development of certain economic activities. The problem is the complex procedures and excessive taxes, which shows a misunderstanding of the country and seems discouraging. Certification Authority Chamber of Commerce works to develop business services that provide the opportunity to save significant corporate funding.

To attract foreign direct investment in the ICT field, Vojvodina has each of the following criteria to improve a lot, because when it comes to coming IT Investment, then it is about the location of global competition. Special attention will be devoted to market development and on-line advertising, that is, despite the growth in the last few years, much lower than in neighbouring countries. Given the fact that in the ICT sector in Vojvodina operate the largest number of small and medium sized organizations, that do not have sufficient capacity to independently perform the developed markets, what request appropriate measures for cluster development, in order to provide the necessary competitive edge. The establishment of the ICT cluster in Vojvodina made the first step in this direction, and the results achieved by its members justifies the application of this concept. Despite the crisis, members of the cluster, a total of 33 which employs 1,500 people, have made annual growth of 23.4% (in 2008.) and 30.61% (in 2009. year). In order to facilitate the transition of clusters in the higher stages of development, more support is needed by the competent institutions (Strategy of Serbian Economic Recovery, Development Programme of Vojvodina).

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