

ICT AS PREREQUISITE FOR ECONOMIC GROWTH AND COMPETITIVENESS - CASE STUDY PRINT MEDIA INDUSTRY

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Review Scientific Paper

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This paper analyzes the contribution of information-communication technologies to economic growth of national economies and higher productivity and competitiveness of companies. Educated work force and organizational changes are necessary in order to realize all ICT potentials and benefits and, on the other side, to minimize risk of implementation. ICT effects are also connected with companies' readiness for innovation and experiments, as well as, with its size and industry. Print media industry is presented as a sample industry with ICT and Internet causing completely new business models and consumer participation in content creation. The last part of the paper is devoted to importance of ICT integration in Serbian economy in order to enhance national economic growth, rise employment and welfare, and improve productivity and competitiveness of national companies.

Keywords: information-communication technology, growth, productivity, innovation, competitiveness.

INTRODUCTION

Information-communication Technologies (ICT) and the Internet are a fundamental economic infrastructure. The benefits of ICTs are amplified by their use throughout the economy and society, and the innovations that they drive. ICT investments spur competitiveness and productivity at the firm and aggregate level, in particular when combined with investment in skills, organizational change (and industry restructuring), innovation and new firm creation (OECD, 2008). In this way wide implementation of ICT and e-business becomes the key parts of the countris development, industrial and inovation policy and have to be treated on the high level and with special care.

ICTs AND ECONOMIC ACTIVITY

In order to overcome stagnant and decreasing economic growth, countries have to consider the possibilities offered by ICTs as they now play a catalytic role in several aspects of economic and social life. In fact, technological progress has been driving economic growth since 1990. Over the past

15 years ICT and the Internet have delivered substantial economic growth accounting for 10 percent of GDP growth (du Rausas et al., 2011) The ICT sector—infrastructure and networks, IT-related services and media—is regarded as an engine of growth and a source of innovation, with some of the highest growth in productivity. The sector also raises productivity throughout the economy by increasing efficiency across sectors. ICT and Internet maturity correlates with wealth creation and will remain the biggest drivers of global economic growth over the coming decades.

Macro level

Based on this, successful growth model need the following two elements: 1) the central role of ICTs in the economy, that is, to enable productive and innovative use of ICTs across the whole economy and society, and 2) the direct impact on economy and growth of the ICT sector itself (see Figure 1.) (du Rausas et al., 2011).

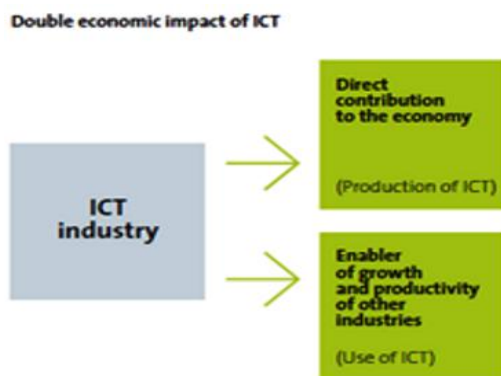


Figure 1: Impact of ICT sector

There are three main channels for analyzing ICTs impact on economic activity (EU Commission, April 2008):

- Technological progress in the production of ICT goods and services, which has made productivity growth faster in the ICT sector than in the rest of the economy;
- Declining prices for ICT goods and services, which stimulate investment in ICTs throughout the economy with immediate positive effects in terms of labor productivity growth. Since the mid-nineties, the distribution of capital has shifted from non-ICT investment to ICT investment in all major industrialized economies;
- In the longer term, increased use of ICTs, accompanied by the reorganization of business processes, which contributes to efficiency gains ('multifactor productivity growth') in the entire economy.

ICT industries (manufacturing and services) represent around 5-8% of total GDP in the three main world economic areas (EU, US and Japan), but account for a much larger share of overall productivity growth thanks to rapid technological progress. In the EU, the ICT sector drives about 40% of the whole productivity increase (ITU, 2010).

ICT production and diffusion in the economy have proved beneficial to innovation, productivity growth and economic development to an extent linked to the capacity of different economies to reap the benefits from ICT investment. That is, increases in ICT investment do not guarantee stronger multifactor productivity growth. General framework conditions, such as the degree of competition in a market, are likely to be of fundamental importance for the innovative capacity of an economy. Statistical evidence suggests that the main role of ICTs as a contributor to productivity growth is their

capacities to enable improvements in the way business processes are organized.

Micro level

On the micro-level studies made by author Pilat (2005) suggests that the use of ICT does have positive impacts on firm performance, but primarily, or only, when accompanied by other changes and investments. This includes expenditure on skills and organizational change. This is also confirmed by many empirical studies that suggest that ICT primarily affects firms where skills have been improved and organizational changes have been introduced. Another important factor is innovation, since users often help make investment in technologies, such as ICT, more valuable through their own experimentation and invention. Without this process of "co-invention" (Bresnahan and Greenstein, 1996) which often has a slower pace than technological invention, the economic impact of ICT may be limited.

In order to analyze ICT impact on firm performance consideration of the following factors are important (Pilat, 2005):

- a. Effective use of ICT requires appropriate skills,
- b. Organizational change is key to making ICT work,
- c. ICT effect are closely linked to competitive effects and the role of experimentation,
- d. Firm size affects the impact of ICT,
- e. The impacts of ICT use often only emerge over time, with certain time-lag.

According to E-Business Watch combination of different analytical approaches (such as micro and sectorial level data) can deliver more balanced evidence about ICT impact on innovation, competitiveness and growth of both companies and economies as a whole (see Table 1.) (EU Commission, 2008).

Regional level

According to EU, the digital economy is a major source of growth and innovation. The digital economy is an important priority for the Barosso II Commission and it is at the core of the new Europe 2020 strategy. Under the heading Digital Society, the initiative "A digital agenda for Europe" is one of the three proposed flagship initiatives to generate smart growth in Europe. The purpose is to speed up the roll-out of high-speed Internet and it specifically sets out to "reap the benefits of a

digital single market (DSM) for households and firms” (EUCommission, 2011).

The DSM can be seen as the fourth wave of economic integration of the EU market. After the 1992 Single Market Program, EMU and the common currency (Euro) in 1999/2002 and the 2007 Services Directive, the creation of a single market for digital goods and services can be seen

as a fourth step of the European Union to foster growth, jobs and innovation. A Digital Single Market which ensures the free movement of information and knowledge could bring benefits to European consumers and business, because knowledge and information move online and are the key drivers of modern growth.

Table 1: The Impact of the ICT and e-Business- micro and sectorial evidence

<p>Micro-data evidence:</p> <ul style="list-style-type: none"> - Increasing strategic importance of e-business; - ICT have become a general purpose technology – they are widely used in all business functions. For many companies, e-business has become an important instrument with which to implement strategy. The specific e-business objectives and applications, however, differ widely depending on the business model of a company, its size, and the market in which it operates; - 55-70% of companies in all sectors expect that ICT will have a high or medium impact on their business. This is true across practically all areas, including primary functions (such as production, marketing and logistics) and support functions (such as controlling, human resources and accounting); - ICT use is positively linked with an increase in turnover in all sectors studied. There is also a positive impact of ICT use on market shares. These points towards positive effects on firm performance.
<p>Sector-level analysis:</p> <ul style="list-style-type: none"> - At the sector level, the direct contribution of ICT capital to productivity growth and industry growth is less pronounced; - The sector in which ICT plays the greatest role is banking; - Data about only modest impact of ICT capital on labor productivity indicates that outsourcing has been key to increasing labor productivity. - Important driver for labor productivity growth (measured as gross production value per working hours) was intermediate inputs intensity; - Electricity intensity is reduced by the use of communications devices, but is increased by IT (computers and software).

Source: EUCommission, April 2008, p. 12.

EU estimate that at least 4 percent additional GDP (EU28) can be gained in the longer run by stimulating further adoption of ICT and digital services through the creation of a DSM. This will also imply job creation. One estimate shows that in Germany alone, the improvement of digital infrastructure will trigger innovation and growth leading to an additional 427,000 jobs over the period 2015-2020. Building a Digital Single Market in Europe requires an ambitious policy response, of all Member States and potential members as well (EUCommission, 2011).

THE ROLES OF APPROPRIATE SKILLS AND ORGANISATIONAL CHANGE

The introduction of ICT and the share of training expenditures were important drivers of organizational changes, such as the introduction of

total quality management, lean administration, flatter hierarchies and delegation of authority. The use of advanced technologies and the skills of the workforce were both positively linked to organizational variables. Organizations that enabled communication within the firm and that innovated at the organizational level seemed more successful in the uptake of advanced technologies. Moreover, such organizational changes also increased the ability of firms to adjust to changing market conditions, e.g. through technological innovation and the reduction of inventories.

Companies that combine high levels of ICT capital with a high-skilled workforce should be better positioned to develop ICT-enabled innovations. High - skilled employees are relevant for ICT-related product- and service innovations. Firms have to adopt an aggressive human-resource

strategy which means continuously improving the skill of its workforce through training and recruitment.

COMPETITIVE EFFECT AND THE ROLE OF INNOVATION FOR THE SUCCESSFUL FIRM PERFORMANCE

Several studies point to an important link between the use of ICT and the ability of a company to innovate. This development implies a change of ICT implementation focus. Although firms continue to use ICT to improve process efficiency (mainly conceived as ICT for cost cutting), ICT are increasingly recognized as an important tool for innovation and increasing revenues by enabling new services and new ways of working within value networks. The borderlines between implementing new ICT-based systems and introducing process innovation are getting blurred. Even the difference between a “product” and “process” innovation may become obsolete as products and services are combined in new ways.

Globalization and the evolution of value networks are forcing firms to cooperate and compete in new ways. New challenges include the emergence of specialized intermediaries, and the greater importance of knowledge-intensive activities within both the manufacturing and services sector. Companies are increasingly focusing on their core competences. ICT enhances this process by improving the transparency of information flows. It facilitates the outsourcing of non-core business processes, and offers new forms of cooperation within networks. ICT is no longer merely the key to internal process innovation - it is also vital for external process innovation.

Moreover, ICT-related changes are part of a process of search and experimentation, where some firms succeed and grow and others fail and disappear. Countries with a business environment that enables this process of creative destruction may be better able to seize benefits from ICT than countries where such changes are more difficult and slow to occur.

There are several impact factors that can determine inseparable relationship between ICT and innovation process (EU Commission, 2008):

1. Strategic orientation on high-technology is often the core of a successful firm strategy;
2. Firms that combined ICT with other advanced technologies do better than firms that only use one technology. Furthermore, the results

emphasize that combinations of technologies that involve more than just ICT are important. For example, adoption of advanced process control technology, by itself, has little effect on the productivity growth of a firm, but when combined with ICT and advanced packaging technologies, the effect is significant;

3. Also innovating on a more continuous basis seems to pay off more in terms of ICT productivity than innovating occasionally. This effect is found for product innovations and non-technical innovations and, to a much smaller extent, for process innovation.

ICT impacts on company’s innovative processes certainly depend on the company’s internal and external characteristics. These characteristics include available and required skills, distribution channels, corporate culture, that varies from sector to sector and from company to company. They are also influenced by the price elasticity of demand, the type of innovation that ICT can enable, and the timing of the innovation in relation to other innovations in the market.

In line with this, the ICT sector is by far the largest R&D spender. The ICT industry in OECD countries spends about two and a half times as much on R&D (USD 130 billion in 2000 prices) as the automotive sector and more than triple that of the pharmaceutical sector. R&D spending is especially strong in services and software as these areas have expanded rapidly. The United States accounts for 40% of all OECD ICT-related business R&D expenditures, the EU-15 for a little under 25%, Japan for 22% and Korea for 9%. The ICT business sector has close to one million researchers; of these around half are in the United States. ICT research priorities are focusing on developing the basic technologies for the next generations of products and a new development has been interest in addressing major challenges including climate change and healthcare (OECD, 2008).

ICT IMPACT ON WORK AND COMPETITIVENESS IN PRINT MEDIA INDUSTRY

The media and publishing industry is undergoing a massive transformation thanks to the rise of digital technology and is a good example to consider ICT impact on work and competitiveness of an industry. Over the past 30 years, changes in newspaper production have been significant: from linotype machines and hot lead type, typewriters

and grease pencils, to computer terminals, satellite transmissions, digital cameras and online editions. The ability to get news online, instead of from the traditional printed newspaper, may be the most dramatic change of all.

Both retail and music are prime examples of sectors that underwent similar transitions. Many traditional retailers seamlessly translated their brick-and-mortar experience and built prosperous revenue streams through e - commerce. On the other hand, many of the traditional players in the music industry struggled to evolve and experienced a shrinking market once iTunes was born.

Digital publishing opens the door to additional income streams beyond advertising and subscriptions in content monetization. Readers will pay for content as long as it's compelling (feeds the intellect or fuels emotions) and can't be found for free anywhere else.

The open Internet has become a medium like no other. In the past ten years, the number of Internet

users shot past one billion and is nearing three billion; users migrated their fixed Internet access from dial-up to broadband; and their usage shifted from text-based to predominantly video traffic. Globally, the number of users in developing countries now exceeds those in developed countries; there are now more mobile broadband subscribers than fixed; and mobile access has shifted to smartphones (see Table 2.). Internet merges the most notable characteristics of traditional media such as broadcast and telecommunications, while also augmenting them in ways that have revolutionized aspects of civil society, business, and government (Kende, 2014).

As a result, the nearly 3 billion Internet users are both creators of information as well as consumers. Websites, blogs, videos, and tweets, can all be broadcast and accessed in the largest mass medium imaginable. Audio and video calls and conferences can be set up and received without regard to distance or cost, (Kende, 2014).

Table 2: Internet users in the world

<p>Internet users (2014)</p> <ul style="list-style-type: none"> - 2.893.587.260 Internet users worldwide. - 2/3 of Internet users are from the developing world. - Internet user penetration rate 40% globally, 78% developed countries and 32% in developing countries. - Households with Internet access: 44% globally, 31% developing countries, 78% developed countries.
<p>Broadband Internet access (indicated years)</p> <ul style="list-style-type: none"> - Global broadband subscriptions 93% of total global fixed Internet subscriptions (2012). - 673.295 648 fixed broadband subscribers worldwide and number of fixed-broadband subscriptions in developing countries overtook the number in developed countries (2013). - 2.3 bn. mobile-broadband subscription globally with penetration rate 32% (2014). - Mobile broadband connections 5.3 bn. - forecasts 2018
<p>Mobile cellular subscription (2014)</p> <ul style="list-style-type: none"> - The number of mobile-cellular subscriptions worldwide is approaching the number of people on earth almost 7 bn. (2014) - Penetration rate 96% (developing countries 90% compared with 121% in developed countries).

Source: ITU, April 2014.

The impact Internet has had on newspapers is twofold. Directly, the Internet has increased competition for the newspaper and revised the way news is distributed. Indirectly, the Internet has influenced advertising trends, consumer behavior and the rise of disruptive technologies. As a result, newspapers have been forced to integrate with the Web and now approximately 80% of newspaper publishers have integrated web and print operations (Bubanja, 2014).

In parallel print media industry need appropriate ICT educated skills and an organizational transformation that will support new digital model of work. The best example of this growing phenomenon and effect of the Internet is reduction of US journalists in their print media. According to the annual American Society of Newspaper Editors survey, in the decade from 2003 through 2012, a total of 16,200 jobs were lost. The recession years

of 2008 and 2009 took a toll from which the industry never recovered. In 2007, there were 52,600 full-time newsroom employees in US. Two years later, that workforce had been pruned by about 20% (Jurkowitz, 2014).

The Internet has removed all geographical boundaries and as a worldwide platform, it has extensive global reach. Also it removed any barriers to entry in newspaper business. Initially, entry costs were very high because large investments were needed to set-up a publishing house, and so the number of players was restricted. However, the Internet gives anyone with a computer an opportunity to publish information. This has placed newspapers in an industry for news and information, and as a result they are now directly competing with all news sites online.

The Internet has revolutionized the way news content is distributed and consumed. It has the ability to deliver news immediately, thus the Internet allows readers to receive news in real time and stay constantly updated. Additionally, the Internet via e-mail and social media activity has led to news being distributed socially.

According to IAB Report for 2013 half of social network site users in US have shared news stories, images or videos, and nearly as many (46%) have discussed a news issue or event. In addition to sharing news on social media, a small number are also covering the news themselves, by posting photos or videos of news events. Consumers in US in 2013 45% of their time spend watching TV, 25% being online and only 5% of their time reading print media (Jurkowitz, 2014).

It is evident that the existing newspaper business model necessitates change in the new digital environment whether this means: a) merely altering their existing model to include print and digital or b) a complete transformation of going purely digitally what is still debatable.

E-BUSINESS AND COMPETITIVENESS LEVEL OF SERBIAN FIRMS

Basic motives for Serbian companies to implement ICT and e-business are the following (Vidas-Bubanja, 2014):

1. The possibility to directly communicate with customers/users,
2. Global reach,
3. Rising competitiveness of export products, and
4. Extension of profit margins.

E-readiness of Serbian firms comprises all the factors influencing ICT adoption and use including infrastructure development, legal framework creation, institutional capacity development, and many others. Starting activities include work on rising awareness among Serbian managers about advantages of e-business application and fact that e-business today is the key precondition to be present on European and world market. Evidence show that rising competition levels (rivalry) between domestic companies induce companies to use ICT. Analysis also finds that large Serbian companies across all sectors are significantly more likely to use ICT than small and medium size enterprises (SORS, 2014). Basic data concerning ICT implementation in Serbian companies are presented in Table 3.

Table 3: ICT implementation in Serbian companies in 2014

100% of companies use computer in their everyday work
100% of companies have Internet connection
74% companies with Internet connection have Web site
40,4% companies with Internet connection make orders online in 2013
21,2% companies with Internet connection make online sales
11, 3% companies use ERP systems during January 2009.
14, 1% companies use CRM systems during January 2009.
3,8% companies pay for cloud services

Source: SORS, 2014. p. 68-79

Empirical analysis demonstrates that once a company has started to use ICT, the intensive use of electronic information exchange systems such as SCM systems as well as employee skills increase the likelihood that a company achieves ICT-enabled innovations. Intensive ICT users are also

more likely to change their organizational structure and to outsource non-core activities.

According to the results of USAID Project on sectorial competitiveness, Serbian ICT companies have a competitive advantage in the region with

regard to pricing and worker skill flexibility for different types of projects. With an average gross wage of \$880 per month for ICT, Serbia ranks below average ICT wages in Georgia (\$1,050 gross) Romania (\$1,300), Hungary (\$2,200) and Turkey (\$3,600). Available technical skills, such as programming, are strong, and there is stable growth in the workforce, with total graduates in the technical areas relevant to ICT work. However, these graduates are not always up to date with current programming needs, and additional on the job training is required.

Firms interviewed also noted that a major skills gap exists with regard to managerial skills, with managers reporting that growth is impeded by the lack of mid-level management to take over key functions while other junior programmers move into more technical roles. Serbia's competitiveness is also hindered by the fact that the industry is fragmented, with small firms that do not jointly bid for larger projects in major markets.

Nevertheless, this is a growing sector and Serbia can capture significant regional business in addition to increasing demand from Western markets. The Serbian IT market value is between 400 million and 450 million EUR, for almost 5 years (2009-2013). Total of 1,704 active enterprises, which created revenues higher than 1 million RSD, comprised the Serbian IT industry in 2011. A total number of employees is 14,876 and represents 10% of total workforce in Serbia. From 2003-2006, sales and jobs have doubled and exports increased from \$11 million to \$50 million. In the same time, export of ICT services from Serbia raised from 62 to 200 million EUR in period 2007-2012. The World Economic Forum report on Serbia's Technological readiness/Innovation is encouraging: Serbia was ahead of most of its neighbors in technological readiness, and ahead of Bulgaria, Macedonia, Albania, and Bosnia in innovation. The Serbian government provides special incentives for FDI in ICT, while sector links with higher education are becoming institutionalized and strengthened (VOICT, 2012).

When analyzing *e-activity* of Serbian firms it indicates that ICT-enabled innovation are closely connected with educated workforce. It is estimated that there are approximately 5,000 active IT professionals in Serbia, who are competent in a broad range of methodologies, technologies and tools. Their activities include supporting efficient development of high quality software, systems integration and hardware, developing front-end,

back-end and middle-ware components, together with creating customized software and systems and managing and enhancing client's entire information technology process. Each year there are around 1,000 graduated students from Electrical Engineering and Computer Science which represents 7% of total university graduates. Since 1968, students from a high-school specialized in in-depth tuition in Mathematics, Physics and Informatics have won an impressive number of prizes at World Olympiads (81 medals in Mathematics, 17 in Physics and 14 in Informatics).

Concerning *e-Impact*, ICT and firm/industry performance in Serbia is evidently closely related with wider ICT and e-business implementation. All available results of domestic companies demonstrate that ICT use increases the turnover of companies and has a positive impact on market shares.

CONCLUSION

Some OECD governments have identified ICTs as an important direct or indirect component of economic stimulus plans. This is based on the rationale that ICTs are a fundamental economic infrastructure and a precondition for competitiveness. The idea is that ICT infrastructure and applications throughout the economy and society induce large benefits through their productivity- and innovation-enhancing features. Media industry is a good example how ICT potentials and digitalization can change business models and open new perspectives in parallel with challenges concerning organizational change and new skill requirements.

For Serbian government one of the important tasks is to integrate ICT policies into overall strategies for enhancing economic growth, employment and welfare. Government has to shift its focus from dealing with sector-specific infrastructure issues towards long-term strategies on how ICTs, the Internet and other types of networks can achieve wider socio-economic objectives. E-government activities are a part of strategies to boost public-sector efficiencies, and ICTs are increasingly used to address wider issues at national level (*e.g.* social cohesion, aging, national security) and globally (*e.g.* climate change, energy efficiency, global health issues).

Specific importance Serbia has to devote to policies that foster innovation like ICT R&D

programs and ICT innovation support. Also policies to promote IT education and to encourage industry-based/on-the-job IT training have to be on the top of government agenda. Other activities include: 1) create an environment characterized by transparent legal regulatory framework that promote competitive markets; 2) appropriate incentives and legal protections, including respect for intellectual property rights; 3) incentives for investment in high-speed communications infrastructures and next generation networks, as well as new media and information technologies; 4) enhance respect for privacy of personal information and recognition of the benefits of global information flows; 5) a stable reliable and trusted infrastructure capable of addressing and responding to emerging risks and threats; 6) an educated work force; and 7) respect for recognized international standards that are established through transparent, market-driven, consensus-based mechanism.

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