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ICT impact on SMEs performance

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Abstract

Information and communication technologies (further – ICT) and its impact in the economic, social and personal development had become an important object of scientific researches during recent decades. Theoretical and empirical studies have demonstrated the necessity to gain and exploit the positive outcomes (productivity growth, organization expansion, efficiency, effectiveness, competitiveness etc.) of ICT adoption and implementation in various organizations. Therefore the aim of this paper is to analyze the literature on potential direct and indirect effects of ICT on SMEs performance and to identify those that could determine a business success. The article is based on systematic, logic and comparative analysis of scientific literature.

Results of this scientific work confirm that ICT has impact on the improvement of external and internal communication and that for best performances it is important to align ICT investments with internal capabilities and organizational processes. Technology itself is not as important as the induced social and economic achievements.

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1. Introduction

Worldwide processes of globalization, knowledge society and economic effects the existence of separate countries, organizations and individuals. The rapid development of information and communication technologies (further – ICT) (which changes the existing business structures and ways of communication) extremely influenced the spread of previously mentioned processes. It is known that the adoption and use of ICT represents fundamentals

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of competitiveness and economic growth for companies, organizations and even countries that are able to exploit them. (Vehovar & Lesjak, 2007; Higon, 2011; Ollo-Lopez & Aramendia-Muneta, 2012; Steinfield, LaRose & Chew, 2012).

Moreover, ICT and its impact in the economic, social and personal development had become an important object of scientific researches during recent decades. According to Ollo-Lopez and Aramendia-Muneta (2012), numerous studies have focused on analyzing how adoption of ICT affects companies and therefore differentiated two types of studies:

- the ones related to productivity
- related to the environment (findings of recent research confirmed that ICT has impact on the reduction of greenhouse and others increase the efficiency of energy). (Hall, Lotti & Mairesse, 2013)

In the industrialized countries almost 30 per cent of all budgets of research and development (in both, private and public sectors) are allocated to research and development of ICT.

Existing research suggests that small and medium sized enterprises form a dynamic and important part of the economy in most countries (Wolf, 2001; Matthews, 2007). Moreover, according to Alam and Noor (2009) SMEs account for more than half of all business and over half of all employment in the developed countries (including Australia and United Kingdom); in Europe SMEs represent around 99 per cent of the total number of companies (Lopez-Nicolas & Soto-Acosta, 2010). Therefore, the limited amount of research concerning ICT adoption and effects on SMEs has been indication of the fact that SMEs started to use ICTs relatively recently.

Alam and Noor (2009) also notes that the majority of the empirical research is based on large companies and usually SMEs are characterized as lacking of knowledge about the possible actual advantages of ICT. Authors also agree on some researches opinions that the use of ICT can improve business competitiveness with internet providing opportunities for SMEs to compete equally with large enterprises.

As there is growing number of research in ICT area the *aim of this paper is to analyze the literature on potential direct and indirect effects of ICT on SMEs performance and to identify those that could determine a business success.*

The methods of research are systematic, logic and comparative analysis.

The article is structured as follows. Section 1 is the introduction. Section 2 presents a literature review of possible ICT impacts on organizations. Section 3 presents the analysis of direct and indirect effects of ICT on SMEs performance. Section 4 presents conclusions.

2. ICT impact on organizations

2.1. ICT adoption

In the companies and countries that assimilate new technologies and innovations rapid changes are expected. There are different studies analyzing ICT, especially factors that impact ICT adoption. Analysis of ICT effects in private sector is significant only after thorough analysis of conditions that should be satisfied in order to successfully adopt ICT – expectations towards positive impacts of ICT and characteristics of individual company (financial, technological, personnel resources, flexibility of structures etc.) are closely linked. According to Alam and Noor (2009) the adoption of the ICT „is considered to be a means to enable businesses to compete on a global scale, with improved efficiency, and closer customer and supplier relationships“(p. 112). Therefore the adoption of ICT is recognized as crucial condition enabling SMEs to consider information and communication technology as an important implement in their business to take competitive advantage from the global markets.

Also some researchers attempted to identify impact of ICT adoption in private sector and understand crucial environmental elements and factors for successful development of company. Therefore Manochehri, Al-Esmail and Ashrafi (2012) states that in order to benefit from ICT adoption, to deliver better services and explore new business opportunities, there should be satisfied at least three conditions and there should be:

- Certain infrastructure;
- Skilled ICT personnel;
- Budget to invest in ICT.

All three conditions should be satisfied to achieve the best results. Similar groups of necessary conditions of ICT adoption were highlighted in Ollo-Lopez and Aramendia-Muneta (2012) work. Authors claimed that all determinants and factors of ICT adoption analyzed in previous scientific literature can be classified into three groups: factors related to the company staff that is going to use ICT, factors related to the characteristics of the company and factors related to the environment in which the company operates. After the thorough multiple regression analysis of the study which examined the relationship between ICT adoption and its factors Alam and Noor (2009) and Lopez-Nicolas and Soto-Acosta (2010) found out that perceived benefits, ICT knowledge and skill, government support are also significant elements of ICT adoption. This may suggest that the productive use of ICT is closely linked to use of organization resources in general. Moreover, the microclimate of organization and organization's preparedness to adopt ICT are related to factors of macro environment and expected benefits.

Basing on logic observations of scientific literature Consoli (2012) states that the benefits/advantages of ICT depend on several variables:

- the type of business,
- internal changes (e.g. re-engineering process, personnel retraining),
- suppliers-customers interaction.

Following these ideas it is important to mention that SMEs are not fully exploiting the potential of ICT like large companies. The one of main findings of Esselaar, Stork, Ndiwalana and Deen-Swarrray (2006) was the fact that the main constraint to ICT usage remains too high investments and / or usage costs. Usually SMEs faces various (both: internal and external) barriers to ICT adoption (Table 1).

Table 1. Internal and external barriers of ICT adoption (Ashrafi & Murtaza, 2008)

Internal barriers	External barriers
Owner/manager characteristics	Infrastructure
Firm characteristics	Social barriers
Adoption and implementation cost	Cultural barriers
Return on investment	Political, legal and regulatory barriers

Table 1 presents the most common barriers of ICT adoption in company. It is obvious that external barriers usually are caused by political or cultural issues; meanwhile internal barriers usually can be easily removed or changed due to progress. Consoli (2012) also agrees on approach that SMEs faces various barriers to ICT adoption partly due to the fact that SMEs usually have limited resources, technology and capabilities although the less complicated structure allows smaller companies more flexibility to changes. Given the discussion above, it is expedient to focus attention on impact of ICT in SMEs sector and to identify direct and indirect effects of ICT as possible motivators for further development and pursue business success.

2.2. Impact of ICT in SME sector

The SME sector has an important role to play in economic development, poverty reduction and employment creation in developing economies. The SME sector largely exceeds the average economic growth of national economies in many countries and contributes significantly to employment creation. (Esselaar, *et al.*, 2006; Higon, 2011).

A study in the UK identified three distinct stages in IT use in small businesses (Matthews, 2007):

- Basic – minimal usage of IT,

- Substantial – several applications and machines in use,
- Sophisticated – integrated various systems and constantly developed use of technology.

Matthews (2007) argues that in terms of harnessing technologies (including ICT) a similar staged progression can be observed, with companies progressing from simple to enabling technologies. As organization/company grows/expands a specific function or department is more likely to be required. Moreover, the stage of harnessing technologies and certain infrastructure, skilled ICT personnel etc. are closely linked and could determine the extent of potential positive impact of ICT. If there are certain infrastructure, skilled ICT personnel and sufficient budget to invest in ICT, positive impact could be expected in the private sector – according to Manocnehri, Al-Esmail and Ashrafi (2012) ICT platforms (for example.: PCs, mobiles, internet, etc.) have four main contributions to organizations:

- More visibility to business enterprises;
- Provide more information to small firms;
- Allow enterprises to overcome traditional trade barriers;
- Facilitate financial transactions.

ICT also influences flexibility of the organizations and companies – companies that adopt ICT tend to perform better in market and easier differentiate products, services etc. Ollo-Lopez and Aramendia-Muneta (2012) state that ICT adoption seems to have a positive effect on productivity, directly as well as indirectly, depending on the sectors and to have great potential to support a sustainable development. Furthermore, the use of e-mail, e-commerce, and social media network have significantly cut down on the physical transportation involved in sending mail, banking, advertising and buying goods (Manocnehri, Al-Esmail & Ashrafi, 2012). However, it is important to emphasize importance of long term investments in ICT because the positive impact of ICT occurs only after a period of adoption. (Consoli, 2012; Bayo-Moriones, Billon & Lera-Lopez, 2013) Also it is important to take in mind that organizations adopting ICT have to adjust their structure, make internal changes such as personnel training, and reorganize them.

Consoli (2012) analyzed scientific literature of ICT impact on companies and identified and categorized main effects into 4 groups (Fig. 1): performance, growth, expansion and new products.

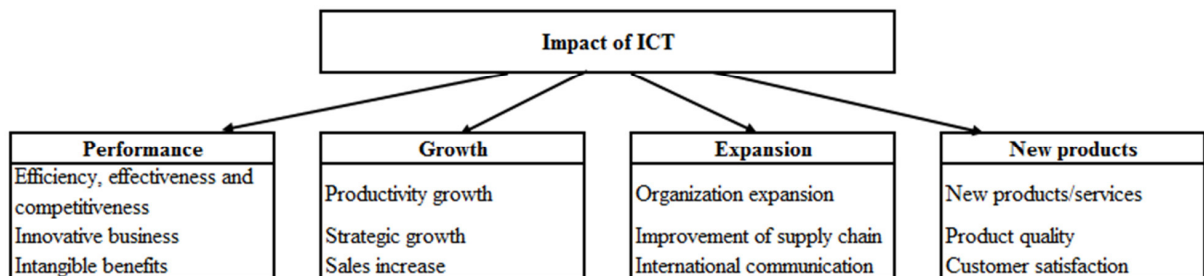


Fig. 1. Impact of ICT in the private sector (Consoli, 2012)

Fig. 1 presents the 4 groups of main effects of ICT. Each of group consists of several dimensions, such as efficiency, productivity, product quality, etc. studies show that investments in ICT had a considerable effect on the productivity of the labor force and on economic growth. (Manocnehri, Al-Esmail & Ashrafi, 2012, Sabbagh, Friedrich, El-Darwiche, Singh & Ganediwalla, 2012)

It is also known that ICTs make services more easily tradable and increase productivity in manufacturing enterprises. (Manocnehri, Al-Esmail & Ashrafi, 2012) A growing number of studies confirmed a positive and significant effect on productivity. In addition, other studies indicate that the productivity effect is not only significant and positive, but increasing in both sectors: private and public.

Matei and Savulescu (2012) found out that Lau and Tokutsu (1992) analyzed the contribution of ICT investment on economic growth in the US for 1960–1990 period, revealing that half of the economic growth in the US was due to ICT investment. Authors also refer to World Bank studies on a sample of 20 000 businesses in 50 developing countries, which proved that sales grow faster, productivity is higher and also employee's growth is faster in companies using ICT. Matthews (2007) supported this approach and stated that „there is some empirical evidence that small firms employing ICT enjoy enhanced profitability and outreach and thus can better position themselves for more wholesale expansion“ (p. 818). Interestingly ICT does not need to be considered solely as a growth driver, to a large extent it also functions as a growth supporter.

However, research has usually focused on direct, easy measurable effects of ICT (e.g. growth, productivity, profits etc.) while indirect effects, especially of ICT on SMEs performance, have been, in general, less studied. Relating all of the above to the goals of average SME (e.g. competitiveness, higher profits and satisfaction of customers and employees, etc.), it could be proposed that exceptional attention should be paid to direct and indirect effects of ICT on SMEs performance – it should be investigated by further research.

3. Direct and indirect effects of ICT on SMEs performance

The increasing attention is given to another group of ICT impact on companies – performance. Consoli (2012) summarized various indicators and suggested that ICT effects on performance could be structured and analyzed via such indicators as efficiency, effectiveness and competitiveness, innovative business and intangible benefits.

Undoubtedly ICT has a powerful impact on the economic performance and could be characterized by a high degree of technological progress and productivity. Also it has an important social impact. (Matei & Savulescu, 2012) For instance, Liang, You and Liu (2010) and Santos and Brito (2012) identified that performance of the company/enterprise has two types:

- Financial performance;
- Strategic performance (it is important to mention that Santos and Brito (2012) preferred naming this type „strategic performance“ instead of original „operational performance“).

These types could be represented by competitive aspects (dimensions of performance): profitability, growth, market value, customer satisfaction, employee's satisfaction, environmental performance and social performance (Fig. 2).

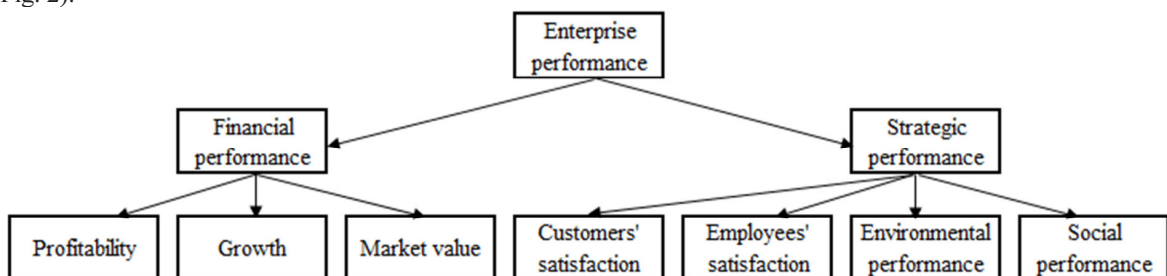


Fig. 2. Dimensions of performance (Santos& Brito, 2012)

The second figure demonstrates more structured and detailed analysis of performance. For instance, Consoli (2012) and Santos and Brito (2012) identified dimensions of financial performance. Consoli identified efficiency and effectiveness and Santos, Brito – profitability, growth and market value that in general covers the same financial aspects of performance. Thorough analysis would suggest using very similar or identical indicators to measure performance dimensions (Table 2). The main difference is the analysis of indirect effects: Consoli (2012) suggests only conceptual idea but Santos and Brito (2012) propose very concrete dimensions (such as environmental and social performance and their indicators).

Table 2. Indicators of performance dimensions (Santos & Brito, 2012)

Dimensions	Indicators
Profitability	Return on Assets, Return on investment, Net income/Revenues, Return on equity, Economic value added
Growth	Earnings per share, Stock price improvement, Dividend yield, Stock price volatility, Market value added (market value / equity),
Market value	Market-share growth, Asset growth, Net revenue growth, Net income growth, Number of employees growth
Employees satisfaction	Turn-over, Investments in employees development and training, Wages and rewards policies, Career plans, Organizational climate, General employees' satisfaction
Customers' satisfaction	Mix of products and services, Number of complaints, Repurchase rate, New customer retention, General customers' satisfaction, Number of new products/services launched
Environmental performance	Number of projects to improve / recover the environment, Level of pollutants emission, Use of recyclable materials, Recycling level and reuse of residuals, Number of environmental lawsuits
Social performance	Employment of minorities, Number of social and cultural projects, Number of lawsuits filed by employees, customers and regulatory agencies

In the second figure proposed approach is similar to Alam and Noor (2009) approach – according to last mentioned authors some empirical studies confirm the positive effect of ICT on firm performance in terms of productivity, profitability, market value and market share. Also the same studies revealed that ICT had some effect in terms intermediate performance measures: process efficiency, service quality, cost savings, flexibility (organization and process) and also customer satisfaction. All dimensions of strategic performance could be qualified as affected indirectly by ICTs.

It is common practice to use profitability measures as the main indicators of company performance. Using only profitability measures is an inadequate decision and can cause a misleading information. According to Santos and Brito (2012) „recent research defines competitive advantage as the ability to create more economic value than the marginal (break even) competitor in its product market“ (p. 112). Global Competitiveness Reports of World Economic Forum comprises 12 key elements of competitiveness (Matei & Savulescu, 2012) that are related to ICT impact on both: strategic and financial dimensions of performance:

- Institutions
- Infrastructure
- Macroeconomic environment
- Health and primary education
- Higher education and training
- Goods market efficiency
- Labor market efficiency
- Financial market development
- Technological readiness
- Market size
- Business sophistication
- Innovation.

Matei and Savulescu (2012) states that “in a concrete situation, there could be estimated an increase by 1 per cent of ICT contribution to GDP” (p. 14) – such fluctuation could lead to an increase by 4,2 per cent of competitiveness. All 12 elements are powerfully interrelated and tend to reinforce each other. Moreover, a weakness in one area often has a negative impact on other areas. In the same manner all indicators of performance dimensions are interrelated and could be affected by each of 12 elements of competitiveness. Consoli (2012) noted that for best performances it is important to align ICT investments with internal capabilities and organizational processes. Therefore dimensions of strategic (operational) performance include indicators that measure not only changes in economic activities of the company but also improvements made, satisfaction etc.

Studies have shown that ICT performance effects vary according to the type of technology being used and its degree of adoption. (Liang, You & Liu, 2010; Bayo-Moriones, Billon & Lera-Lopez, 2013) Moreover, Bayo-Moriones, Billon and Lera-Lopez (2013) researched effects of internal and external communication and coordination on operational and final performances (Fig. 3).

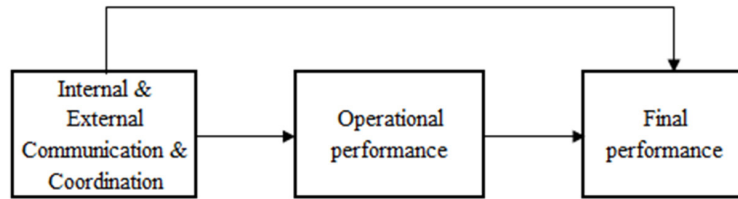


Fig. 3. Relations among internal and external communication and coordination, operational and final performance (Bayo-Moriones, Billon & Lera-Lopez, 2013)

According to Bayo-Moriones, Billon and Lera-Lopez (2013) „the number of ICTs has a significant impact on communication improvement. This effect is also found in relation to ICT intensity“ (p. 127). Also authors during their study of perceived performance effects on ICT in manufacturing SMEs found out that communication improvement induced by ICT adoption leads to better operational performance (positive impact of ICT). Therefore communication improvement and operational performance are associated with better final performance.

To sum up, the approach informing in this study explicitly stresses the importance of ICT direct and indirect effects on SMEs performance depending on the 12 elements of competitiveness. Therefore, this may suggest that the SMEs performance and its dimensions are closely linked and interrelated with other groups of main effects of ICT on private sector. The literature analysis shows that ICTs impact on SMEs performance dimensions (profitability, growth, market value, social and environmental performance, satisfaction) could be considered as significant predictor of business success. Furthermore, the results of study suggest that all performance dimensions are equally important in order to succeed in competitive markets.

4. Conclusions

This paper provides theoretical evidence on the direct and indirect effects of ICT on SMEs performance. In summary, the above literature review suggests that ICT can improve overall, financial and operational performance of SMEs if it is used appropriately. It is well known that marketing, communication, networking and resource planning are the areas that ICT impacts the most.

In order to gain significant competitive advantage there should be 12 key elements of competitiveness considered. Moreover, literature review shows that there are two different types of SMEs performance: financial and strategic (operational) that consists of various dimensions that are interrelated in the same manner as previously mentioned 12 elements. The dimensions of strategic (or operational) performance could be considered as ones that causes indirect effects of ICT on SMEs performance.

Some empirical studies confirmed the positive effect of ICT on company performance in terms of productivity, profitability, market value and market share. Findings highlight that for best performances it is important to align ICT investments with internal capabilities and organizational processes. Therefore dimensions of strategic (operational) performance include indicators that measure not only changes in economic activities of the company but also improvements made, satisfaction etc.

Results of this scientific work confirm that ICT has impact on the improvement of external and internal communication and that ICT play major role in innovation performance of SMEs. Technology itself is not as important as the induced social and economic achievements.

Some limitations on this research should also be mentioned. Further research should investigate not only aspects of ICT adoption and effects on SMEs but also to analyze possible effects of ICT adoption and implementation on clusters of enterprises. Some authors shared insights about possible ICT impact on collaborating enterprises that was

not theoretically or empirically tested in previous studies. It is believed that ICT impact on clusters performance could be very interesting trend for future researches.

Although interesting results have been obtained from literature analysis, it would be interesting to analyze only indirect effects of ICT on SMEs in more comprehensive way: there are no unanimous opinions which dimensions of SMEs strategic performance are having the major impact on business success. ICT use does not predict business success by itself but this does not mean that ICT is not important.

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