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FACTORS FOR EFFICIENT USE OF INFORMATION AND COMMUNICATION TECHNOLOGIES INFLUENCING SUSTAINABLE POSITION OF SERVICE ENTERPRISES IN SLOVAKIA*

Dana Benešová[1], Miroslav Hušek[2]

[1,2] University of Economics in Bratislava, Faculty of Commerce, Department of Services and Tourism, Dolnozemská cesta, Bratislava, Slovak Republic

E-mails:[1] dana.benesova@euba.sk ; [2] miroslav.husek@gmail.com

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Abstract The importance of the service sector is constantly increasing. This statement is proved by the development of macroeconomic indicators such as value added and employment in services. However, in the current fast changing market environment it is difficult for service enterprises to succeed in competition. The specific service features significantly influence the production and exchange processes that determine the key sources of production which are namely skilled labor force and the use of ICT. Many authors proved that innovation and ICT together with a skilled workforce and with the necessary digital skills are factors of sustainable competitive advantage and of increasing productivity in services. Implementation of basic ICT into the processes of the enterprise may or may not bring competitive advantage to an enterprise or increase its performance. An intention of this article is to identify the factors which influence an efficiency of established ICT in services, also to quantify their contribution to performance and to the sustainable position of service enterprises in Slovakia.

Keywords: service sector; information and communication technologies; sustainable and stable position; factors of effective use of ICT; human capital; business processes

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1. Introduction

Globalization of the world economics have brought and formed a new generation of services. Services have become an important sector and at present they retain essential impact on GDP as well as on the process of creating new work positions. While in the sixties services represented a minority in the total economic output, now their share on GDP in the most developed countries exceeds 70% and is still increasing (Cram, 2012). The

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process of Slovak economic approaching the developed economics of the European Union resulted into positive changes in the growth of the service sector measured by the share of value added and employment 61% in 2016 (World bank, 2018). Therefore, the service sector employs nearly two-thirds of workers. Based on the past development and development in EU countries there is an assumption that the service sector will continue to provide new job opportunities.

However, given the current highly competitive environment and turbulent market changes, it is difficult to secure a sustainable and stable position for service enterprises. Porter (1990) described the importance of innovation and ICT as a factor in the competitiveness of services, but he also sees indispensability in quality management and qualified workforce. Introducing new, progressive ICT tools into the business processes of service-shaping services and increasing their competitiveness is therefore a current challenge. These include, for example, widespread use of the Internet to develop the marketing of service enterprises, as well as the widespread use of complex information systems and the interconnection of individual information flows (Raudeliūnienė et al., 2018a, 2018b; Tvaronavičienė et al., 2018; Ragulina et al., 2018).

In order to increase the competitiveness of services according to the OECD (2012), it is also necessary to choose the appropriate workforce with the necessary digital skills, and to increase the digital skills of the permanent employees and the skills of the consumers.

ICT has now reached a position that provides a strategic advantage and a sustainable competitive advantage. Also, investments and innovations enabling the advancement of information and communication technologies contribute significantly to productivity growth and have a major impact on competitiveness in services (European Commission, 2012). Hackley (2005) states that in order to gain a competitive advantage in services, it is necessary to digitize business processes and to implement appropriate information systems that give service enterprises the opportunity to expand on the market. He also emphasizes the important role of online marketing tools as a possible competitive advantage. In ICT investments, the services sector is at the forefront of other sectors, as stated by Lush, Vargo (2004), the result is that added value of services is boosted. In addition, in the service sector, production is predominantly based on information and knowledge, and if services are expected to remain competitive, it must implement and use information and communication technologies (Berr, 2008). Ghani, Goswami and Kharas (2012) confirm that the number of such service enterprises in the service sector, whose portfolios can be accessed by customers through the digital market without country borders, is increasing. The result is elimination of any barriers and even smaller enterprises are given the opportunity to use more sophisticated ICT.

Over the last decade, the implementation of information and communication technologies into service processes has required considerable investment which has not been used efficiently in many cases. Salah (2003), through his research, demonstrated that 75% of ICT investment in services did not meet the business objectives because there was not enough attention payed to the introduction of ICT. Failures and missed opportunities led to a loss of strategic advantages for enterprises, resulting in lower levels of future investment in information and communication technologies (Goulding, Alshawi, 2004; Peppard, Ward, 2004; Zuhairi, Alshawi, 2004). However, this condition was not only caused by unskilled workforce in general, but was primarily due to a lack of knowledge within the management. The management, which was unable to identify the functionality neither to quantify the contribution of information and communication technologies to the enterprise. This is an important fact because ICT workers have no knowledge of the course and economy of the business nor its strategic goals (Basu, Jarnagin, 2008).

It is therefore necessary to examine and improve managers' attitude to understanding the benefits of adopting information and communication technologies, in different words to get managers to know the value of ICT and then to find out how this understanding and approach influence the real state of implementation of information

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and communication technologies directly related to investments in ICT (Vargo, Maglio, Akaka, 2008; Ekuobase, 2013). Impact of information and communication technologies on business performance and productivity can be seen according to Brynjolfsson and Hitt (2000) in a wider context, which means that the positive economic impacts of ICT use can be achieved by combining investment in ICT with another combination of additional investment in work skills, reconstruction of business processes, and human capital. The aim of the contribution is to verify the consideration of the factors that make effective use of information and communication technologies in the implementation and use of ICT, to identify the impact of ICT on performance and on the sustainable position of service enterprises.

2. Literature Review

Factors of efficient use of ICT in service enterprises. Factors, which bring effective impacts in the production of service enterprises enabled by ICT have been addressed by several authors. For example, Raisinghani (2004) identified four critical factors for the efficient use of information technologies, such as the ability of a enterprise to quantify the benefits of information technology, collect, organize and evaluate information, understand the importance of people who work with information technologies, recognize their usefulness, and invest in qualification training and education for skilled employees in the field of information technologies for future benefit.

The heterogeneity of the service sector and the specific nature of services require consideration of other factors in the introduction of ICT. As Burgess (2002) states, each enterprise must consider the supply and the direction of its production and therefore the sectoral approach in the implementation of ICT. For this reason, a enterprise must also take its portfolios into consideration in the situations when choosing suitable ICTs, otherwise the implementation of information technologies may be ineffective. Martiško (2003) stresses that the information system is improving at the same time as the enterprise. For its healthy development, it is important to take into account not only the sectoral factor but also the factor of attractiveness of the region within which the enterprise operates and the business scope factor. According to Earl (2003) by introducing appropriate information technologies a enterprise can accomplish a successful achievement of its goals.

Koellinger (2006), based on analyzes in the eBusiness watch study initiated by the European Commission, confirmed the hypothesis that the positive impact of ICT on productivity is most visible in enterprises with more advanced ICT and with technologies implemented in all or several business processes that are compatible with each other. Aldhmour, Shannak (2009), highlighted the importance of using advanced information technologies to improve the services offered and to improve the efficiency of the costs spent on producing services. Authors examined the relationship between information technologies and competitive advantage, concluding that this relationship is positive. However, it is necessary to measure a competitive advantage in reference to the enterprise's profitability, its market share and customer satisfaction itself.

For the purpose of using new business technologies, it is necessary to innovate organizational processes as well as the enterprise's technological infrastructure with the aim of complex process optimization (Dedrick, Kraemer, 1998). Information technology has the position of a certain catalyst for a number of changes in the enterprise. There is a need to increase both the knowledge and the appropriate workers education in ICT skills. As Holland and Light (1999) state, business process optimization is important not only in the implementation of basic information technologies but also in more advanced ones. In order to successfully use advanced information systems, existing business processes need to be analyzed properly. Based on this analysis the compatibility of ICT with a given business process and the changes that need to be made in business processes can be defined (Scheer, Habermann, 2000). Smith, Chaffey (2002) also consider it necessary to adapt business processes to the use of ICT, as is also suggested by Pride, Ferrel (2006).

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In addition to changes in business processes and investments in ICT, the skills of a qualified ICT workforce are also relevant in ICT implementation. Other authors as Delina, Vajda (2009), Greenwood (1998), Powell (1997), Brynjolfsson, Hitt (2003) agree with the statement. They place a skilled workforce in the foreground, but as well emphasize the importance of changes in business processes and corporate culture. They are convinced that effective use of ICT is conditional on other related changes. A similar opinion is also presented by Drake-Brockman, McCredie (2011), who consider a skilled workforce as a key factor in the effective use of ICT. They add that the training of the workforce for the enterprise is expensive, which can be reflected in the increased costs of the enterprise. Trainor et al. (2010) also emphasize that human resources play the most important role in the ICT introduction as they directly affect the performance of the business itself.

Several authors, in connection with the implementation of information technology, considered it important to examine the satisfaction of the employees themselves. The reason is that the introduction of ICT into service enterprises is also linked to the requirements placed on employees and their technical skills. Colombier et al. (2007) have shown that employees regard the deployment of ICT as positive for enterprises, appreciating in particular time saved and faster and better communication not only internal but also external.

Information and communication technologies are an area that is constantly changing, evolving and requires a lot of investment (Kubičková at al., 2015). However, the use of information and communication technologies, which are improving at a rapid pace, allows to increase business performance and improve business processes and services. The dominance of small and medium-sized enterprises in the service sector and their investment sub-dimensionality appear to be the biggest barrier for the deployment of more advanced ICT. Reducing or dividing the costs of a small business to secure ICT allows to form electronic partnerships, relationships and networks. In addition, these offer more opportunities to acquire a new market, a new order that the service enterprise could not obtain independently.

The focus of business activities on the core of their business, the efforts of enterprises to use external resources while providing supportive business processes as well as the effort to purchase only ICT services, result in an increasing use of ICT outsourcing. Sparrow (2003) highlights the high interest of enterprises in ICT outsourcing, as enterprises have understood that ICT innovation in their own set up has been disadvantageous for them due to constant upgrading and development in the field of information technology. Enterprises do not have the ability to innovate technology as quickly as specialized professionals and, above all, not in such a quality.

Many authors (Lesjak, Lynn, 2000; Gilley, Rasheed, 2000; Claver, Gonzáles et al., 2002, Kamayabi, Devi, 2011 and others) conducted studies on the impact of outsourcing on business processes. Lesjak and Lynn (2000) showed that information technology is most used in enterprises that see innovation as a source of competitiveness. Gilley and Rasheed (2000) tried to detect the impact of ICT outsourcing on enterprise performance in their study. Their research pointed out that there is no direct dependence of these two variables. This relationship is influenced by the chosen business strategy in the great degree. Other authors, Devi, Kamayabi (2011), on the other hand showed the positive impact of outsourcing on the enterprises´ performance in small and medium-sized enterprises. Outsourcing of information and communication technologies enables enterprises to leave the full control of ICT in the hands of professionals. This way enterprises eliminate problems related to unskilled use of technology and therefore have the opportunity to fully focus on the core activity of their enterprise.

Based on the opinions of researchers, it can be stated that by appropriate implementation of information technology, enterprises become competitive, as ICT connects the enterprise with the market, mediates competition and market knowledge, optimizes business processes, supports faster business response to market changes, and others. However, it is important for ICT implementation to take into account those factors and effects which help to distinguish the enterprise from competition. In addition, it is necessary to consider the

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specific nature of services and the heterogeneity of the service sector. According to the knowledge base of the subject issue, it is possible to identify factors of effective use of ICT in services as follow: *quantification of the contribution of information technologies; respect for the sectoral approach; introduction of more advanced information technologies or systems; change of business processes in line with the introduction of ICT; skills of a qualified workforce in the ICT field; forming of electronic partnerships, relationships and networks; use of ICT outsourcing.*

3. Methods

The chosen methodological apparatus respects the stated goal and the scientific intention of the contribution. The analysis and synthesis method is applied in identifying factors for the efficient use of ICT in services, due to the qualitative nature of the research the method of induction is applied continuously throughout the practical part, and to determine the impact of ICT on performances and on the internal and external environment of service enterprises. Testing of factors for the efficient use of ICT was realized through a questionnaire. We used mathematical methods of statistics, regression and correlation analysis and other mathematical methods to measure the impact of ICT on enterprise performance. We performed the analysis in Microsoft Excel and UNISTAT software. The descriptive and analytical (inferential) statistics were used to evaluate data and interpret the results.

The questionnaire survey was carried out by random selection of the research sample formed by Slovakia's enterprises in the market services sector (Economic activities of market services categorized into NACE sections Rev. 2: G - Wholesale and retail, H – Transport and storage, I – Accommodation and catering services, J – Information and communication, K – Financial and insurance services, L – Real estate activities, M - Scientific and technical activities N - Administrative and support services. Market services include all services that may be the subject of sales and purchases at market for a price and for which there is demand. Non-market services are not produced for commercial purposes and their production is not organized on a market-based basis. Market services include those services which resources are mainly formed by sales (Michalová et al., 2013). We contacted 1400 respondents, from whom we recovered 160 questionnaires, i. e. 11.43% return. Questionnaire survey was realized in months November – December 2017. Respondents had only one option for each question: 1 = definitely not, 2 = no, 3 = neutral, 4 = yes, 5 = definitely yes. The observed period includes the years 2011-2017.

Table 1. Number of participating enterprises by NACE Rev. 2

Sections according to NACE Rev. 2	Number of enterprises
G	14
H	23
I	23
J	26
K	8
L	13
M	33
N	20
Total	160

Source: Personal collection, 2018

The application of the sectoral approach to the use of ICT by service enterprises was realized by sorting the enterprises according to the direction of their production: to the end consumer (B2C), to intermediate consumption (B2C), to intermediate consumption and to final consumers (B2B and B2C).

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Table 2. Direction of production of service enterprises

	Absolute frequency (n)	Relative frequency (%)
B2B	53	33,13
B2C	62	38,75
B2B a B2C	45	28,13
Total	160	100

Source: Personal collection, 2018

The relationship between the use of ICT and the enterprise's performance was identified with the help of the Pearson correlation coefficient (r)) and the determinant coefficient (r2), and a graph of dependencies was used to illustrate the results. We determine this dependency on the basis of the correlation coefficient. For the performance indicator we chose the sales of service enterprises that are in the position of dependent variable (y) and the individual ICT systems stand out as independent variables (x). Quantification of the extent of the use of individual ICTs in service enterprises (number of enterprises using ICT) was identified as ICT: mobility, cloud, social media, sophisticated website (websites with extended functionality), on-line sales and online purchasing (business electronic transactions), ERP, CRM; here:

Mobility – mobile employee access to enterprise information systems also while being off-premises. Such an approach, for example, saves time for employees, helps generate tailor-made customer service, supports communication, sales, logistics, enables new business models;

Cloud – providing services stored on virtual servers on the Internet. It is a technology that allows to share files between users' devices or between multiple users. The cloud service offer is very broad, the goal is to free a user from IT management starting from infrastructure through application, information and ending in processes;

Social media – communication with more customers who formulate requirements, services, and service ratings. When recorded and analyzed in an enterprise system, they can effectively, unprecedently and positively influence the marketing, sales and services of the enterprise;

ERP – business system for enterprise activities supported by a multi-modular application that helps enterprises manage activities such as planning, purchasing, inventory, supply relationships, customer service, order tracking, etc. ERP can also include modules for a enterprise's economic system and human resources management. It is integrated with the appropriate enterprise database system;

CRM – a system that mediates the creation, improvement and maintenance of customer relationships. It is an integrated information system that provides customer information, analysis of this information, and transformation into customer knowledge, leading to the creation of an individual offering that increases customer benefits and, at the same time, increases the efficiency of the enterprise's production).

We formulated three questions in the process of verifying the acceptance of factors for the effective use of ICT in the implementation and use of ICT in service enterprises.

RQ 1 Which advanced ICTs were used by service enterprises according to the direction of their production in 2011-2017 in Slovakia?

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RQ 2 How did the use of ICT influence the turnover in service enterprises according to production trends in 2011-2017 in Slovakia?
RQ 3 Did the introduction and use of ICT affect internal and external environment in service enterprises in 2011-2017 in Slovakia?

In RQ1 we tested factors of industry approach; introduction of more advanced information technologies or systems, and in RQ2 we quantified the benefits of ICT and their impact on business turnovers. In the RQ3 we investigated the impact of ICT deployment on the internal environment (factors of business process change in line with ICT deployment, skills of ICT qualified force) and on the external environment (creation of electronic partnerships, relationships and networks, use of ICT outsourcing).

4. Results and discussion

RQ 1 Which advanced ICTs were used by service enterprises according to direction of their production in 2011-2017 in Slovakia?

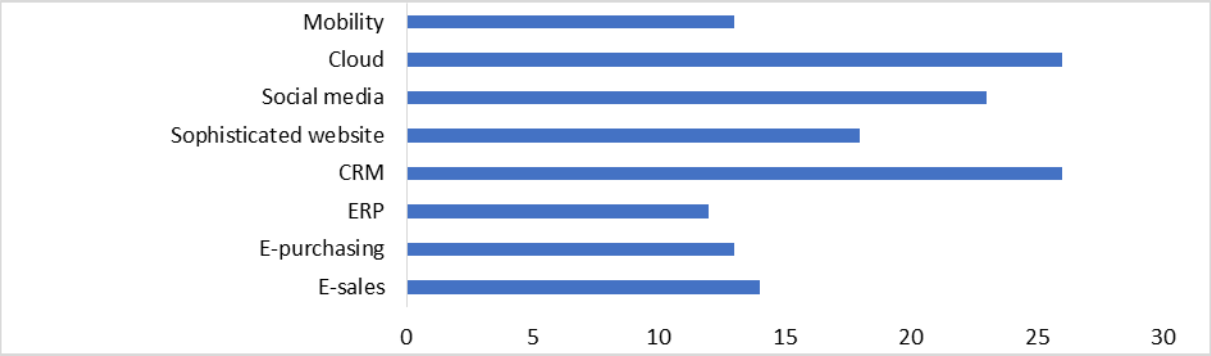

Fig.1. Use of ICT by B2B service enterprises
Source: Personal collection, 2018

Enterprises targeting intermediate production (Chart 1) are mostly using cloud and CRM systems. The least used are business transaction technologies and enterprise resource planning (ERP systems). In reference to results it is apparent that B2B enterprises use primary systems to support internal processes. This fact results from the direction of their production. Outputs are directed at enterprises, their production is characterized by a high degree of specialization and is based on knowledge and on the creation of new knowledge. The activities of advisory services, technical, information and other professional services requiring co-operation and teamwork between employees and clients, are also included. The online sale and purchase of B2B business´ service production is therefore limited.

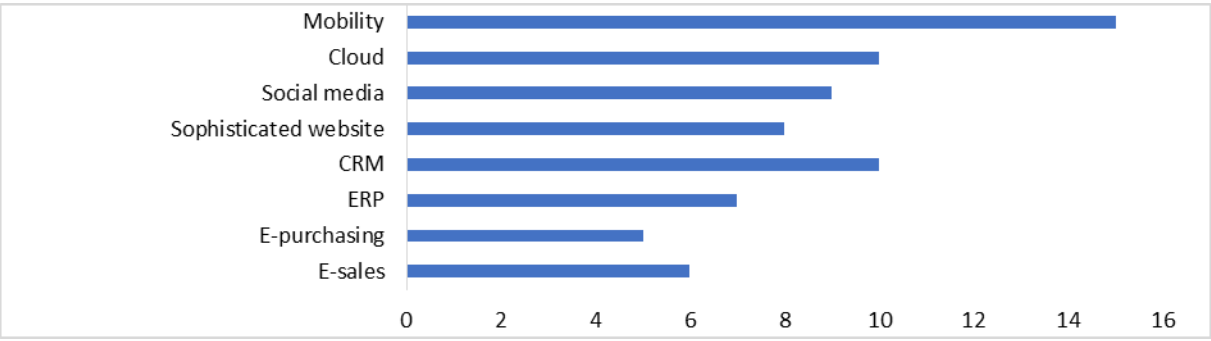

Fig.2. Use of ICT by B2C service enterprises
Source: Personal collection, 2018

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The most used technology of enterprises, the overwhelming majority of which is directed towards the end consumer, is mobility. Customer interconnection, tailor-made customization, customer information, and employee access to enterprise information system data from any location are key to B2C business. The results show that the surveyed enterprises take into account the verified factors of sectoral approach and the introduction of more advanced IT technologies in the implementation and use of ICT.

RQ 2 How did the use of ICT influence the turnover in service enterprises according to production trends in 2011-2017 in Slovakia?

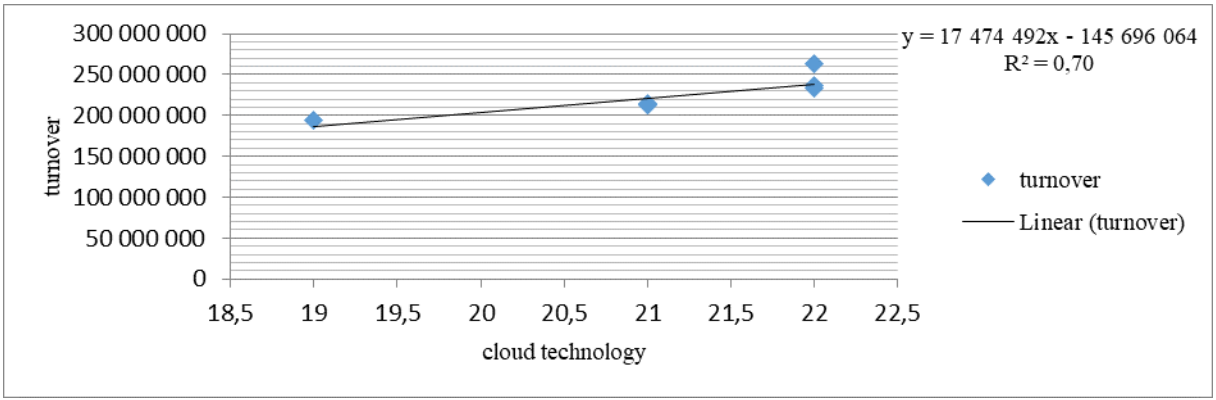

Fig.3. The relationship between cloud technology use and the turnover in B2B enterprises *Source*: Personal collection, 2018

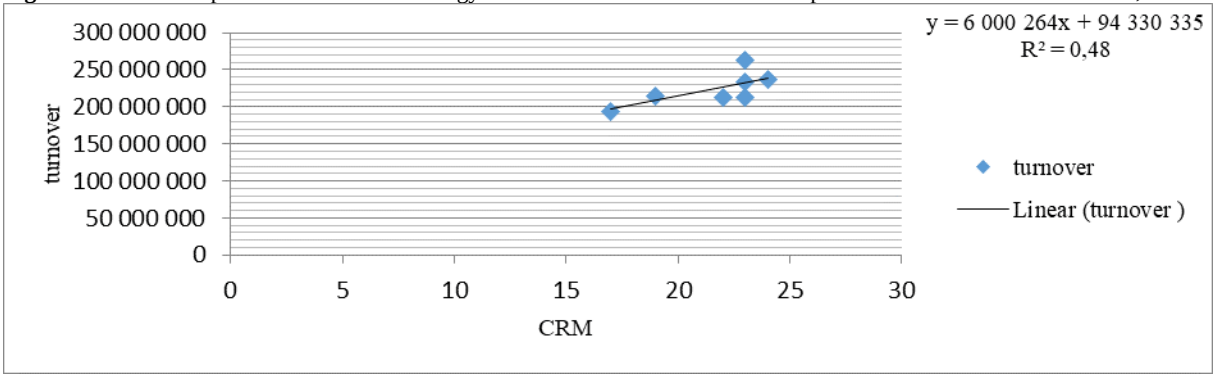

Fig.4. Relationship between CRM use and the turnover in B2B enterprises *Source*: Personal collection, 2018

Table 3. Results of the correlation and regression model

Direction of production	ICT	Correlation coefficient	Determination factor	Significance F (p-value)
B2B	Cloud	0,83	0,70	0,018
	CRM	0,69	0,48	0,084

Source: Personal collection, 2018

The results of the correlation and regression analysis confirmed a very high linear dependence between the use of cloud technologies and turnovers. This means that if the number of enterprises using the cloud grows, B2B turnovers also grow. The regression model explains up to 70% of data variability, the remainder is caused by deterministic factors that are not included in the model and by random effects. The model is statistically significant (0.018) at the significance level $\alpha = 0.1$.

Also, the relationship between the use of CRM and B2B enterprises shows a large direct linear dependence. The growth of CRM enterprises positively affects turnover growth, the model explains 48% of data variability. The model is statistically significant.

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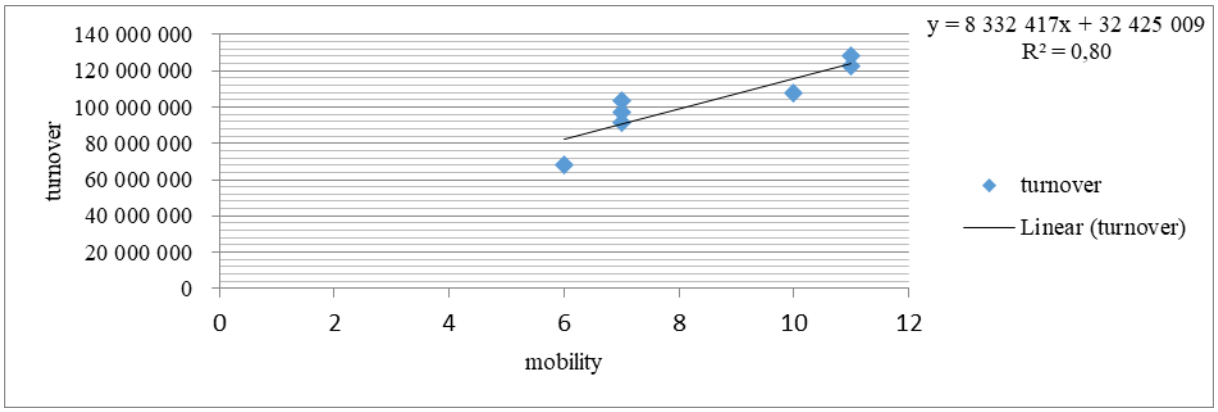

Fig.5. The relationship between mobility use and the turnover in B2C enterprises *Source*: Personal collection, 2018

Table 4. Results of the correlation and regression model

Direction of production	ICT	Correlation coefficient	Determination factor	Significance F (p-value)
B2C	mobility	0,89	0,80	0,006

Source: Personal collection, 2018

An almost perfect linear relationship was demonstrated between the use of mobility and the turnovers of B2C business enterprises. Correlation analysis proves that the growth in the number of mobility using enterprises has a positive effect on the growth of B2C turnovers. The determination factor confirms that 80% of the data is explained by the model, the remained is caused by other factors and by random effects. The model is statistically significant.

RQ 3 Did the introduction and use of ICT affect internal and external environment in service enterprises in 2011-2017 in Slovakia?

Table 5. The impact of ICT on internal and external business environment

INTERNAL ENVIROMENT					
Change of business processes in line with established ICT					
Has the use of ICT optimized the processes of your enterprise?	7	10	20	88	33
Has the use of ICT accelerated the processes of your enterprise?	6	8	12	104	29
Has the use of ICT clarified the processes of your enterprise?	4	11	12	111	20
Has the use of ICT secured the materials for efficient decision-making in your enterprise?	4	24	18	99	13
The skills of qualified workforce in the field of ICT					
Has the use of ICT affected the qualification requirements of your employees in ICT skills?	3	46	31	71	7
Have your employees adapted to the functionality of ICT?	1	15	24	115	3
Has the use of ICT required training and retraining of your employees?	4	59	31	61	5

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EXTERNAL ENVIROMENT					
Forming of electronic partnerships, relationships and networks					
Does the use of ICT enable a collaboration with your business partners?	1	20	23	107	7
Does the use of ICT participate on the improvement of the interaction with costumer?	0	11	14	110	23
Does the use of ICT enable interconnection of the enterprise´s internal and external environment?	3	26	30	94	5
Use of outsourcing ICT					
To what extend does your enterprise use external ICT?	22	34	40	56	6

Source: Personal collection, 2018

Most of the surveyed enterprises confirmed the effects of optimization, transparency and acceleration of business processes through the introduction of ICT. It means that enterprises were able to change their processes in line with established ICTs. It brought them positive changes and innovation of process leading to more effective management decision-making.

Most enterprises declared effective employees´ adaptation to the functionality of established ICTs, demonstrating that service employees have ICT skills and are well-qualified, and flexible to adapt to change in business. This is also confirmed by other respondents' replies, as only a third of enterprises declare the need for requalification and further training of their ICT employees. This means that enterprises take into account the factor of a skilled workforce in the field of ICT when choosing their employees.

Creating electronic relationships and networks with partner organizations, collaboration with customers and employees are both another effect of using ICT. This was confirmed by the most of the enterprises. Service enterprises are aware of the need to link the internal and external environments, the need to obtain information about customer in the terms of creating or improving an existing product, and the need to build partnerships for the purpose of the new business opportunity on the market.

The use of outsourcing and passing the governance of ICT to professionals, so the enterprises were able to concentrate on their core activity, didn´t particularly succeed among the surveyed enterprises. Only half of enterprises use the services of external ICT service providers.

Conclusions

The survey results show that the surveyed enterprises take into account the factors of sectoral approach and the introduction of more advanced IT technologies in the implementation and use of ICT. The most used technologies by B2C and B2C effectively influence business performance as measured by their turnover. The positive influence of ICT on the internal and external environment of Slovak service enterprises was also confirmed. The verified factors of efficient use of ICT were accepted and implemented by enterprises in the survey. Therefore, it can be said that the identified factors bring effective impact on the production of services. Their implementation contributes to the sustainable growth and position of Slovak enterprises in the service market.

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Dana BENEŠOVÁ
ORCID ID: https://orcid.org/0000-0002-9336-7447

Miroslav HUŠEK
ORCID ID: https://orcid.org/0000-0001-5415-402X