THE PREPAREDNESS OF SMALL AND MEDIUM SIZED BUSINESSES IN THE CZECH REPUBLIC FOR THE USAGE OF CLOUD COMPUTING

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ABSTRACT

Small and medium sized businesses in the Czech Republic and elsewhere have been facing ever growing requirements in respect of digitization. Decrees, acts, directives, along with the requirements for an efficient, user-friendly and simple form of communication while keeping maximum labour safety and effectiveness, constitute an element essential for the development of the society. To choose an appropriate solution in connection with the available sources is the key aspect of the development, not only in terms of financial sources but also human resources.

The topic of this article is to analyse cloud computing services and their usage in the Czech Republic as compared to EU countries with the aim to characterise other possibilities of how to expand the usage of these services by small and medium sized businesses. To achieve this aim, we have used the results of surveys targeted at the effectivity of information systems in businesses in the Czech Republic. A sample of approximately 900 businesses was examined. The survey was carried out by using a web questionnaire accessible to the respondents with a verification of the response correctness (to eliminate random responses). Likewise, data available from the Czech Statistical Office was used.

Based on the analyses made, the authors state that there is still room to extend the use of cloud computing. In the conclusion, the article characterises the key aspects supporting the development in this area.

KEYWORDS: *Cloud computing, Communication, Information safety, SME.*

1. INTRODUCTION

Small and medium-sized enterprises (SMEs) are currently forced to face a relatively complicated situation. In 2018, with the current unemployment rate of 2.4% (Czech Statistical Office, 2018b), it is extremely difficult to find quality and available human resources in the Czech labour market. When communicating with state institutions and often also with their suppliers and customers, the companies are expected to ensure effective mutual communication and maximum security at the same time. Electronic communication is one of the possible means to this end; it is often required in communication with state institutions and our customers and suppliers already expect it. The issues SMEs face in execution are related not only to the lack of human resources, but also financial restrictions. The solution of the complicated situation may be facilitated by a suitable use of cloud computing services in SMEs.

This paper aims at analysing cloud computing services and their use in the Czech Republic in comparison to other EU countries in order to determine other possibilities of extending the application of these services by small and medium-sized enterprises. To achieve this goal, we have

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used the results of our own research and other surveys focused on information system efficiency in enterprises in the Czech Republic.

The companies might select from the different forms of cloud computing based on the sensitivity and significance of the processed data in order to improve the utilization of their financial resources.

2. LITERATURE REVIEW

Based on the findings presented in the study (Carcary, Doherty, Conway, & McLaughlin, 2014) it can be assumed that the existing frameworks of cloud application are not exactly suitable for the SME market. Cloud computing may probably prove commercially viable for many SMEs due to its running cost structure and scalability, in particular in today's demanding economic atmosphere (Sultan, 2011). According to (Ross & Blumenstein, 2015), cloud computing also brings related threats to SMEs, including potential issues with adjusting to cloud based business models. Cloud technologies offer a potential business advantage to SMEs; however, they may also become necessary, if the other players adjust to this environment over time as well.

In many SMEs it may be difficult to allocate financial resources to training and further education of the employees. The use of cloud computing offers a number of opportunities and can help enterprises to improve their business and the quality of human resources by electronic education. However, the advantages and risks of cloud computing use to support business and education in SMEs have not been investigated in detail (Hamburg, 2015).

SMEs are not inclined towards using cloud for sharing and cooperation and they prefer their old conventional methods of sharing and cooperation with the parties involved (Gupta, Seetharaman, & Raj, 2013). According to (Yu, Li, Li, Zhao, & Zhao, 2018), the fashion trends in IT could stimulate small and medium-sized enterprises to follow innovations in the field of cloud services. The subsequent effect will depend of the development of trust of small and medium-sized businesses in cloud service building.

The study by (Ross & Blumenstein, 2015) states that SMEs tend to trust the external environment surrounding the cloud services more. The study results imply that SMEs are more probable to transform cloud services if they believe cloud will give them the attributes they need and expect. Moreover, Ross & Blumenstein (2015) state that usefulness and reliability contribute significantly to the cloud service trust for IT artefacts, but functionality contributes to the IT artefact trust insignificantly. The IT fashion may stimulate SMEs to follow cloud service innovations. However, the effect will be based on the trust of SMEs in building cloud services and artefact.

According to (Gupta et al., 2013), easy use and convenience are among the most significant factors of cloud service use. The other include safety, privacy, followed by cost reduction.

3. DATA ANALYSIS

In the paper was used methods of descriptive statistics. The purpose is to compile a data file into a simpler form for easier orientation. However, its significant disadvantage is a big loss of information; but on the other hand, you can get a better overview of the data.

Based on the analyses of data from Eurostat these results are then compared and challenged by the results of authors surveys where approximately 900 small and medium sized businesses were examined. Through the results is then possible to identify threats and also opportunities for development of usage cloud computing by SMEs not only in the local conditions of Czech Republic but also in the international environment.

Since 2002, the Czech Statistical Office has been monitoring ICT development and use in the business sector. The data used for processing are based on the results of a regular annual statistical survey concerning the use of ICT and e-commerce by economic entities in the business sector of the

Czech Republic (ICT 5-01), which is fully comparable to similar surveys performed in other EU countries.

In the performed survey (Czech Statistical Office, 2018), cloud computing is perceived as an umbrella term for paid services allowing sharing and remote access to computing means and data repositories using the internet. The service provider makes the computing means (hardware and software) available to the users based on their needs. Therefore, the service users do not need to own, maintain or update the instruments. They pay for the services based on consumption or agreed volume.

Public cloud refers to a situation when a company uses paid cloud computing on shared servers of service providers and private cloud is paid cloud computing on servers reserved by the providers exclusively for a given company (for one customer) and these are not shared by other clients.

As of 1 January 2017, paid cloud computing services in the Czech Republic are used by 20% of companies with 10–49 employees and 27.5% of companies with 50–249 employees. As for small companies, 15.1% use public cloud and 8.1% use private cloud. The above shows that approximately 3.2% of companies use a hybrid solution. Among companies with 50–249 employees, public cloud is used by 20.8% of companies and private cloud by 11.3% of companies. Thus, a hybrid solution is used by 4.6% of companies. 79% of small and 74% of medium-sized companies that use cloud services use them for e-mail, 58% of small and 60% of medium-sized companies use it for data storage, 47% of small and 50% of medium-sized companies use it for office software, 39% of small and 34% of medium-sized companies use is for running accounting applications, 14% of small and 25% of medium-sized companies use it for computing performance of operating corporate applications. This finding is also confirmed by (Olsaker, 2011), who claims that e-mail and office productivity applications, data repositories and emergency restoration services are the typical tools used within cloud services. The companies that use cloud solutions usually use multiple cloud services. Enterprises use the public cloud services 2x more than the private cloud services. Only 16% of the companies that use cloud computing use a combination of the two solutions. The structure of the use of cloud services is very similar in all EU countries, as far as the use ratio is concerned.

The performed study (Harms & Yamartino, 2010) shows that the aggregate costs related to the ownership of one server are inversely proportional to the number of servers administered in cloud. According to another study (Alford & Morton, 2009), the total cost ratio of ownership and operation of 1000 virtual servers in the cloud compared to standard non-shared infrastructure is 0.5 for private, 0.37 for hybrid and 0.33 for the public cloud. Migrating the services to the private cloud could reduce the total costs of their ownership by on half, even two thirds if they were migrated to the public cloud. The survey results have shown that the companies using a cloud solution use the cost reduction by as much as 50% in SMEs. Practical experience (Marinescu, 2018) with migrating several information systems to a unified infrastructure show a relatively substantial decrease in the peak load when compared to the sum of extremes for each individual system. However, there is still a considerable potential for more extensive use of cloud computing, since it is currently used only in 21% of companies, and even in these companies it could often be utilized better.
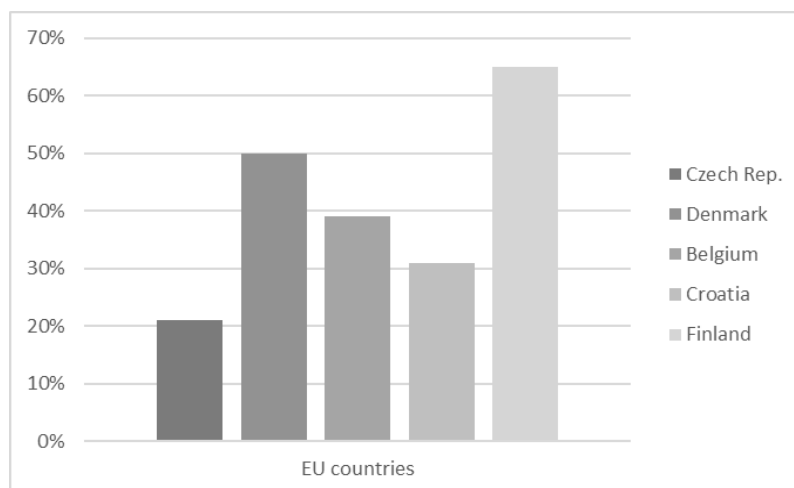
Figure 1. Using cloud computing in SME
Source: adapted from (Czech Statistical Office, 2018)

In comparison to other EU countries, SMEs in the Czech Republic are approximately in the middle among the compared countries. When compared to countries such as Finland with 65%, Denmark with 50%, Belgium with 39% and Croatia with 31% of companies using CC, there is enough space for development in this area in the Czech Republic. As an example, 73% of enterprises send electronic invoices. 72% of invoices are sent e.g. by e-mail and only 18% are invoices suitable for automated processing. Electronic invoices are accepted by 88% of companies, 82% of invoices are received by e-mail and 30% are suitable for automated processing.
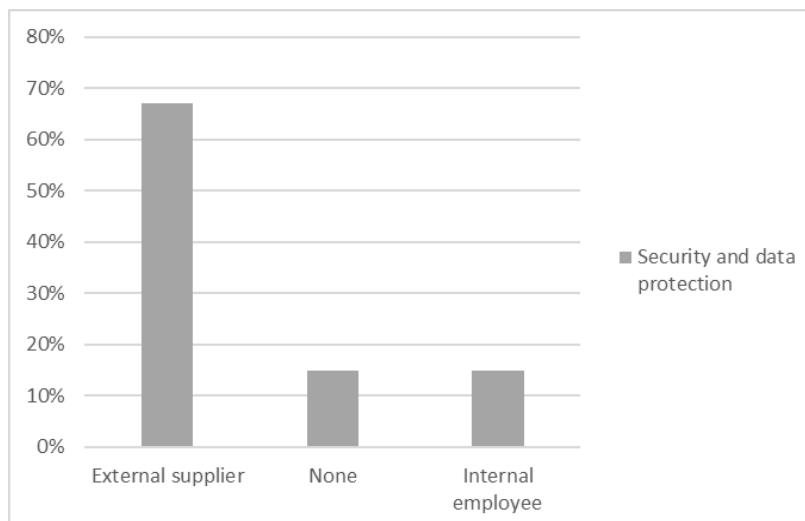

Figure 2. Security and data protection
Source: adapted from (Czech Statistical Office, 2018)

There has been an interesting finding that data security and protection is ensured by external providers in 67% of SMEs, in 15% the issue is not addressed at all and in 15% it is dealt with by an internal employee. Data security and protection by an internal member of staff places SMEs in the Czech Republic at the last position in the whole of the EU. 18% of SMEs employ their own IT specialist and nearly half of them arranged trainings for their IT specialists in 2016. 10% of SMEs hired a new IT specialist in 2016 and 7.6% of the companies are having difficulty finding an IT specialist in the market. One third of the companies that employed IT specialists were having

problems in 2016 to find a specialist in the market. Out of the total number of SME employees, IT specialists comprise as little as nearly 3%, only 1% are programmers.

The research performed by Koch on a set of 4180 respondents from 939 SMEs using an online questionnaire accessible to respondents with response validation (to remove random answers) has shown the following:
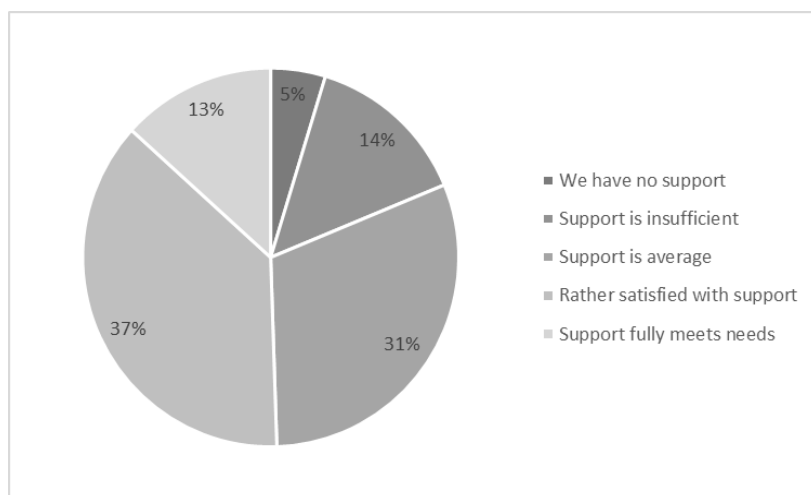

Figure 3. Existence of user support in the business
Source: own research

Only 5% of the respondents claim there is no user support in their company, 14% state the support is insufficient, 31% refer to it as average and 37% are mostly happy with the support. Only 13% of the respondents are very happy with the support and claim it meets their needs fully.

In 50% of the companies, the respondents believe their employer should invest more money in IS, 33% think it is not necessary and 17% were unable to judge. 39% of the respondents believe the resources spent are adequate to the result and 14% do not see this connection.

Two thirds of the respondents have no experience with outsourcing. There is a positive finding that only 8% of the respondents have negative experience with outsourcing and 28% have positive experience. Moreover, a half of the respondents believe that the IS they are using could not be applied as a service; 30% believe that the solution would be possible as a service in their company.
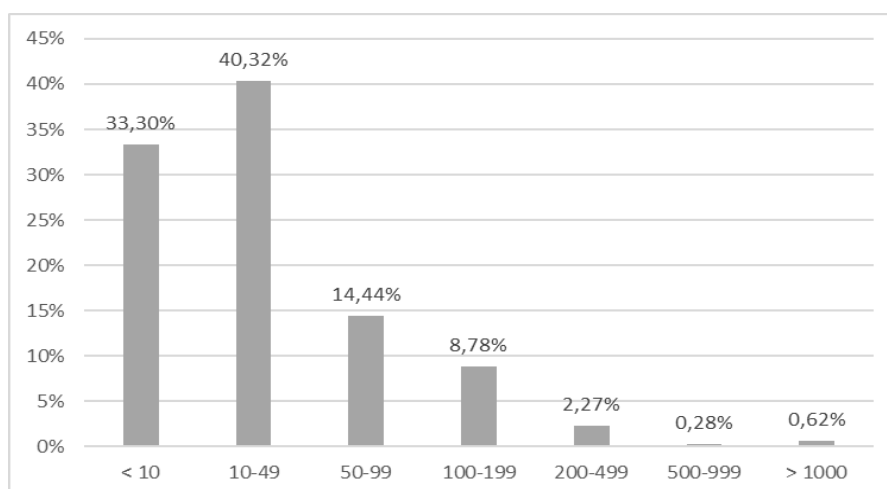

Figure 4. **Number of computers in SME**
Source: own research

There are fewer than 10 computers in one third of the companies, more than 10 and fewer than 200 computers in more than two thirds of the companies. This is related to the need to address the issue of maintenance in these companies.

With 15% of the respondents, the data back-up is performed by an IS support worker, with 36% of the respondents data back-up is fully automated. With 5% of the respondents, the data are backed up by someone else than an IS support worker. 11% of the respondents work as IS support workers in SMEs full time and 21% of the respondents engaged in IS support combine this work with other activities.

Only 2% of the respondents have no access to the internet from their company notebook.

In their respective views, training is not necessary or probably not necessary for one half of the respondents, the other half would definitely or mostly appreciate it.
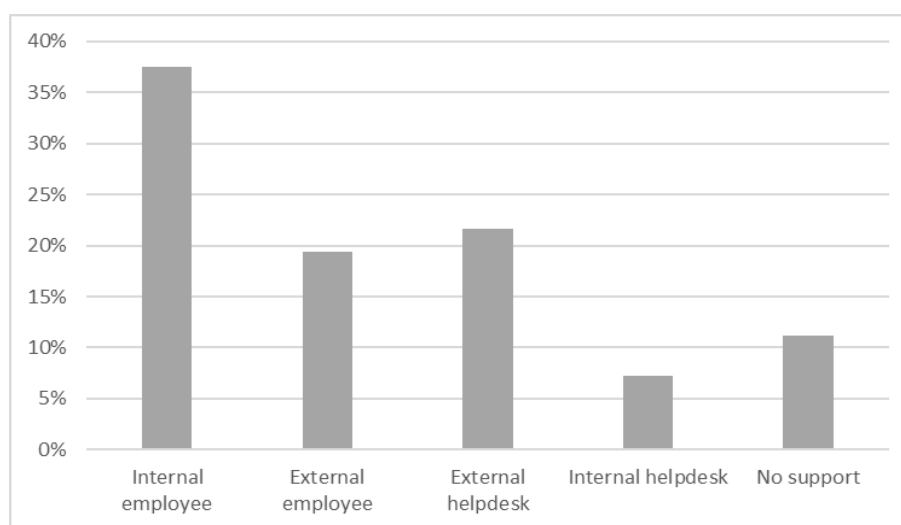

Figure 5. **Providing of user support**
Source: own research

In 38% of the companies support is provided by internal staff members, in 19% by external workers that attend the workplace. In 22% the support is ensured by external helpdesk and in 7% of the companies by internal helpdesk.

In 50% of the companies, the information system for support of both main and auxiliary processes has the form of a complete solution, in 14% it has been created by the company itself and in 11% it was tailor made. The solution is rented only in 5% of the companies.

In 70% of the companies, their annual turnover reaches tens of millions of Czech crowns, hundreds of millions in 15% and less than one million only in 15% of the companies.

IS lease is used in 36% of the companies, little or for a small IS part in 2/3 of them.

There are no safety rules in 33% of the companies, or the respondents are not aware of them. In 47% of the companies the rules are in place, but they are not strongly enforced or monitored. The rules are strictly enforced and monitored only in 19% of the companies.

In 30% of the companies, further staff training is not supported, the same amount of companies supports further training actively or very actively. For 40% of the companies it can be claimed they are inclined towards training support.

4. DISCUSSION

Considering the situation in the labour market of the Czech Republic, the question of availability of suitable human resources, in the SME environment in particular, is increasingly pressing. On the one hand, the companies are forced to reduce the requirements on newly hired employees ever more

often and on the other hand they need to behave highly rationally, continuously train their existing employees and motivate them to remain loyal to the company. The use of available cloud solutions for employee training is one of the ways to systematic employee training while keeping the costs at a reasonable level. For these solutions, the suitable option for the company may be selected also from the set of public clouds, which could reduce the costs even more. In 2016, nearly half of SMEs that employed their own IT specialists addressed the need of their training. We assume the companies will deal with the issue of training even more in 2018, since there is not enough qualified workforce in the market and therefore the existing human resources must be improved. We find the utilization of cloud services to be a suitable way to deal with the lack of qualified workforce.

There is a sufficient potential in SMEs in the Czech Republic as currently the CC services are only used by approximately 20% of their total number. The companies could purchase only the services they need and the provider would take care of their administration and operation. In 2017, nearly 15% of the companies ignored the issue of data security and protection. The introduction of GDPR required the companies to deal with the situation. Assignment of an internal member of staff who had to be trained in the area was one possible solution for SMEs, or the companies could hire a new employee, however, the amount of resources available in the labour market is considerably limited. As early as in 2016, nearly 7.6% of the companies were having trouble finding a suitable IT specialist in the labour market and with the GDPR implementation approaching, the situation became even more difficult. We believe a suitable possible solution is to engage an external provider combined with potential use of cloud services – within the public or private cloud.

The usefulness and reliability of the services provided may be one of the significant concerns of small and medium-sized enterprises in the transition to cloud services. The fact that usefulness and reliability is easier for the users to judge in general may be one of the possible reasons. Evaluation of the individual functions may be more complicated for the users since they may be required to understand the specifics of cloud services in more detail. It can be assumed that in the context of decision-making concerning the implementation of cloud computing in SMEs, correct information, data and trustworthy services are more important than their initial correct function, which can be adjusted later on.

The example of received and issued electronic invoices shows that the emphasis on the preparations for automated data processing is not so strong in SMEs yet. However, it can be expected that the lack of workforce will require greater emphasis to be laid on the automated data processing requirement. The use of a cloud solution may appear to be an interesting alternative in this context. This solution would decrease the demands not only on the purchase of the necessary IT equipment, but the company would not have to deal with any issues related to its operation, maintenance, safety and updates – which may bring more savings to the company. If a company used a cloud solution, it would not have to deal with the currently pressing issue of insufficient human resources. CC implementation in the field of security might also be beneficial, since today there are no safety rules in 80% of the companies, the employees are not aware of them or they are not enforced or monitored.

5. CONCLUSIONS

The companies have to make sure that the expected form of communication (data exchange) is not achieved at the expense of its safety and work with its content. The search for a suitable solution is often made more complicated by the fact that the available resources, both financial and human, are considerably limited in these companies and there is real pressure on cost cutting even from the owners. The lack of quality human resources in companies may also be related to the fact it is more difficult to define the requirements necessary for ensuring the company system outputs under the conditions agreed with suppliers or customers. Efficient use of cloud computing services in these companies together with diversification of the necessary services to various forms of cloud

computing based on their sensitivity and significance may help to reduce costs of implementing the solution in the company.

In the Czech SMEs, there still is a considerable potential for more extensive cloud computing application; more than three quarters of companies do not use any form of cloud yet. The research performed among Czech SMEs has shown there is potential for CC use in a third of them, according to the respondents. Internet connection from company computers required for the use of CC is available in nearly all the questioned SMEs. It seems to us that cloud implementation in SMEs may be an interesting opportunity to increase competitiveness and improve the market position. SMEs currently prefer forms of the public cloud, which are most cost effective when compared to the conventional solution and can save up to a half of the costs. However, some companies are aware of the need for increased protection of sensitive data and important company applications and focus on using private or combined solutions as well. The companies use cloud services for e-mail services, data storage, office and accounting software and operating corporate applications. Corporate applications represent an interesting area for utilizing private solutions. There is space for use of public clouds in SMEs for e-mail services and data repositories. Data repositories are another interesting area with a potential for cloud solution implementation since a half of these are currently being backed up in SMEs in some form. The transition of these services to a paid public cloud may be much more beneficial for the companies than performing the services themselves.

The area of Cloud Computing can improve the quality and efficiency of SMEs with direct impacts on Digital Society in the age of Industry 4.0, which is part of authors research focus.

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