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The benefits of using cloud technology in Bosnia and Herzegovina

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ABSTRACT

The primary goals of the research are to identify the perceptions of top management in domestic companies in BiH, to determine the willingness of domestic companies to migrate to the cloud and systemize the benefits of using Cloud technology in BiH. *The advancement of information and telecommunications technology has enabled large and small companies to access cutting-edge technology, thanks to which they can increase profitability and competitiveness while reducing business costs. The research results indicate companies' top management does not have enough information/data related to the benefits of Cloud technology, and thus partially or insufficiently consider the possibility of business migration to the cloud. Certain companies base their business on Cloud technology, but most companies have hardware resources they use as a basis for creating a platform necessary for the operation of one or more information systems. According to the research results, we can conclude the managers are not familiar with the potential benefits of Cloud technology, which serves as direct evidence for the hypothesis. However, it is expected, SMEs and large companies will completely or partially switch to Cloud technology, in future.*

I. Introduction

The advancement of information and telecommunications technology has created some preconditions for innovations and concepts of business that directly affect the way of transacting business in large companies, but also in small enterprises or the so-called SMEs (Small and Medium-sized Enterprises). Certain comparative advantages of large companies, which also represented entry barriers to the market for many companies, are easily accessible in a few clicks with the help of new information and telecommunications technologies, primarily referring to Cloud technology. Cloud technology is expanding, and there are a growing number of cloud providers in the global market (Google Cloud, 2019; Amazon Cloud, 2019, Microsoft Azure, 2019) and local markets (BH Telecom Cloud, 2019). It is important to emphasize the modern cloud is a platform that offers solutions for extremely complex business, covering a number of different information systems (e.g. ERP — Enterprise resource planning, CRM — Customer relationship management, BI — Business intelligence, DMS — Document Management System and dr.), which may represent an independent or integrated solution.

The primary goals of the research are set as follows:

- Identify the perception of top management in domestic companies
- Determine the willingness of domestic companies to migrate to the cloud
- Systemize the benefits of using Cloud technology in BiH

The hypotheses are postulated as follows:

- Companies' top management does not completely recognize the benefits of Cloud technology, neither they devote enough attention to utilizing the potentials of Cloud technology in BiH.

Innovation is one of the most important strategies of competition, both for small and large firms. It is often argued that SMEs are innovate in specific ways, different from the innovation process in large firms. While there are certain size-specific features, the heterogeneity of the SME sector prevents simple generalizations.

2.Literature review

Possessing and using advanced technology represents a comparative advantage in the market, over competitors who do not utilize it or only partially. Nowadays, Cloud technology is considered as one of the most significant technologies, achieving a high degree of utilization and providing excellent business support, as well as flexible infrastructure (Mohiuddin, Abu Sina & Mahmudul 2012). Cloud technology has many advantages, supporting companies to devote time and energy to business development rather than establishing, maintaining and developing a platform necessary for the operation of multiple information systems (e.g. ERP, CRM, BI, WMS, etc.). It is supremely important to point out companies operating in an extremely demanding market and are expected to carry out daily changes in their businesses. Accordingly, it is necessary to provide an adequate level of flexibility/agility at reasonable costs, taking into account that companies must be effective in peak loads or peaks (Vivek 2015).

Cloud technology enables SMEs to become competitive, since the benefits previously experienced only by large companies (Makena 2013) in the segment of owning and other Centers, are completely overcome in just a few clicks, while avoiding high fixed costs (Makena 2013). It is significant to emphasize that the costs were not the only obstacle for many companies, and a timeframe represented a fundamentally critical dimension i.e. the process that required significant time necessary for the procurement, installation and configuration of equipment, and subsequent maintenance and improvement. These obstacles/challenges are eliminated by the use of Cloud technology, and one of the most significant benefits is that only in a few clicks, it is possible to stop using certain services and information systems, if there is no need for them, therefore eliminating the costs of using hardware or software on Cloud technology (On-demand computing). The same is applied when a company needs to use more resources in both hardware and software in a short period of time (Vivek 2015).

Thanks to the immense role and importance of Cloud technology in business, we can say that it has an enormous impact (Islam, Weippl & Krombholz 2014) on the business of both small and large companies. Most companies have recognized the benefits and possibilities of Cloud technology, and their migration to the cloud is unquestionable. One of the key questions is: What is the best way to use the contemporary trend and technology to enable their business to operate in the modern economy (IDG 2018; Isik, 2013).

Cloud technology is based on the computing grid (Anurag 2014), and can be defined as a pool of computing resources delivered to the user of Cloud technology. Diverse architecture and cloud models will be presented in detail in a separate section. The architecture and a large amount of computing resources that cloud providers offer, allows companies great flexibility without their investment in infrastructure, staff training and licensing (Subashini & Kavitha 2011). Cloud technology and services enable companies to transform or enhance business in a way that companies, with the same business processes, operate more efficiently, reliably and flexibly (Deloitte 2018), while simultaneously transferring more obligations and responsibilities to the cloud providers (Gorelik 2013).

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Cloud technology and services can be deployed across the company in several ways (Deloitte 2018). One of the biggest changes in the way information systems are distributed in the B2B (business-to-business) segment (Dempsey & Kelliher, 2018). The services offered by the cloud providers have become more reliable and accessible to end-users, with a flexible price (Aljabre, 2012).

The IT sector is an extremely dynamic environment and only the companies with an agile approach and a flexible IT solution can adapt to the changing and demanding business environment (Vivek 2015). In addition, some of the main responsibilities formerly performed by company staff are now migrating to the cloud service provider, primarily referring to the maintaining responsibility of both hardware and software (if for example SaaS - Software as a service) (Haslinda & Mohd, 2017).

Companies who switched to the cloud can focus more on their businesses (Kiryakova & Yordanova 2017), leaving infrastructure and/or services to the company whose primary business is cloud platform maintenance. The most significant Cloud technology characteristics could be summarized as follows (Kiryakova & Yordanova, 2017):

- On-demand self-service
- Permanent network access
- Pooling and sharing of resources
- Elasticity (scalability)
- Pay-per-use
- Reducing the cost of creating and maintaining IT infrastructure
- Effective use of resources
- Payment for actually used services

Most of the stated characteristics will be presented in the next sections. However, it is important to note that each technology has certain disadvantages and limitations; therefore, Cloud technology is not an exception as well. It is equally important to note that most of the shortcomings or risks are reduced or eliminated with the advancement of technology. For example, some of the limitations of Cloud technology include the followings (Lakshmi, 2014):

- Failure of communication will cut off a cloud service
- Sending data on a publicly accessible communication system
- Deterioration of the quality of service of a cloud provider or a provider ceasing

operations due to bankruptcy.

- Complex legal problems may arise if providers' servers are in a foreign country
- Surveillance of data traffic on the Internet

There are also other limitations/risks which need to be considered or analyzed in a more detailed way. Additionally, each company has distinct characteristics in terms of procedures and business process segment, as well as the information systems it uses. Therefore, it is necessary to analyze/improve internal business processes and information systems before migrating to the cloud. The key motives for the companies to improve business processes, according to one conducted survey are: to save money, reduce costs and/or improve productivity (Tatić, Haračić & Haračić 2018), therefore, the companies consider the same or similar motives for migrating to the cloud.

2.1. Cloud Deployment Models

Cloud Deployment Models include three types: Public, Private and Hybrid cloud. The choice of a model depends on the requirements, needs and company characteristics, as well as the company's existing infrastructure. Companies that have invested significant resources in their infrastructure will rarely migrate fully to the cloud and will primarily choose Hybrid Cloud. Companies that are subject to legal regulations implying the inability to provide services on shared servers, typically migrate to private cloud. Most companies use public cloud primarily because of the low cost and features that in most cases can meet the needs of a large number of companies. Cloud Deployment models will be presented below in more details (Lakshmi 2014; Singh & Stefana 2015; Kiryakova & Yordanova 2017; Si Xue, Wee & Xin 2016):

- *Public Cloud* – this model implies cloud infrastructure shared across multiple users. Public Cloud is an extremely popular model provided by cloud providers (global or local). The payment is usually arranged as "pay per use model" which means paying for the resources utilized in a unit of time (usually 1 hour). Service quality is in most cases defined by the Service Level Agreement (SLA). In most cases, cloud service providers have clearly defined policies, procedures, billing models, and others.
- *Private Cloud* **–** It is managed within an organization and is suitable for large enterprises. Private cloud is cloud infrastructure managed for a single organization.
- *Hybrid Cloud* **–** this model implies a combination of public and private cloud and is frequently used by companies that already possess their data centers or who, due to the specifics of their jobs and procedures, cannot fully migrate to the cloud.
- *Community Cloud* **–** presented models (Public, Private, Hybrid) constitute a community cloud created primarily for a particular industry needs.

2.2. Cloud services: SaaS, PaaS, IaaS

Cloud providers in most cases offer the following main services: (Harshala 2014, p. 2-3.): Software as a Service (SaaS), Platform as a Service (PaaS), Infrastructure as a Service (IaaS). However, it is significant to note that they offer other services such as: (Mohiuddin, Abu Sina, Mahmudul 2012, p. 204.): Storage-as-a-service, Database-as-a-service, Information-as-a-service, Process-as-a-service, Application-as-a-service, Platform-as-a-service, Integration-as-a-service, Security-as-a-service, Management/Governance-as-a-service, Testing-as-a-service.

In this paper, we will focus primarily on SaaS, PaaS, IaaS, because these are the most commonly used services and can be used for other services listed above. (Harshala, 2014; Mohiuddin, Abu Sina & Mustaq, 2012, Harjit, Si Xue & Wee Xin, 2016; Buyya & Sukhpal, 2018; Lakshmi 2014; Mitropoulou, Michalakelis, Filiopoulou & Nikolaidou, 2015, Kiryakova & Yordanova, 2017):

- SaaS – these services are the first services offered through Cloud technology and are used by a large number of users. SaaS refers to the provision of services at the customer's request. SaaS benefits include cost savings in purchasing hardware, licenses and providing a flexible IT solution.
- PaaS – is a cloud-based application development environment, used for developing high-level services. Developers and IT administrators have the ability to customize conditions to application parameters and requirements. PaaS is a platform that enables you to build and deliver applications and services that run primarily through web environments and mobile applications.
- IaaS – is a virtualization concept where cloud providers provide users with basic storage and compute capabilities as standardized services over the network. IaaS provides various hardware configuration options based on Cloud technology. The advantages of IaaS primarily relate to the ability to use an extremely complex hardware environment without investing in hardware procurement, which not only applies to servers but also to the network, storage, processing unit, etc.

SaaS is nevertheless the most popular model used by companies of different sizes; however, other models are becoming more and more popular (IDG, 2018). The SaaS model is utilized primarily by end-users, while the PaaS model is used primarily by companies who develop software and various applications, and the IaaS model is used by IT specialists in maintaining hardware resources (Kiryakova & Yordanova, 2017).

The application of Cloud technology enables a platform to offer various services both in the short-term (e.g. test environment, periodic reporting, etc.) and in the long-term (use of Cloud technology for daily business e.g. e-mail services, ERP systems, etc.). This service is provided with exceptional flexibility, adaptability to the requirements and the needs of the company, especially in the unpredictable requirements when companies experience a temporary need for increasing hardware and software resources. For this reason, it is critical to define the following features of Cloud technology (Gorelik, 201; Microsoft, 2019):

- *Vertical scaling (scale-up)* – suppose a company has invested heavily in computing resources and doesn't care about capacity availability until the company's requirements are approaching/reaching limits. When the capacity of the purchased hardware is reached, the company must invest in expanding the capacity or completely replacing the existing hardware. This is a major problem for the companies in need of periodic and significant increases in hardware capacity. This problem in the cloud environment is eliminated with a few clicks, where the company can obtain the extension of computing resources to any desired level, for the period of time it wants. Extension in the context of the vertical scaling involves extending the computing resources of existing servers.
- *Horizontal scaling (scale-out)* **–** enables companies to expand computing resources by adding new servers/clusters. This form of scaling is popular because it allows quick allocation of resources without significant financial investments.
- *Automated elasticity* – implies constant monitoring of the used capacities and scales them according to the needs as defined by the cloud service users. Scaling in this concept not only involves scaling to higher, but also scaling to lower levels, in case capacities are not used.

2.3 Advantages and benefits of using cloud

The impact of Cloud technology on business is enormous in terms of enabling small (SMEs) and large companies to easily utilize innovative technology in their business model without experiencing a need for experts in various areas, which would have been necessary if the company had its own infrastructure. The benefits of Cloud technology not only apply to technological aspects, but also to financial aspects, both in the long-term investment segment and in the cost segment, where most of cloud's payment models are based on the pay-as-you-go principle (Mitropoulou et al., 2015). Business migration to the cloud represents a fundamental change, primarily in the segment of how the data are managed (Vivek, 2015). SMEs have an urgent need for an advanced reporting system such as BI system, and its successful implementation would lead not only to the improvement of the decision-making system, but also to a tremendous increase in efficiency, productivity and effectiveness of SME operations (Tatic, Dzafic, Haracic & Haracic 2018). Cloud technology enables the creation of a large number of information systems, such as ERP (Enterprise resource planning), WMS (Warehouse management system), CRM (Customer relationship management), BI (Business intelligence), ML (Machine learning), AI (Artificial Intelligence), etc. In addition to this, there are numerous other benefits related to reducing deployment time, IT costs, then the complete elimination of maintenance costs, etc. (Haslinda & Mohd 2017). One of the most significant advantages is the flexibility and agility introduced into the business of both large and small companies (Aljabre, 2012). Moreover, companies can take advantage of the latest technology without the high investment required to acquire and deploy their data centers, which have been in the past entry barriers for most companies (Patnaik, Yang, Tavana & Popentiu-Vlădicescu, 2019; Haslinda & Mohd, 2017; Deloitte, 2018). The key benefits of using Cloud technology are related to (Gorelik, 2013; Mitropoulou et al., 2015; Lakshmi, 2014; Harjit, Si Xue & Wee Xin 2016; Stefan, 2015, Kiryakova & Yordanova, 2017):

- Cost Reduction – the application of Cloud technology provides greater control over costs through monitoring the resources used, but at the same time affecting CAPEX (Capital expenditures) and OPEX (operating expenses).
- Pay-As-You-Grow – Cloud technology enables the increase of capacity and resources according to the requirements of the company, which means, large infrastructure investments are not needed for resources that are not currently critical for the company but which may be needed in the future.
- Elasticity - the ability to scale computing capacity depending on the needs (more or less resource) of companies. Thanks to this, the company pays resources that are useful depending on the needs and requirements (e.g. seasonal fluctuations in production requirements).
- Flexibility – using Cloud technology, companies increase business flexibility by not having bottlenecks (e.g. in peaks). On the other hand, they have the ability to test and develop new services without significant investment.
- Agility – Business in the modern economy requires companies to constantly optimize business processes and costs. Put differently, companies must achieve a high degree of efficiency and effectiveness with a high level of flexibility to remain competitive and be able to adjust to internal and external changes.
- In-house Infrastructure Liability and Costs – possessing own infrastructure generates more costs and represents a significant liability for the company. With the transition to Cloud technology, many obligations/risks are shifted to the cloud service provider, where rights and obligations are defined in the service-level agreements (SLA).
- On-demand self-service – this technology provides service infrastructure on demand, with the possibility to exploit resources scalably where companies do not have to worry about space constraints, processor power, etc.
- Broad network access – access to Cloud technology is possible from anywhere at any time, provided the user has adequate access to the Internet. With the advancement of telecommunication technology, this no longer poses problems in both the fixed telecommunications network segment and the mobile telecommunications network segment.
- Resource pooling – Cloud technology providers possess unlimited capacities of computing resources, most often spread across multiple data centers in various locations, providing greater reliability and economies of scale, thus being able to provide services at significantly lower prices.
- *Measured service* – the resources exploited on Cloud technology can be measured very easily (e.g. storage, processing, bandwidth, and active user accounts) and thus Cloud technology user can optimize their costs, as well as the resources required for the services it uses.
- *Automatic Software/Hardware Upgrades* – having their infrastructure remains a problem for companies that need upgrades at both the hardware and software levels. Applying Cloud technology eliminates the bottlenecks that result from an increase in company requirements, or companies can shift their capital expenses to operating expenses.

The most significant advantages of Cloud technology relate to the following:

- High degree of reliability and scalability,
- Almost unlimited storage,
- Backup and recovery (which can be located in different data centers in different locations / continents),
- Automatic software integration (certain cloud provider services are also the companies offering various software integrated in Cloud technology),
- Quick deployment (getting resources and services in a few minutes),
- Business continuity (being able to provide anywhere at any time).

It is important to emphasize each technology has its advantages and disadvantages, and Cloud technology is no exception (Lakshmi 2014, p. 1-6):

- Access to the cloud depends solely on the Internet access service, which increases the company's dependence on the Internet (because of what is mentioned above, companies may include other links - backup links).
- Cloud provider should represent a stable company with experience and adequate staff, as well as data center to ensure security and avoid failure or lose data, due to some undesired event (e.g. natural disasters, accidents and abuses).
- Releasing data over the Internet poses a risk of theft by tapping the communication line, stealing or corrupting data, or stealing it from disk storage (companies use VPN or MPLS services, or use various types of encryption to secure themselves from data theft).
- Sending and storing data to the cloud can have different legal restrictions, especially if the Cloud provider has data centers outside the country where the data hosting company operates.

Those were merely some of Cloud technology disadvantages, which can be eliminated or reduced if the company undertakes appropriate actions. Therefore, it is crucial for the company to constantly assess them and take actions to reduce or prevent them. It is significant to point out large companies and multinationals already utilizing Cloud technology, and it represents an inevitable future, primarily because of numerous benefits of Cloud technology, many of which are presented in this paper.

One of the main obstacles to more significant deployment of Cloud technology in Bosnian companies is the lack of government support. The government does still not have the strategy for SME development. There is no policy and there are no specific goals for SME development in BiH (Dzafic, 2014). There is also a lack of specific legislation, measures, instruments, and harmonized organizations to support SME development. The lack of coordination between state and entity institutions, and a centralized tax system (used to cover high public costs) are major obstacles to the creation of a framework policy for SMEs. A limited government budget for export promotion programs limits the implementation and efficiency of export promotional activities (Džafic & Omerbasic, 2018).

3.Research method

The research was conducted between February and September 2019, based on online survey including nine research questions (all questions mandatory), primarily relating to top management attitudes and perception regarding cloud technology. The questionnaire was created through Microsoft Forms and distributed via email, Skype, Viber, LinkedIn, and was shared with 387 participants, while only 84 questionnaires were filled in full. The research results were processed in Microsoft Excel and will be presented in graphical form in the paper. The research questions were created on the basis of the following research:

- Haslinda H., Mohd H.M.N., Norhaiza K., Iskandar A. (2017). Factors influencing cloud computing adoption in small and medium enterprises. Journal of ICT, 16, No. 1 (June) 2017, pp: 21–41

- Deloitte (2017). Channeling the Cloud: A Candid Survey of Federal Leaders on the State of Cloud Transformation in 2017.

4.Results and discussion

On the basis of the research results, it can be concluded that a significant number of the respondents belong to the companies with more than 500 employees (38%), or companies with up to 50 employees (30%). A significant number of the respondents work in telecommunication companies (telecom operators or alternative operators primarily operating in the FBiH- 28%), companies from the service (21%) and manufacturing branches (17%).

Graph 1: Industry branch to which your company belongs:

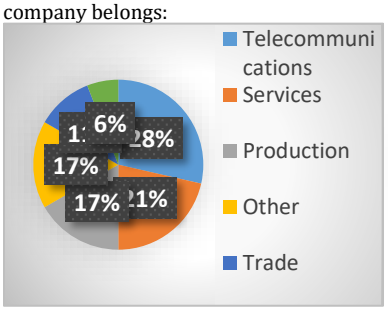
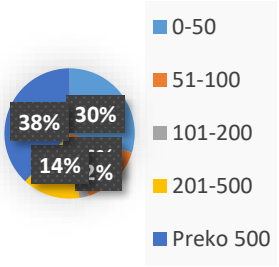


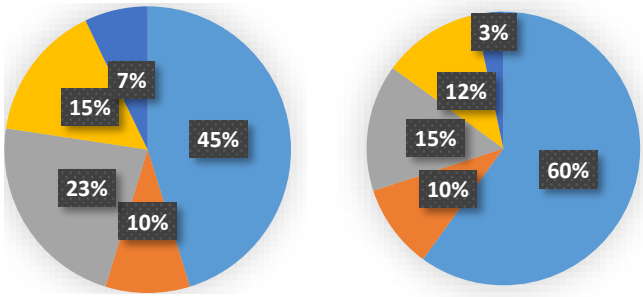
Chart 2: Number of employees in the company:



***Source**: Authors' analysis.*

The results of the survey indicate that very few respondents have fully switched to the cloud – only 3% of them, as stated in Graph 3 (graph on the right). Additionally, 45% of the respondents answered that they did not use cloud services at all. However, if we analyze the research results without including respondents from the telecommunications sector, then we get the information that 2/3 of the respondents do not use cloud services. A significant number of the respondents use cloud as "storage", which is free of charge when using certain e-mail services, such as e-mail services from Microsoft and Google. There is, furthermore, an increased number of users of Office 365, who receive a significant amount of storage on OneDrive as part of the package. Basically, the research results presented in Graph 3 indicate that the vast majority of respondents do not base their business on the cloud, but at the same time there are services migrated to the cloud, primarily referring to the e-mail

Grafikon 3: How would you describe the process of migrating your business to the Cloud?

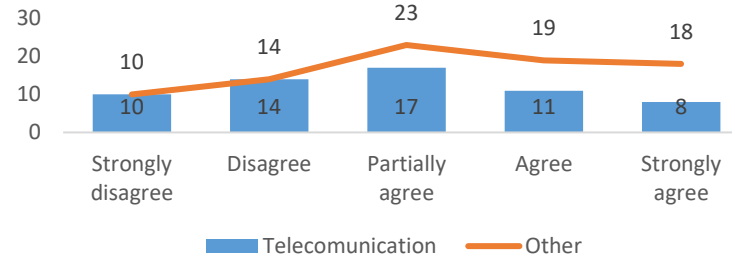


***Source**: Authors' analysis*

Note: The research results presented on the right side do not include the respondents from the telecommunications sector (60 respondents included in the analysis).

A significant number of companies in BiH possess their infrastructure used for primary information systems such as ERP and others. Based on the research results presented in Graph 4, which relates to the question of whether top management plans to invest in cloud computing, the majority of respondents expressed a neutral position. The research results point to the conclusion that company managers do not have enough information and data related to the benefits of Cloud technology, or there are certain barriers that prevent migration to Cloud technology. If we exclude the respondents from the telecommunications sector, then it is possible to conclude that top managers do not plan to invest in the cloud, at all. We believe most of these barriers/reasons are not based on relevant information and real indicators, nor on the experience of companies in the world, who have migrated to the cloud. The switch to Cloud technology would give companies in BiH many benefits presented in the work, which would make the companies more efficient and effective, more competitive, which would certainly affect their business results in the short and long term.

Graph 4: Top management is likely to invest in cloud computing

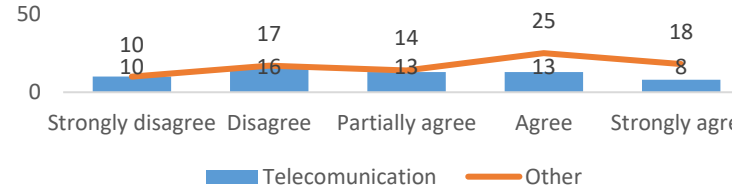


***Source**: Authors' analysis*

Note: The data presented in blue color refers to the results without respondents from the telecommunications sector (60 respondents included in the analysis).

Inadequate information and education of top management influences the perception of Cloud technology. Unfortunately, a significant number of respondents do not think switching to cloud would allow the company to gain a competitive advantage. If we analyze the results of the research, excluding the data of respondents from telecommunications companies, then the percentage of disagreements is increased, i.e. respondents believe Cloud technology cannot influence the increase of competitive advantage. Based on the experience and information available to the authors, it can be concluded that top executives are often not even aware of all the benefits of switching to Cloud technology. They do not have enough information and knowledge to cloud technology. Also, a significant number of BiH companies possess their infrastructure, which is often not implemented according to the regulations and standards that require owning an adequate server room with adequate standards. In this way, the companies are exposed to significant risks related to the possibility of data loss and significant downtime in the event of a malfunction or major problem (e.g, it takes a long time for recovering it to be operational).

Graph 5: Top management is interested in using cloud computing to achieve competitive advantage



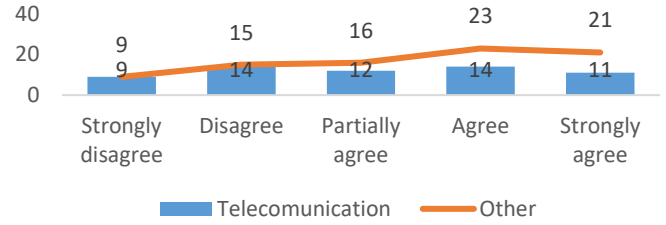
***Source**: Authors' analysis*

Note: The data presented in blue color refers to the results without respondents from the telecommunications sector (60 respondents included in the analysis).

Based on the research results presented in Graph 6, it can be concluded that a significant number of respondents support the implementation of cloud. With an adequate training and analysis of the companies' business by consultants or cloud service providers, the respondents would be willing to consider the option to switch to cloud (probably Public or Hybrid Cloud). However, the results of the research are somewhat different if we analyze only the data with telecommunications sector excluded. We can conclude that respondents from the

telecommunications sector are more familiar with cloud technologies and its benefits benefits, and they expressed a more positive attitude about cloud than respondents from other branches.

Graph 6: Top management supports the implementation of cloud computing

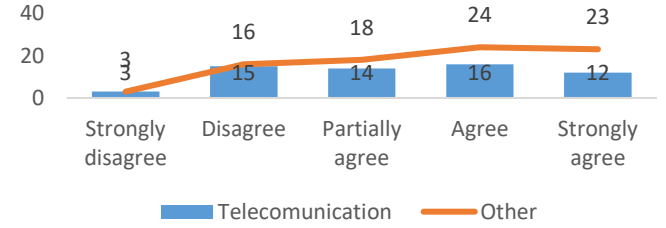


***Source**: Authors' analysis*

Note: The data presented in blue color refers to the results without respondents from the telecommunications sector (60 respondents included in the analysis).

An inadequate level of awareness causes a significant number of top executives to disregard Cloud technology as an opportunity to improve the company's operations. In spite of what is mentioned above, based on the results of the research presented in Graph 7, a significant number of respondents (respondents who answered with 4 and 5) in some way involve it in the processes related to information systems.

Graph 7: Top management provides strong leadership and involvement in the processes related to information systems

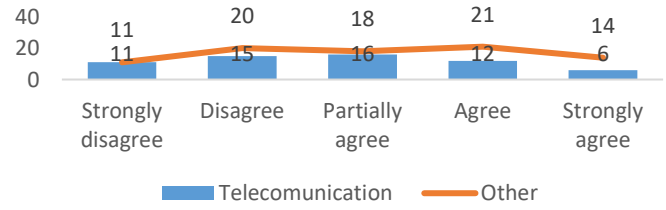


***Source**: Authors' analysis*

Note: The data presented in blue color refers to the results without respondents from the telecommunications sector (60 respondents included in the analysis).

According to the research results presented in Graph 8, the respondents do not share unique attitude in the risk taking segment of the cloud. We believe the research results are primarily a reflection of the respondents' lack of knowledge about the cloud, its benefits and risks. If we analyze the results that exclude respondents from the telecommunications sector, then it can be concluded that top management is not ready to take the risks of using the cloud. The research did not cover the segment of risk knowledge analysis related to migration to the cloud. Moreover, the research did not include the analysis and understanding of the risks assumed if the company does not migrate to the cloud. Increasing awareness and education level about the cloud, we believe the results of the research would be different. Most companies with their servers are, at the same, exposed to higher degree of risk (e.g. loss of data, inadequate degree of flexibility, etc.) than the risks they would be exposed with partial or complete migration to the cloud.

Graph 8: Top management is ready to take the risks related to the cloud computing utilization

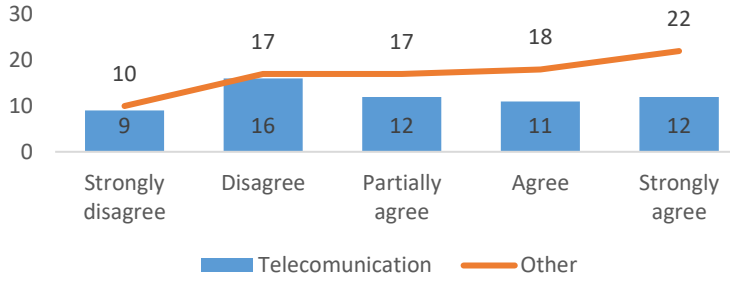


***Source**: Authors' analysis*

Note: The data presented in blue color refers to the results without respondents from the telecommunications sector (60 respondents included in the analysis).

The research results presented in Graph 9 indicate that the respondents do not have attitude regarding the cloud's advantages and strengths, meaning that they do not possess the necessary knowledge in this segment, which was presented in the previous section. Analyzing the current trends in technology implementation in BiH, it is evident that in the near future an increasing number of companies will migrate to the cloud. Especially, in the cases where significant investments are required in the procurement of equipment. Simultaneously, it is possible to see an increase in the cost of employing adequate IT professionals who have the knowledge and experience necessary to implement adequate solutions that involve meeting the short and long-term needs of companies, that in most cases implement a larger number of information systems with a tendency for continuous improvement.

Graph 9: Top management understands the benefits of the cloud computing

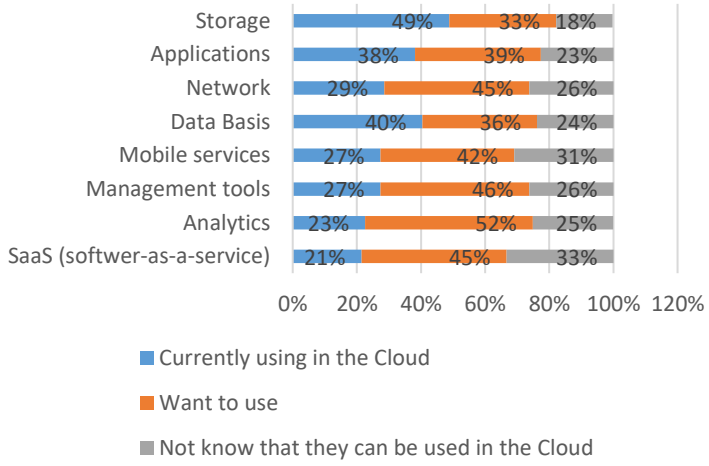


***Source**: Authors' analysis*

Note: The data presented in blue color refers to the results without respondents from the telecommunications sector (60 respondents included in the analysis).

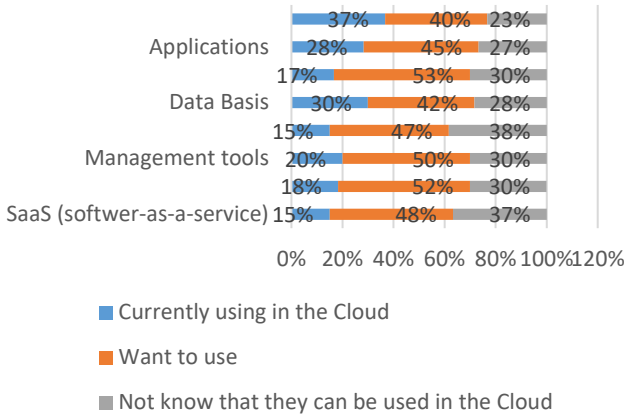
The following graphs will present the research findings pertaining to the perception of the use of Cloud technology for 8 different potential services. The research results reveal that a high percentage of respondents does not use Cloud technology for different services, as shown in the first of the two graphs, with included respondents from the telecommunications sector, and in the second graph, with excluded respondents from the telecommunications sector.

Graph 10: Perception of using Cloud technology



***Source**: Authors' analysis*

Unfortunately, the research results presented in the previous two graphs suggest a significant number of respondents use the cloud primarily as storage or database technology, and there is a great potential and scope for using the cloud. Furthermore, the research results suggest respondents would like to use more cloud services, especially the network, management and analytics tools segment. Unfortunately, based on the research results, we can conclude that there is a high percentage of respondents who do not know that certain services can be used on the cloud.



***Source**: Authors' analysis, research results without respondents from the telecommunications sector (60 respondents included in the analysis)*

According to the presented research results, it is evident that there is significant potential for cloud service providers in BiH. However, an adequate training is required for both decision-makers and other employees, or IT administrators, who would present the advantages and disadvantages of Cloud technology, but also eliminate certain unjustified obstacles and barriers that simultaneously represent the potential for the transition to Cloud technology.

5. Discussion

Based on the presented benefits of Cloud technology, its future use is undeniable not only among companies, but also in other segments such as government and non-governmental institutions. Before a company decides to migrate to the cloud, it is necessary to analyze the actual requirements of the company in terms of business processes, and to improve them to optimize and achieve synergistic effects between business processes, employees and information systems (see more detailed results of a research paper entitled "The improvement of business efficiency through business process management" by Tatić, Haračić, Haračić 2018, p. 32, 37). A detailed analysis and mapping of business processes is necessary to improve and optimize information systems that need to be partially or fully migrated to the cloud. It is important to emphasize the fact that the migration of information systems to the cloud does not imply migration of the "physical" server of the company in terms of specifications, but implies optimizing resource utilization by using resources on the cloud only when it's needed. Thanks to numerous benefits of the cloud, companies can have a flexible and agile approach. Adequate specifying of the genuine needs and their monitoring enables multiple beneficial effects of partially or fully migration to the cloud.

The research results suggest that most companies do not base their business on the cloud, but at the same time, there are indications that certain companies will migrate to the cloud in the future. It is equally necessary to increase the level of information and education of top management regarding the advantages and disadvantages of Cloud technology. We believe this may represent an opportunity for domestic cloud operators who can increase their share of the domestic market, primarily through a greater degree of commitment to individual customers, which is one of the competitive advantages over global cloud providers.

We also believe domestic companies should devote more attention to Cloud technology and plan their business and future investments in the development and improvement of existing and future information systems, especially the cloud, as one of the potential and strategic development guidelines. It is supremely significant to point out the advancement and development of information and telecommunications technology, as well as data collecting, storing and processing remain critical aspect of business decision-making (see more detailed results of the study entitled "The use of business intelligence (BI) in Small and Medium-sized Enterprises" (SMEs) in BiH by Tatić, Džafić, Haračić, Haračić 2018, p. 23-36). We believe that this will be increasingly important in the future, and the loud technology can be a primary platform for collecting, storing and processing data using various tools and systems such as BI (Business Intelligence), ML (Machine Learning) and AI (Artificial Intelligence).

6. Conclusion

Cloud technology has an enormous impact on businesses and the way information systems are used in both small (SME) and large companies. The application of Cloud technology in domestic companies is a relatively new trend that will record a positive degree of utilization in the upcoming years. The companies and decision-makers, primarily top management, do not yet have enough information and data related to the advantages and disadvantages of Cloud technology. This is one of the significant obstacles/barriers to making a strategic migration decision on cloud. It is a matter of time before managers recognize Cloud technology as an opportunity to improve their business and increase their competitive advantage in the market, which will certainly help them become more flexible and agile. Cloud technology is not just a hardware infrastructure, but a platform (hardware and software) that adapts to the users' needs and requirements.

Unfortunately, there is not much research conducted on this specific topic. According to the research results, we can conclude that the managers are not familiar with the potential benefits of Cloud technology, which serves as direct evidence for the hypothesis. However, it is expected that small and large companies will completely or partially switch to Cloud technology in future.

Recommendations for further research refer to the analysis of the key reasons why companies should migrate to the cloud, along with an analysis of the major obstacles and barriers that companies face, as well as the use of modern business decision-making tools such as: BI (Business Intelligence), ML (Machine Learning) and AI (Artificial Intelligence).

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