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Cloud computing – SME company point of view

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Annotation:

Cloud computing is a modern concept which helps to optimize the IT performance of SMEs sector without huge cost of infrastructure. It is an on-demand computing service which provides pay-per-use possibility to SMEs. This research study is explaining various advantages of cloud computing, which motivate SMEs to adopt these services. SMEs do not have a large amount of financial and human resources, so they are not able to implement and upgrade advanced technologies to increase their business performance. The main purpose of this research study is to explain how SMEs can benefit from using cloud computing for their businesses and to make suggestions about potential disadvantages. A detailed literature review is gathered to discuss basic concepts of cloud computing and its implementation in SMEs. Furthermore, advantages of cloud computing are also discussed in connection with existing theory. A qualitative approach is selected to direct this study by focusing on interpretivism research philosophy. A convenient sampling method is used to choose six SMEs operating in Oulu and other cities in order to gather data. An unstructured questionnaire is used to conduct interviews from IT personnel working in these SMEs. Findings of the research study suggest that the most important factors which lead SMEs towards adoption of cloud computing include cost effectiveness, flexibility and scalability in resource utilization, lower technology risk, data security and effective IT support. Some other factors related to service providers have also been identified in this study; for instance, trust in service providers is considered an important factor while making decisions about cloud adoption. Trial-ability of cloud services makes it more convenient for SMEs to implement the best suitable services as per their business environment.

Keywords:

Cloud Computing. SME.

1   Introduction

This article is based on the thesis research carried out by Imran Khan and supervised by Ilkka Mikkonen in 2015 at the Oulu University of Applied Sciences, Finland (Khan 2015).

In the modern world, the competition in the business sector is quite high because of the development of the technological sector and evolvement of business markets. Thus, all the existing skills and products are becoming obsolete in this technological world (Pauly 2011, 461-503). Limited availability of resources to small and medium enterprises (SMEs) makes them unable to compete in the market. SMEs have less competitive advantages because they cannot access modern technologies to perform IT operations. On the other hand, SMEs are very important for economic development of a country as they increase the employment rate and decrease the need of imported products. They can produce many products at a lower cost and provide a large amount of employment to local people (Marston et al. 2011, 176-189). However, they can produce more efficient output by implementing a new strategic direction. A new strategic direction can be decided by focusing on new technology, which can provide them with a competitive advantage in the international market as well.

It is important for SMEs to respond quickly because the business market cannot wait for six to eight weeks to get their supplies (Dillon et al. 2010, 27-33). Therefore, SMEs should adopt a new strategy involving a technological solution which may increase innovation, reduce cost and enhance implementation speed. Massive computing power and business insight can be used to generate a competitive advantage in this era of globalization of information technology (Liu & Orban 2010, 83-91). There are many barriers for SMEs in the global market which can be removed with an advanced IT infrastructure. It also offers a degree of flexibility to SMEs and allows them to become more competitive and efficient. Cloud computing is a way to address all these inefficiencies by making a contribution in the growth of an organization, specifically SMEs. In information technology services, cloud computing is a paradigm shift which has potential to provide flexibility, efficiency and agility to meet exceptionally growing demand (Iyer & Henderson 2010, 117-131).

In the last few years, development in cloud computing has been noticed worldwide, and it provides various facilities to organizations. Storing of information, resource sharing, auto-scalability, complete availability are its major services. It has also developed a concept of services renting where pay-as-you-go is implacable (Callewaert et al. 2009, 7-18). A new pathway is offered by cloud computing to the business sector to increase its competitiveness and agility, which allows it to embrace ready-to-use cloud support resources like IT structure, various business applications and service software. Organizations can access IT services on demand and get support whenever required. This process is way faster than managing an IT resource in house, which needs more time for obtaining, installing, and configuring of infrastructure (Dillon et al. 2010, 27-33). Therefore, cloud computing has become a game changer for SMEs as it provides scalable competences and infrastructure as services. It provides a way to computing like household utilities as you can use it on demand and pay an affordable amount for this utilization (Conway et al. 2014).

Cloud computing services include hardware, software and platforms which are provided by cloud providers to organizations. It enables them to shift away from computing a product to computing a service, which is offered by large scale clouds or data centers by using the internet. The main difference is that the computing product is owned by a cloud user while a computing service is delivered to a cloud user and can be utilized anytime and anywhere (Catteddu & Hogben 2009). Therefore, quick service delivery enables SMEs to empower a change in IT infrastructure and reengineer their business operations. A fundamental

revolution can be made by an organization to advance it business application and enhance customer interaction. Finland is one of the cloud computing users with the highest enterprises proportion in EU. As indicated by Eurostat, more than half (51 %) of Finnish enterprises are using cloud computing services (Bourne 2015).

In spite of the fact that cloud computing is considered as an incipient idea, it is not an entirely new concept. The term cloud computing could be new in the business sector though Parkhill (1966) has characterized it as a novel term for an old-aged aspiration of computing as a utility. Firstly, in 1969, the cloud computing concept was introduced by Licklide; however, it evolved over time and became more advanced in IT field after 2000 (Durkee 2010, 20). The foundations of cloud computing are new as it can be observed from its dependence on the web and its association with grid computing and virtualization. Its present universality is a consequence of the Internet explosion, expanded data transmission, cell phones, and portability requirements for clients (Weinhardt et al. 2009, 391-399).

Cloud computing may have potential to exceed expectation of IT and meet all challenges (Harms & Yamartino 2010, 13). However, there is one issue that involving a third party in data handling may increase risk. The truth about cloud computing lies among these two extremes and can be determined by different factors (Yang & Tate 2009, 2-4). So, a detailed discussion about cloud computing pros and cons makes us unable to settle on one choice. SMEs have an apparent inclination toward cloud computing as a result of advantages that could ensue to them. Cloud computing is beneficial for all types of business organizations; however, small businesses like SMEs have different IT needs and usage as compared to big organizations (Gupta et al. 2013, 861-874). Therefore, this research report is more inclined towards discussing the needs of SMEs, which make it essential for them to adopt cloud computing.

2   Research Problem

The business market is growing rapidly, which has also increased competition among many organizations. Therefore, every organization needs to have upgraded abilities and innovation for delivering advanced products and services suitable for market requirements (Pauly 2011, 461-503). SMEs have a less competitive advantage to deliver improved products and services because of limited recourses and limited access to modern IT services. Cloud computing provides a solution to all these issues by offering a wide range of services which can remove technological barriers for SMEs in the global market. Previous research studies have focused on cloud computing by relating it to innovation and business agility. However, there are many advantages of cloud computing which are not discussed in detail, although it can enhance competitiveness of SMEs in the global market. To assist SMEs in adoption of cloud computing, this research study aims to answer the research question "**Why Businesses (SMEs) should adopt Cloud Computing.**"

The major purpose of the thesis is to carry out research on the cloud computing in relation with small businesses and analyze its potential benefits to businesses. The main aim is further divided into the following sub-objectives.

1. To do a feasibility report for SMEs.

2. To explain how SMEs can benefit from using cloud computing for their businesses.

3. To discuss advantages of adopting cloud computing for storing data.

4. To make a suggestion about potential disadvantages associated with cloud computing.

3 Theoretical Background

This chapter reviews literature relating to cloud computing concepts and services in order to discuss its implementation in SMEs. Basically, the literature review has been organized in three sections. The first section covers important concepts and characteristics of types of cloud computing. The second section covers the use of cloud computing in SMEs and explains its different types. In the third section empirical evidence on the subject matter is discussed briefly.

3.1 Concept and Characteristics of Cloud Computing

Cloud computing is a wide-ranging and quickly advancing idea; therefore, SMEs should understand cloud computing comprehensively to adopt better approaches towards the utilization of cloud computing services (Velte, Velte & Elsenpeter 2009, 47). Basically, the idea of cloud computing depends on the pre-existing concepts, such as virtualization, grid computing and distributed computing. Although it is not a relatively new field of study, it can be differentiated based on the novelty of the idea to deliver computing services to a general consumer as a utility (Stallings 2007, 202-245). The broadly accepted definition of cloud computing is provided by the National Institute of Standards and Technology (NIST) in the United States as cloud computing is a model for empowering expedient, on-demand system access to a shared pool of configurable computing resources, which can be quickly provisioned and discharged with slight effort of administration or interaction of a service provider (Mell & Grance 2009, 50).

It is important for any organization and particularly SMEs to understand the basic characteristics of cloud computing in order to implement its services efficiently. Fundamentally, a cloud enables the users to expand their capacity by offering self-service entrances in remote servers (Gong et al. 2010, 275-279). The following are some important characteristics of cloud computing identified by the National Institute of Standards and Technology.

1. **On-demand Self-service:** Cloud computing provides self-service portals to its users, where they can access basic IT services, such as storage or server time without interaction of humans.

2. **Rapid elasticity:** The provision and issue of IT resources is elastic and can be accessed on-demand. The automated access is allowed to users; however, there are some parameters and triggers fixed in the system. The resources provided to users are unlimited as the exact capacity is available on time to meet the needs of a specific application (Stallings 2007, 202-245).

3. **Resource pooling:** The service providers merge different IT resources, such as memory, storage, processing and network bandwidth, and supply these pooled computing resources to multiple customers. However, these resources are separated and secured based on a logical level to meet the dynamic demand of multiple customers (Zhang et al. 2010, 7-18).

4. **Broad network access:** Service users can access the cloud computing resources from the main network or server. Mainly, these resources are retrieved by many different

devices, such as user mobile phones, tablet devices, workstations, laptops and computers (Stallings 2007, 202-245).

5. Measured service: The resource use is automatically controlled and improved by a computing system as it utilizes a metering competence which is appropriate to different services, such as bandwidth, processing, storage and dynamic user accounts. Asset utilization can be observed, controlled and stated by offering transparency for both service users and service providers. This attribute of cloud computing empowers a service user to expend the administration in a "pay as you develop" model or for inner IT divisions to give IT chargeback abilities (Gong et al. 2010, 275-279).

Ahson & Ilyas (2010, 59) emphasize the fact that virtualization is not the main objective of cloud computing; it also focuses on innovation, where technology is utilized as a service whenever needed. It is important for users to have complete knowledge about implementation and usage of a particular cloud computing service, such as infrastructure and internet requirements (Thain & Moretti 2010, 153-171). It enables the service users to understand the services available in the cloud computing market and how these services are used to achieve organizational objectives. Moreover, understanding of the characteristics of cloud computing helps the users to manage self-service portals (Stallings 2007, 202-245).

3.2 Cloud Computing and SMEs

The business competitiveness can be improved with the utilization of advanced information and communication technologies (ICT). SMEs can also benefit from the use of ICT as it makes them able to compete in the market with large organizations (Ahson & Ilyas 2010, 59). The complexity of management issues related to networking, software and hardware is increasing in traditional IT environments. So, it is essential for SMEs to employ IT specialists in order to implement and maintain the IT services. Cloud computing offers an appropriate solution of these IT issues by providing scalable capabilities and infrastructure to SMEs (Sharma et al. 2010, 144-149). According to Vouk (2008, 235-246), cloud computing also provides the immediate access to modern solutions of information technology, which enables the SMEs to expand their services by enhancing customer interaction and market reach. It maximizes the SMEs' return on investment and helps them to operate in ever demanding corporate environment effectively (Velte, Velte & Elsenpeter 2009, 47).

The idea of cloud computing in SMEs does not only indicate improvement in technological data centers, but it also specifies the fundamental change in IT services, such as how these are used, provided and released to users from one place (Sultan 2011, 272-278). As compared to large business industries, the access of SMEs towards human and financial resources is low. Therefore, they do not have the ability to effectively upgrade their IT systems in order to meet changing business requirements effectively. Their incapability of implementing modern technologies in business also reduces their chances to participate in highly advanced business environment and to contend with prevailing competitors (Sharma et al. 2010, 144-149). However, the adoption of cloud computing enables a variety of services for SMEs, such as provision of storage services, collaboration, IT infrastructure, more specifically, private cloud infrastructure. Therefore, SMEs which are operating with small IT departments can rent IT services rather than buy them by utilizing their limited resources. Literature about cloud computing adoption by SMEs indicates that these enterprises are motivated to use cloud computing services through the internet in order to enhance their business capabilities (Alshamaila et al. 2013, 250-275).

According to Peng et al. (2009, 23-27), SMEs should classify their IT requirements in different cloud computing categories in order to make effective decisions about technological structure. These services are able to meet every IT requirement of SMEs with constant support of telecommunication and IT industries. The following are four basic categories of cloud computing services which are recently available for SMEs.

3.2.1 Infrastructure as a Service (IaaS)

The least disrupting cloud computing service adopted by SMEs is infrastructure as a service, also known as IaaS. The SMEs can get virtualized computing services through the internet by using IaaS, as IT stacks and servers are based on this service, which also enables the software as a service and a platform as a service (Peng et al. 2009, 23-27). A third party is involved in an IaaS model, which operates as a host to offer software, hardware, storage, a server and other components of infrastructure to service users. It also handles a user's applications and offers a backup solution, system maintenance and resiliency development (Weinhardt et al. 2009, 391-399). Highly accessible resources are offered by IaaS platforms, which can be managed on user demand. Therefore, the IaaS is the most suitable for temporary and experimental workload, which can be changed unexpectedly (Giessmann & Stanoevska-Slabeva 2012, 31). The cloud providers in IaaS can be differentiated based on their service legal agreements (SLAs), their pricing and their performance (Mujinga & Chipangura 2011, 196-203).

3.2.2 Platform as a Service (PaaS)

The platform as a service (PaaS) offers an interesting solution for IT related SMEs which are involved in the development of applications. A hosted environment is offered by PaaS, which enables the SMEs to use a web-based platform and develop applications online (Lawton 2008, 16-19). PaaS likewise provides infrastructure like development software, hardware and an operating system to service users, which help them to develop a new application without making heavy investment. They can rent PaaS services which offer an entire lifecycle of application development (Giessmann & Stanoevska-Slabeva 2012, 31). Zhang et al. (2010, 7-18) have stated the association of infrastructure as a service and PaaS as it delivers an operating system over the internet, which eliminates the need of downloading and installing software in the end-user system.

3.2.3 Software as a Service (SaaS)

Software as a service (SaaS) is basically a distribution model, where service providers or vendors host applications and use the internet network to deliver these applications as a service to customers (Peng et al. 2009, 23-27). It is also referred as on-demand software because applications are licensed on the subscription basis. This is the most valuable computing service for SMEs because it is supported by the "plug and go" notion, where SMEs can get IT resources from a public cloud or other service providers and deliver those resources to their customers (Lawton 2008, 16-19). Meanwhile, the IT organization plays a role of an IT service broker to provide basic services to SMEs. An IT solution is provided by SaaS by utilizing software, bandwidth and a server. SMEs have the option to choose the service provider which has a required solution which can be accustomed according to the worker's need. However, it is important to make sure that the service access is guaranteed by the service provider (Azodolmolky, Wieder & Yahyapour, 2013).

3.2.4 Communication as a Service (CaaS)

SMEs can lease communication solutions from a cloud computing service provider; this process is categorized as communications as a service (CaaS). It enables the SMEs to utilize the Unified Communications and Voice over IP services without making any hardware investment because the required infrastructure is managed by the cloud provider (Youseff, Butrico, & Da Silva 2008, 1-10). CaaS is basically an outsourcing model for business communication which can be used by the organization to increase efficiency and reduce cost by involving telecommunication (Conway et al. 2014). A wide range of cloud services is available to SMEs; however, it is important for enterprises to analyze their IT requirements and workload before adoption of any cloud computing model (Rath et al. 2012, 688-691).

3.3 Empirical Evidence

An emerging paradigm of information technology is cloud computing, which provides web-based computing services to its customers. Sultan (2011, 272-278) has discussed the cloud computing approach by focusing on the existing technologies, such as grid computing, virtualization and the internet. The study also concentrates on identification of some constraints which organizations face while adopting a cloud computing model. However, there are some unique aspects of cloud services which make them viable for SMEs, such as on-demand and flexibility. Another important feature is pay-as-you-go, which limits the stretching of financial resources to fulfill IT requirements and manages an appropriate cost structure for SMEs, which increases their competitiveness and makes them able to operate in a changing economic situation.

Rath et al. (2012, 688-691) have conducted a research study to assess the adoption of cloud services in Indian SMEs. Organizations can concentrate more on their core business operations when all the IT requirements are outsourced with the help of cloud computing technologies. Many firms in India have adopted the cloud service approach in order to decline their operational cost without undermining the need of their customers. Nonetheless, in case of SMEs there is a lower trend of outsourcing and use of cloud services. An initial survey has been conducted by Rath et al. (2012, 688-691) to identify the major reasons for SMEs to adopt these services. The findings of the study indicate that cloud computing can be more beneficial for SMEs if it is used for computation intensive tasks, such as modeling, data mining and simulation. They have also identified some other benefits of cloud services, for instance, efficient use of the computing system, low level of hardware investment, and faster upgrades of software.

Nowadays, cloud computing is a much argued subject in literature. IT professionals are trying to identify more and more logic to explain its uniqueness and to implement cloud services in the business environment. In a research study, Abdollahzadehgan et al. (2013, 67-74) advocate the cloud computing by providing a list of its benefits, which motivates an organization to adopt it. However, some disadvantages of cloud service are also discussed in their study to inform businesses about risks associated with this system. They further discuss the SMEs' need to adopt cloud computing, as the SMEs cannot fulfill their IT requirements efficiently because they do not have enough human and financial resources to deal with the over-demanding market. Mainly, the research study focused on the TOE framework (Abdollahzadehgan et al., 2013. 68) includes technological, organizational and environmental factors for the evaluation of cloud computing adoption in SMEs. A detailed review of previous literature has been conducted by the researchers to identify the critical success factors based on the chosen criteria. The findings of the study indicate that

technological factors, such as complexity and compatibility, are more important because they motivate the adoption of cloud services in SMEs.

The inefficiencies of SME sector can be addressed by cloud computing services as they also make a vital contribution to the competitiveness and growth of these enterprises. They enable the SMEs to obtain advanced technology without paying any upfront cost. Sahandi, Alkhalil and Opara-Martins (2013, 1-12) have explored the different perception of SMEs about cloud computing adoption by discussing the major requirements and motivation concerning cloud services. A quantitative approach has been adopted and a survey has been conducted among 300 SMEs operating in UK. The results of the study indicate that SMEs have more concerns about vendor lock-in and security breach, which are influencing the adoption of cloud services in UK.

In today's digital age, cloud computing has become the buzzword for web-based IT services. The concept of cloud computing became more popular with the advancement of the internet, broadband, improved bandwidth, mobile devices and increasing mobility requirements of end-users. Gupta, Seetharaman and Raj (2013, 861-874) argue about the SMEs' preferences towards cloud computing and its perceived benefits. IT requirements of SMEs are different than those of large business organisations, so the cloud usage in SMEs is also influenced by different factors, which are discussed in their research study. Five major factors are identified, where the most favorable factor is convenience and ease of use. The second important factor is security and privacy while the third cause for adoption of cloud computing is lower cost or expense. However, the fourth factor identified is reliability, which is not supported by results because cloud service is not considered reliable by SMEs. Another unfavorable factor is an old conventional method, which is preferred by SMEs to share and collaborate with their stakeholders because they do not trust clouds for sharing their private data.

Alshamaila, Papagiannidis, and Li (2013, 250-275) have conducted a research study to analyze the adoption process of cloud computing in SMEs. They identified that the access to scalable technologies enables the SMEs to compete with large businesses in the market by delivering modern products and services. A qualitative exploratory study was conducted by using interviews as a tool to collect primary data. SMEs operating in the north-east of England were selected for data collection, as that region aspires to become home of digital innovation and has a large number of enterprises. The technological, organizational and environmental (TOE) framework is used as the theoretical base of this study, and findings indicate some major factors which play an important role in adoption of cloud services by SMEs. These factors include the market scope, innovativeness, geo-restriction, uncertainty, compatibility, firm size, relative advantage, supplier effort, external computing and top management support. However, no significant evidence has been found on competitive pressure as a factor of cloud computing adoption.

Enterprises are showing a lot of interest in cloud computing since its inception, as it enhances the business value by offering technological solutions. However, there are some obstacles faced by organizational adoption of cloud services, such as higher management experience, standards and regulations. El-Gazzar (2014, 214-242) has explored major issues related to adoption of cloud computing by presenting a systematic literature review on the subject matter. He has reviewed 51 academic articles about adoption of cloud computing and its benefits. The grounded theory approach (Pandit 1996, 1-15) is used to classify the articles in eight main categories; these articles are further classified into abstract categories which involve the process and factors of cloud computing adoption. Findings of the study indicate that there are many critical issues faced by SMEs in adoption of cloud services.

Moreover, the researcher recommends the use of information systems (IS) in order to explore the under-investigated areas concerning the process and factors of cloud computing.

Cloud computing refers to the movement in the IT model which increases the efficiency, agility, and flexibility of an organization. However, there is a lack of research on adoption of cloud computing technology in SMEs. Conway, Curry and Donnellan (2014) have attempted to fill the literature gap and conducted a case study to discuss the challenges faced by SMEs. They have used a framework named IT-CMF (Conway et al. 2014, 2-4) to address the identified issues. A startup company which was involved in technological research was considered as a sample, and a highly concerted research plan constructed on the design science principles was discussed by applying the concerned framework. A measurement competency enabled by the framework guaranteed that risks associated with cloud computing were eliminated. Findings suggest that IT-CMF framework is an invaluable tool for SMEs as it maximizes the opportunity for cloud computing in a controlled and planned way.

A research study has been conducted by Adam and Musah (2015, 115-139) to explore the need of cloud computing in SMEs operating in developing countries. An exploratory approach was adopted to conduct a qualitative study. They reviewed 95 research articles on cloud computing and categorized these articles by developing a framework. The research activity was differentiated based on a lifecycle model which included the needs, requirements and desires of SMEs, which led to the adoption of cloud computing. The research study further highlighted unbalanced utilization of quantitative methods and absence of case study usage to frame the theoretical basis in this subject. Additionally, literature gaps were recognized, which indicated that the obstacles of cloud computing in SMEs were ignored while adoption of cloud computing was widely discussed. Their research study focused on identification of key research gaps involving conceptual framework, issues and techniques.

4 Cloud Computing Advantages and Disadvantages

There is a major role of cloud computing in addressing the ineffectiveness and inefficiencies of SMEs. It also contributes to the fundamental competitiveness and growth of SMEs. After the adoption of cloud computing, SMEs can be able to effectively utilize modern technology along with cutting upfront costs (Oliveira & Martins 2010, 1337-1354). Therefore, this chapter is going to discuss the advantages and disadvantages of cloud computing with regards to SMEs.

4.1 Cloud Computing Advantages

As cloud computing is modern technology, these services are currently used by different types of companies. It is expected by the IT experts that the growth of cloud computing will be increased in the next few years. Cloud computing is highly beneficial for mid-size and large companies but now smaller firms are also adopting and using its benefits to increase their businesses. Companies get benefits through cloud computing as they implement such services leading to the development of IT in all types of SMEs along with industries and universities (Adam and Musah 2015, 115-139).

Cost Savings

Cloud computing is mostly helpful in IT cost cutting. This is also helpful for all businesses including small, medium or large ones, as it helps in maintaining operations and

capital expenses at the minimum amount. Further, it is also helpful in saving substantial cost along with application requirements and zero in-house server storage (Gupta et al. 2013, 861-874). Operational costs of the companies also decline due to less on-premises infrastructure in terms of administration, air conditioning, and power costs (Zhang et al. 2010, 7-18).

Scalability/Flexibility

These days most companies are focusing on data management centers due to high scalable cloud computing nature, and for this purpose, cloud experts are trained to maintain hybrid, private, and shared clouds. Companies get quick resources allocation in controlled environment, in which overloading is not happening as the system is properly managed (Conway et al. 2014).

Reliability

The cloud computing service is highly reliable due to a managed service provider, and it is consistent as compared to in-house IT infrastructure. Service providers usually offer their services in 24/7/365 with 99.99% reliability. Services can be easily transmitted to further available servers in case of failure of applications (Gupta et al. 2013, 861-874).

Maintenance

Cloud computing is easy to manage as it is not required to be installed in every single computer, and thus it can be reached from different locations. Features of cloud computing platform help service providers to maintain, host, develop, and test applications in a cloud. In this way, developers can modify and launch different programs as compared to setting up systems and infrastructure themselves (Weinhardt et al. 2009, 391-399).

Minimized Licensing of New Software

Cloud computing strategies are used to custom tailor solutions for a company, and thus the company needs cloud IT with fully integrated, dynamic and robust computer systems which are completely web based. In this way, applications, files, and emails can be accessed easily with any internet connection, and need of software and hardware is also decreased in this way. Thus, companies need less licensed software (Lawton 2008, 16-19). Therefore, companies can now grow without investing in a larger amount on licenses.

Innovation

Cloud computing enables companies to interact with customers, employees, and partners in a different way. Companies can get incredible business opportunities, which can help them to build real-time interaction and innovation to flourish (Alshamaila et al. 2013, 250-275).

Multiple Users at the Same Time

Cloud computing is also helpful in increasing the effectiveness of shared resources. Multiple users not only share these resources but also allocate them dynamically as per demand. Further, it is also helpful for multiple users to retrieve their data through a single server and update data without buying a license (Zhang et al. 2010, 7-18).

It Is Green

Cloud computing is the best and most effective for future use. According to Blaisdell (2014), companies can increase their return by 200% by using cloud computing. Software development and IT industry are also fundamentally changing in order to adopt modern

technologies. In this way, they can help to save the environment by using fewer servers and other resources.

4.2 Cloud Computing Disadvantages

There are various potential advantages of cloud computing enterprises, which are discussed above in detail, but still some factors need to be worried about by the company's management. Therefore, cloud computing has some disadvantages for SMEs, which are the following.

Lack of Control

Cloud computing is fully owned, managed and monitored by service providers, and customers have minimum control over it. Therefore, customers only have control over services, data, and applications. Further, customers do not have access to administrative tasks like firmware and updating management, and access to a server (Gong et al. 2010, 275-279).

Network Dependency

Cloud computing is a completely internet dependent service. This is a major drawback of cloud computing because full dependency of a cloud on the internet leads to prone service outages at any time. Service interruption can occur during transactions, file transmission, or other tasks, and as a result, a task can be delayed (Stallings 2007, 202-245).

Risk

Every single cloud computing component is highly accessible from an internet server. However, internet connected services are not secure, and sometimes IT teams have to suffer from hard security breaches and attacks (Yang & Tate 2009, 2-4).

Essential Need of an Internet Connection

In an IT department, cloud computing is excessively used as an essential feature, but the most important part is the availability of the internet. Computer networks and in-house servers are also replaced but employees are not able to access the data if they don't have an active internet connection (Sultan 2011, 272-278).

Migration Issue

Migration to cloud computing is tricky. There are some common challenges in this regard, which consist of identification of the right cloud vendors, effective management of cloud resources, and transitions of IT hardware and investments (Marston et al. 2011, 176-189).

Continuous Evolution

Cloud computing, storage, networking, and interface requirements of the customers are continuously changing. Such evolving parameter shows that a cloud cannot be static and it is continuously changing with the passage of time (Durkee 2010, 20).

5 Research Methodology

The research design has an important role in simplifying of the preliminary research assumption by applying diverse methods (Rudestam & Newton 2014, 29). Furthermore, the general research methods are also divided into small sections which discuss research

population, sampling, data collection and data analysis techniques. Two basic research approaches are available to design a study which includes a quantitative and qualitative approach.

In a qualitative research method, beliefs and perceptions are discussed, such as experience of some participants in a specific social setting. It helps to understand social behaviour of individuals towards a specific situation; therefore, a small sample size is preferred in qualitative research design. There are two different methods which are used in a qualitative study, known as a focused group and interviews. However, in case of a quantitative study, the numerical structure of obtained data is important. A certain research phenomenon is categorized by using a specific hypothesis, which is further accepted or rejected based on findings. It also has two different methods for data collection, such as observation and use of structured questionnaires in a research survey.

In this research study, the qualitative research method is adopted in order to analyse individual perspectives about advantages of cloud computing in SMEs, which further leads towards adoption of this technology.

5.1   Research Sample

The population of the research study was SMEs operating in Finland and using cloud computing. The research sample is selected by using the convenience sampling method. The convenience sampling method is the most suitable when data are to be collected from a large sample group. It is the most suitable method as compared to other sampling methods because it provides an opportunity to participants to give their views based on their preferences and the researcher can be able to access data for his convenience. Six different SMEs were selected which were using cloud computing in order to discuss advantages of cloud computing, which further led them towards adoption. The selection criteria of the sample were based on time duration of cloud computing, such as the SMEs using cloud computing for one year.

5.2   Research Instrument

In this research study, the interview method was utilized to gather required data from the selected research sample. A set of questions (appendix) was designed by focusing on different aspects of cloud computing in order to collect responses in interviews. The main discussion of interviews revolved around research objectives in order to address the underlying research problem. An open-ended questionnaire was developed as a research instrument to gather data from participants.

5.3   Data Collection

The primary research method was adopted for data collection, such as discussions over the phone. Also, a few meetings were arranged to conduct one-to-one interviews with the responsible IT personnel. A pre-planned schedule for the researcher and participants was decided for data collection which is managed according to the convenience of respondents.

6 Data Analysis and Discussion

Cloud computing is one of the biggest effects among all the new technologies, which has been introduced during the last few years. Organizations' views of this technology have changed because they can implement simple and effective solutions with the help of computing. It also enables them to be creative and interact with customers more efficiently. Moreover, the cloud is easy to deploy and cost-effective, which makes it possible for an organization to experience advanced technologies. The IT sector has become able to produce new items and distribute these items to a wide network.

In this study, interviews with various IT personnel have been conducted to find out the various factors in SMEs which has driven them toward adoption of cloud computing for their enterprises. It has been observed that most of the SMEs consider advanced technology as a critical success factor, so the cloud platform is implemented to meet this requirement.

6.1 Summary of the Interview

In SMEs, different types of clouds are used to run their operations. As observed in the interviews, most of the organizations are using public clouds which are owned and operated by isolated businesses in the external environment. There are also some SMEs which are using private clouds which are operated and owned by themselves while use of a partner cloud has been also noticed. In SMEs, a trend of hybrid cloud computing is also observed, where cloud services are provided by different sources, both private and partner ones. In case of a cloud operating system, commonly used packages in SMEs are SaaS and CaaS, which help them to manage their business operations effectively. They provide various services, such as network capacity, storage, communication facilities, etc. However, there is less use of PaaS via cloud computing in order to develop new applications because of high risk in the environment.

Many SMEs are using cloud computing in order to reduce capital expenditure, which further lowers their costs as they can avoid the expense of buying hardware and licensing software. Another reason is managing effective IT support because it is difficult for small organizations to hire highly experienced IT specialists and operate a whole tech department. Moreover, scalability and flexibility of IT resources are other observed reasons which lead SMEs towards adoption of cloud computing. Agility of services increases the opportunities to use advanced technologies in these small organizations, which increases the firms' profitability. However, they are facing some hurdles in utilization of cloud computing in SMEs. For example, it decreases the level of internal control in organizations when they outsource a large number of services. It is difficult for SMEs to manage reliability of IT operations on clouds because there is a high level of security risk in the environment. Legal service agreements and vendor lock-in are the biggest challenges for SMEs in adoption and implementation of cloud computing. But the best thing is that these hurdles can be managed by effective strategies and planning.

Cloud computing services are utilized to manage various business processes in SMEs, such as management of sales data, creation of payrolls by using specified software, and administration of financial records. They also help SMEs to manage research and development activities and provide solutions for data analysis; in this way, organizations can become more informed about changes in technological areas and be innovative. However, a problem arises when secure services cannot be achieved by a single cloud system. Therefore, a more reliable solution for this issue is a hybrid cloud, where automated services allow the users to control their data on networks. In this way, some SMEs are managing security and privacy concerns of their organizations appropriately.

6.2   Use of Cloud Computing in SMEs

After the identification of some innovative technology and its perceived benefit, SMEs would like to adopt that technology. Therefore, it is important for SMEs to have complete knowledge of cloud computing and its relative advantage. According to the analyzed data, it has been found out that cloud computing is considered as an important and interesting technology in SMEs. Most SMEs are attracted towards use of cloud services to run their business operations and trying to reduce some minor drawbacks of clouds by implementing adequate plans. However, there has been lack of awareness among SMEs about cloud computing, which has become the major reason for late adoption of this technology. SMEs - current users of cloud computing - are well aware of its benefits as it has made them more competent and successful in the market. In addition, SMEs have more control over their IT operations and expenditure because of cloud mobility and scalability. The major reason behind the adoption was that the SMEs were not satisfied with their existing infrastructures as they did not meet their business expectations. Implementation of cloud computing can be easier for them after conducting a brief analysis of its advantages.

Uncertainty was another important factor in adoption of cloud computing because major concerns of SMEs were privacy and security of data. It was also a complicated issue to relinquish ownership to an external entity by accessing cloud computing services. However, these issues have been addressed by establishing relationships with reliable service providers. As per views of one participant, it is quite risky when another organization has your confidential data, but there should be an element of interest to run a successful business. However, there are also some other solutions used by SMEs, such as signing of a confidentiality agreement in order to secure their data. Another identified fact is that some early adopters trust their service providers, which leads these SMEs towards implementation of cloud computing. Overall, SMEs are satisfied with cloud computing services as they are compatible with their IT structure, and they are easy to use. It is important for any advanced technology to provide user friendly and comfortable services. In case of cloud computing, it has been observed that its services are consistent with organizational values and technology requirements.

In cloud computing services, SMEs have the option of trial-ability, which allows them to use these services on the trial basis before implementation. It has great impact on their decision about adopting a particular service, but it is also very useful as it provides them with an opportunity to choose the most suitable service providers. However, it has been found that trial-ability of cloud computing services mostly has a positive effect on adoption by SMEs. It is also useful for them because of small size of the organizations, and the participants believe that it is quite easy for them to follow agility of cloud computing and change direction whenever needed. Flexibility is another important factor which motivates SMEs to choose cloud services as it allows them to control their density and avoid capital expense.

6.3   Reasons for Adopting Cloud Computing

The following are some important reasons observed in this study, which motivate small and medium enterprises to adopt cloud computing services.

Flexibility and Scalability in Resource Utilization. Unmatched flexibility is offered to SMEs by cloud computing, which allows them to manage their versatility and usage policies. One of the most important benefits of cloud computing is provision of data storage facilities, which motivates SMEs to move on to clouds. In fact, more than half of the population have adopted cloud computing because of this factor. Data storage facilities are

flexible on clouds as SMEs have to pay only for the volume of the space which they consume. In this way, they can increase or decrease storage space whenever required to meet business requirements. Therefore, cloud computing provides a relative advantage to IT business, which requires availability of resources on demand to experience rapid growth.

Cost Effectiveness. As discussed above, flexibility and scalability in resource utilization lead an organization to reduced operational costs and capital expenditure. They also allow SMEs to control financial spending on extensive upgrades as cloud computing assists them in installing continuous updates at very reasonable costs. In case of any maintenance requirement, SMEs do not have to pay any expenses because it is a responsibility of the vendors to update, upgrade and maintain a cloud. Moreover, it enables them to compete in the market by offering a cost reduction structure and advanced IT solutions. As findings of this study suggest, most of the SMEs saved a significant amount of their IT expenses after the adoption of cloud computing.

Lower Technology Risk. Apart from the financial advantages of cloud computing, its ready to use infrastructures reduce the level of technology risk in SMEs. Major cloud providers in the industry offer a guarantee for their clouds, and risk of data unavailability is also minimized because of cloud computing. In this way, the SMEs have more trust in cloud providers, which allows them to use their storage.

Data Security. At the beginning, SMEs had many concerns about security breaches and data losses on a cloud. However, after evolvement of cloud computing and some advanced changes in this technology, security concerns have been reduced. Recently, cloud computing is used in a secure network because it offers a high level of security and integrity of user data.

Effective IT Support. The corporative productivity of SMEs has been enhanced by the implementation of cloud-based frameworks in IT sections. SMEs can get effective support anytime because cloud computing enables their service providers to work from devices. Highly specialized IT personnel can offer their services to SMEs from anywhere in the world at a reasonable cost. SMEs can spend more on training of their human resources when other costs are reduced because of cloud computing. In this way, organization performance can be highly improved by following some effective strategies.

Technical Skills. These days organizations are trying to reduce paper work, so it increases the level of IT utilization in all parts of organizations. Therefore, it is important for them to have highly skilled IT specialists with effective knowledge of computing, who can help them to maintain and update their work online. The implementation of IT applications associated with cloud computing can help SMEs to choose a better way to increase technical efficiency, which further enables them to compete in the market.

In spite of some security concerns, the level of risk in cloud computing is not much higher. Cloud computing can offer the best solution to small enterprises and ensure a high level of output from cloud investments when the right organization is selected as a cloud partner. In the last few years, a rapid change in IT environment has increased the trend of cloud adoption in SMEs, which can be more efficient with the help of clear understanding in this regard.

7   Conclusions and Recommendations

The introduction of on-demand computing services has gradually modified the way IT services are developed. "Computing services on-demand" are gradually modifying the way information system services are developed, maintained, upgraded and paid for. The initiation of cloud computing can be associated with earlier outsourcing trends, such as virtualization. However, the cloud computing is based on a novel idea, which involves a high speed internet connection to provide all IT services at one platform (Sultan 2011, 272-278). In this research study, an initial attempt wa made by the researchers to explore the advantages of cloud computing in SMEs operating in Finland. Cloud computing is an evolving concept which has rapidly emerged and adapted in the last few years. It is the most suitable technology for SMEs as they are not able to attain technical expertise due to lack of adequate resources. Cloud computing allows them to establish an appropriate IT infrastructure, which enables SMEs to compete in the business market efficiently.

A systematic review of literature is conducted in this study in order to discuss different concepts of cloud computing to enhance the level of understanding. Empirical evidence on the subject matter suggests that there is an increasing trend of cloud adoption in developed countries, specifically in Europe. Finland is one of the major countries which are using cloud computing. In fact, more than half of the Finnish enterprises are cloud computing users. Despite this fact, there are still some SMEs which are unclear about the adoption of cloud computing. Therefore, the major reason and benefits associated with cloud computing have been identified in this research study, which further enables SMEs to make the best decision about adoption of cloud services. Based on theoretical analysis, some key advantages and disadvantages of cloud adoption in SMEs are also discussed in order to get in-depth understanding of the underlined research issues. The most important advantages are cost reduction, flexibility, reliability, innovation and agility. However, there are also some challenges faced by SMEs in adoption of cloud computing, which involve security and privacy concerns, lack of control, network dependency, continuously evolving nature, etc.

The qualitative research approach is adopted in this research study, and the interview method is used for data collection. According to empirical analysis, the major factors which are playing an important role in cloud adoption are: the lower level of cost, flexibility and scalability of resource utilization, reduced risk, upgraded security resolution, effective IT support and the high level of technical skills. Nonetheless, SMEs also face some difficulties after implementation of cloud computing, which are addressed by effective strategies. It has been observed that partner clouds are mostly preferred in SMEs while focusing on SaaS packages.

These research findings are beneficial for SMEs' managers, service providers and the research community as they can help SMEs' managers to analyze benefits of cloud computing by focusing on their business operations. In this way, they can formulate new and effective strategies to adopt and implement cloud services in their enterprise. They can also uproot any ambiguity of service users about implementation of cloud services in small enterprises. In case of service providers, with the help of these research findings, they can understand SMEs' behavior towards adoption of cloud computing and can design their services by focusing on these specific factors. Service providers can be able to enhance their cooperation with SMEs which are current users of cloud services to develop healthy environment for adoption of cloud computing. One important factor behind the adoption of cloud computing in SMEs is the level of trust in service providers which reduce their security concerns as well.

Four main objectives were established to conduct this research study. The first objective was achieved by discussing how cloud computing can be implemented in SMEs. Various characteristics and types of cloud computing are briefly examined and discussed in the study. Potential advantages and disadvantages of cloud computing are analyzed in order to gain in- depth understanding and achieve the second and third research objective. Further, a qualitative approach is adopted to explore benefits of cloud services which lead towards adoption. It was the most important research objective, which addressed the research question "Why SMEs should adopt the cloud computing service to carry out their business operation". The important benefits of cloud computing are concisely discussed in the findings.

Based on these research findings, future research can be conducted by focusing on a specific industry. A different research approach, such as quantitative analysis, can be used to measure the role of cloud computing increasing a firm's performance as the most important benefit identified is cost reduction. The semi-structured interview method is used in this study, which can be modified in future research to get more specified results on cloud computing advantages. Further, this research study is helpful for SMEs as it provides them with in-depth understanding of cloud adoption and implementation. SMEs can make better decisions about the use of technology by following research findings of this study. Only IT personnel working in SMEs were interviewed in this study; nonetheless, future research can be conducted by focusing on views of the higher management, end users and other stakeholders.

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APPENDIX 1

Questionnaire

1: What is the size of the enterprise, e.g. number of employees?

2: Number of years of cloud computing utilization.

3: Which cloud computing solution are you using in the enterprise?

4: Which type of cloud are you using in the enterprise?

5: Would you be willing to outsource to multiple cloud providers and why?

6: Which IT services/applications supporting business processes are most likely to be outsourced to a cloud computing service provider?

7: What are the reasons behind your possible engagement in the cloud computing area?

8: What are your main concerns about cloud computing?

9: What is your opinion about continuously evolving nature of cloud computing?

10: Are you satisfied with the internet connection and speed which is used for the cloud computing service?

11: Is it easy for you to manage your internet service all the time?

12: Would you recommend use of cloud computing in other SMEs? Why?