



The Impact of cloud accounting on Small and Medium-sized Enterprises

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Table of Contents

1	<u>CHAPTER 1: INTRODUCTION.....</u>	<u>4</u>
1.1	RESEARCH BACKGROUND.....	4
1.2	RESEARCH AIM	5
1.3	RESEARCH RATIONALE.....	5
1.4	RESEARCH OBJECTIVES	6
1.5	RESEARCH QUESTIONS.....	6
2	<u>CHAPTER 2: LITERATURE REVIEW</u>	<u>7</u>
2.1	HISTORY OF ACCOUNTING SOFTWARE	7
2.2	TYPES OF ACCOUNTING INFORMATION SYSTEM	8
2.2.1	MANUAL SYSTEMS.....	8
2.2.2	LEGACY SYSTEMS	9
2.2.3	MODERN INTEGRATED SYSTEMS	9
2.3	CLOUD COMPUTING	11
2.4	TYPES OF CLOUD COMPUTING	11
2.4.1	INFRASTRUCTURE AS A SERVICE (IAAS)	12
2.4.2	PLATFORM AS A SERVICE (PAAS)	12
2.4.3	SOFTWARE AS A SERVICE (SAAS)	12
2.5	OVERVIEW OF CLOUD ACCOUNTING IN SMES.....	13
2.6	BENEFITS OF CLOUD ACCOUNTING	14
2.7	DRAWBACKS OF CLOUD ACCOUNTING	15
3	<u>CHAPTER 3: METHODOLOGY</u>	<u>16</u>
3.1	INTRODUCTION	16
3.2	RESEARCH APPROACH	17
3.3	SOURCE OF INFORMATION	17
3.3.1	INSTRUMENT FOR DATA COLLECTION.....	18
3.3.2	RESEARCH AUDIENCE	18
3.3.3	DATA ANALYSIS	18
4	<u>CHAPTER 4: RESULTS.....</u>	<u>19</u>
4.1	IMPROVING CLOUD SECURITY	19
4.2	IDENTITY AND ACCESS MANAGEMENT	19
4.2.1	THE PRINCIPLE OF LEAST ACCESS RIGHTS.....	19
4.3	SWOT ANALYSIS OF THE USE OF SAAS APPLICATIONS IN COMPANIES.....	20
4.3.1	STRENGTHS	20
4.3.2	WEAKNESSES	21
4.3.3	OPPORTUNITIES.....	22

4.3.4	THREATS	23
5	<u>CHAPTER 5: DISCUSSION.....</u>	<u>25</u>
5.1	MICROSOFT AZURE INFORMATION SECURITY	25
5.2	DATA CENTERS AND THEIR SECURITY	26
5.3	AZURE DATABASE.....	27
5.4	PROTECTION OF CUSTOMER DATA	28
5.5	AZURE AVAILABILITY & CONFIDENTIALITY	29
6	<u>CHAPTER 6: CONCLUSION.....</u>	<u>30</u>
7	<u>REFERENCES</u>	<u>32</u>

List of Figures

Figure 1: Client Server Model	10
Figure 2: Cloud Computing Frame Work.....	11
Figure 3: Types of Cloud Computing	12
Figure 4: Forecast's prediction of the ratio of operating profits of service providers of SaaS-based CRM applications	24
Figure 5: Azure data centers and regions are divided and connected to each other	27

1 CHAPTER 1: INTRODUCTION

The main goal of every firm at the present period is to maximise the shareholder's wealth, and also to maintain a competitive edge in the industrial sector by increasing work efficiency and accuracy in day-to-day business operations. All businesses look for creative solutions and new methods to operate to meet financial and non-financial goals of organisations. Although the advancement in the information technology (IT) sector has made it hard for firms to achieve these objectives and hold equal consideration while making strategies for future objectives (Pepe, 2011). One of the main objectives of firms is to maintain accuracy as well as to keep track of financial information and to keep business up-to-date.

This research is based on in-depth analysis of the use of cloud accounting software, on how the advancement of technology influenced businesses to move from traditional accounting systems to modern accounting ones such as cloud accounting use in Small and Medium-sized enterprises (SMEs). Cloud accounting is similar to established accounting software however, it can be accessed from anywhere in the world (Keating, 2022). This means that the user can access business data from any place and at any time they want. This has made decision making easier. Furthermore, since financial information can be tracked by the personnel without them having it on their system, information would be stored in a main system which can be accessed by everyone who has the permission to access it. Small and medium organisations can significantly upgrade themselves by using this data-driven software (Khanom, 2017).

1.1 Research Background

Technology advancement has been crucial in the twenty-first century, and the adoption of cloud computing by SMEs has skyrocketed. The use of cloud computing has had both positive and

negative effects on the accounting industry and it is also reasonable to say that positive outcomes have outweighed negative ones (Fadel and Trilling, 2009). Within this thesis the researcher has considered these positive outcomes as being; transparency, accuracy, accessibility, efficiency and interest of stake holders in businesses as a result. However, a clear negative outcome is the constant cyber security risk which will increase the IT support requirement at all times to prevent crashes of the main data system, which could result in stolen or lost data which would take significant time to recover (Sun Z et. al,2014). Small and medium organisations can significantly upgrade themselves by using data-driven software which this thesis will unpack. This section will provide the overview of the research that was conducted on SMEs to understand the impact of cloud accounting on small and medium organisations.

1.2 Research Aim

The primary aim of the thesis was to assess the impact of cloud accounting on medium and small-sized organisations. The technical advancements in recent years that have seen small organisations using technology for growth will be the case study in question used to illustrate the arguments of this thesis.

1.3 Research Rationale

The motivation behind this research was to analyse the impact of cloud accounting on SMEs. The researcher aims to identify the benefits and risks associated with cloud accounting such as accuracy, efficiency, effectiveness, operational cost, data confidentiality and loss of data in an SME as evolving trends are helping businesses to effectively improve their business operations at

the lowest cost. (Chen and Zhao, 2012). For these reasons it is important to study the impact of cloud accounting in an organisation as these trends could effectively impact SMEs in future.

1.4 Research Objectives

1. To assess the impact of cloud accounting on SMEs.
2. To effectively assess how the latest technology of cloud accounting is successfully utilised by the SMEs in question.
3. To effectively demonstrate the influence of Cloud accounting in the present scenario and impact of it on the future business of SMEs.
4. To study the details of various cloud accounting software on SMEs

1.5 Research questions

1. What is the impact of cloud accounting on the SMEs?
2. How are SMEs assessing the latest technology of cloud accounting?
3. What could be the influence of cloud accounting on future SMEs?

2 CHAPTER 2: LITERATURE REVIEW

One of the information technology industry's most hotly debated subjects in recent years has been the digitization of accounting in business (Christauskas and Miseviciene, 2014). The Accounting Information System can be used to describe the idea of accounting software (AIS). A computerised system called an AIS produces reports for companies and financial insights as a basis for managerial-level strategic decisions for both internal and external users. An AIS is a process that combines linked components to gather accounting, raw data, or regular data, transform them into financial data, and then communicate that information to decision-makers (Soudani, 2012).

2.1 History of accounting software

In the past the accounting process to record transactions and to generate reports was manual, but as technology advanced accounting methods were switched to advanced methods. Whole accounting systems were converted into computerized accounting softwares. Punching card devices were used to launch the accounting software revolution in the 19th century. It was later utilised for fundamental calculations in 1928 (castelluccio, 2022). In 1955, the first “Electronic Recording Machine” computer system was invented for accounting purposes (Parsons, 2022). In 1959, the IBM incorporation invented the ‘9pac’ accounting program to modernize the accounting world. Significantly, in 1973, companies introduced ‘SAP’ accounting software with flexible features and in doing so created the path to automated financial transactions which helped businesses to make decisions at executive level (Novinson,2013). Until then, accounting software had not been available to the public, but with the revolution in 1978 of Peachtree accounting

software being introduced, this could now, for the first time, be made available for sale to the general public.

The automated accounting programme "Quick Books" for personal finances was created by Intuit Inc. in 1983. (Nyberg,2019). Additionally, Turbo Tax was made available to the general public. The business sector has seen rapid and unprecedented change in the last two decades. Reliance on information technology and the demand for online accounting software means that 'Cloud accounting 'usage is increasing for accounting professionals who are using it to improve the efficiency of business operations and to increase the credibility and accuracy of financial records to further gain the trust and respect of stakeholders. (Scott, 2015).

2.2 Types of Accounting Information System

Depending on an organisation's structure and the needs of SMEs, AIS fall into three types (Turner et al., 2022).

2.2.1 Manual Systems

Medium and large organisations are already using computerised accounting software to keep data up-to-date while smaller firms may often use completely manual systems to keep financial records up-to-date. Manual systems are also very important for large organisations in order to perform some specific tasks in order to strategize business operations such as the printing of payslips, which can be filled in by automated systems, while employee time cards, on the other hand, are filled in manually. The complete manual system requires the entire accounting process from recording transactions, to posting in final accounts manually. It also requires there to be a

source of a transactions which can be used in an audit process to support the validity of financial records (Dalci and Tanis2004).

2.2.2 Legacy systems

Legacy systems are the oldest systems which were installed in an organisation before the advancement of technology many years ago (Vijaya and Venkataraman, 2018). The systems were installed with customised features which were not so easily available in accounting softwares. Due to a defect known as "Y2kg" that affected the rollover of the clock from 1999 to 2000 and misread the time and dates on crucial documents, legacy systems eventually went out of date and businesses installed new systems before the year 2000. Most organisations updated legacy systems with new technology to save their historical data and to maintain up-to-date systems without the need for replacements (Irani, Themistocleous and Love, 2003).

2.2.3 Modern Integrated Systems

In this new era in the accounting world, there are large numbers of accounting softwares available on the market for sale. Organisations purchase these softwares to integrate their business operations. Previously, softwares were developed by the in-house or local IT teams of an organisation according to the needs of the specific firm. Today, firms can purchase softwares and modify them according to their requirements (Ghasemia et. al,2011). The developed softwares have been far more user friendly than legacy systems were.

There are two types of modern computing systems. One is cloud computing and other is a client server model. The client server model is a distribution of application models that divided web-based tasks between client and server, where a client requests information and the server

provides required information to the client, such as, whether it is a general model which is used by millions of people every day in order that they can get information from web servers for personal use (Choudhary et.al., 2017). By following this model, large organisations integrate their business operations by connecting servers with main systems of organisations where managers request information and main servers respond to their request automatically.

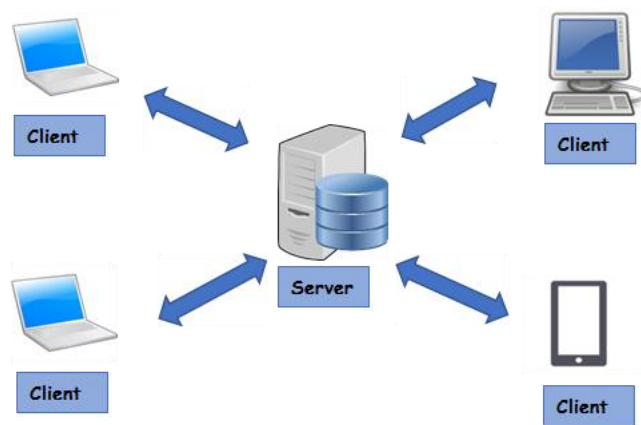


Figure 1: Client Server Model

Cloud computing is the second category of contemporary system. It is necessary to comprehend the many sorts of cloud computing in order to comprehend cloud accounting. To offer SMEs commercially available cloud accounting software, all major cloud accounting vendors distribute cloud computing in the accounting sector (Dimitriu and Matei, 2014).

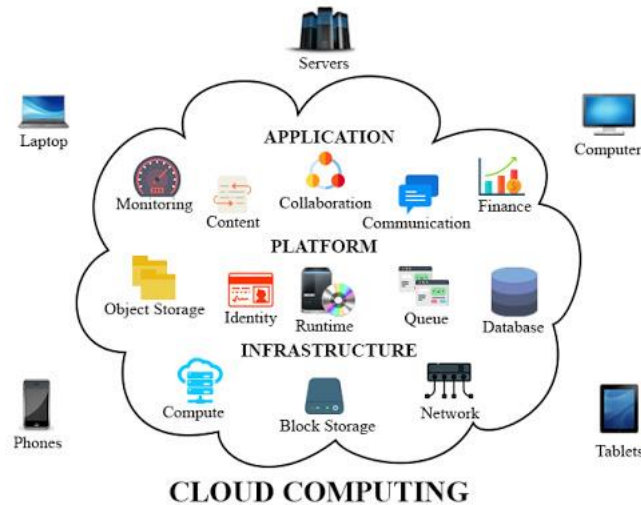


Figure 2: Cloud Computing Frame Work

2.3 Cloud Computing

The National Institute of Standards and Technology (NIST) of the United States provided the general definition of cloud computing: “Cloud computing is a model for enabling ubiquitous, convenient, on-demand network access to a shared pool of configurable computing resources (e.g., networks, servers, storage, applications, and services) that can be rapidly provisioned and released with minimal management effort or service provider interaction” (Mell and Grance, 2011). IT platforms for SMEs are supplied via cloud computing, where software is not sold as a product but rather as a service to store data on the cloud rather than on hardware (Christauskas and Miseviciene, 2012).

2.4 Types of Cloud Computing

The three different types of cloud computing models are as follows:

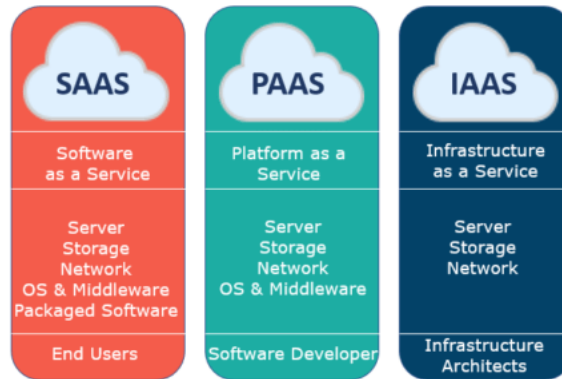


Figure 3: Types of Cloud Computing

2.4.1 Infrastructure as a service (IaaS)

In this bottom tier of cloud computing, suppliers rent out virtual computing resources to customers. For instance, variable storage space, etc. In this kind of infrastructure, businesses can quickly create their own cloud servers and applications on top of the vendor's cloud server.

2.4.2 Platform as a service (PaaS)

This medium-level Cloud computing infrastructure is offered by suppliers to customers so that they can easily manage and create custom apps. Clients can create customised applications or softwares by using various programming languages where high storage and servers are provided by cloud service vendors at minimum cost.

2.4.3 Software as a service (SaaS)

This is the most common cloud computing infrastructure provided by vendors to clients. The organisation does not require software or hardware because all services are provided by a

cloud service provider to a client where the client can access softwares online. This SaaS provider-only service, provides software to a client on a monthly or annual paid subscription basis.

2.5 Overview of cloud accounting in SMEs

Other SMEs are recognised as being fuel economic engines (Pathan, Akram and Latif, 2017). The use of IT and other tools has increased the accountability required of firms, as shown in corporate reporting, because it has made trustworthy, pertinent, and transparent information more accessible (Y.vEveringen, 2000). Enterprise Resource Planning (ERP) is being used by SMEs so that they may run under the same database. Some ERP systems are overly expensive, costing more than \$100 million, and they will cost even more if a customised ERP system is introduced, as is sometimes necessary. One of the major obstacles for SMEs is investment, thus businesses with limited funding rely on cloud accounting services (Beck, 2007).

According to a Cisco Systems estimate from February 2018, by 2022, cloud service providers will host 94% of company workloads, while traditional applications will host 6%. (Beck, 2007). According to their organisational requirements, SMEs use customised cloud accounting softwares that are tightly integrated with AISs and record and execute transactions like payroll services, bookkeeping, trail balance, etc. (Trigo, 2016). SMEs use cloud accounting SaaS softwares (Haselmann and Vossen 2011). Accounting softwares' sum functions are as follows:

Table 1: Functions of AIS

Function	Explanation
Data collection and storage	The primary purpose of an AIS is to efficiently and effectively gather and store information about a company's financial activities. This includes extracting transaction data from source documents, entering the data into journals, and posting journal data to ledgers.
Decision making	The provision of information that may be used to make decisions, such as the creation of managerial reports and financial accounts, is the second function of an AIS.
Controls placement	Ensuring that controls are in place to accurately record and ~~analyse~~ data is the third role of an AIS.

2.6 Benefits of Cloud Accounting

Cloud based accounting can provide benefits to both the accounting profession and to businesses more broadly. Accounting systems are customised to process financial information in an efficient way. SMEs are using; Xero, QuickBooks, FreshBooks and other such cloud accounting softwares in the UK. In the UK, cloud service providers are providing easy solutions to SMEs in the form of SaaS which can reduce costs and a service provider will be responsible for the maintenance of the accounting software as well as the backup systems which are also located with the service providers where data will be safe. (Dimitriu and Matei, 2014a, 2014c). According to existing studies there are several benefits and barriers to using cloud accounting. It has provided several benefits to SMEs such as flexible working environments, easy sharing of financial

information with clients and stakeholders and minimum IT maintenance costs for SMEs (Prichici and Ionescu, 2015). Cloud accounting is not similar to traditional accounting software as it does not require; various conditions such as IT experts to install and configure system settings, license fees or personal servers. Cloud accounting also helps businesses to access real-time information (Ionescu, B, et.al 2013).

Arsenie-samoli argued that cloud accounting reduces the initial upfront expenses such as the cost to install new hardware, software and personal servers to store information; expertise expenses and the cost of Computer systems are also less than traditional accounting software (2011, p784). Ionescu, B et. Al, conducted a study in 2013 in Romania using a return on investment policy to justify the use of cloud accounting in SMEs. They concluded that the use of cloud accounting is more beneficial as well as more profitable (2013, p107). Similarly, another researcher conducted a study using a theoretical approach to analyse the use of cloud accounting in businesses and concluded that it helps businesses to centralize accounting operations such as cash sales, creditors, debtors and gives the real-time status of financial information which helps to respond to the queries of stakeholders in a more efficient manner (pacurari and nechita, 2013).

2.7 Drawbacks of Cloud Accounting

While there are numerous clear benefits in opting for cloud accounting, there simultaneously exist several drawbacks. Many accounting professionals still preference their traditional modes of accounting over cloud accounting. The main concern of accountants and firms is the security risk of cloud accounting especially where they deal with important and confidential financial records (Armbrust et al., 2010). Christauskas (2014) highlighted this same concern about the risk of cloud security, stating that the main barrier for SMEs is the risk of security over

accounting transactions as SMEs have less resources for IT teams and, to paraphrase, the lack of an overview on cyber security prevents firms from being able to adopt cloud accounting in good faith. Two researchers Muca and Shakurti conducted a survey by including 66 accountants and they concluded that the major blockers to allowing the use of cloud accounting are organisational policies and data security risks. (2014, p2).

Another concern about using cloud accounting, frequently raised by users, are fears about loss of access to financial data. By using cloud accounting, the physical locations of servers and of data centres are unknown and lack of availability of cloud services leads to a blocking of access to information which can result in loss of revenue and financial data (sultan, 2011). Data confidentiality is also a significant concern and one of the main disadvantages of adopting cloud services is that data is stored in third party locations, these are not known to businesses but are controlled by a third party, which to many, may seem precarious and therefore unsafe (Marston et al, 2011).

3 CHAPTER 3: METHODOLOGY

3.1 Introduction

This section focuses on the dissertation's research methodology because choosing appropriate methodology is important for determining the credibility of the research paper. Due to non-availability of up-to-date critical literature about cloud accounting usage in SMEs, this dissertation will make use of secondary sources to substantiate the research arguments. The report will use quantitative data to conduct research from individuals working in SMEs by means of this secondary data.

3.2 Research Approach

There are three common research approaches used by researchers qualitative, quantitative or a mixed approach for conducting research (Williams,2011). Qualitative research methodology focuses on the detailed observations of respondents and data is represented by words. In basic terms, quantitative research methods for data collection focus on collecting and analysing structured statistical data which can be represented numerically, with the help of using statistical tools on computer, by using SPSS. After careful consideration of the characteristics of all mentioned research approaches the researcher has mainly adopted the quantitative approach and the researcher will use secondary data to gauge the sentiments of those interacting with cloud software and to weigh up their respective stances.

3.3 Source of Information

The information is collected from several sources such as financial and audit reports available online, academic articles, journals and publications from different researchers through online portals including; Elsevier, SAGE, Research Gate, or Google scholar. The information was selected based on the requirement of the specific research in question, however, some of the articles which were outdated were nevertheless taken into account as they are recognised by researchers.

3.4 Secondary Data Collection

This is the most important part of the research for this dissertation. Because of the non-availability of previous data on SME firms, the researcher used this method to engage directly with the core data to substantiate this thesis.

3.3.1 Instrument for Data Collection

The researcher utilised secondary data in order to illuminate the points made in the dissertation. It sought to ascertain the extent to which those doing online accounting are using cloud accounting software, organisation names etc. Other considerations included assessing the risks and benefits associated with the use of cloud accounting, the nature of firms in question, the effect of cloud accounting on human resources in an organisation and within cloud accounting and the risk associated while conducting audits on SMEs. The 3rd section was designed for the respondents who were not using cloud accounting to identify the reasons why they are not using it and to gauge how long they will take to adopt cloud accounting moving forward.

3.3.2 Research Audience

The target audience was the personnel working in SME organisations as well as in other SMEs. The views of those working in organisations' IT or accounting department were focused on in order to get the most appropriate data for the research work. Senior and experienced personnel were preferred as they have experience of both manual and cloud based accounting software.

3.3.3 Data Analysis

Secondary data analysis, which is employed for this dissertation, involves here a researcher using the information available to assess the impact of cloud accounting on Small and Medium-sized enterprises.

4 CHAPTER 4: RESULTS

4.1 Improving Cloud Security

The information security of cloud services is largely based on trust between the customer and the service provider. Therefore, the customer should always first thoroughly familiarise themselves with the background and security practices of the service provider before implementing the service. In most cases, the areas of responsibility for information security in a cloud service can be divided into the parts that fall under the responsibility of the service provider and the customer (Hassanalieragh *et al.*, 2015). The information security of the cloud service is therefore not only made up of the information security practices of the service provider, but the customer also has responsibility for making the cloud secure, according to the service model.

4.2 Identity and Access Management

As mentioned in the previous risk section, insufficient identity and access management in the cloud environment pose a big threat to the company. Previously, threats posed by identity and access management were discussed, so the next paragraph discusses ways in which identity and access management can be made more secure (Ross and Blumenstein, 2015).

4.2.1 The Principle of Least Access Rights

The principle of least access rights means that any device, process or user should have the smallest possible access rights to perform the task. In practice, this means that, for example, a programmer does not need rights to the company's financial data, or a normal user the rights of a system administrator, i.e. the highest possible rights. Adhering to the principle of least access rights significantly reduces the risk that attackers would gain control of the company's critical

systems or sensitive data only by exploiting so-called normal low-level user accounts. The principle of least access rights can also be used to prevent a potential virus from spreading directly throughout the company, because if one employee's credentials have fallen into the wrong hands, the attacker only has access to the systems used by this employee (Buyya, Broberg and Goscinski, 2011). If an employee had a user account with system administrator rights, the virus could spread directly to all the company's systems. Even users with system administrator rights should have a user account with lower rights, which is always used when system administrator rights are not necessary.

4.3 SWOT analysis of the use of SaaS applications in companies

Today, more and more companies have either moved or are moving to use cloud services. In the corporate world, the purpose of a SWOT analysis is to help companies understand what kind of internal and external factors should be taken into account when using SaaS-based cloud services (Armbrust, A. Fox, and R. Griffith, 2009). In order for companies to be prepared for the threats and weaknesses brought by SaaS applications, it is good to look at the characteristics of the applications using this four-field analysis. The SaaS service model has many benefits and some problems for companies. The analysis is divided into positive and negative factors.

4.3.1 Strengths

By using SaaS applications, companies have less responsibility in IT matters. The service provider is responsible for the licenses, updates, availability and operation of the applications. The applications can be used from any device with a working Internet connection and a browser. In SaaS applications, files are stored in companies' data centres. Companies also don't have to

worry about updates or maintenance of server computers, as the service provider is also responsible for them. The introduction of SaaS applications is very often effortless and fast, as there is no need to do separate software installations. Companies can very often try apps for free, after which the contract can potentially be extended. The trial period of just one contract period gives companies the opportunity to familiarise themselves with the applications thoroughly. By using SaaS applications, companies can save on the overall cost of IT applications (Aleem and Ryan Sprott, 2012). Applications are usually paid for with a monthly fee, which allows companies to quickly react to changes in workload by adding or reducing services. In the traditional model, a separate license must be purchased for each application or application package. The workload of companies may vary seasonally, so by using SaaS applications, resources are used efficiently. Unlike the traditional model, using SaaS applications, companies only pay for the applications they use.

4.3.2 Weaknesses

It is difficult for service providers to plan and implement unified applications that would meet the needs of all different companies. Many companies want to modify the software according to their own needs or possibly add additional features to the applications. Companies cannot modify SaaS applications, as their customisation options are limited. SaaS applications have increased their popularity precisely because of their availability and because of their simplicity (Hashem *et al.*, 2015). If the service providers allowed companies to modify the program code, the availability of the software could decrease due to possible program errors. Some companies may need the ability to modify the operation of SaaS applications so that the application fully meets the needs of the respective companies.

File availability is simultaneously one of the biggest advantages and disadvantages of SaaS applications. The files are stored on the service providers' servers. In order to access the files, of course, a working Internet connection is required. Benefits include, for example, the availability of files. Files can be accessed with a working Internet connection regardless of location and device. If the service provider's servers are down or the Internet connection is not available for some reason, companies have absolutely no possibility to use the applications or even view the files of the applications. It is difficult to use applications with slow or unstable data connections, as the services rely on an Internet connection (King and Raja, 2013).

4.3.3 Opportunities

Customers of SaaS applications do not need to worry about software updates. SaaS applications are priced either monthly or annually, and very often service providers offer free software updates to their customers. New updates are often useful and may include new features that allow companies to speed up their business processes even more. As the competition grows, companies must focus more and more on their core business and save on costs in order to succeed in the global market. SaaS applications are flexible, so services can be turned on or off as needed. When using the services, companies do not need to invest in, for example, license fees, server computers, or paying the salaries of IT support staff. Companies can also change the service provider of the SaaS application if necessary (Lele, 2019). A new application may enter the market that meets the company's needs more precisely than the application in use. In the traditional model, changing software can be a drawn-out and tedious process, especially if the company has a lot of terminals.

Today, every company has to more or less use IT services in some form. Service providers are constantly developing their services and bringing new cloud-based applications to the market for different uses (Chawla and Diwaker, 2012).

4.3.4 Threats

The servers of SaaS application service providers are distributed in many different countries. Companies must therefore prepare for a situation where business-critical files are stored in a different country than where the company itself is located. The laws of different countries may differ from the laws of the company's home country, so the company must be prepared for possible information security risks. The files used in SaaS applications are stored on the service provider's servers. Let's take an example where a user has accidentally deleted important files. If the files were stored locally on the user's computer, the companies themselves could try to get the data back using different methods. In SaaS applications, this is impossible, as users cannot access hardware resources (Ruan *et al.*, 2013). There may also be errors in file synchronization if there are problems with the Internet connection while using the application. In this case, the changes made by the user are not saved on the service provider's servers, which may cause many lost working hours.

The absence of local IT support staff may cause problems in situations where errors should be corrected as quickly as possible. The company's own local IT support can react to problems much faster than the IT support staff of SaaS applications. This is critical in business models where every lost minute of work causes considerable costs for the company. Service providers of SaaS applications may offer support in a language that is not necessarily familiar to the company's employee, so providing the necessary support may even be impossible in some

cases. According to the forecast, a good 60% of service providers' operating profits in 2018 will come from SaaS applications. SaaS applications are growing in popularity among both business and private users (Nowicka, 2017).

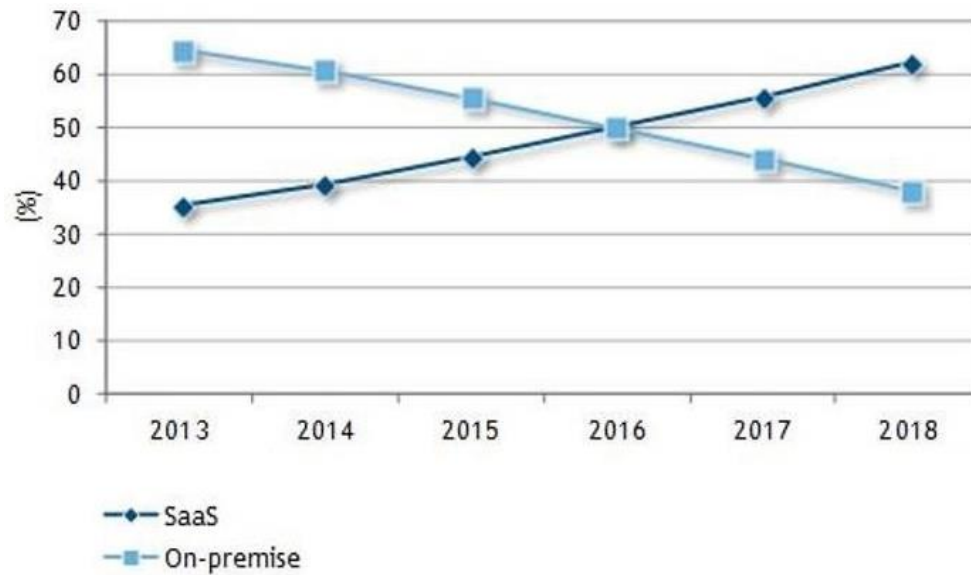


Figure 4: Forecast's prediction of the ratio of operating profits of service providers of SaaS-based CRM applications

5 CHAPTER 5: DISCUSSION

5.1 Microsoft Azure information security

Azure is a public IaaS cloud service released by Microsoft in 2010, which enables companies to run their infrastructure in the cloud. It works on the pay-for-what-you-use principle, which is why it is often a very cost-effective solution for companies. Azure enables companies to use hundreds of different services on one platform. For example, company databases, storage spaces and websites can be run in Azure. Azure also offers companies many services, such as Azure Active Directory, which works in the same way as normal Active Directory, but in the cloud (Gia *et al.*, 2015).

Microsoft spends a billion dollars every year to improve its information security, most of which is budgeted for new innovations. According to Azure's director of information security on the board, moving to the cloud is a turning point where the thinking model about cyber security must be changed. He also says that 90% of the threat landscape he sees starts with the human element, i.e. a mistake made by a person, which somehow endangers security. According to Devereaux and Gottlieb, (2012), in an ideal situation, we end up in a world where people do not interact with the Azure production environment at all.

The amount of money Microsoft spends annually on information security alone is therefore compelling and gives the impression that the company cares about its customers' information security and wants to develop it continuously. Most of the customers who use Azure hardly have the resources to put so much money into information security and its development. This makes Azure look like a very attractive option for the company also in the field of information security (-, 2013).

5.2 Data Centers and their Security

Azure consists of globally distributed data centres located in 52 different regions. These areas are divided geographically and this ensures the location, sovereignty of the data and that the legislation and requirements of the area are followed when processing the data. This enables the use of Azure also for those customers who have specific regulations related to the location of information and its storage. These geographic locations are resilient to withstand entire regional failures, because in the event of a failure, the data centre is connected to a separate high-capacity network infrastructure intended for it (de Bruin and Floridi, 2017).

Within regions, data centres are divided into many different locations, called availability regions. Each availability zone consists of one or more data centres, all equipped with independent power supplies, cooling and networking. With the help of these availability areas, it is possible to keep data availability high and enable low-latency data replication. Consequently, the company can also run business-critical programs in Azure (Villamizar *et al.*, 2015).

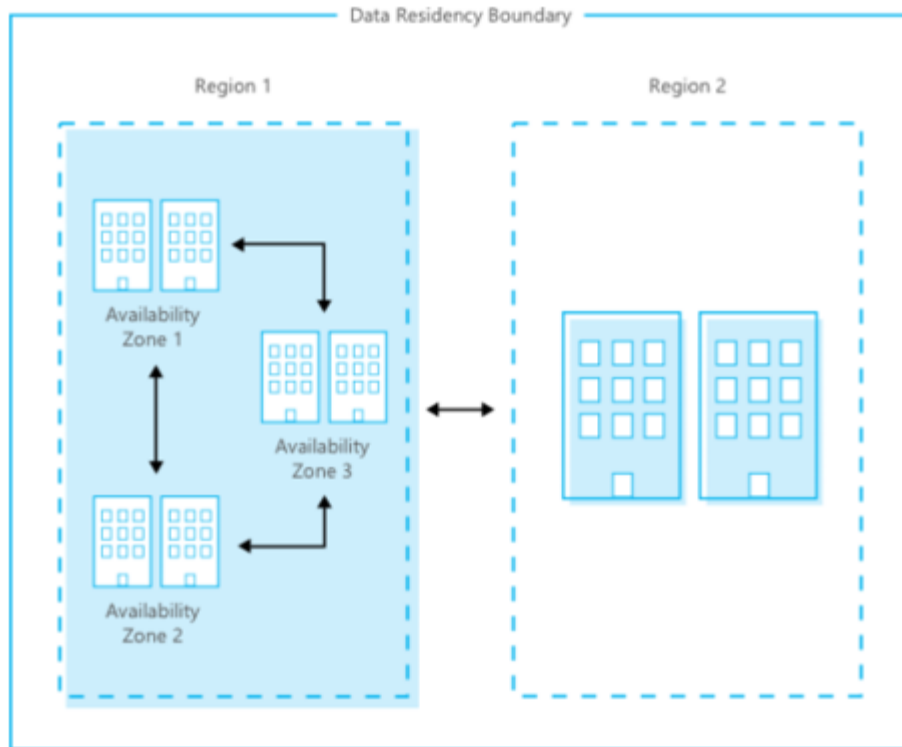


Figure 5: Azure data centres and regions are divided and connected to each other

5.3 Azure Database

In order to protect customer data and offer strong security features, the Azure database has its own security capabilities. The Azure database only supports the TDS protocol, which requires that the database can only be accessed over the default port, i.e. TCP/1433. Azure's database also contains its own firewall, which blocks all traffic to the database by default. The database gateway also has DosGuard, which protects against denial of service attacks, which actively monitors rejected logins from IP addresses and can thus block login attempts, if they constantly come from the same IP address (Issa, Chang and Issa, 2011).

5.4 Protection of Customer Data

Microsoft offers its customers strong data protection by default and also optionally by the customer. Customer data is protected, for example, by data segregation, i.e. separation and data encryption. Microsoft naturally does not monitor or observe the customer's data, and does not know what kind of data the customer stores in Azure. By default, Microsoft's operations and support staff also do not have access to customer data. If these people need access to the data, approval is always done by the management (Merschbrock and Munkvold, 2015). Access to data is carefully managed and visits are recorded in a logbook, and people are always granted the smallest possible rights to perform the task. Customers' virtual machines also do not have Microsoft's own normal or administrative users.

Separation of data is important, because Azure is a multi-customer service and the data of many customers is stored on the same physical devices. Azure uses logical isolation to separate customer data. Separation therefore provides the scope and financial benefits of a multi-customer service, while preventing customers from accessing each other's data. Azure offers its customers a wide range of different data encryption options, giving the customer the flexibility to choose the solution that best supports the company's needs. The client company is therefore itself responsible for ensuring that data encryption in Azure is handled in accordance with the company's practices (Topol, 2019). Azure has an application called Key Vault, which allows the client company to easily control the keys used to encrypt data. The customer can also enable encryption between their own virtual machines and end users' machines. Incoming or outgoing traffic can therefore be encrypted. Azure uses the TLS 1.2 or later protocol for this with 2048-bit RSA/SHA256 encryption keys in accordance with the recommendations of the CESG/NCSC (Wu and Lin, 2013).

5.5 Azure Availability & Confidentiality

Microsoft promises its service high availability, reliability, efficiency and scalability, which are achieved with the extensive redundancy available through virtualization technology. Microsoft's data centres have uninterruptible power supplies that ensure a continuous power supply in the event of short power outages. In addition to this, the data centres also have generators that produce electricity in case of longer outages or maintenance outages. The data centres also have generators that run on fuel, which are used in the event of a natural disaster. Microsoft monitors Azure's production environment every day of the year 24/7 for emergency situations and outages (Kane *et al.*, 2015). The customer's access to the Azure database is ensured through a gateway where the database is constantly available. The health and status of active databases is also monitored with checks every five minutes.

Microsoft was also the target of a major data breach in December 2019, when 250 million customer records were obtained from its database. The database contained Microsoft's customer support analytics data, which was, however, anonymized. The data included e-mail addresses, IP addresses and information on support cases, for example. However, according to Microsoft, most of the registers did not contain personal data, and according to it, personal data is also removed from support cases using automated tools in accordance with the procedures when they are exported to the database (Potts, 2012). However, some e-mail addresses had ended up in the database in such a form that it was possible to read the names of customers. According to Microsoft, this data breach was caused by incorrectly configured Azure security rules.

6 CHAPTER 6: CONCLUSION

The popularity of cloud services has grown significantly over the past few years, and more and more companies are switching or considering switching to cloud services. Cloud services have many benefits for companies. The benefits can be, for example, efficient joint use of IT resources and business efficiency with the cost savings brought by cloud services. The rise in popularity of the services has been influenced by a number of mutually influencing factors, for example the development of technology and the speeding up of telecommunication connections. The goal of the engineering work was to find out what the term cloud service means, how companies can use it in their business, and to find out the factors related to the use of SaaS applications by companies (McAfee, 2011). Based on the research, it can be concluded that SaaS applications have more strengths than weaknesses. Application weaknesses apply more to large companies with business-critical files.

The information security risks of the cloud consist largely of the same things as the risks of the traditional On-premises model. In the cloud, however, a shared responsibility model between the customer and the service provider is followed, so risk management in the cloud belongs to both parties. In the cloud, the risks are also often accentuated compared to the traditional on-premises environment. According to CSA's 2019 study, the biggest security risks to the cloud were data breaches, incorrect configurations and insufficient change management, the absence of a cloud security architecture and strategy, inadequate identity and access management, and account hijacking (Ross and Blumenstein, 2015).

Researching the information security of SMEs could have continued for a very long time, because information security involves a lot of areas that form a single whole, and a wealth of interesting information was found in Microsoft's documentation and other sources, which was

not mentioned in this study. Because of this, the topic was narrowed down to the information security of the SME's infrastructure, because it is often a more unknown aspect of cloud services for companies, and what is really going on at the end of the service provider, and how the customer's data is really protected, is often not well known if at all.

Based on the research, the SME's information security level turned out to be a positive surprise, and Microsoft seems to be protecting the SME's infrastructure actively and diligently. Since Azure is a cloud service of the IaaS service model, however, the customer remains responsible for a significant role in protecting the company's infrastructure. While doing my research, it became clear that Microsoft gives its customers a lot of good advice on how to make the company's cloud infrastructure secure in SMEs (Mell and Grance, 2011).

7 REFERENCES

- 1- Pepe, A., 2011. *The Evolution of Technology for the Accounting Profession*. [online] CPA PRACTICE ADVISOR. Available at:
<<https://www.cpapracticeadvisor.com/2011/04/19/the-evolution-of-technology-for-the-accounting-profession/1159/>> [Accessed 30 July 2022].
- 2- Keating, R., 2022. *What is Cloud Accounting? | Definitions, Strategies & Glossary*. [online] Gocardless.com. Available at: <<https://gocardless.com/guides/posts/what-is-cloud-accounting-and-how-does-it-work/>> [Accessed 1 August 2022].
- 3- Keating, R., 2022. *What is Cloud Accounting? | Definitions, Strategies & Glossary*. [online] Gocardless.com. Available at: <<https://gocardless.com/guides/posts/what-is-cloud-accounting-and-how-does-it-work/>> [Accessed 1 August 2022].
- 4- Fadel, C. and Trilling, B., and 2009. *21st century skills: Learning for life in our times*. John Wiley & Sons
- 5- Sun, Y., Zhang, J., Xiong, Y. and Zhu, G., 2014. Data Security and Privacy in Cloud Computing. *SAGE*, [online] 10(7), pp.3-6. Available at:
<<https://journals.sagepub.com/doi/full/10.1155/2014/190903>> [Accessed 30 July 2022].
- 6- Chen, D. and Zhao, H. (2012). Data Security and Privacy Protection Issues in Cloud Computing. *2012 International Conference on Computer Science and Electronics Engineering*, [online] pp.647-651. Available at:
<https://ieeexplore.ieee.org/abstract/document/6187862/> [Accessed 1 Aug. 2022].
- 7- Soudani, S., 2012. The Usefulness of an Accounting Information System for Effective Organizational Performance. *International Journal of Economics and Finance*, [online] 4(5). Available at: <<https://d1wqtxts1xzle7.cloudfront.net/39214984/16517-52549-1-SM->

with-cover-page-

v2.pdf?Expires=1659889832&Signature=T68M9zkFslZbXD4Yr5eWwo~xM11iKp-

Rjn7bd4gf~GrR5SxOJCOF52e3cuKW9sohxqiH5ZrFWc3D6egwzTVCaW0m1~Ym6Wq

lA195c7V3ZkqXzA~ksfHYYP LFVJh8wf6tpGIWxTptavbW93qMvD3bUELSXYVJIzW

GdmM~De547~TetLIzMw2gU4-

ptAHgteD1jRddhs4rlXlIEHpyWHKfbJZ47teaabf4sHej1hsUUEKL-

s4QYvJiK4MZqDegpatS-wfOdzTd35BRAOqbmQWK-XOu4ATplkM78Kesd28Qa5Cp-

Gj5-xlxYqQB7qBP eEi1AyXIVwLdGRYiXpOcV3JBqQ__&Key-Pair-

Id=APKAJLOHF5GGSLRBV4ZA> [Accessed 30 July 2022].

- 8- CASTELLUCCIO, M., 2022. *ACCOUNTING TECH THROUGH THE YEARS: A LONG LOOK BACK*. [online] Available at: <<https://sfmagazine.com/post-entry/june-2019-accounting-tech-through-the-years-a-long-look-back/>> [Accessed 1 August 2022].
- 9- Parsons, J., 2022. *New Perspectives Computer Concepts Comprehensive*. 21st ed. p.594.
- 10-Novinson,2013. Eric. "The History of Computerized Accounting". *ehow.com*. Demand Media, Inc.
- 11-Nyberg, C. (2019). Intuit, Inc.'s small business and self employed unit: A strategic analysis. Undergraduate Honors Thesis. University of Nebraska-Lincoln[Accessed 2 August 2022].
- 12-Scott, B. (2015). The Accounting Journal: accounting software grows up.Available at: <https://www.myob.com/au/blog/the-accounting-journal-accounting-software-grows-up/> [Accessed 3 August 2022].
- 13-Turner, L., Copeland, M. and Weickgenannt, A., 2022. *Accounting Information Systems: The Processes and Controls*. John Wiley & Sons, p.60.

- 14-Dalcı, İ. & Tanış, V. N. (2004). Benefits Of Computerized Accounting Information Systems On The JIT Production Systems . Çukurova Üniversitesi Sosyal Bilimler Enstitüsü Dergisi , 13 (1) , . Retrieved from <https://dergipark.org.tr/en/pub/cusosbil/issue/4369/59752> [Accessed 2 August 2022].
- 15-Ghasemia, M., Shafeiepourb, V., Aslanic, M. and Barvayehd, E., 2011. The impact of Information Technology (IT) on modern accounting systems. *Procedia - Social and Behavioral Sciences*, [online] 28, pp.112-116. Available at: <<https://www.sciencedirect.com/science/article/pii/S1877042811024621>> [Accessed 1 August 2022].
- 16-Choudhary, S., jadoun, R. and Mandoriya, H., 2017. Role of Cloud Computing Technology in Agriculture Fields. *Computer Engineering and Intelligent Systems*, [online] 7(3). Available at: <<https://core.ac.uk/download/pdf/234645129.pdf>> [Accessed 1 August 2022].
- 17-Dimitriu, O., & Matei, M. (2014a). A New Paradigm for Accounting through Cloud Computing. *Procedia Economics and Finance*, 15, 840-846. Dimitriu, O., & Matei, M. (2014b). The Expansion of Accounting to the Cloud. *SEAPractical Application of Science*, (4), 237-240.
- 18-Mell, P. and Grance, T. (2011). *National Institute of Standards and Technology's*. [online] NIST. Available at: <https://www.nist.gov/news-events/news/2011/10/final-version-nist-cloud-computing-definition-published> [Accessed 7 Jul. 2022].
- 19-Dimitriu, O., & Matei, M. (2015). Cloud Accounting: A New Business Model in a Challenging Context. *Procedia Economics and Finance*, 32, 665-671. doi:[http://dx.doi.org/10.1016/S2212-5671\(15\)01447-1](http://dx.doi.org/10.1016/S2212-5671(15)01447-1)[Accessed 9 Aug. 2018].

- 20-Arsenie-Samoil, M. D. (2011). Cloud Accounting. Ovidius University Annals, Economic Sciences Series, 2, 782-87.
- 21-Armbrust, M., Fox, A., Griffith, R., Joseph, A. D., Katz, R., Konwinski, A., . . . Stoica, I. (2010). A view of cloud computing. *Communications of the ACM*, 53(4).
- 22-Ahmed, M. and Ashraf Hossain, M. (2014) ‘Cloud Computing and Security Issues in the Cloud’, *International Journal of Network Security & Its Applications* [Preprint]. Available at: <https://doi.org/10.5121/ijnsa.2014.6103>.
- 23-Alani, M.M. (2016) ‘Security threats in cloud computing’, in *SpringerBriefs in Computer Science*. Available at: https://doi.org/10.1007/978-3-319-41411-9_3.
- 24-Aleem, A. and Ryan Sprott, C. (2012) ‘Let me in the cloud: Analysis of the benefit and risk assessment of cloud platform’, *Journal of Financial Crime* [Preprint]. Available at: <https://doi.org/10.1108/13590791311287337>.
- 25-Ali, M., Khan, S.U. and Vasilakos, A. V. (2015) ‘Security in cloud computing: Opportunities and challenges’, *Information Sciences* [Preprint]. Available at: <https://doi.org/10.1016/j.ins.2015.01.025>.
- 26-Appuswamy, R. *et al.* (2013) ‘Scale-up vs scale-out for hadoop: Time to rethink?’, in *Proceedings of the 4th Annual Symposium on Cloud Computing, SoCC 2013*. Available at: <https://doi.org/10.1145/2523616.2523629>.
- 27-Armbrust, A. Fox, and R. Griffith, M. (2009) ‘Above the clouds: A Berkeley view of cloud computing’, *University of California, Berkeley, Tech. Rep. UCB* [Preprint]. Available at: <https://doi.org/10.1145/1721654.1721672>.
- 28-Armbrust, M. *et al.* (2010) ‘A view of cloud computing’, *Communications of the ACM* [Preprint]. Available at: <https://doi.org/10.1145/1721654.1721672>.

- 29-Berl, A. *et al.* (2010) 'Energy-efficient cloud computing', *Computer Journal* [Preprint].
Available at: <https://doi.org/10.1093/comjnl/bxp080>.
- 30-Blandford, R. (2011) 'Information security in the cloud', *Network Security* [Preprint].
Available at: [https://doi.org/10.1016/S1353-4858\(11\)70040-X](https://doi.org/10.1016/S1353-4858(11)70040-X).
- 31-de Bruin, B. and Floridi, L. (2017) 'The Ethics of Cloud Computing', *Science and Engineering Ethics* [Preprint]. Available at: <https://doi.org/10.1007/s11948-016-9759-0>.
- 32-Buyya, R., Broberg, J. and Goscinski, A. (2011) *Cloud Computing: Principles and Paradigms, Cloud Computing: Principles and Paradigms*. Available at:
<https://doi.org/10.1002/9780470940105>.
- 33-Chawla, S. and Diwaker, C. (2012) 'Cloud computing', *International Journal of Applied Engineering Research* [Preprint]. Available at: <https://doi.org/10.4018/jeei.2012040104>.
- 34-Devereaux, R.L. and Gottlieb, M.C. (2012) 'Record keeping in the cloud: Ethical considerations', *Professional Psychology: Research and Practice* [Preprint]. Available at:
<https://doi.org/10.1037/a0028268>.
- 35-Gia, T.N. *et al.* (2015) 'Fog computing in healthcare Internet of Things: A case study on ECG feature extraction', in *Proceedings - 15th IEEE International Conference on Computer and Information Technology, CIT 2015, 14th IEEE International Conference on Ubiquitous Computing and Communications, IUCC 2015, 13th IEEE International Conference on Dependable, Autonomic and Se.* Available at:
<https://doi.org/10.1109/CIT/IUCC/DASC/PICOM.2015.51>.
- 36-Hashem, I.A.T. *et al.* (2015) 'The rise of "big data" on cloud computing: Review and open research issues', *Information Systems* [Preprint]. Available at:
<https://doi.org/10.1016/j.is.2014.07.006>.

- 37-Issa, D.T., Chang, A.V. and Issa, D.T. (2011) 'Sustainable Business Strategies and PESTEL Framework', *GSTF INTERNATIONAL JOURNAL ON COMPUTING* [Preprint]. Available at: https://doi.org/10.5176/2010-2283_1.1.13.
- 38-Kaufman, L.M. (2009) 'Data security in the world of cloud computing', *IEEE Security and Privacy* [Preprint]. Available at: <https://doi.org/10.1109/MSP.2009.87>.
- 39-Khan, M. *et al.* (2017) 'Big data challenges and opportunities in the hype of Industry 4.0', in *IEEE International Conference on Communications*. Available at: <https://doi.org/10.1109/ICC.2017.7996801>.
- 40-King, N.J. and Raja, V.T. (2013) 'What Do They Really Know About Me in the Cloud? A Comparative Law Perspective on Protecting Privacy and Security of Sensitive Consumer Data', *American Business Law Journal* [Preprint]. Available at: <https://doi.org/10.1111/ablj.12012>.
- 41-Kranz, J.J., Hanelt, A. and Kolbe, L.M. (2016) 'Understanding the influence of absorptive capacity and ambidexterity on the process of business model change – the case of on-premise and cloud-computing software', *Information Systems Journal* [Preprint]. Available at: <https://doi.org/10.1111/isj.12102>.
- 42-Lele, A. (2019) 'Cloud computing', in *Smart Innovation, Systems and Technologies*. Available at: https://doi.org/10.1007/978-981-13-3384-2_10.
- 43-Li, H. *et al.* (2016) 'Pricing and Repurchasing for Big Data Processing in Multi-Clouds', *IEEE Transactions on Emerging Topics in Computing* [Preprint]. Available at: <https://doi.org/10.1109/TETC.2016.2517930>.
- 44-Maqueira-Marín, J.M., Bruque-Cámara, S. and Minguella-Rata, B. (2017) 'Environment determinants in business adoption of Cloud Computing', *Industrial Management and*

- Data Systems* [Preprint]. Available at: <https://doi.org/10.1108/IMDS-11-2015-0468>.
- 45-Mell, P. and Grance, T. (2011) 'The NIST definition of cloud computing', in *Cloud Computing and Government: Background, Benefits, Risks*. Available at: <https://doi.org/10.1016/b978-0-12-804018-8.15003-x>.
- 46-Nowicka, K. (2017) 'Competitiveness of Polish enterprises in relation to the potential of cloud computing', *Kwartalnik Nauk o Przedsiębiorstwie* [Preprint]. Available at: <https://doi.org/10.5604/01.3001.0010.0158>.
- 47-Rahman, M.A. and Hossain, M.S. (2019) 'A cloud-based virtual caregiver for elderly people in a cyber physical IoT system', *Cluster Computing* [Preprint]. Available at: <https://doi.org/10.1007/s10586-018-1806-y>.
- 48-Ross, P.K. and Blumenstein, M. (2015) 'Cloud computing as a facilitator of SME entrepreneurship', *Technology Analysis and Strategic Management* [Preprint]. Available at: <https://doi.org/10.1080/09537325.2014.951621>.
- 49-Ruan, K. *et al.* (2013) 'Cloud forensics definitions and critical criteria for cloud forensic capability: An overview of survey results', *Digital Investigation* [Preprint]. Available at: <https://doi.org/10.1016/j.diin.2013.02.004>.
- 50-Singh, S. and Soni, U. (2019) 'Predicting order lead time for just in time production system using various machine learning algorithms: A case study', in *Proceedings of the 9th International Conference On Cloud Computing, Data Science and Engineering, Confluence 2019*. Available at: <https://doi.org/10.1109/CONFLUENCE.2019.8776892>.
- 51-Subashini, S. and Kavitha, V. (2011) 'A survey on security issues in service delivery models of cloud computing', *Journal of Network and Computer Applications* [Preprint]. Available at: <https://doi.org/10.1016/j.jnca.2010.07.006>.

- 52-Ukpe, K. (n. d.). S.M. on C.R. from http://www.cs.uic.edu/~xkong/wsdm14_lu.pdf. *et al.* (2015) *Are social media silos holding back business results?* | *ZDNet*, 25.06.2015.
- 53-Villamizar, M. *et al.* (2015) ‘Evaluating the monolithic and the microservice architecture pattern to deploy web applications in the cloud’, in *2015 10th Colombian Computing Conference, 10CCC 2015*. Available at:
<https://doi.org/10.1109/ColumbianCC.2015.7333476>.
- 54-Wang, B. *et al.* (2015) ‘DDoS attack protection in the era of cloud computing and Software-Defined Networking’, *Computer Networks* [Preprint]. Available at:
<https://doi.org/10.1016/j.comnet.2015.02.026>.
- 55-Zimmermann, A. *et al.* (2015) ‘Digital enterprise architecture-transformation for the internet of things’, in *Proceedings of the 2015 IEEE 19th International Enterprise Distributed Object Computing Conference Workshops and Demonstrations, EDOCW 2015*. Available at: <https://doi.org/10.1109/EDOCW.2015.16>.