

UDK
334.72:657]:004.75:004.455(497.7)

(Original scientific paper)

BLAGICA KOLEVA¹

BILJANA ANGELOVA²

CLOUD COMPUTING AS A NEW PARADIGM FOR MACEDONIAN ACCOUNTING COMPANIES

Abstract

Accounting as a generator of a large amount of key information for a large number of stakeholders requires the use of reliable technology, methods and techniques for processing and storing relevant information. The unprecedented expansion of information technology of the last few years together with the emergence of the Internet, did not leave accounting immune to changes and introduced new paradigms in the way this profession is practiced. Cloud accounting and its collective impact is an example of such a new paradigm that is the focus of this paper. Cloud accounting is accounting where the accounting software, as well as the data, are located on a remote server that is not owned by a specific company. Cloud accounting software performs the same function as traditional accounting software, the only difference being its location, mobility and cost.

Keywords: accounting, digitalization, cloud accounting, accounting software, efficiency.

JEL Classification:M40,M41

¹ PhD, University “Goce Delcev“, Faculty of Economics- Shtip, Republic of North Macedonia E-mail:blagica.koleva@ugd.edu.mk

² PhD, Ss.Cyril and Methodius University in Skopje, Institute of Economics-Skopje, Republic of North Macedonia, E-mail:b.angelova@ukim.edu.mk

Introduction

Cloud technologies represent an evolution in the IT world and a response to the growing demands of the business community, which is constantly interested in a new, well-organized and secure IT infrastructure. Cloud, as one of the main IT trends, is increasingly more present today and enables a new use of information technology. The business world is constantly changing and becoming more competitive and sophisticated with the advancement of cloud technology, which is one of the biggest technological advances and trends at the moment. The cloud is a platform for making data available anytime, anywhere, from almost any device with an internet connection. The most well-known term for cloud technology is the English term cloud computing. The term "cloud" is an integral part of this phenomenon and one of its foundations, which is identified with accessibility, mobility and speed of data management. Cloud is a term for a computing service that stores data on the Internet, rather than storing them on local computers or other devices. It also includes computer services for online information processing. Cloud services are performed on special computers called servers. Hundreds of thousands of servers gathered together in data centers provide these services. Cloud services are designed to keep data secure and private, regardless of whether they are stored for a long time or are there only briefly. Cloud storage services usually offer a certain amount of free storage, available for a certain number of devices. Cloud technology can significantly improve the efficiency of business processes and reduce costs. There are many benefits to the application of this technology such as cost, scale and productivity.

Traditionally, accounting is performed using software that is locally installed on a computer. In contrast to this, cloud technology allows the use of software that is entirely in the cloud and operates exclusively on the internet. It is software for which, most of the time, a regular monthly or annual fee is paid, which frees those working in accounting from buying, installing and maintaining programs on individual computers. Instead, all employees regardless of which computer they are working on can connect and access the data they need. Traditional (on-premise) accounting uses traditional accounting software, which means software that is installed on a company's computer and used to keep business books and other administrative tasks. The data is primarily prepared and stored on these computers.

Cloud accounting is accounting where the accounting software, as well as the data, are located on a remote server that is not owned by a particular

company. Cloud accounting is a system that allows multi-user access and secure storage on the Internet or a remote server. Users send all the data to cloud providers where the same data is processed, stored and retrieved securely. Cloud technology enables business processes to be streamlined and adapted to the growth of the company.

Cloud accounting software performs the same function as traditional accounting software, the only difference is its location, mobility and cost. The main difference is that Cloud accounting software is "hosted" on remote servers and that business data is sent to the "Cloud", where it is processed, stored and where the user can "retrieve" it at any time. Therefore, for the operation of the cloud accounting software, only the Internet is required. Cloud-based accounting works by using secure web-based software to help streamline business processes. Small business owners and their finance teams can access all the key data from their locations, making collaboration and financial reporting easier. Users can access the software applications over the Internet or other networks through a cloud application service provider. With cloud-based software, a company does not have to set up individual desktops with software because everyone in the company can access the cloud on their own devices. From finance teams to receivables, remote teams or branches can access the same key data and financial records.

1. TERM AND CHARACTERISTICS OF CLOUD COMPUTING

The term "cloud" in cloud computing refers to computing resources that companies and users can access from remote locations, without needing to know where the hardware and software are physically located. Today, hardware and software resources located in locations beyond the physical boundaries of a company can be easily accessed through the Internet and a web browser. Accounting, as the language of the business world, serves every company from the very beginning of its operation, and with the advent of accounting software, the practice of accounting has improved significantly. Like other business sectors, accounting has also embraced cloud technology solutions to provide relevant information and a real-time overview of the business. Such solutions occupy a very important place in the optimization and improvement of all business processes of a company, which is why companies should not ignore them, but rather accept and apply them in business. Certain businesses that have already adopted cloud computing services have stated that

they have opted this choice because it helps reduce IT costs, the services are easy to use, information is secure, cannot be lost or stolen, and because it increased the mobility of their employees. Although an increasing number of companies are starting to apply accounting in the cloud, there are still companies and/or individuals who are skeptical about the introduction of this technology in their business.³

The main characteristics of cloud computing are:⁴

1. providing services at the request of the user,
 2. broad network access,
 3. pooling of resources,
 4. elasticity and
 5. measurable use.
- Providing on-demand services to users (on-demand self-service) allows users to independently select and manage the computing resources they need. In this way, users can choose the time of the service, as well as the size of the data storage space, independently, without the need to communicate with the service provider.
 - Broad network access implies that the services are available over the network and can be accessed through standard devices such as mobile phones, tablets, laptops, etc.
 - Pooling of resources – the computer resources of the provider are combined using the so-called Multi-tenant model, that allows several users to use the service at the same time, with different physical and virtual resources, which are assigned and removed at the request of the user.
 - Quick elasticity – services can be started quickly and flexibly, sometimes automatically, in order to adapt resources to the current needs of users.
 - Capacities available to users are often unlimited and can be accessed at any time.

³Armbrust, M., Fox, A., Griffith, R., Joseph, A. D., Katz, R., Konwinski, A. & Zaharia, M. A view of cloud computing. *Communications of the ACM*, (2010). 53(4), 50-58.

⁴National Institute of Standards and Technology. *The NIST Definition of Cloud Computing. Recommendations of the National Institute of Standards and Technology*

- Measured use (Measured service). Cloud systems automatically control and optimize the use of resources. Resource usage can be monitored, controlled and reported, reports can be created that provide transparency for the service provider and the user.

Other features of cloud computing are:

- Easy payment structure - Cloud computing offers a Pay-as-you-go payment method that is billed based on usage basis.
- Automation - The ability of cloud computing to automatically install, update, automatically provision, configure and maintain a cloud service is known as automation in cloud computing. Improves efficiency and productivity with less human supervision.
- Security - Security plays a vital role in the prevention of cyber threats, data leakage and the privacy of sensitive information. Thus, cloud computing stores data in an encrypted form. And to limit access to files, proxies and mediation are used.
- Flexibility - Cloud computing is a fundamentally flexible IT solution, which gives businesses access to storage and software that scales to meet their real-time needs and achieve goals. Users have freedom when hosting their data on a cloud platform.
- Scalability - With the help of scalability, we can add or delete resources according to the people visiting our application. That helps us maintain the quality during expansion.
- Resource pooling system - In the resource pooling model of cloud computing, the service provider serves multiple clients simultaneously with scalable and temporary services. Resource pooling is done flexibly without any technical challenges.

In terms of the security of this technology, cloud accounting providers use encryption, rewriting the information in a secure, unbreakable code, to send and store data. Cloud solutions use the same type of security that is used to make financial data and online banking safe.⁵

Cloud accounting software offers the following security measures:

- safe premises,
- security personnel,
- automatic off-site backup server,
- regular security checks,

⁵Mayevsky, M. The Clouds Economy. Chiron Academic Press, (2014) p. 174.

- software for high level digital security with input and output encryption,
- multiple segregated networks,
- multiple built-in user authentication methods,
- dedicated anti-malware staff,
- customer service and technical support and
- automatic updates.

2. ADVANTAGES AND PROBLEMS OF USING CLOUD COMPUTING IN BUSINESS

The advantages of using cloud computing in business are numerous. Some of these benefits include the following:

- **Costs:** Cloud computing eliminates capital costs, costs of purchasing hardware and software, and managing data centers.
- **Speed:** Since most computing services are in the cloud, large amounts of computing resources can be provisioned within minutes.
- **Scope:** Cloud computing enables global availability, which means companies can get the right amount of resources in almost any geographic location.
- **Productivity:** Cloud computing eliminates the need to customize hardware, software and other long-term tasks, which increases the productivity of employees in enterprise IT teams.
- **Performance:** Given that cloud computing services operate on a global network of protected data centers, computer equipment is constantly updated and upgraded.
- **Reliability:** Cloud computing allows for data backup, and business continuity. Services based on cloud technology, thanks to the huge capacities that are available, they can quickly respond to the requests due to the increased demand for the service. Also, cloud service providers are in charge of maintaining the physical resources and the risks are fully transferred to them.

Unlike traditional software, cloud software is accessible from any computer, tablet or smartphone, from any location. To connect to the cloud software the

user only needs an internet connection. This means that information can be within reach, whether or not the user is in the office, on the road or at home.

Also, through this means of communication, the user can authorize other users, such as accountants, and give them access to financial data. Cloud computing increases collaboration between employees, and allows synchronization and work on shared documents and applications simultaneously. Companies that use cloud computing rent only the resources they need and continue to reduce the cost of doing business as well as the negative impact on the environment. Cloud accounting gives accountants instant and mobile access to financial information and completely changes the way accountants work.

Both traditional accounting software and cloud accounting solutions have their own advantages and disadvantages. Small and medium-sized enterprises typically have less complex IT needs and support than larger enterprises. Small and medium-sized enterprises are often happy to outsource IT delivery and operations to third parties.⁶ On the other hand, for some companies, the use of traditional accounting software would still be more beneficial. These are, for example, companies that want tight control over their accounting data or companies that hold very sensitive financial information such as banks. The advantages of cloud accounting are: lower costs, security, availability, updates, automatic backup, copying and data recovery. The advantages of cloud accounting are obvious, but there are still potential risks that users of this software face, some of them are: Internet connection, security, reduced control.

In addition to the numerous advantages of using cloud computing in business, problems and challenges inevitably arise in the use of this technology. Problems with using this technology in business mostly concern the security of keeping business information. Cloud computing carries significant risks related to the privacy and confidentiality of data stored in the cloud.

⁶Mayevsky, M. The Clouds Economy. Chiron Academic Press, (2014) p. 174.

3. CLOUD COMPUTING IN THE ACCOUNTING PROFESSION

Before addressing cloud computing in accounting, let's give a brief explanation of the importance of an efficient accounting system. An accounting system allows a business to analyze financial information. A well-designed system must meet the needs of processing transactions and controlling the drafting of financial statements. The accounting system simultaneously provides information to different levels of managers, managers in production, human resources, finance, marketing and logistics. The information helps managers plan and control operations as well as provide reports to stakeholders, creditors and government agencies. Too often, traditional accounting systems do not do this with adequate business support.⁷

In general, accounting systems can be divided into two groups:

1. an accounting system installed on local computers located within the company and
2. web accounting system installed on servers.

Web accounting software is based on Internet technologies where information is stored on servers or in the cloud. The cloud accounting system allows a company's accounting to function online. This is known as online accounting or in some circumstances as SaaS (software as a service) accounting software. Traditionally, accounting is performed using software that is locally installed on a computer. In contrast to this, cloud technology allows the use of software that is entirely in the cloud and operates exclusively on the internet. It is software for which a regular monthly or annual fee is usually paid and frees those working in accounting from buying, installing and maintaining programs on individual computers.⁸ Instead, all employees regardless of which computer they are working on can connect and access the data they need.

For example, if an accountant needs to complete an important project that requires a large amount of data, and his computer does not have enough memory, he can upload everything to the cloud through an application that is managed by a server and whose capacity can be expanded. Another example

⁸Dimitriua O; Mateia M, Cloud accounting: a new business model in a challenging context, *Procedia Economics and Finance* 32, Iasi,2015 p. 667

would be when the accountant's computer or other device needs to be formatted, which would erase all data. He/she can put all the documents, pictures, records and other information in the cloud and open them on a completely different device in a completely different place without any restrictions and losses.

Cloud accounting can be seen as a form of virtual accounting information system. The user can access the information through a laptop, tablet, mobile phone and other devices. An increasing number of companies are starting to apply this technology in their business, in almost all business functions. It allows for fast access and analysis of large amounts of data. The use of this technology in accounting also allows achieving lower costs and faster access to accounting information. Since accounting is directly related to money management and all information in this case is located on servers that are not owned by the company, there is a high level of concern for the security of the information. For example, if there is an interruption of the Internet connection, then access to the accounting information located on the cloud is disabled. Also, the company loses control over the accounting software, which is fully managed by the provider.

4. EMPIRICAL RESEARCH

In this section, we will present a micro-research that included respondents, top managers of 25 business entities, 7 of which are from the manufacturing sector and 18 from the service sector. The research was conducted according to the survey method. An online survey was used, and forwarded to the managers' email address.

The first survey question refers to the manager's familiarity with the concept of cloud computing in accounting.

The first question reads: Are you familiar with the concept of cloud computing in accounting?

Suggested answers:

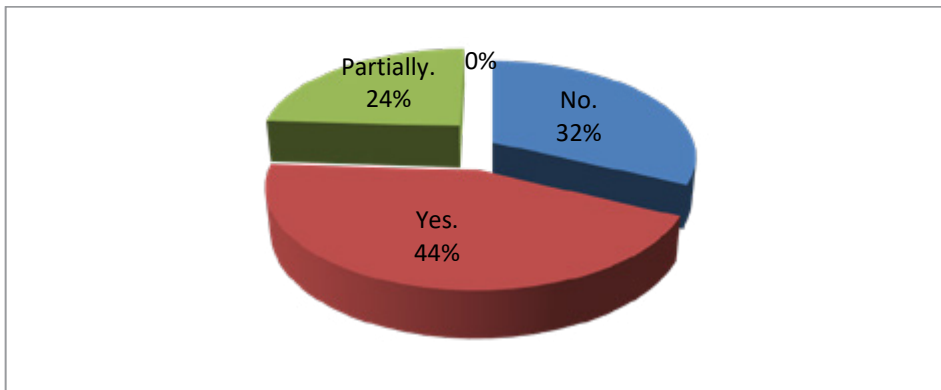
- Yes.
- Partially.
- No.

The results obtained from the surveyed respondents are showcased in tabular and graphic form.

Table 1. Presentation of respondents' answers to the first question

Question asked:		
Are you familiar with the concept of cloud computing in accounting?		
Answers offered		
1. Yes.	2. Partially.	3. No.
Accountants' individual responses		
11	6	8

Chart 1. Presentation of respondents' answers to the first question



From the total number of respondents, 8 managers (32%) are not familiar with the possibilities of using these services in accounting, 6 managers are partially aware of this possibility (24%), while 11 of them (44%) are familiar with the application of this technology in accounting. Respondents who answered negatively to the first question did not have the opportunity to answer the remaining two questions, so only 17 respondents answered the second question.

The second question reads: Do you think that the use of cloud computing in accounting can contribute to greater operational efficiency?

Suggested answers:

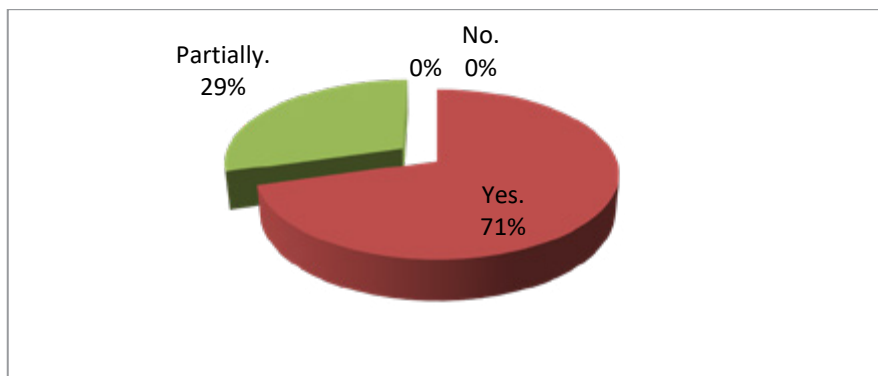
- Yes.
- Partially.
- No.

The results obtained from the surveyed respondents are shown in tabular and graphic form.

Table 2. Presentation of respondents' answers to the second question

Question asked:		
<i>Do you think that the use of cloud computing in accounting can contribute to greater operational efficiency?</i>		
Answers offered		
1. Yes.	2. Partially.	3. No.
Accountants' individual responses		
12	5	0

Chart 2. Presentation of respondents' answers to the second question



Most of them (71%) believe that the use of this technology can contribute to more efficient management in the company, while 5 respondents (29%) believe that this technology partially contributes to more efficient management (chart 2).

The third question reads: What is the main problem in using cloud computing technology in accounting?

Suggested answers:

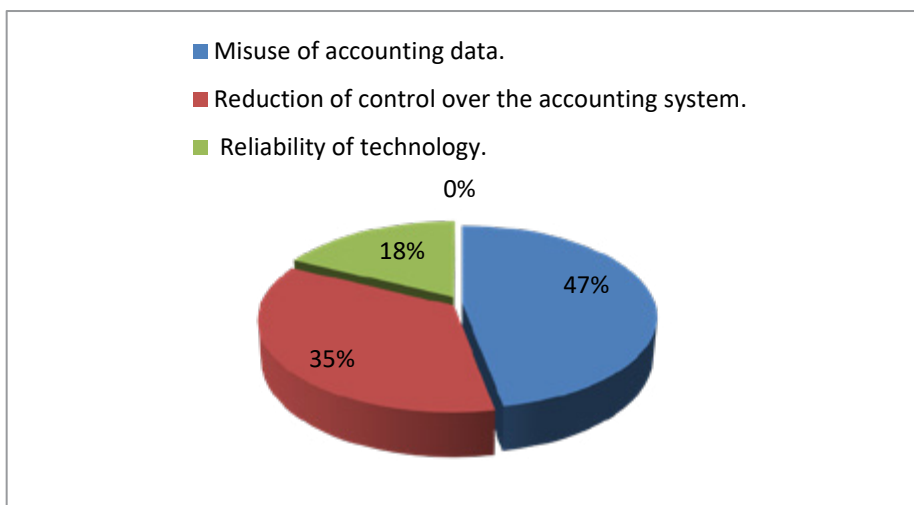
- Misuse of accounting data.
- Reduced control over the accounting system.
- Reliability of technology.

The results obtained from the surveyed respondents are shown in tabular and graphic form.

Table 3. Presentation of respondents' answers to the third question

Question asked:		
What is the main problem in using cloud computing technology in accounting?		
Answers offered		
1. Misuse of accounting data.	2. Reduced control over the accounting system.	3. Reliability of technology.
Accountants' individual responses		
8	6	3

Chart 3. Presentation of respondents' answers to the third question



Surveyed managers are the main problem of the use of this service in accounting. Of the respondents, 8 managers believe that the main problem for the use of this technology in accounting is the possibility of misuse of accounting data (47%), 6 managers due to the reduction of control over the accounting system (35%) and 3 managers due to the confidentiality of the technology (18%).

Conclusion

Cloud technology is the right solution for a modern accounting information system, for efficient management of business processes and greater operational efficiency. The cloud accounting information system thus becomes a factor on the basis of which the competitive advantages of companies are strengthened. The main advantage of the cloud in accounting is the increasing the efficiency of the accounting system. Also, this technology leads to an increase in productivity, decrease in operating costs, an improvement of liquidity, profitability and other relevant financial indicators. Cloud computing in accounting brings a significant number of quality solutions, and they refer to: integrity in data entry, transparency in business, improved financial reporting, reduction of operating costs, reduction of administration in the execution of these operations, as well as better alignment of processes throughout the business.

Since accounting is directly related to money management, and in cloud computing the information resides on servers that are not owned by businesses, there is a high level of concern about the security of this information. The research we did showcased that managers identify this problem as the main one when it comes to the use of this technology.

Also, a reduction in control over the accounting software, which is entirely managed by the provider, has been recognized as one of the significant problems associated with this technology. The application of cloud computing in our country is at an extremely low level. The main reasons for this are: insufficient quality of the communication infrastructure and the complexity of the legislation. Larger companies are starting to apply certain IT solutions that are related to cloud computing, as opposed to small and medium-sized companies where it is still in the planning phase. The main reasons for this are related to mistrust and lack of information in the economy. It is of great importance that education and legal compliance in our country encourages users to implement this management system in companies.

References

1. Armbrust, M., Fox, A., Griffith, R., Joseph, A. D., Katz, R., Konwinski, A., ... & Zaharia, M. A view of cloud computing. *Communications of the ACM*, (2010) 50-58.
2. Boomer J. (2013). –Benefits and Challenges of Cloud Accounting. CPA Practice Advisor.
3. Csaplar, D. Aberdeen Group. The Proven Benefits of Backing-Up Data to the Cloud
4. Chan, W., Leung, E., Pili, H., & Crowe Horwath LLP (2012). Enterprise Risk Management for Cloud Computing. – Thought Leadership in ERM. 1-23.
5. Gill, R. Why Cloud Computing Matters to Finance. *Strategic Finance*, (2011) 92(7), 43-47.
6. Christauskas, C., & Miseviciene, R. (2012). Cloud–Computing Based Accounting for Small to Medium Sized Businesses. *Engineering Economics*, 23(1), 14-21
7. Dimitriu, O., & Matei, M. (2015). Cloud Accounting: A New Player in the Economic Context.
8. Dimitriu, O., & Matei, M. (2014). A New Paradigm for Accounting through Cloud Computing. In: *Procedia Economics and Finance, Emerging Markets Queries in Finance and Business (EMQ 2013)*, 24-27 October 2013 (pp. 840-846).
9. Hui, D., & Yu, C. Cloud Computing, Accounting, Auditing, and Beyond. *CPA Journal*, (2010) 80(10), 66-70.
10. Mayevsky, M *The Clouds Economy*. Chiron Academic Press. (2014)
11. National Institute of Standards and Technology. The NIST Definition of Cloud Computing.
12. Quinn, M; Strauss, E; Kristandl, G. The effects of cloud technology on management accounting and business decision-making. *Financial Management*. (2014)
13. Savić, Mirko, i Siniša Janković *Primena Cloud computing-a u rakvodstvu, Synthesis, International Scientific Conference of IT and Business-Related Research, Beograd*, (2015) p. 719.
14. Weinman, J. (2012). *Cloudonomics: The business value of cloud computing*. John Wiley & Sons