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ANALYSIS OF THE DEVELOPMENT OF CLOUD TECHNOLOGIES IN ACCOUNTING

The object of research is cloud technologies in accounting.

The research is devoted to the study of modern achievements in the field of cloud technologies and the justification of the need for their use in the field of accounting for deeper analysis, modeling and forecasting based on timely and complete information about business processes.

The article provides statistical data that indicate how cloud technologies are positively changing the course of accounting development. In the context of such positive changes, the authors highlight the differences between traditional accounting and cloud accounting, and highlight the advantages of its implementation at enterprises. The cloud accounting software is analyzed and its main characteristics are highlighted.

It is concluded that at the present stage of development of information technologies, the use of cloud computing is gaining popularity. This, in turn, in the field of accounting, can provide significant cost savings and unprecedented flexibility in how enterprises can use information technology. That is why the use of cloud computing in accounting has never been more important.

The main theoretical provisions of the article can be used in the practical activities of enterprises and help to choose the optimal cloud technology for accounting in accordance with the needs of the business entity. The results obtained will be useful for managers of enterprises of all forms of ownership, as they provide an answer to the need to implement cloud technologies in their activities. This, in turn, is an ideal solution to the problems that arise, which will allow the business entity to continue its work and reach a new level, develop a successful business and be able to keep it in the market.

Keywords: *cloud computing, accounting, software, cloud accounting, traditional accounting, private cloud, public cloud, hybrid cloud.*

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1. Introduction

Nearly 45 years ago, technology vendors released the first accounting software and forever changed how accountants do their jobs. Systems that ran on computers replaced paper ledgers and the basic tools that helped bookkeepers crunch numbers.

As accounting software matured, it took another major leap forward with the invention and advancement of cloud-based accounting systems. Much like other cloud software, these solutions gave businesses game-changing flexibility while reducing capital expenditures and maximizing human resources.

Cloud accounting offers clear advantages over previous approaches to this critical business function, which explains why it has gained widespread adoption [1].

Cloud-based accounting software is creating a buzz in the industry these days as they help accountants, CPAs, and business owners streamline their accounting process as well as increase the efficiency and productivity of the business.

As per a recent report published in GoRemotely, 94 % of accountants have adopted cloud accounting [2].

Cloud accounting software is similar to traditional, on-premises, or self-install accounting software, only the accounting software is hosted on remote servers, similar to the SaaS (Software as a Service) business model. Data is sent into «the cloud», where it is processed and returned to the user [3].

There are 3 types of cloud computing (Fig. 1) [4].

The benefits of cloud computing are considerable, and recent accounting changes have made cloud solutions even more attractive to many businesses. On August 29, 2018, the FASB issued new guidance on a customer's accounting for implementation, set-up and other upfront costs incurred in a cloud computing arrangement (CCA) hosted by the vendor – that is, a service contract. Under the new guidance, a customer will apply the same criteria for capitalizing implementation costs of a CCA as it would for an on-premises software license [5].

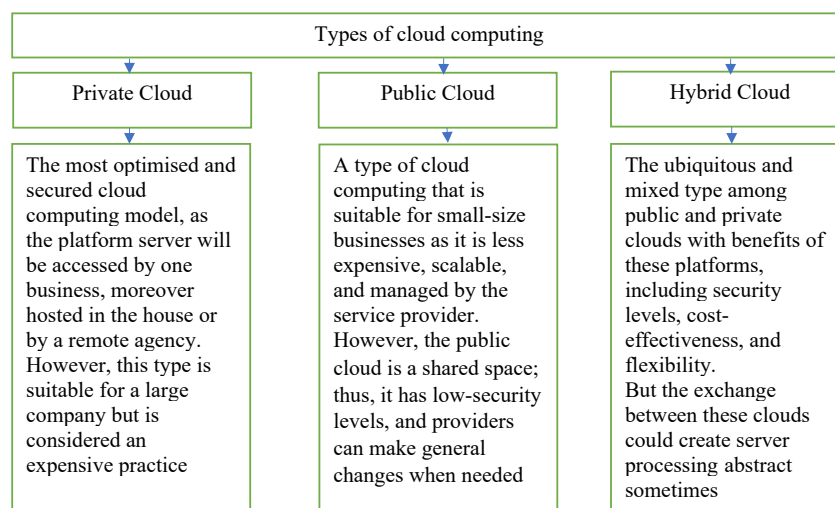


Fig. 1. Types of cloud computing

The aim of the article is to study the trends in the development of accounting software in the context of cloud technologies, to identify the advantages and disadvantages of using cloud technologies in solving accounting tasks in automated systems.

In turn, this will make it possible to offer business entities effective approaches to solving accounting and taxation tasks.

2. Materials and Methods

The object of research is the cloud technologies of accounting, the peculiarities of their usage at enterprises. Theoretical methods were used in the research: analysis, synthesis, induction and deduction. Scientists works were analysed according to that very issue.

3. Results and Discussion

3.1. Results. The evolution of cloud computing technology has revolutionized the way organizations function and handle their businesses. Adapting cloud computing in accounting for reaping the overall benefits of accounting is something many are currently choosing.

Cloud computing accounting involves hosting and carrying out accounting tasks such as auditing, storing data, bookkeeping, data entry, and data processing on the internet, a feature born out of an innovative marriage between technology and business [6].

With cloud accounting software, it's also easier to get real-time reporting and visibility throughout your organization, with greater mobile capabilities and collaboration. Subscription-based models are popular among cloud accounting providers, and in most cases these subscriptions are usage-based. Companies that pay a cloud accounting subscription received updates to the software as soon as they arrive, with no additional software purchases required [3].

Another words, cloud accounting is a system that allows multi-user access and safe online or remote server storage. Your users send all your data to cloud providers where the same data is processed and safely stored, and returned. Cloud technology allows business processes to be streamlined and tailored to company growth [7].

Here are some statistics showing how cloud computing is changing the course of accounting:

- 92 % of US accountants say that new technology is delivering value to their business;
- 42 % of Australian businesses are using paid cloud computing to run their business processes;
- 38 % of European businesses use cloud-based financial software [8];
- 66 % of accountants feel their firms need to increase the pace of technology adoption to stay competitive;
- the use of cloud computing in the EU increased particularly in the retail trade in 2022, compared to 2021;
- 81 % of all enterprises have reported that they have a multi-cloud strategy already laid out or in the works;
- at the end of 2022, 67 % of all enterprise infrastructure was cloud-based;
- it is reported that 82 % of the workload will reside on the cloud;
- Amazon web services have the largest cloud computing market share at 32 %;
- Platform-as-a-Service (PaaS) is expected to grow in adoption to 56 % by 2021 [6].

New research shows that 67 percent of accountants prefer cloud accounting over locally installed software options and cloud software reduces labor costs by up to 50 percent. And, the market is growing. The market size is projected to reach 4.25 billion USD by 2023, from its current 2.62 billion USD [9].

There are a several key distinctions between cloud accounting and traditional, on-site accounting. For one, cloud accounting is more flexible. Accounting data can be accessed from anywhere on any device with an Internet connection, rather than on a few select on-premises computers. Secondly, unlike traditional accounting software, cloud accounting software updates financial information automatically and provides financial reporting in real-time. This means account balances are always accurate and fewer errors take place due to manual data entry. They are also better able to handle multi-currency and multi-company transactions more efficiently.

In the on-premises world, every time a firm grows, they encounter greater software license and maintenance costs as well as new licenses and fees for database, systems management and other software. The firm might also

have to make expensive capital purchases of new hardware, such as servers. With cloud solutions, businesses don't get stuck with permanent, expensive equipment and licenses when your business contracts are up and, likewise, there are no big spikes in costs when it expands a little.

Also, cloud accounting requires far less maintenance than its traditional counterpart. The cloud provider completes the backups, updates occur automatically and nothing needs to be downloaded or installed on a company computer (Table 1) [10, 11].

Moving data, applications and platforms to the cloud may create substantial business benefits because companies may be able to reduce capital expense outlays while maintaining a more flexible IT environment. However, companies should consider the financial reporting implications as well as broader tax and IT considerations as a result of the new accounting guidance [5].

With Cloud Based Accounting, accountants can access the financial data from anywhere at anytime virtually and stay up to date with the financial status. Also, with the feature of mobility and multiple user access, data is easily input by the sales department, logistics department, and of course, by accountants as well.

Moreover, all of this leads to accountants being pulled out of the archaic book-keeping pit and out in the new stance where they are of integral importance in financial advising and more into actual finance management.

In order to explore more, let's have a look at the top benefits of Cloud computing for accounting industry and accountants so one can shift to this modern technology wisely [12, 13] (Fig. 2).

Risks with cloud accounting may include privacy breaches, security threats, and technical issues that can force system downtime. There are limited risks with cloud software, but they do exist. However, many say the benefits outweigh the risks and cloud accounting makes life easier for all involved [7].

The security of cloud-based accounting is rather subjective. First of all, considering how sensitive the data associated with cloud accounting applications is (e. g., financial data and banking), security is a very vital issue in the cloud accounting sphere.

However, when we also consider traditional computer accounting software, which poses the threat of serious problem if a business desktop is damaged, lost or stolen, then cloud accounting is relatively very secure.

Generally, most cloud accounting solutions utilize innovative approaches like encryption and multi-factor authentication, which guarantees the security of sensitive data. In addition, cloud providers typi-

cally position backup servers in two or more sites. This means you would still have access to your data even if one server network malfunctions.

Table 1

Difference between cloud accounting and traditional accounting

Main characteristic of cloud accounting	Main characteristic of traditional accounting
Definition	
Cloud accounting, or cloud computing, is a software-as-a-service (SaaS) solution that allows to keep your financial records in the cloud. The cloud is not a physical location but a network of remote servers that can store data across multiple servers. This allows to access information, make adjustments, and monitor trends in your business from any location at any time	Traditional accounting is called «traditional» because it's designed for use on a desktop computer and not for mobile devices. It's also sometimes called «desktop» or «desktop-based» because it doesn't require an internet connection to function. It is installed on your desktop computer and stores data on local servers rather than in a central location
Using	
It can be used and accessed from anywhere on the globe and at any time	It can only be used on the particular device on which they are downloaded
Gives real-time financial reporting	There is drawback to real-time financial reporting
Flexible and scalable	
Very flexible and scalable, so they can be customized to suit the demands of the organization using it	Very rigid, no customization available
Cost-effectiveness	
Cloud accounting is significantly more cost effective than traditional accounting. With cloud accounting, it is possible to pay for the services that you use. It requires no initial investment, as it's a subscription-based service that it is possible to cancel or pause at any time. If don't need a specific feature, it's not included in your price	Traditional accounting systems, on the other hand, can be expensive. It requires the purchase of software and hardware, ongoing maintenance costs and additional storage when needed
Efficient collaboration	
Cloud accounting is a great way to ensure that your employees can work collaboratively on financial reports. Because of its multi-user function, people can easily access the latest version of financial reports, making it easier to stay on top of all your company's financials at once	The traditional accounting system was not designed for collaboration; only one person could work on and access it at a time
Data storage and reliability	
Cloud software is available around the clock and can be accessed from anywhere with internet access – making it more reliable and better suited for accessing critical or sensitive information	Traditional accounting, however, is usually set up to store your financial data locally on your computer. This means you have to back up the information regularly
Integration	
Integration with other accounting software can reduce the workload of your bookkeeper by automating various processes	Traditional accounting systems are not designed to integrate seamlessly with common business tools. They are designed to work independently of other software and are often only compatible with a small number of programs
Accessibility	
With the cloud, it is possible to log in from any compatible device with your secure credentials and access the data. This off-premise arrangement helps in many ways	Traditional systems are on-premise, which means you have to be in a particular location or on a specific computer to access financial data. This may affect your commitments, schedule, and efficiency
Environmental Sustainability	
Cloud accounting is paperless and remotely hosted. It does not use up any resources that are harmful to the environment. So, ethically this is the better option for your business	Traditional accounting compromises the environment as it relies mainly on paper trails, printouts, and hardware support

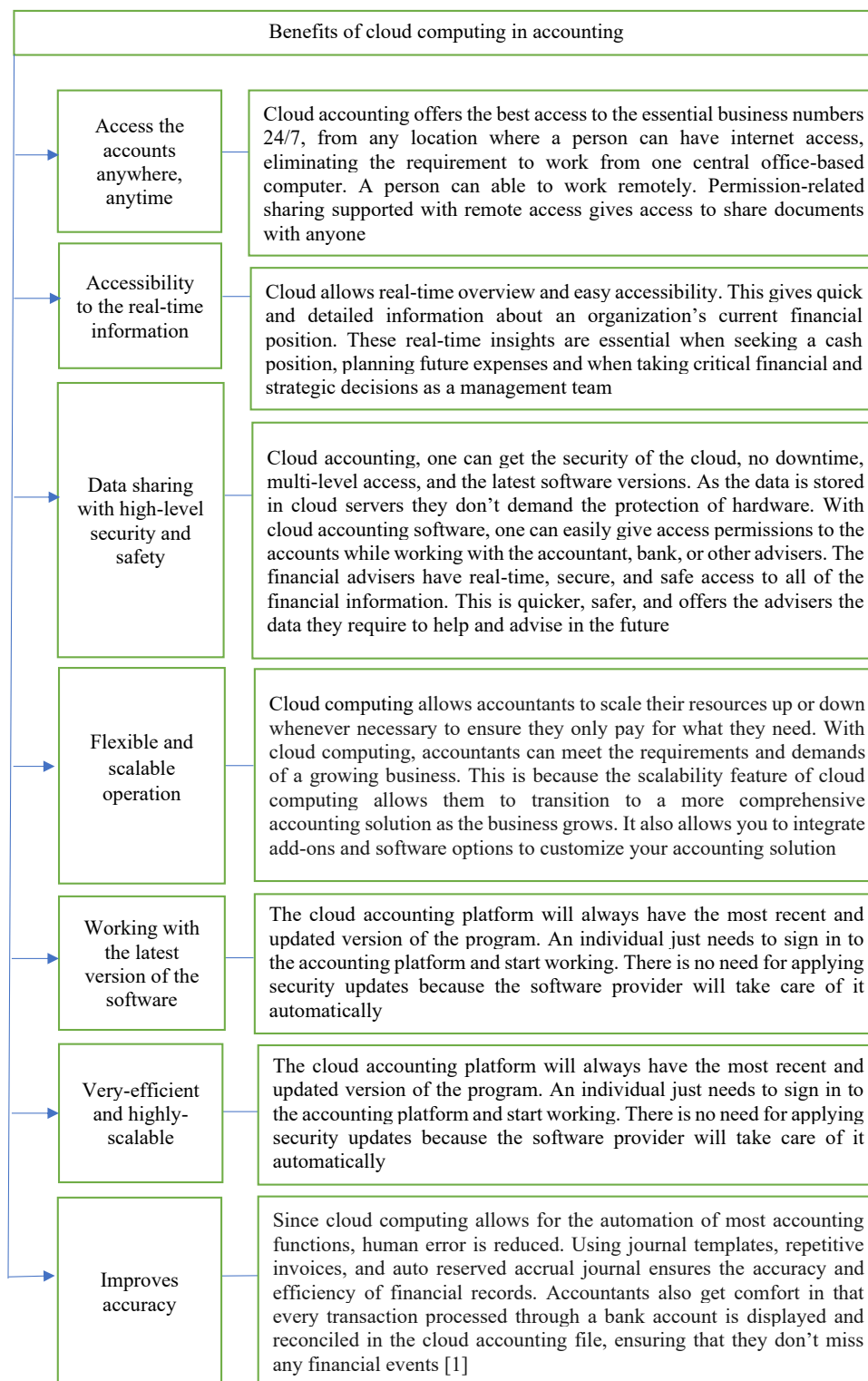


Fig. 2. The main benefits of cloud computing in accounting

Hence data in cloud accounting is relatively very secure unlike information kept just on-premises, which could be damaged or destroyed in a fire, flood, accident or any natural disaster, and may never be recovered.

The cloud accounting market is growing tremendously with a vast scope of various cloud service providers to choose from. The cloud accounting software that's the right one must perfectly fit all the business goals as well as the accounting demands and the app ecosystem. A few

of the cloud providers to choose it is possible to find in Table 2 [8, 14].

There are some real benefits to making the switch to cloud computing. It will make your life easier by saving time and money. Plus, it is possible to meet clients' needs more efficiently since the cloud is accessible from any computer anywhere with internet and no downloads are necessary. Fast, cost-efficient, secure – when it comes to listing the benefits of cloud computing, there's no limit.

Table 2
Cloud accounting software

Name of the cloud accounting software	Short characteristics
Xero	A perfect choice for small businesses that needs simple accounting alongside detailed reporting as the business expands. Xero also has a huge worldwide app ecosystem
QuickBooks Online	A platform that's the main goal is to offer better cloud accounting for small businesses, with all the accounting programs and functionality of QuickBooks classic desktop version, plus an appealing app store
Sage Business Cloud Accounting	Bigger businesses will like the scalable accounting of Sage's cloud platform, with all the business functionality of their desktop version. Third-party apps are available, but extra Sage modules will add to your costs and budget
Zoho Books	It gives many other business software of its own to connect Zoho Books with. It consists of a few connections to third-party software too
Sage Business Cloud Accounting	Large-scale businesses will mostly use the scalable accounting of Sage's cloud platform, with all the business functionality of their desktop version. Third-party apps are available, but extra Sage modules will add to the costs and budget
KashFlow	A good choice for small businesses that want a straightforward platform that gets the job done. All the basics are there but with fewer options when it comes to apps
FreshBooks	The FreshBooks cloud accounting solution is a full-service system that checks all the boxes for security, reliability, technical support, customer service, and ease of use. Take advantage of FreshBooks' free trial to enter a cloud accounting platform
Exact	For both small businesses and enterprises, Exact offers a range of financial software which can offer additional functionality beyond accounting. There's also an app store to add even further functionality
NetSuite ERP	Is a complete set of business software solutions bundled from Oracle. It is customizable and allows users to connect easily with third-party partners
Bonsai's	Financial management accounting software offers invoicing support, client and project management, and a wide variety of templates. Bonsai books specializes in small businesses like freelance creatives and lifestyle coaches
FreeAgent	For freelancers, contractors or microbusinesses, FreeAgent gets your accounts done without all the additional bells and whistles
ClearBooks	Great for small businesses, ClearBooks even offers a free option called Micro which they say is best suited to «new or super small business»
QuickFile	Like ClearBooks, QuickFile also offers a free option to businesses under a certain size
MYOB	One of the key providers in Australia, MYOB is designed for small businesses that want a streamlined accounting solution with all the benefits of the cloud

Summarizing the information, Forbes analysts determined the best cloud accounting software of 2023:

- Freshbooks: Best for overall cloud accounting software;
- Xero: Best for multiple users;
- Zoho Books: Best for a diverse range of solutions;
- Intuit QuickBooks: Best for maximizing tax deductions;
- Sage Business Cloud Accounting: Best for freelancers and solopreneurs;

- Wave Accounting: Best for free accounting software;
- Kashoo: Best for easy setup;
- Neat: Best for business with a lot of expenses [15, 16].

So, the best accounting software from a cloud provider offers the following security measures:

- secure premises;
- security staff;
- an off-site automatic backup server;
- regular security audits;
- high-level digital security software with inbound and outbound encryption;
- multiple segregated networks;
- multiple built-in user authentication methods;
- dedicated anti-malware staff;
- customer service and technical support;
- automatic updates [7].

3.2. Discussion

Practical significance. The results obtained in the course of the study will help business entities to assess the effectiveness of the use of cloud technologies in accounting, to choose the optimal cloud accounting software in accordance with the specifics of their activities.

Limitations of the study. The main obstacles to the widespread use of cloud technologies in solving accounting problems in Ukraine are the still rather low trust in cloud services in terms of information security and the classic inertia, i. e., the rejection of new technologies.

The impact of martial law. The full-scale invasion of the territory of Ukraine has had a negative impact on the development and implementation of cloud technologies in accounting, as a large amount of material resources from enterprises are used to support the army, rather than to purchase and implement these technologies. It should be noted that the unstable situation in the country poses a threat of service binding to a particular provider due to the possibility of its bankruptcy or acquisition.

Prospects for further research. Given the conditions dictated by modern business, the development of cloud technologies in accounting is becoming increasingly relevant, which is why further research will be aimed at studying this issue in the context of assessing the level of security of using cloud technologies in accounting and management.

4. Conclusions

Based on the results of the study, it can be concluded that the cloud technology market is characterized by a stage of gradual spread in Ukraine, and the popularity of cloud services is growing every year both in Ukraine and globally. That is why, given the continuous development of each country and the economy as a whole, their spread will definitely increase, and the degree of cloud services will improve.

In turn, the development of cloud technologies in general will allow accounting to reach a new level and carry out significant modernization in the work of accounting. First of all, the introduction of cloud services will lead to a change in the approaches to organizing accounting at enterprises, facilitate accounting tasks and allow for faster data summarization. Employees will be able to access information remotely and work outside the company, i. e., from a remote workplace. In turn, this will lead to

the need to revise labor standards, change the number of accounting employees to reduce the company's costs and increase the efficiency of the work performed. Due to the above changes, it is inevitable that the documentation process will be modernized, based on the prompt receipt of reports in the appropriate time and in the required format, and the organization of electronic data archiving with unlimited access to relevant documents and a quick search mode throughout the database.

The results obtained will be useful for managers of enterprises of all forms of ownership, as they provide an answer to the need to implement cloud technologies in their activities. This, in turn, is an ideal solution to the problems that arise, which will allow the business entity to continue its work and reach a new level, develop a successful business and be able to keep it in the market.

Conflict of interest

The authors declare that they have no conflict of interest in relation to this research, whether financial, personal, authorship or otherwise, that could affect the research and its results presented in this paper.

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The study was performed without financial support.

Data availability

The manuscript has associated data in a data repository.

Use of artificial intelligence

The authors confirm that they did not use artificial intelligence technologies when creating the current work.

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