

CLOUD-BASED ACCOUNTING SERVICES-MARKET ANALYSIS AND PROSPECTS FOR THE FUTURE IN ROMANIA

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Abstract. *The purpose of this paper is to briefly clarify notions such as “cloud computing” and “cloud accounting”, stressing the pros and cons of these technologies, based on the state of the art on the topic, as reflected by the scientific literature, and to analyze the present state of such kind of services in Romania. The research method is the literature analysis, focusing on current issues related to online accounting services based on cloud technology, followed by local market analysis and a survey in which accountants and managers activating in Romania have expressed their views on cloud accounting. The study reveals that, although most companies in Romania keep accounting in the classic system, especially by using specialized software licenses installed on computers, managers and accountants would like to adopt cloud accounting. Respondents consider that the new technology certainly has big pros: accounting data can be accessed from anywhere (32%), it is more advantageous from an economic point of view (23%), cloud clients benefit from the emerging technologies integrated by the cloud services provider, such as artificial intelligence, chat robots, blockchain and Internet of Things (19%). Respondents also have some fears, especially related to: data security risk (38%), monthly subscription costs (24%), risk of disappearance or bankruptcy of the provider (21%), and others. Most respondents are certain of the fact that particularly small companies will change the way they work, because they have better chances related to data security by contracting cloud accounting-based services, due to the fact that they offer at a convenient price, as a rule, access control, user authentication, and strong data encryption. Respondents stressed that cloud accounting supports remote work, which is gaining more followers, and favors outsourcing accounting services. Furthermore, the investment to purchase licenses, servers, and other equipment for the IT infrastructure can be very expensive, and choosing a solution based on “cloud” technology can reduce these costs. The adoption of cloud-type technology represents an element of novelty in the local market, but there are already specialized companies accredited by CECCAR (The Body of Expert and Licensed Accountants of Romania) that offer such kinds of services. The transition to cloud accounting requires not only a different organization of the financial accounting function, but also a different mentality, which favors remote work. For many managers, cloud accounting means reliability, scalability, and better control of financial data. For others, data security risks are a matter of concern. Romania has allocated funds through the National Recovery and Resilience Plan of Romania, for the digital transformation component worth 1.8 billion euros, which mostly targets the digitization of large public services, but also investments in the digitization of the business environment.*

Keywords: *cloud computing; cloud accounting; SaaS; PaaS; artificial intelligence; digitization.*

Introduction

The fourth industrial revolution, with which we are contemporaneous, is driven by four factors, namely the rise in the amount of data, computing power, and connectivity. Today's economic environment is characterized by the development of business analytics, capacity, and level of intelligence, new correlations between machines and people emerging, and the rise of digital transfer instructions to the physical world, such as three-dimensional printing and robotics (Mujiono, 2021).

In the past, accounting was done with pencil on paper, then with the help of a computer and accounting software installed on the workstation. Today technology offers much more efficient ways of management by automating many processes. There are primary accounting programs for preparing invoices, receipts, statements, cash registers, etc. These supporting documents are usually issued internally and then registered, according to the law, in the financial and management accounting by the employed accountant (full-time or part-time) or by the accounting firm accredited by a professional body (in the case of Romania, by to the Corps of Certified Accountants and Certified Accountants, according to Government Ordinance No. 65/1994 on the organization of accounting expertise and certified accountants, republished, with subsequent amendments and additions).

Companies are increasingly turning to online accounting services based on cloud technology, which offer solutions that fundamentally change the dynamics of the accountant-entrepreneur relationship.

Cloud computing is the most fashionable term in the IT world today. Its definition is not unanimous, but several versions exist in the new age of information technologies. Cloud computing is a computer organization system that enables on-demand, ubiquitous, convenient network access to a shared pool of configurable computing resources (eg, networks, servers, storage, applications, and services) that can be quickly provisioned with minimal management effort or interaction with the service provider. Cloud computing can be likened to an electric grid to which people connect and pay according to their electricity consumption.

In 1997, Chellappa first coined the term "Cloud Computing" (CC) in his speech at the INFORMS annual meeting (Chellappa, 2017).

The challenges associated with CC are currently diverse, such as: reliability, service and data availability, security, complexity, limited customization, and cost of service.

The traditional model involves purchasing hardware solutions, applications, and software licenses. They are protected by their own firewall, and the company gains control over the intellectual property (IP). On the other hand, the cloud model implies access rights only for the software application, the technology solutions being protected by the cloud service provider's firewall, which also retains control over the IP. Therefore, traditional applications, including accounting software, are difficult to manage and expensive for small businesses. They need servers, physical spaces, networks, bandwidth, storage capacities, security services, and specialized personnel to install and configure them. With "cloud computing", managing a business becomes

much easier, because entrepreneurs can log in to a data center where these applications are stored and benefit from automatic, high-performance upgrading.

Cloud technology facilitates entrepreneurs' access to an online accounting platform based on a subscription. The services are available 24/7 from any device connected to the Internet (laptop, smartphone, tablet, PC, etc.).

Architecture of Cloud Computing is complex, and it can be classified as follows:

1. The Service Models-Software as a Service (SaaS), Platform as a Service (PaaS), Infrastructure as a Service (IaaS)

2. The Deployment Models- Public Cloud, Private cloud, Community Cloud, and Hybrid Cloud (Darwish, Yafi, Almasri, Zuhairi, 2018).

SaaS - "software as a service" contracts are used for accounting services. Specific to these types of contracts is that the company concludes contracts for services and does not intend to purchase or lease software assets. This is because, in a cloud-based environment, the SaaS contract provides the right to receive access to the cloud service provider's application software, rather than a license of IP (e.g. source code control).

Common examples of Cloud Accounting Software include: Cloud Elements, IBM App Connect, IFTTT, and Zapier (Byron, Kelly, 2020).

Despite the many advantages associated with cloud computing, many vulnerabilities and challenges are associated with security and privacy in the cloud—data breaches, loss of control, unauthorized uses, etc. Therefore, one of the main reasons cloud accounting software is not yet widely used is users' fear of the threat to data security.

A cloud provider's customer management interfaces are usually accessible via the Internet, representing a high-security risk, especially when combined with remote access technologies or policies, in addition to the typical vulnerabilities of the web browsers.

Unauthorized access, when someone gains logical or physical access without permission to a network, system, application, data, or other resource is a risk arising from allowing third-party organizations to manage an individual's data and the user is not in full control. Legal complexity impacts cloud computing where data is stored. The advantages of cloud computing—its ability to scale rapidly, store data remotely and share services in a dynamic environment—can become disadvantages in maintaining a level of assurance sufficient to sustain confidence in potential customers (Pearson, 2013).

Stipic and Vicic researched why many accountants are still reluctant to adopt cloud accounting. The research results showed a significant correlation between resistance to cloud accounting and fear of new technologies, as well as resistance to cloud accounting and fear of a lack of complete control over accounting data. While resistance to cloud accounting is not significantly related to the age structure of accountants (Stipic & Vicic, 2022).

Cloud technology is also characterized by scalability (the property that shows the ability of an application to correctly support a larger volume of data)-for an application running on the company's servers, the increase in the volume of activity above a certain level can cause significant additional investments in equipment hardware and software. This technology allows the management of a larger volume of data by supplementing the demand for cloud services with a minimal additional cost, as clients only pay for what they use.

The current business environment is an extremely dynamic one. Therefore, access to information, the speed of their transmission, the speed of decision-making, and mobility, are extremely important in order to be able to remain competitive. Since information technology has evolved extremely fast, the decision to change accounting software is important and can have a major impact on the business. The solution of replacing accounting software with cloud accounting services can be taken if:

- the company uses several non-integrated software applications, or the current software is outdated, because there is a high risk of errors and additional costs;
- the manager does not have access to information directly from the application, these being received late, with the risk of making erroneous decisions;
- the manager is always on the move and mainly uses a smartphone or a tablet, since a cloud accounting application can be accessed online from anywhere, whereas with classic accounting applications, this is impossible;
- the business is carried out in several geographical areas or includes various fields of activity.

Accountants can also have clear advantages in the "cloud accounting" system. In the classic system, customers use an online or installed invoicing program, send the invoices by e-mail, or deliver them personally, printed on paper. In the "cloud accounting" system, the client issues invoices directly in the online application, and the accountant views all their documents in real-time and can make accounting records per the law. Also, the client can attach scanned documents to the system, which the accountant can view and record in the General Ledger. This way, time can be saved, and the accountant can fill out the tax returns and the month's closing more relaxedly, without fear of exceeding the deadlines.

The existing mainstream accounting cloud service network density is very low, which significantly impacts the integration of accounting cloud services. Accounting cloud services should make every effort to optimize the network density, have greater density and shorter path length, and improve integration and reliability (Chen, Guang, Hua, 2021).

Resistance to change, organizational culture, price, cyber security, and data protection related to accounting data are the main barriers to digital transformation in accounting. Automating routine tasks and reducing errors frees up time for accountants to provide higher value-added services and eliminate paper (Gonçalves, Silva, Ferreira, 2022). Although the security of data stored in the "cloud" is often presented as a weak point of this technology, in reality, things are different, the companies that offer "cloud" services have implemented strict procedures and rules for data security, but in practice, it can happen interruptions or unauthorized access. The advantages are great, especially for small and medium-sized companies. For large companies, the decision to change the

current software or ERP solution with cloud technology must be well considered, because it involves both benefits and risks that can be largely mitigated.

Regarding cloud computing in auditing, the studies show that firms often opt for hybrid or private solutions instead of the cloud, even though cloud computing technology is perceived as a strong support point, because privacy must come first to information security. Cloud security could be better than traditional IT systems, especially for providers audited by companies with a good reputation (Yigitbasioglu, 2015).

The EU prioritizes digitization through the Digital Europe Program, which, until 2027, will finance projects in five areas, each with its own indicative budget:

-high performance computing: EUR 2,226,914,000;

-artificial intelligence: EUR 2,061,956,000;

-cyber security and trust: EUR 1 649 566 000;

-advanced digital skills: EUR 577,347,000;

-implementation, optimal use of digital capabilities and interoperability: EUR 1 072 217 000 (EU Council Press Release, 2021).

Market Analysis Of Cloud-Based Accounting Services in Romania

In 2021, 42% of EU enterprises used cloud computing. This is a 6-percentage point (pp) increase since 2020 (36%), and more than double the share in 2016 (19%). Cloud computing most commonly is used in the Nordic Member States, the highest shares were reported in Sweden, Finland (both at 75%), and Denmark (65%) in 2021. Of the companies that chose such services, 79% opted for a cloud solution for hosting email systems, 68% used the cloud for data storage, 61% used it for office software (such as word processors and spreadsheets) and 59% to host their database.

In addition, these businesses also used the cloud to access more advanced software applications such as financial management or accounting (48%). So, less than half of the companies currently use cloud technology for accounting purposes (Eurostat, 2021).

Romania has the second lowest percentage of companies using, at 14%, down from last year and well below the EU average (42%).

Notwithstanding high-speed internet at reasonable prices, the percentage of companies in Romania that chose to host resources on rented servers (cloud), instead of using their own IT infrastructure, decreased to 14% from 16% last year.

The pandemic has contributed to accelerating the digital transformation in the business environment in the EU and Romania, an aspect that presupposed the creation of an IT infrastructure that allows the integration of the various software solutions that companies adopt, aimed at amplifying their strategic plans. Digital transformation, including in the field of bookkeeping, is necessary, which requires investment budgets in this regard and partnership with experts to help in the implementation process.

Until recently, in Romania, the accounting software market remained in the 90s, dominated by classic accounting programs, intended to be installed in a computer's memory. Online accounting services have become more popular lately, because they are based on cloud technology. The relationship between the accountant and the entrepreneur becomes a prompter and more well-organized one. End users just take a picture or scan supporting documents and upload them to the platform. Further, they will be processed and recorded in accounting.

Saga accounting program is one of the most used in Romania (almost half of the users of accounting softs have a Saga license running on their computers) and is particularly useful for medium and small companies with several employees that operate with lei, but also with other currencies. The Saga program has several important advantages: good quality/price ratio, intuitive interface, easy to learn, real-time updating of legislative changes, can be used to keep the accounting records of several companies and by several users, allows simultaneous access to the same program options.

Another popular choice of Romanian accountants is Winmentor accounting software, compatible with the Windows operating system. The programs offered are customized according to the specific needs of each field. This accounting program can be adapted to the specifics of the activity carried out by the company, it contains the necessary modules to have control over the growth attributes: management, salaries, production, and cash registers, it allows simultaneous access to the database of a large number of users, regardless of location, provided you have an internet connection, even of low speed. Also, the program ensures the interconnectivity of the modules and the application's connectivity with management peripherals (cash registers, barcode readers, electronic scales, data collection terminals, etc.)

Ciel was among the first companies that started to sell accounting software produced in Romania, 30 years ago, so, it still has many clients. It has two product variants, the standard for small and medium-sized companies, and the professional for accounting firms or large companies. The applications can be customized and the company provides consultancy in this regard.

SAP is one of the most complex ERP programs, integrating accounting, logistics, and personnel. It is not an easy program to use, so prior training is needed.

Other software products Romanian accountants use are: Nexus, D-Soft, Tigris, SmartBill Conta, Charisma, Neomanager, Asis, Navision, Omikont, Softpro, Contaflux, Wizcount, Iscala, Dynamics AX, Freeform Contab, Diel, ContabSQL, Clarvision, Softimel, etc.

Most software developers prefer older technologies, but they are preparing new versions, which will likely use cloud accounting, as users begin to trust this new way of keeping accounts.

Not only private entities need digital transformation, but also public entities need it, especially because a priority of the public sector is the managerial internal control based on a set of policies in order to provide reasonable assurance for: achieving the objectives of the public entity in an economical, efficient and effective way. The quality of accounting documents and the timely production of reliable information, related to the financial and management segment are crucial for any public entity.

The implementation of a cloud-type infrastructure in the public sector is a priority assumed by the Government of Romania determined by the COVID-19 pandemic, and by the need to exchange data in electronic format in the public sector, absolutely necessary for the improvement of public services dedicated to citizens and for the efficiency of related expenses computer systems and networks.

Romania has allocated funds through the National Recovery and Resilience Plan of Romania, for the digital transformation component worth 1.8 billion euros, which

mostly targets the digitization of large public services, but also investments in the digitization of the business environment.

The Romanian Government has recently concluded that cloud technology is increasingly used by authorities and public institutions in the member states of the European Union, as a result of the technical and economic advantages regarding data processing and storage, as well as the availability of services, advantages that result in the generation of substantial savings in terms of investments and operational expenses. That is why the Government of Romania adopted Emergency Ordinance No. 89 of June 27, 2022 regarding the establishment, administration, and development of infrastructures and cloud IT services used by public authorities and institutions, published in the Official Gazette no. 638 of June 28, 2022.

The Romanian Government has appointed three main actors for creating, maintaining, and managing the government cloud: the Authority for the Digitization of Romania, in collaboration with the Special Telecommunications Service and the Romanian Information Service. The so-called "Government Cloud" would provide the necessary infrastructure for state institutions to digitize their activity and relationship with the public.

Research methodology

The research method is the literature analysis, focusing on current issues related to online accounting services based on cloud technology, followed by market analysis and a survey in which accountants and managers activating in Romania have expressed their views on cloud accounting matters. As such, the quantitative-qualitative method is used, by applying the questionnaire as a specific tool in the data collection process. The research includes questions with multiple choice answers, but also open-ended questions, which inquired for personal opinions on those questions. The data collection and interpretation were performed automatically and securely, the online questionnaire being applied between June 20-30, 2022, and 119 responses were collected.

Research Questions. Result and Discussions

The first interrogation of the questionnaire was: "What are the pros of adopting cloud accounting?"

The answers, and the respective percentages were the following:

- a) accounting data can be accessed from anywhere (32%);
- b) it is more advantageous from an economic point of view (23%);
- c) cloud clients benefit from the emerging technologies integrated by the cloud services provider, such as artificial intelligence, chat robots, blockchain and Internet of Things (19%);
- d) more efficient operational management, a clearer and updated vision of the business performance (15%);
- e) storage of information in the cloud offers an almost unlimited storage capacity, with the possibility of backup and recovery (11%).

The second question asked in the survey was: "What are the cons of adopting cloud accounting?"

- a) data security risk, as the client gives access to all sensitive company information to a cloud computing service provider (38%);
- b) monthly subscription costs (24%);
- c) risk of disappearance or bankruptcy of the provider (21%);
- d) lack of support, because sometimes cloud computing companies fail to provide adequate support, they depend on the frequent asked question menu or online help (11%);
- e) the risk of not being able to access one's own data in case of network and connectivity problems. (6 %).

The survey also contained open-ended questions to identify why cloud accounting is not widely adopted in Romania. Thus, in this third question, respondents indicated: the fear related to the lack of data security, the resistance to change, the recent appearance of this kind of service on the local market, and the fact that at the moment, in Romania there is no law regulating very clearly cloud computing, but only regulations in the field of personal data protection. Also, the respondents mentioned that managers are reluctant to contract cloud accounting-based services, because in Romania companies still prefer to hire their own accountants rather than outsource the service to specialized companies. In addition, many providers offer packages that require regular payments. For some packages, cloud accounting is more expensive in the long term, so doing a cost/benefit analysis before purchasing the respective services is good. Many cloud storage service providers limit their users' bandwidth usage. So, if the firm exceeds the given allowance, the additional fees could be significantly expensive.

The last question answered by the respondents was: "Do you think that in the next three years, Romanian companies will prefer the large-scale adoption of cloud accounting or will remain faithful to classic technologies?" Most respondents answered in a positive way, and argued that especially small companies will change the way they work, because they have better chances related to data security by contracting cloud accounting-based services, due to the fact that they offer at a convenient price, as a rule, access control, user authentication, and strong data encryption. Respondents stressed that cloud accounting supports remote work, which is gaining more followers and favors outsourcing accounting services. Moreover, the investment to purchase licenses, servers, and other equipment for the IT infrastructure can be very expensive, and choosing a solution based on "cloud" technology can reduce these costs. Additionally, the responsibility for the optimal functioning of the applications rests entirely with the "cloud" service provider company, therefore, entrepreneurs no longer have to allocate financial, time, and human resources for server administration, updates, upgrades, and backup. The money saved can be used for business development.

Limits of research

The research limits are related to the small number of respondents and the newness of the topic, so some of the respondents may not have enough knowledge related to cloud accounting matters.

Conclusions and recommendations

Currently, most companies in Romania keep accounting in the classic system, especially by using a specialized software license installed on the hardware. The adoption of cloud-

type technology represents an element of novelty in the local market, but there are already specialized companies accredited by CECCAR (The Body of Expert and Licensed Accountants of Romania) that offer services in the new way of working. The transition to cloud accounting requires not only a different organization of the financial accounting function, but also a different mentality, which favors remote work. For many managers, cloud accounting means reliability, scalability, and better control of financial data. For others, data security risks are a matter of concern. Romania has allocated funds through the National Recovery and Resilience Plan of Romania, for the digital transformation component worth 1.8 billion euros, which mostly targets the digitization of large public services, but also investments in the digitization of the business environment.

The future of accounting and business advisory services is, most likely, including in Romania, the "paperless" technology, through cloud accounting, a tool that entrepreneurs can access anytime and anywhere to information about their businesses. Gradually, cloud applications gain ground in favor of applications that run on their own servers. The advantages of cloud technology are numerous: it requires minimal investments in hardware equipment, short implementation time, and maintenance provided by the supplier, without additional costs. "Cloud" technology offers mobility and independence, data and applications can be accessed from anywhere there is internet access.

References

Byron, P., & Kelly, W.L. (2020). Do-it-yourself accounting automations. *Journal of Accountancy*, 229(6), 1-8.

<https://www.journalofaccountancy.com/issues/2020/jun/diy-accounting-automations.html>

Chellappa, R. K. (1997). *Intermediaries in cloud-computing: A new computing paradigm*. INFORMS Annual Meeting.

Chen, X., Guang C., & Hua D. (2022). Credibility Analysis of Accounting Cloud Service Based on Complex Network. *Advanced Sensor Technologies in Agricultural, Environmental, and Ecological Engineering*.

<https://doi.org/10.1155/2022/5420772>

Darwish, M.A., Yafi, E., Almasri, A.H., & Zuhairi, M.F. (2018). Privacy and Security of Cloud Computing: A Comprehensive Review of Techniques and Challenges.

International Journal of Engineering & Technology, 7 (4.29), 239-246.

<https://www.sciencepubco.com/index.php/ijet/article/view/26263/13517>

Gonçalves, M., da Silva, A., & Ferreira, C. (2022). The Future of Accounting: How Will Digital Transformation Impact the Sector?. *Informatics 2022*, 9(1), 19.

<https://www.mdpi.com/2227-9709/9/1/19>.

<https://doi.org/10.3390/informatics9010019>

Mujiono, M. N. (2021). The shifting role of accountants in the era of digital disruption.

International Journal of Multidisciplinary: Applied Business and Education Research, 2(11), 1259-1274.

<http://www.babmrjournal.org/index.php/ijmaber/article/view/198>

Pearson, S. (2013). *Privacy and Security for Cloud Computing*. New York: Springer, 30–38. https://link.springer.com/chapter/10.1007/978-1-4471-4189-1_1

Ray, P. (2018). An Introduction to Dew Computing: Definition, Concept and Implications. *IEEE Journals & Magazine*, 6, 723–737. <https://ieeexplore.ieee.org/stamp/stamp.jsp?tp=&arnumber=8114187>.
Doi:10.1109/ACCESS.2017.2775042

Stipic, V., & Vivic, M. (2022). An analysis of accountants' resistance to cloud accounting. *Journal of Economics and Business Issues*. <https://www.jebi-academic.org/index.php/jebi/article/view/40/18>

Yigitbasioglu, O. M. (2015). External auditors' perceptions of cloud computing adoption in Australia. *International Journal of Accounting Information Systems*, 18, 46–62. <https://www.sciencedirect.com/science/article/abs/pii/S146708951500024X>

EU Council Press Release (2021). *The Digital Europe program receives the green light from the Council*. <https://www.consilium.europa.eu/ro/press/press-releases/2021/03/16/digital-europe-programme-gets-green-light-from-council>

Eurostat (2021). *Cloud computing used by 42% of enterprises*. <https://ec.europa.eu/eurostat/web/products-eurostat-news/-/ddn-20211209-2>.

The Romanian Government (2008). Government Ordinance No. 65/1994 on the organization of accounting expertise and certified accountants, republished, with subsequent amendments and additions. *The Official Journal of Romania*, 1 (13).

The Romanian Government (2022). Emergency Ordinance No. 89/2022 regarding the establishment, administration and development of infrastructures and cloud IT services used by public authorities and institutions. *Official Journal of Romania*, 638.