

ARTIFICIAL INTELLIGENCE, BIG DATA, BLOCKCHAIN AND CLOUD COMPUTING – FUTURE ACCOUNTING?

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Abstract: The contribution examines how the accounting profession is affected by specific technologies, which are artificial intelligence, big data, blockchain and cloud computing, and thus contributes to the discussion about the use of technology in the accounting profession with its content. According to the literature review, these technologies can dramatically automate and digitize the work of accountants. For that reason, it is important for accountants to understand these technologies, as these technologies are constantly evolving and more companies, will incorporate them into their business processes. The aim of the overview article is to theoretically define artificial intelligence, big data, blockchain and cloud computing, based on an overview of selected research, to analyze available articles on this topic and to propose appropriate recommendations. Although digital tools can replace a whole range of accounting activities, it is important for accountants not to consider them as a threat, but rather as an aid in their work. For this purpose, it is advisable for accountants to acquire new skills and characteristics, or deepen existing ones in such a way as to be competitive in the digital world. Emphasis needs to be placed on the education of employees in companies, but also on changing the content of teaching in educational institutions, namely in the field of digital technologies and skills in the field of information and communication technologies, which already greatly influence contemporary accounting. At the same time, it is necessary to make such legislative changes that will reflect the current problem of the entire industry 4.0.

Keywords: accounting, artificial intelligence, big data, blockchain, cloud computing

JEL Classification: K34, M41, O15

INTRODUCTION

New technologies are advancing at breakneck speed in the current economic environment, and their potential in today's world is enormous. At the same time, however, concerns about job losses are growing; according to PricewaterhouseCoopers (2017a), almost 40 % of employees fear that their jobs will be replaced by technology. According to PricewaterhouseCoopers (2018), the automation process could develop in three phases by 2030 – Algorithmic phase (automation of basic activities); Augmentation phase (automation of repetitive activities); Autonomy phase (automating physical work and solving real-world problems). Above all, the first, but also the second phase is already underway, not only in accounting, but the third phase is currently more in development. The biggest job loss is expected in the coming years in administrative jobs including accountants World Economic Forum (2023).

The adoption of technology in organizations will deepen in the coming years, which can lead to a total transformation of the organization itself. According to the World Economic Forum (2023), almost 80 % of companies are interested in new technologies with the aim of implementing them in the next few years. At the same time, the adoption of technology, or rather automation, varies from country to country. The level of adoption of automation by 2030 ranges from around 20% in Asian or Northern European countries to around 40% in Eastern European countries PricewaterhouseCoopers (2018). According to the World

Economic Forum (2023), by 2027, jobs focused on traditional classic accounting will tend to decrease and a total of approximately 5 million jobs should be eliminated. At the same time, the demand for bookkeeping is expected to decrease by about 30 %.

The overview article contributes to current research by providing some insight into the current drivers that affect or could affect the accounting profession. In many, especially larger companies, the chosen technologies are important sources of opportunities and increased competitiveness. After the introduction the paper deals with theoretical background, where it is briefly devoted to the advantages, disadvantages and importance of technologies and methodology. In the results section is devoted to selected technologies and their practical application in accounting and further research analysis. The conclusion of the paper provides concluding comments, recommendations, limitations as well as future research directions.

1. THEORETICAL BACKGROUND

A prerequisite for the introduction of new technologies in accounting is the need to use the electronic form of documents. The biggest trends in the use of information technology in accounting include artificial intelligence, big data, blockchain and cloud computing. All the named technologies represent the so-called Industry 4.0 Technologies (Bartodziej, 2017; Moll & Yigitbasioglu, 2019).

The advantages of using ICT in accounting are therefore indisputable. Among the main advantages is the reduction of costs associated with repetitive manual rewriting of data. The implementation of new technologies in accounting increases the flexibility and transparency of accounting processes and operations. Limiting manual processes is one of the main benefits, but technology can make an impact on accountants' approach to their work. Manual rewriting takes a lot of time that accountants could devote to other activities, therefore ICT can represent a certain benefit for employees that can make their work more interesting. Conversely, the disadvantages and risks associated with digitization include an increase of cyber-attacks and the resulting need for data security, which, according to Ernst & Young (2019), is the biggest problem especially for financial accounting. The risks of losing access to data, possibly destroying data as a result of an internet connection failure or unauthorized access to data are associated with this issue. Artificial intelligence, new technologies, for example in the areas of so-called blockchain or data mining, require new skills and abilities of accountants, as these are technologies that play or will play a key role in the future. Technologies thus represent a significant potential for accountants and allow them to achieve a better strategic position in the organizational structure of the company (Ernst & Young, 2019). It is important for companies to quickly and efficiently adapt to changes in accounting systems, as this adaptation provides them with a competitive advantage Raudeliuniene, Davidaviciene & Jakubavicius (2018).

According to Association of Chartered Certified Accountants (2016), there are 6 basic skills that the accountant of the "future" should acquire: technical and ethical skills, which include the skills and abilities to conscientiously and carefully perform given activities; intelligence, which includes the ability to use knowledge, the ability to make decisions and solve problems; digital skills including awareness and ability to use digital technologies; emotional intelligence and creativity meaning the ability to use one's own and others' emotions and apply them to tasks; vision meaning the ability to predict future trends; experiences.

2. METHODOLOGY

Basic methods of statistical inference, specifically comparison, are used in the article. Furthermore, a systematic overview of selected research devoted to the issue was carried out, which was carried out by searching for relevant keywords. Artificial intelligence in accounting, big data in accounting, blockchain in accounting, cloud computing in accounting were used as keywords. These keywords were searched for in the titles, keywords or abstracts of the articles. The literature search was limited in time from 2016, but it was still focused on more recent research and was not focused only on journals focused on accounting issues, see more about the criteria in Tab. 1. Relevant researches were searched primarily in the Web of Science

or Scopus database (more in Tab. 2). This methodological procedure enabled a wide coverage of the literature that was focused on the use or practical application of technologies in accounting.

The overview article reviews the literature that focuses on four related technologies that affect the work of accountants. These are artificial intelligence, big data, blockchain and cloud computing. The article provides an overview of quantitative, qualitative research published in journals. It focuses on clarifying basic terms and their use in accounting.

The article further uses data from professional accounting bodies such as the Association of Chartered Certified Accountants or from auditing firms such as Ernst & Young and PricewaterhouseCoopers. Data from the Eurostat and Statista databases were also used.

Tab. 1: Selected criteria for the overview of the selected literature

Area	Criteria
Keywords	Artificial intelligence; big data; blockchain; cloud computing; in accounting
Years	2016-2023
Document types	Article
Database	Web of Science, Scopus

Source: Own processing

Tab. 2: Number of articles in the Web of Science and Scopus databases from 2016 to 2023 (07/2023)

Database	2016	2017	2018	2019	2020	2021	2022	2023
Web of Science	714	939	1260	1543	2185	2831	3429	1674
Scopus	75	143	159	211	233	323	534	318

Source: Own processing

The largest number of articles was focused on the topic of artificial intelligence and big data in accounting, and as can be seen, the number of articles increases especially from 2020. With regard to, for example, the title, abstract and keywords of the articles, their analysis and selection was carried out with regard to selected topic.

3. RESULTS

3.1. Artificial Intelligence

Artificial intelligence (AI) represent systems that are characterized by intelligent behavior, in such a way that they can analyze their environment and perform certain actions at the same time. It is a science that deals with how to make a computer or software perform such activities that require intelligence as if they were done by a human (Finocchiaro, 2023). Alternatively, AI can be defined as the ability of a system to effectively interpret data, learn from it, and through learning and adaptation achieve set goals (Agustí & Orta-Peréz, 2022). The use of artificial intelligence improve the efficiency of information systems, which can also be used in accounting Qiu (2022). In accounting, AI is used, for example, to detect false business transactions or to detect errors and irregularities in time. For this use, however, it is necessary to collect data on financial or accounting fraud and thus create a database of fraudulent financial statements. AI can be used to predict costs based on automatic visualization of quantitative risks (Moll & Yigitbasioglu, 2019; Yoon, 2020).

It is possible, for example, to automate various manual tasks such as reconciliation or internal control testing, to automatically import transactions, or to automatically warn if the significance level is exceeded, etc. In a very short time, it is possible to detect false or fraudulent invoices. AI can be used to analyze trends and identify outliers (Moll & Yigitbasioglu, 2019; Ernst & Young, 2020). It can be used to collect complex information about entities and then analyze it in such a way that it can check all accounting transactions in the general ledger and thus identify potential errors (Zhang et al., 2020).

Artificial intelligence help estimate models that are based on historical as well as current data. It can be used for overall analysis of accounting statements and for detecting potential fraudulent transactions,

or to strengthen the company's internal control system. Apart from the analysis itself, it can also be used for the preparation of financial statements and thus serve as a support tool for decision-making tasks, thereby improving the quality of company decision-making (Värzaru, 2022a). The use of artificial intelligence within the control system was discussed (Askary, Abu-Ghazalech & Tahat, 2018), where an AI-based system is able to search vast data and also provide its conclusions and recommendations for improvement. Artificial intelligence can be used in the approval and verification of short-term and long-term loans, as well as in the comprehensive analysis of mortgage risks and the risks of trading on the stock exchange, or to identify the movement of securities prices Askary, Abu-Ghazalech & Tahat, 2018. Accounting softwares that are based on artificial intelligence are constantly changing and adapting and can also be used to identify contractual terms of operating or financial leasing Lehner et al (2022).

Artificial intelligence can be used for ever-repeating activities within the framework of robotic process automation (RPA), which automates all activities that are repeated at regular intervals. These are processes that are performed through computer technology. RPA represents software technology that, for example, enters characters on a keyboard, copies, pastes and moves data, performs calculations, opens e-mails, logs into business applications or fills out forms. According to a Pricewaterhousecoopers (2017b) survey, it was found that 30% of respondents have started incorporating RPA into their business processes. AI combined with RPA makes it possible to automate a whole range of activities performed by accountants and allows them to focus on other and more important tasks.

Large language models (LLM) are considered an important area of AI, which make it possible to create human text, answer questions, translate and perform other language-related activities (Veres, 2022). It is an artificial intelligence system based on transformer architecture, which can be used, for example, to generate text based on learning the distribution of natural language. It can also be used to write various files, for example of an accounting nature (Snoswell, Snoswell & Smith, 2023). Some models based on this technology include GPT, BERT, XLNET, BLOOM or GPT-3. These models can be used for more advanced interaction between accounting software and its user (Kasneci et al 2023). The LLM can be used, for example, when studying accounting or during training, through the generation of questions, tests or study materials. Tab. 3 shows the size of the artificial intelligence market worldwide, including a forecast until 2028 and Tab. 4 shows list of selected research articles. According to Statista (2023), it can be assumed that the artificial intelligence market will show significant growth in the coming years.

Tab. 3: Artificial intelligence market size worldwide in million U.S. dollars

	2021	2022	2023	2024	2025	2026	2027	2028
Summary	95 603	142 320	207 902	298 247	420 466	582 949	795 385	1 068 718

Source: Statista (2023), own processing

Tab. 4: List of selected research articles focused on artificial intelligence (AI) in accounting

Author(s)	Finding	Method
Agustí & Orta-Perez (2023)	There is growing academic interest in AI in accounting	Literature review
Al-Sammarraee & Alshareeda (2021)	The use of AI in accounting information systems is recommended to increase the efficiency and effectiveness of these systems	Literature review Discussion
Estep, Griffith & MacKenzie (2023)	Auditors are not averse to AI and expect it to improve the quality and efficiency of their operations and the quality of financial reporting	Questionnaire
Friedrich et al (2022)	Accounting will not cease to exist due to AI, but it should look for new areas to become competitive	Theoretical essay
Fulop et al (2023)	Accountants have a basic understanding of AI, but only a small fraction of accountants understand it	Interviews
Gavrilova & Gurvits-Suits (2020)	Reasons for not adopting AI in accounting: lack of experience, lack of skilled professionals and overall complexity The current knowledge of accountants is not optimal	Questionnaire
Lee & Tajudeen (2020)	The use of AI-based accounting software has accelerated work productivity, improved efficiency, improved customer service, supported flexible work styles, and saved manpower	Interviews
Lehner et al (2022)	The ethical challenges are: objectivity, privacy, transparency, accountability and trustworthiness	Literature review
Marques et al (2023)	Although AI will transform accountants, not all accounting activities will be delegated to it Accountants will need to update their skills	Questionnaire Interview
Mohammad et al (2020)	Accountants must adapt not only to the use of AI, but also to the constantly changing business environment	Literature review
Munoko, Brown-Liburd & Vasarhelyi (2020)	The advantages of AI can be time saving, faster data analysis, higher accuracy, more efficient analyses The use of AI brings ethical implications	Literature review
Sutton, Holt & Arnold (2016)	AI research in accounting has grown over the past 30 years	Literature review
Tian & Li (2022)	The recognition accuracy rate in accounting is better thanks AI	Processing technology
Vărzaru (2022a)	AI solve ethical problems in accounting, but at the same time creates new ones	Questionnaire
Vărzaru (2022b)	AI is changing accounting and can be used for simple and repetitive tasks	Questionnaire
Qiu (2022)	The AI model in accounting accelerates the flow of all accounting information and improves the accuracy of the entire system	Feasibility analysis
Zemánková (2019)	AI has great positive potential in accounting, but at the same time it raises a lot of questions to be addressed, including ethical and moral ones	Literature review
Zhang et al (2020)	Top accounting companies are embracing AI, and accountants are expected to expand their knowledge in this area	Literature review
Zhang et al (2023)	Ethical areas: data security, privacy, misuse; responsibility; accessibility; transparency and trust	Interviews

Source: own processing

3.2. Big Data

Big data represent large-volume, high-speed and diverse means that use efficient and effective forms of information processing that serve as decision support, process automation. Big data include large volume, speed, variety, and some authors also state their credibility. In addition to the huge amount of data, they also include various techniques that are used to analyze it. Visualization programs improve the accuracy and reliability of decision-making and prediction, and also allow unstructured data to be explored. In accounting, it is a reliable source of financial data to support business decision-making (Zhang et al., 2020). Big data consists of technologies and techniques that are used to analyze large amounts of complex data.

This is a large volume of diverse data that is obtained from various sources and that cannot be processed through traditional techniques.

Big data can provide other forms of valuation of intangible assets, including those not included on the balance sheet. At the same time, they can be used in the valuation of hard-to-value assets, or they can help with the selection of an appropriate depreciation method (Moll & Yigitbasioglu, 2019). According to Leitner-Hanetseder & Lehner (2022), it can be used to gain a better insight into business processes, thereby reducing costs due to errors or by setting optimal product prices. According to Najafi, Soleimanpur & Morady (2022), the use of big data leads to the improvement of the company's competitiveness, but it is necessary for the current accounting to cooperate with this new technology. Big data can be used to provide financial reports and overviews, to forecast the amount of profit or in matters of investments. They can be used to collect data on taxpayers and thus to forecast potential tax evasion (Pilipczuk, Cosenco & Kosenko, 2019). Big data makes it possible to collect and record accounting data in a more efficient way and thus to use it better in management. In managerial accounting, it can be used in the budget management.

In financial accounting, it will improve the quality and relevance of accounting data. In reporting, it can help with the creation and improvement of accounting standards. It enables changes in audit procedures and leads to better use of data and information. It can provide ongoing audits, helps reduce audit risks, enables more efficient and effective audits and also provides new evidentiary information that was not available in previous periods (Warren, Moffitt & Byrnes, 2015; Yoon, 2020). Big data makes it possible to identify suspicious recorded accounting data, it is used to analyze the maturity of receivables and payables, gross margins and sales, investment and other expenses and costs (Chu & Yong, 2021). Big data can be used in the framework of fraud prediction by forecasting the behavior of businesses based on the analysis of their historical data. Big data enables the processing of accounting, financial, etc. data in real time. They facilitate the accuracy, completeness and accessibility of accounting data (Cockcroft & Russell, 2018).

Tab. 5 shows the size of the big data analysis market worldwide, including the forecast until 2028 and Tab. 6 shows list of selected research articles. According to Statista (2022a), it can be assumed that the big data analysis market will grow in the coming years.

Tab. 5: Large Analytics Market Size Worldwide in million U.S. dollars

	2021	2022	2023	2024	2025	2026	2027	2028
Summary	241	272	308	350	396	450	510	578

Source: Statista (2022a), own processing

Tab. 6: List of selected research articles focused on big data (BD) in accounting

Author(s)	Finding	Method
Abdullah, Sanusi & Savitri (2022)	BD facilitate and improve the implementation of strategic accounting practices	Interviews
Alles & Gray (2016)	Major audit firms are seeking to implement BD and see it as an increasingly important part of their assurance practice	Literature review Discussion
Changmarin (2021)	BDs help improve corporate strategy and accounting performance	Literature review
Moll & Yigitbasioglu (2019)	BD and other technologies are affecting the daily work of accountants and it is important that accountants learn new skills	Literature review
Perkhofer et al (2019)	Accountants who have experience with BD indicate high perceived ease of use. To further increase usage in the accounting profession, it is necessary to provide training, user-oriented visualizations and support	Questionnaire
Phornlaphatrachakorn & Jannopat (2021)	BD has a significant impact on the quality of accounting information, decision-making efficiency and sustainable business growth	Questionnaire
Pilipczuk, Cosenco & Kosenko (2019)	There is a need for accountants to actively upgrade their skills to meet the needs of technology	Literature review
Prabhat, Kaur & Gupta (2021)	BD in forensic accounting can facilitate the fight against fraud	Questionnaire
Sivarajah et al (2017)	There are shortcomings in existing research on BD in accounting compared to other disciplines, and there is a need to deepen BD in real-world cases	Literature review
Sun (2022)	The integration of managerial and financial accounting based on BD analysis can support the effect of corporate financial management	Regression
Varma, Piedepalumbo & Mancini (2021)	Research in the area of BD and accounting is at the beginning	Literature review
Xu (2022)	An accounting system based on BD can effectively improve the quality of accounting work	Big data mining
Zin et al (2022)	It is important for accountants to acquire BD knowledge and skills	Interviews

Source: own processing

3.3. Blockchain

Blockchain technology was first introduced in 2008 as a payment system for cryptocurrencies by providing a secure record of every digital currency transaction without the need for a third party. Blockchain is an information recording technology that uses encryption to prevent falsification or other manipulation of data Yoon (2020). Blockchain technology represents an internet network that uses cryptography Schmitz & Leoni (2019). It is a decentralized and distributed database that allows network users to share, store and send data continuously. It is a technology where various data are stored in so-called blocks, which are connected as chains, by means of cryptography. In other words, it is an immutable digital ledger that records economic transactions, allows tracking of assets across the network, and requires all blocks of data to be stored on every computer of the network Smith (2018).

Blockchain can represent a shared ledger that can record economic operations between two entities (Raval, 2016). Once an economic transaction is approved (all participants agree on its validity) it cannot be canceled or changed, thus ensuring that all users have the same records. In case a transaction is corrected, a new operation must be created. It is a mechanism to create trust between users without the need for a third party (Moll & Yigitbasioglu, 2019). On the basis of blockchain technology, for example, it is possible to create a transparent accounting system that provides reliable storage of accounting data on economic operations in real time. Blockchain can be used to perform an audit in real time and at the same time increase the quality of its execution. Auditors can only focus on more complex accounting transactions, contract review, etc. (Zhang et al., 2020). According to Belluci, Bianchi & Manetti (2022), blockchain allows testing the entire

accounting database, instead of just a smaller sample. However, there will always be a need for an independent party to control the activities of businesses. Rather, auditors will expand their skills and services into the realm of administrators or advisors of blockchain-based accounting systems.

In connection with the blockchain, so-called smart contracts are also relevant, which represent a computer protocol that, for example, determines the rules for contracts. The protocol holds the funds and releases them only when the agreed conditions are met. These facts lead to an improvement in the quality of accounting data and a radical change in the double-entry bookkeeping that is currently used (Wu, Xiong & Li, 2019). In the case of smart contracts, there is no need for an intermediary, but everything happens automatically. Approval of smart contracts takes place through digital signatures (Faccia & Petratos, 2021).

To some extent, blockchain technology represents a breakthrough in the way of creation, control, archiving of documents, documents or accounting books, creating a system of so-called universal accounting. The property of the given technology is to change the accounting system through universal diffusion, immutability and programmability. Blockchain will allow the accounting profession to be strengthened in the organizational structure by allowing accountants to engage in activities with higher added value, such as planning, valuation, etc. according to Pugna & Dutescu (2020). In the case of an audit, it is possible to check the entire group of economic transactions, not just a certain sample, and due to the immediate access to this data, operations can be checked practically in real time. At the same time, it is possible to continuously identify risky transactions. In this regard, it is necessary to think about the issue of new skills of auditors and audit costs (Moll & Yigitbasioglu, 2019).

Blockchain technology makes it possible to increase the efficiency of information exchange between tax administrators. Furthermore, it can also influence the form of traditional tax returns, it can automate tax returns and minimize the administrative burden of tax administration, or it can reduce process fragmentation by complying with country-level regulations (for example, language). It also allows for greater integrity and transparency, reduces the cost of compliance with legislation and makes tax collection more efficient, through smart contracts. In the administration of value added tax, it is possible to use blockchain technology, through the automation of business rules and the use of smart contracts. It also enables faster value added tax (VAT) refunds and more efficient tax control by creating a single transparent shared view of data Podik, Shtuler & Gerasymchuk (2019). Tab. 7 shows the size of the blockchain market including its forecast, according to which this market should grow according to (Statista, 2022b) and Tab. 8 shows list of selected research articles

Tab. 7: Blockchain market size worldwide in million U.S. dollars

	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026
Summary	0,98	1,57	2,55	4,19	6,92	11,54	19,36	32,69	55,54	94,89

Source: Statista (2022b), own processing

Tab. 8: List of selected research articles focused on blockchain (BC) in accounting

Author(s)	Finding	Method
Alkafaji, Dashtbayaz, & Salehi (2023)	BC will positively and significantly affect the quality of accounting information	Questionnaire
Bonyuet (2020)	BC will affect the auditing profession and it is important for auditors to understand how to use this fact to their advantage	Literature review
Cai (2019)	Triple-entry accounting with BC can fundamentally improve accounting	Case study
Desplebin, Lux & Petit (2021)	Due to BC, accountants will change their current role and will need to learn new skills	Literature review
Faccia & Petratos (2021)	BCs can facilitate the integration of different levels and streamline auditing or compliance with accounting regulations	Literature review
Fang et al (2023)	BC significantly improves the quality of accounting information	Analysis Literature review
Han et al (2023)	BC will not completely replace accountants, as their expertise is needed to assess a wide range of activities. Changing roles will give accountants more capabilities and more time to focus on higher value-added activities	Literature review
Chowdhury, Khan & Dhar (2023)	BC adoption factors: privacy, utility, cost, and convenience	Questionnaire
Kolisnyk et al (2023)	BC can help reduce the likelihood of accounting errors and ensure a higher level of information security	Literature review
Lardo et al (2022)	In recent years, the number of studies regarding BC has increased	Literature review
Liu et al (2022)	BC brings benefits to accounting and auditing processes and has the potential to reduce various transaction costs	Analysis Literature review
Liu, Wu & Xu (2019)	Auditors should adapt and be promoted to the role of strategic partners in the implementation of BC and increase their competence	Literature review Discussion
Maiti, Kotliarov & Lipatnikov (2021)	BC is not ready for immediate use due to lack of technological and organizational legal frameworks and high implementation costs	Case study
Pascual, Gelashvili & Nebreda (2021)	BC, after its technical improvement, will include an important transformation of the accounting system, with a subsequent modification of the work of accountants	Literature review
Pedreno, Gelashvili & Nebreda (2021)	BC will involve the transformation of the traditional accounting system	Literature review
Secinaro et al (2022)	BC as an external force can create intersections between: accounting, auditing, accountability, business, management, IT and engineering disciplines	Literature review
Sheldon (2019)	All key parties in the accounting profession should use BC to collect fraud and BC is likely to be used in normal accounting procedures	Literature review
Simões et al (2021)	BC offers an opportunity to improve financial reporting and auditing processes	Literature review
Tan & Low (2019)	BC-based accounting will ensure lower error rates and thus improve audit quality. Accountants will not be the main point, but will remain processors of financial reports, etc.	Literature review Analysis
Vardia & Singh (2022)	BC leads to better transparency between internal and external accounting users	Questionnaire
Wu, Xiong & Li (2019)	BC can improve the relevance, fidelity, timeliness, comparability of accounting information and data	Literature review Analysis
Yu, Lin & Tang (2018)	In the short term, BC could be used as a platform for companies to voluntarily disclose information. In the long term, BC could reduce disclosure errors and increase the quality of accounting data	Literature review Analysis

Source: own processing

3.4. Cloud Computing

Cloud computing makes it possible to provide various information technology services, such as applications, files, storage or servers, through the Internet (Brandas, Megan & Didraga, 2015). Cloud Computing is divided into 3 categories. Infrastructure as a Service on the basis of which the subject can rent computing equipment such as a processor. Platform as a service allows entities to install their own applications through a certain

platform that is determined by the service provider. Software as a Service represents the provision of access to applications by a service provider via the Internet (Christauskas & Miseviciene, 2012).

Currently, there are a number of web applications that serve primarily for smaller business entities that invoice themselves and other accounting work is performed by a qualified accountant. An official definition of cloud accounting does not yet exist; however, it is possible to define it using its properties according to Dimitriu & Matei (2014).

The most important characteristic is that accounting services are performed without the need to install any software. Cloud accounting is used via a web browser, i.e., via the Internet and allows access from virtually anywhere and from any device. All data is stored with the provider. Some cloud services in accounting include the automatic creation of attachments to economic operations, the automatic control of accounts or the preparation of all interim statements or reports, calculation of financial indicators or creation of financial statements (Dimitriu & Matei, 2014).

Cloud accounting is an accounting system based on cloud computing. Cloud accounting allows both clients and accountants to perform their function efficiently and effectively, ensures data security and improves their synchronization (Sora, 2020).

Accounting in cloud computing makes it possible to reduce the costs of own information technology resources (software, licenses, experts), and due to monthly variable usage fees, their cost optimization is possible. Access to accounting data is practically unlimited, depending on the Internet connection.

Accounting through cloud computing allows access to all accounting or financial data in real time, using any device. Its use enables forecasting and improves financial and accounting reporting or internal and external audits. Access and analysis of data in real time can lead to quick detection of errors and allows monitoring of clients' economic operations, without the need for communication (Moll & Yigitbasioglu, 2019). In accounting through cloud computing, there is no need to print any accounting documents, and the system will automatically notify the payment of liabilities (Qunying, 2019).

A remote server connected via the Internet is used for accounting via Cloud computing (there is no need to store any software on the computer). The data are then automatically updated and backed up without the need for human intervention. Data archiving is then not affected by storage capacity. Access to the data is allowed to an unlimited number of users. Cloud Computing can be used, for example, within a corporate system for storing accounting data Jin & Zhang (2023).

Tab. 9 below shows the share of companies using cloud computing services in EU 2014-2021 according to the number of employees and Tab. 10 shows list of selected research articles.

Tab. 9: Share of companies using cloud computing services in EU (in %)

Employees	2014	2016	2018	2020	2021
10 - 49 employees	16,7	16,9	21,2	33,5	38
50 - 249 employees	21,9	26,2	33,7	45,7	52,9
250 and more employees	31,6	42,1	53,1	64,9	71,6

Source: Eurostat (2023), own processing

The most frequently used service is cloud e-mail, which was used by 32,4 % of companies in 2021 (only 12,2 % in 2014) Eurostat (2023).

Tab. 10: List of selected research articles focused on cloud computing (CC) in accounting

Author(s)	Finding	Method
Alles (2018)	The CC literature fails to establish a clear role for itself in relation to the field of accounting or CC	Literature review
Alshawabkeh et al (2023)	CC plays a significant role in the relationship between system availability and security and integrity with business performance	Questionnaire
Asatiani et al (2019)	CC users outsource more accounting processes than with traditional systems	Questionnaire Delphi
Cleary & Quinn (2016)	CC in accounting has a positive and statistically significant impact on human capital and relational capital	Questionnaire
Deng (2022)	Data monitoring by an accounting system based on sensor monitoring and cloud computing is more efficient compared to traditional accounting systems	Analysis
Eldalabeeh et al (2021)	CC adoption characteristics: top management support, organizational competence, service quality, system quality, usefulness and ease	Questionnaire
Handayani, Adrianto, & Ritchi (2021)	Perceived usefulness and perceived ease of use have a positive impact on businesses' intentions to use cloud accounting software	Questionnaire
Hamundu, Husin & Baharudin (2021)	Characteristics of CC Adoption: Perceived Compatibility, benefit, Complexity, Organization Size, Government Intervention, Competitive Pressure	Interviews
Hu et al (2016)	When using CC in auditing, the priorities for improvement are: Operations, User Provisioning Automation, Technology Risk, and Protection System	Multiple Attribute Decision Making
Lamei (2022)	CC has an impact on improving accounting information in small and medium-sized enterprises	Cluster analysis
Ma, Fisher & Nesbit (2021)	Companies are at least at the same level in accounting after adopting CC as they were before	Interviews
Pramuka & Pinasti (2020)	Characteristics of CC adoption: perceived usefulness, ease of use, and credibility	Questionnaire
Saad et al (2022)	Characteristics of CC adoption: relative advantages, security concerns, management support, organizational readiness, intensity of competition, and supplier computing support	Questionnaire
Shakatreh, Abu Orabi & Al Abbadi (2023)	CC affects the definition and presentation of financial reports	Questionnaire
Ting & Liu (2020)	The platform for intelligent data analysis improves the ability of statistical analysis of accounting data	
You & Xiao (2023)	CC in accounting can create an efficient supply chain, reduce inventory and reduce cost accounting	Cost analysis

Source: own processing

CONCLUSION

Currently, however, various new trends are slowly coming to the fore in this area as well. One of them is artificial intelligence combined with the aforementioned robotic automation of processes, further it is blockchain, big data and cloud computing technology. Technologies are currently becoming more and more integrated within business processes and there is practically no longer an area in which their influence is not noticeable. For this reason, it is necessary to support employees in this area so that they do not perceive these technologies as a necessary evil, but on the contrary, to take advantage of the opportunities that are offered to them. According to the literature research, the importance of selected technologies for the transformation of the current view on the accounting profession results. In most of the articles, the authors focused on the impact of technology on accounting, factors that influence their adoption in accounting and ethics, etc. At the same time, academic interest in these technologies is growing over time.

The problem of these new technologies is insufficient or no legislative regulation, and therefore economic policymakers are advised to address the issue as soon as possible and to introduce as much detail as possible into the current legislative process. This is primarily the area of liability for errors caused by artificial intelligence. At the same time, it is recommended that these technologies should be integrated into the curriculum of high schools and universities so that potential employees acquire the required skills. ICT should be integrated much more into the educational curriculum of both secondary and higher schools, so that future employees acquire not only knowledge of accounting and taxation, but also of advanced ICT, which could also result in a change of their attitudes and could make the job itself more attractive. These technologies are only a helper, as human activity will always be needed, especially with certain more advanced accounting techniques. However, there is a need for people to increase their digital skills and take advantage of these trends, as the use of these technologies will continue to grow over time, as shown. Limitations of this paper include that there are currently a number of other specific types of technology that were not mentioned in the paper, which should be addressed in future research.

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