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# **DOCTORAL THESIS SUMMARY**

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**Alba Iulia  
2024**



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**PROSPECTS AND EXPECTATIONS IN THE DESIGN OF THE NEW  
MODERN DIGITAL ACCOUNTING PARADIGM IN THE CONTEXT  
OF CLOUD COMPUTING TECHNOLOGY**

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**Keywords:** accounting, computerization, digitization, robotization, cloud accounting, pandemic, accounting profession, impact, role, transformation, emerging technologies, competencies, skills, pandemic, SPSS, Gretl, model

#### **PREAMBLE-AN ALTERNATIVE INTRODUCTION**

"Only an author can understand how, sometimes, during the writing of a book, it has the gift of taking over, writing itself somewhat "on its own". I'm sure you've heard the expression and probably have mixed opinions about it. A long time ago, when I tried to explain the phenomenon to one of my former editors, his line was: "Sounds kind of scary, Mike...I don't think you want readers to see that!" Well, naturally a book can't write itself. Writing a book requires hard work on the part of the author, who of course has to know what he is writing about. Yet the whole process has a truly mysterious dynamic. Not infrequently it happens, for example, that after the author has laid the foundations of the plot, the characters take over, setting the pace and direction. All the author has to do is follow them!" (Phillips, 2013, p. 15) Such an excerpt taken from a historical narrative may seem atypical and inappropriate for an economics-specific research paper, but it contains a subtle and impenetrable truth that can be successfully subscribed to any field of research. Passion, dedication and perpetual accumulation of knowledge in a defined field of research leads to the easy shaping of the scientific universe from the creator's perspective, the research itself

defining its own path, driven by the researcher's expertise and driven by the evolving trends of society. In this way the perfect framework is created for things to flow of their own accord and for research to achieve the very purpose for which it was undertaken.

## **DOCTORAL THESIS CHAPTERS PRESENTATION**

### **INTRODUCTION**

#### **Research overview**

In the last few decades of the history of accounting, there have been significant changes in the way its tasks and functions are performed under the umbrella of the massive penetration of modern information technology in the economic field. The significant link between accounting and information technology since the introduction of the first technological innovations continues to show a remarkable potential for adaptation to the constant changes in advanced technology that characterise the contemporary era. (Boghian & Socoliuc, 2020) Digital accounting is an essential issue for companies and the accounting profession, and its approach, in all its distinctive aspects, is the differentiator between the success or failure of the modern company.

The manifestations of technological modernity have expanded rapidly in recent times, arousing the interest of many academic communities as well as practitioners to study in depth the implications of these developments in many areas of activity. This paper also deals with a current issue in the life of every company, whatever its characteristics and specificities, which has been identified as one of the greatest challenges, accentuated by the current pandemic situation: the advance of the digitalisation of financial accounting operations.

Although ubiquitous in the language of business, issues such as robotics and the automation of organisational processes are still unexplored areas in terms of their economic and social impact on the business environment, which will also be highlighted throughout this research. In relation to accounting, it shows a growing potential for the implementation of modern technologies. The massive penetration of modern technologies in financial accounting processes is a current challenge that raises various controversies in the business environment as well as in the academic world, in terms of the risks and drawbacks generated by their implementation and use.

#### **Research motivation and significance**

The motivation for choosing the research topic related to the aspect of shaping new paradigms in accounting as a result of advanced technological developments is justified in several ways. On the one hand, the initiation of this study is justified by the main feature of the complex development of humanity from a technological perspective, on the principle based on the idea that development is a real "barometer of the vitality of a people and a state organisation" (Dobrescu, 2016). (Dobrescu, 2016) Secondly, it is impossible to omit the

consideration related to the considerable computerisation of the accounting field, which is located in a region suitable for the computerisation process, with a potential for automation of the tasks assigned to the accounting professional in 98%. (Frey & Osborne, 2017) The research is also based on the popularity and affirmation of cloud computing technology, also in the accounting field, mainly in the context of the COVID-19 crisis. A further basis lies in the topicality of issues related to robotization and automation in accounting, and the implications of these phenomena for the future of accounting.

### **Research aim and objectives**

The main purpose of the research is to contrast the paradigm whose dawn is emerging in the field of accounting, its presence is increasingly felt in the economic field, this is not the exclusive subject of the thesis, the paper deals with a series of issues related to the footprint of emerging technologies on the accounting field. Through this thesis we aim to achieve five fundamental objectives related to the outline of the conceptual framework related to the emergence, evolution and forms of manifestation of digital accounting, the reflection of how researchers report on the phenomenon of cloud accounting, the analysis of the perception of accounting professionals in relation to cloud accounting applications against the background of the acceleration of the computerisation of accounting as a result of the pandemic situation generated by the emergence of COVID-19, Identifying the impact of the robotics and automation phenomenon on the accounting field and analysing the correlation between the number of ICT professionals in the companies and the degree of use of cloud accounting technology, reflected in the process of purchasing accounting and finance IT applications in the form of cloud computing services.

### **Methodological benchmarks in the research approach**

Research is becoming a real challenge for the researcher in the context of information overload, the complexity of economic mechanisms and changes in social structures. The need to frame the study in an appropriate way has led to the use of a variety of tools to provide an accurate, comprehensive and objective picture of the current context. These tools, techniques and methods are summarised below. The literature review helped to consolidate the study in terms of defining the basic concepts and highlighting the relationship between the researchers and the issues under study. The conceptual analysis produced by this method is accompanied by pragmatic research, represented by bibliometric analysis tools, the use and interpretation of questionnaires and correlation analysis based on the econometric method. The plurality of scientific research methods and tools is a fundamental pillar in order to reflect the objectives, purpose and expected results based on the combination of qualitative and quantitative research.

The structure of the thesis is shown in the figure below.

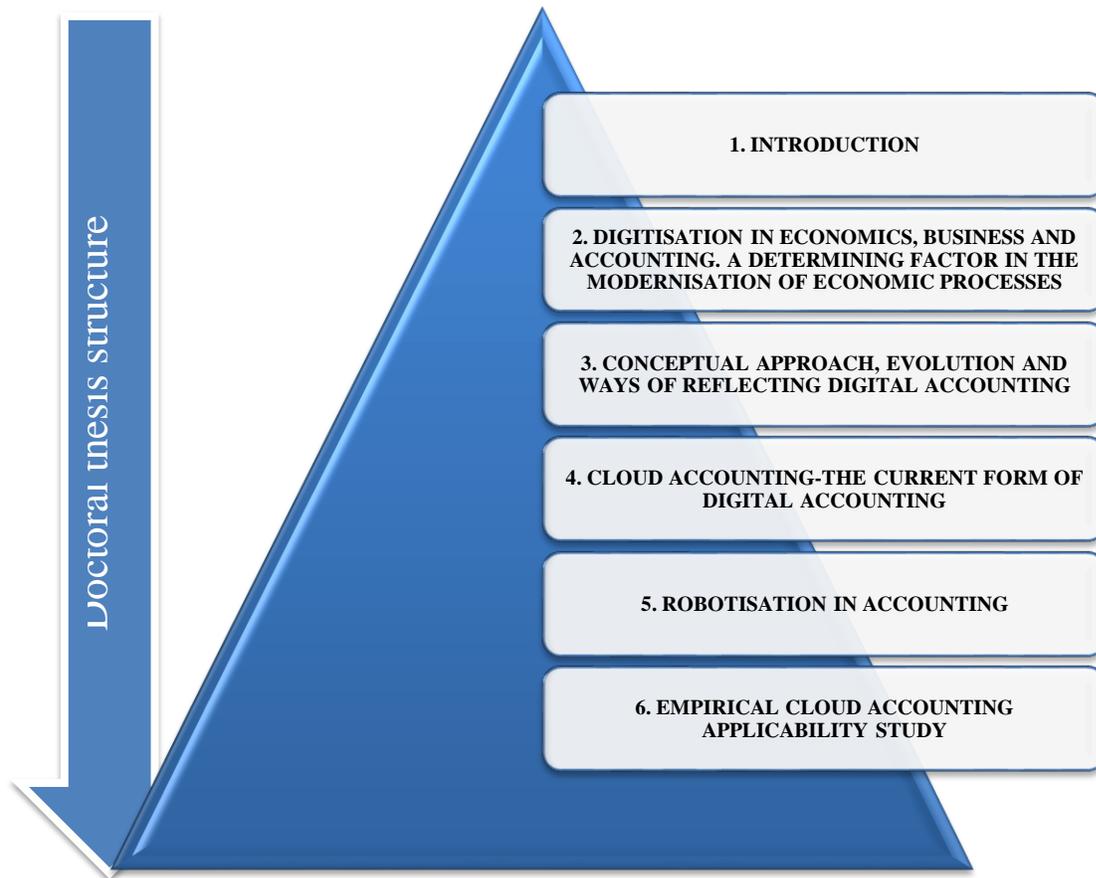


Figure 1.1-Doctoral thesis structure

Source: Own processing

## **DIGITISATION IN ECONOMICS, BUSINESS AND ACCOUNTING. A DETERMINING FACTOR IN THE MODERNISATION OF ECONOMIC PROCESSES**

### **Going digital-driving the wellbeing of the modern business**

Digitalisation has changed the way companies perceive the creation and storage of value by adapting service-oriented behaviour. (Thomson et al., 2021) In the midst of the health crisis caused by the pandemic situation that the whole of humanity is going through, the phenomenon of digitalisation has experienced an unprecedented acceleration. The actions related to the digitalisation process of companies, which should have been carried out in about 5 years in a progressive digitalisation process, were carried out in only 8 weeks. (Digital Adoption through COVID-19 and beyond | McKinsey, 2021) Against the backdrop of

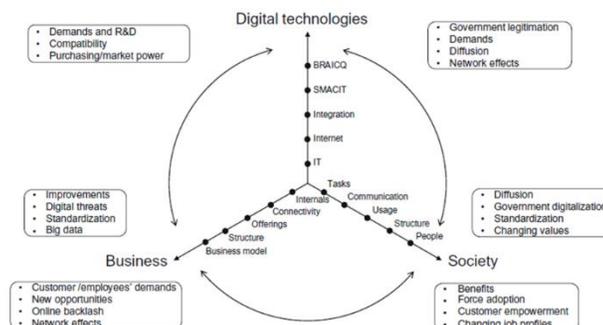
emerging technologies, companies need to restructure their business by reusing existing assets or building innovative assets to produce digital goods and services and using digital tools in their work processes (Isaksen et al., 2020; Kyllingstad et al., 2021). In the context of contemporary society, digitisation is an issue of interest to representatives of technical and humanistic fields, economists, politicians, businessmen and students, for each of whom the phenomenon wears a different cloak.

### Timeframe evolving of digital technologies

The timeline of digital technologies reveals their evolution over time, organised in 5 waves of evolution (Van Veldhoven & Vanthienen, 2021, p. 4). The first wave is characterised by early IT solutions to automate tasks of low complexity (Legner et al., 2017). The second wave focuses on the emergence of the internet and innovative solutions with a focus on connectivity and collaboration (Heavin & Power, 2018). With the massive popularisation of task digitisation and the expansion of the internet, the third wave is characterised by the emergence of integrated solutions based on applications that can manage large amounts of data (Heavin & Power, 2018). The fourth wave, which is identified with the current state of the digitisation process as described by most models, includes the massive growth of social networks, the development of cloud computing technology, as well as the formation of the Internet of Things or IOT-Internet of Things. (Legner et al., 2017; Vial, 2019) The next wave is characterised by the emergence and development of new technologies such as 3D printing, artificial intelligence, blockchain technology, cognitive and quantum computing (BRAICQ) (Verhoef et al., 2021).

### Conceptual aspects of the digital ecosystem

The digital ecosystem is underpinned by the massive deployment and development of digital technologies (Subramaniam et al., 2019), reshaping the way we perceive interconnectedness. The digital transformation of business structures and social environments is the fundamental pillar of digital innovation, and the specific framework for its development is provided by the digital ecosystem. In this sense, digital transformation forms a tripartite relationship with the business environment and the social framework, giving rise to the digital ecosystem, as can be seen in the following figure. (Van Veldhoven & Vanthienen, 2021):



### Figure 2.3-Digital development framework based on interaction

Source: Van Veldhoven, Z., & Vanthienen, J. (2021). Digital transformation as an interaction-driven perspective between business, society, and technology. *Electronic Markets*.

<https://doi.org/10.1007/s12525-021-00464-5>, p. 5)

#### **Digital technologies' transformative nature**

The transformative power of new digital technologies, together with their innovative capacity and high potential for accessibility, referred to in the literature as SMACIT (social, mobile, analytics, cloud and Internet of Things), has been tested among 25 of the world's leading companies. The digital transformation affects all areas of human activity, especially the business domain (Schallmo et al., 2017). The decision to be digital or not is the impetus for survival, creating entrepreneurial opportunities to achieve performance and innovation (Ferreira et al., 2019, p. 7). According to a study in the academic community in Kosovo, based on the model of analysis of a person's entrepreneurial behaviour, commonly called TPB (Theory of Planned Behaviour), implemented by researchers Turker and Selcuk (Turker & Sonmez Selcuk, 2009), it was found that entrepreneurial decisions are influenced by digital technologies. Thus, digitisation provides a complex range of opportunities in the entrepreneurial environment (Nambisan, 2017) and the process of digitisation reshapes the way business is organised (Fossen & Sorgner, 2021).

#### **The impact of covid-19 on accelerating the digitisation of accounting processes**

The pandemic situation created by the emergence and spread of infection with the new coronavirus has led to a change in the approach to business models, reshaping the way we relate to innovative solutions characteristic of the massively computerised society. Against the backdrop of the coronavirus pandemic, the accounting professional has a significant role to play in the business environment, being at the forefront of those with a critical role in contributing to the 'cure' of business. This can be achieved by identifying the most appropriate solutions to ensure its survival and progress (Zgardan & Frumusanu, 2020). In a survey conducted among accounting professionals and managers of private companies in Romania regarding the changes in financial accounting processes during the pandemic, 88% of them supported the importance of accelerating the digitalisation of the accounting spectrum as an indispensable solution for the survival of the company. (Zgardan & Frumusanu, 2020). The pandemic period thus becomes a turning point for the accounting profession, a decisive moment for redefining accounting paradigms, replacing the old ones with innovative ones adapted to the information society and the highly digitised business environment. ('The Evolution of Accounting Skills: The Impact of COVID-19 and the Direction for the Future', 2020) The health crisis caused by the emergence of the new coronavirus has also led to a shift in companies' interest in cloud-based accounting solutions due to employees working remotely ('Accounting Software Statistics and Trends', 2020). The COVID-19 pandemic has changed

the rules of the economic game, leading to the adoption of new modern information paradigms that play a critical role in optimising business performance.

## CONCEPTUAL APPROACH, EVOLUTION AND WAYS OF REFLECTING DIGITAL ACCOUNTING

### Conceptual overview of digital accounting

With its wide scope and proven applicability, information and communication technology is gaining considerable ground in the field of accounting, and the interdependent relationship between the two contributes to the continuous advancement of the field in the direction of humanity's evolution from the perspective of advanced technology (Utami & Dwi Yulianto, 2019). Digital accounting, under all its values and implications, is attracting considerable interest from researchers, with the number of publications related to this topic steadily increasing, which is captured by the following figure:

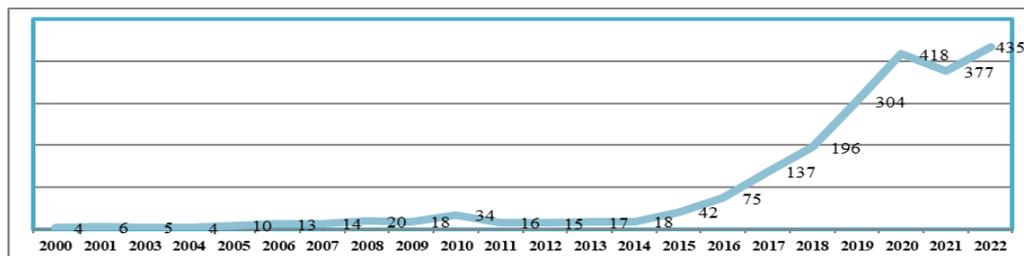


Figure 3.1-Evolution of the number of publications linked to digital accounting between 2000 and 2022 - WOS publications

Source: Web Of Science

The distribution of publications by region shows a significant interest in digital accounting research in Russia with a total of 332 publications, followed by the USA with 309 publications and the UK with 224 publications, which is supported by the level of technological development of these regions. The paper includes a detailed description of the main forms of manifestation of digital accounting, namely: cloud-based accounting software, artificial intelligence, RPA software, DPA software, audit analytical software, block chain, big data, etc., based on the specific identification of applications specific to the listed areas.

### Cloud accounting theoretical lines. Current state of research

Amid the massive development of the information society and digital economy, cloud accounting technology is becoming a force for business development. Its adoption is no longer an option, but a necessity in terms of driving the accounting business into a future strongly marked by digitalisation (Feng, 2015, p. 208). The dawn of the cloud accounting concept emerged in 2011, marking the first moment of the definition of the phenomenon by researchers Ping and Xuefeng. A typical technology of postmodern accounting, cloud accounting, with a faithful translation into Romanian of "accounting in the cloud", according to the authors Dimitriu and Matei, denotes a specific application of cloud computing technology for the specific purpose of processing financial data. It contributes to the

modernisation of the entire business process through its innovativeness, timeliness and adaptability, marking the emergence of a new business model (Dimitriu & Matei, 2015, pp. 665-671).

According to the authors Dordevic et al. the term cloud accounting equates the concepts of online accounting, web accounting or virtual accounting system that fully embodies the valences of modern revolutionary cloud computing technology. (Đorđević et al., 2018, p. 24) Online accounting or cloud accounting is when data is stored in a centralised computer and can be accessed by any authorised person from anywhere via the internet. (Soni et al., 2018, p. 37)

As an example, the graph below shows the extent to which companies across Europe will use cloud-based accounting and finance applications over the period 2014-2021 (latest data available via EUROSTAT). As we can see from the graph above, the Nordic countries are leading the way in the widespread use of cloud technology for accounting tasks. This is due to their considerable development in terms of digitisation: the top three countries with the highest DESI (Digital Economy and Society Index) in 2021 are Norway, Sweden and Finland. (Digital Economy and Society Index 2018 Report | Shaping Europe's Digital Future, 2021)

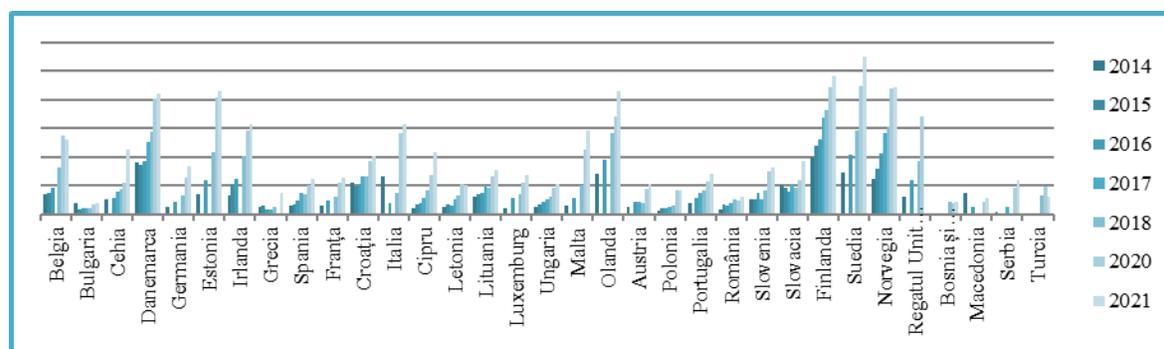


Figure 3.4-Grade of use of cloud computing technology in accounting and finance in the business environment

Source: Own processing based on data collected via Eurostat website, available at:

[https://ec.europa.eu/eurostat/databrowser/view/ISOC\\_CICCE\\_USE\\_\\_custom\\_6852551/default/table?lang=en](https://ec.europa.eu/eurostat/databrowser/view/ISOC_CICCE_USE__custom_6852551/default/table?lang=en), accesat on 20 July 2023.

### The role of cloud technology in redefining accounting

In accounting, the 21st century marks the emergence of cloud computing technology, with the transition to the new business model facilitated by the early inclusion and adoption of IT tools in accounting. (Dimitriu & Matei, 2014b, p. 238)

The era of cloud computing can be considered, due to its peculiarities, as the successor of the Internet revolution, whose strong impact on the accounting field is inevitable. (Dimitriu & Matei, 2014b, p. 240) Cloud accounting thus becomes a new defining business mode for the

function and role of contemporary accounting. (Ostrowski, 2020)The future of accounting and management is clearly marked by cloud computing technology. (Roenker, 2017) The companies that will be successful in this fast-paced environment of change will be those that are receptive to the idea of innovation, willing to integrate into their business processes modern technologies that enable them to achieve "more with less". (Hossack, 2015, p. 267)

## **CLOUD ACCOUNTING-THE CURRENT FORM OF DIGITAL ACCOUNTING**

### **Cloud computing technology**

#### **Defining cloud computing**

One of the most famous definitions of cloud computing comes from the US National Institute of Standards and Technology (NIST), which states that "Cloud computing is a model that provides ubiquitous, convenient, on-demand access to a shared pool of configurable computing resources (networks, applications, services, servers) that are provisioned and accessed with minimal management effort or interaction with the service provider." (Mell & Grance, 2011) Cloud computing is defined as a new computing paradigm that highlights the dual relationship between cloud service providers and cloud end users as the main actors in the process. (Rani et al., 2015) Through the authors Sendi & Cheriet, cloud computing is considered as a relatively new paradigm defined by a number of characteristics such as availability, increased accessibility and rapid elasticity that play a critical role in meeting the current demands of the business environment.(Sendi & Cheriet, 2014) Cloud computing embodies a business model characteristic of the modern era that provides IT resources that represent an innovation of the information technology environment. It provides individuals and organisations with on-demand access to a shared pool of managed resources such as applications, servers and storage (Sunyaev, 2020).

In our opinion, it is appropriate to link cloud computing technology to the field of accounting in terms of transferable attributes to accounting tasks and functions. My personal approach to the definition of the concept of cloud computing is to identify it with an innovative business model, defined for contemporary society with fundamental foundations in computer science, assimilated to a modern computing technique that allows the storage of resources independent of spatial and temporal landmarks.

### **Cloud accounting technology**

#### **Defining cloud accounting**

This paper presents more than 50 approaches to the definition of cloud accounting in the literature. Considering the conceptual aspects of cloud accounting technology taken from the literature, a personal approach to defining the phenomenon is presented below. Cloud accounting represents the use of cloud computing technology by adopting its characteristics, operational capabilities, benefits and vulnerabilities to perform financial accounting processes. In my opinion, the cloud phenomenon and its application to accounting is significantly shaping the future of accounting and the accounting profession by making its practitioners

responsible for accumulating knowledge, experience and skills to manage the changes brought about by the implementation of technology.

### **Vulnerabilities identified during implementation and use of cloud accounting technology**

The use of cloud accounting technology in a company's economic department involves certain or potential risks that require detailed analysis before the decision to implement is taken. For example, some of the most commonly cited disadvantages of using cloud computing technology in accounting are those related to data security and confidentiality. This is due to the lack of pre-established protocols and standard procedures in the implementation and use of technology in accounting processes.

### **Strengths identified during the implementation and use of cloud accounting technology**

Although cloud accounting systems have certain shortcomings in terms of their use and management, the benefits derived from their use become a fundamental pillar in overcoming the fears of accounting departments when deciding to implement them. In my opinion, the main advantages are: flexibility of use, optimisation of the cost of use, simplification of the maintenance and management of the system, increase in productivity, possibility of accessing data regardless of time and place, etc.

### **The outsourcing relationship in cloud-based accounting**

Cloud accounting technology creates a variety of implications under the umbrella of partner relationships within the business environment.

The outsourcing relationship in cloud accounting technology involves the presence of key players and defining elements with a significant role in shaping and functionality of the system. The cloud accounting system, as a new generation of accounting software, offers specific services based on the connection to the internet network, facilitating the tripartite link between the client-cloud service provider and the accounting firm. A significant proportion of these components allow the connection of their system to third party digital services such as the banking system, the tax system, facilitating transactions and government reporting in virtual format. Cloud service providers operate through accounting firms, which in turn offer the software for sale to clients along with accounting services (Asatiani & Penttinen, 2015).

### **Cloud accounting bibliometric benchmarks**

#### **Bibliometric analysis: a brief introduction**

Over time, a number of specific applications of the bibliometric method have been developed to facilitate the review of scientific literature. An overview of these is given in this paper, and a sample list is given below: CRExplorer, Publish or Perish, ScientoPyUI, Bibexcel, Biblioshiny, BiblioMaps, CiteSpace, CitNetExplorer, SciMAT, Sci2 Tool, VOSviewer.

The main techniques of bibliometric analysis are also presented, namely: citation analysis, co-citation analysis, bibliographic linkage, co-word analysis, co-authorship analysis,

total publications, number of authors, single-author publications, co-author publications, collaborative publications, number of active years per publication, total citations, average citations, collaboration index, collaboration coefficient, number of cited publications, h-index, g-index and i-index.

### **Bibliometric analysis of cloud accounting technology**

The theoretical aspects of cloud accounting technology are harmoniously complemented by the bibliometric analysis of the universe of cloud accounting. The main objective of the present bibliometric analysis of the concept of cloud accounting was to map the phenomenon in order to obtain an overview of it, with the aim of highlighting its research flows and historical evolution.

Compared to the annual scientific output, the rate of increase of research interest shows a positive trend over time. The Journal of Accounting Research is one of the most important sources of publications related to the research aspect of cloud accounting. From the perspective of institutional collaboration, the research topic is of particular scientific interest to academic institutions. The keyword co-occurrence network, highlighted according to the keyword plus parameter generated by Bibliometrix, illustrates 3 clusters that are representative of the research theme, reporting on performance, patterns and impact.

## **ROBOTISATION IN ACCOUNTING**

### **Conceptual and pragmatic framework**

Based on the development of the interdependency between IT and accounting, the accounting field can fully benefit from 14ptimizing its performance by automating processes based on robotics. Through automation, recurring processes that do not require a high degree of professional judgement can be replaced, thus significantly increasing the potential for technology to penetrate the accounting field. (Stanciu & Rîndaşu, 2020) Robotisation, as a phenomenon of technological modernity, can be successfully implemented to transform business models, including in companies providing accounting and auditing services (Tiron-Tudor et al., 2020).The impact of RPA in accounting is related to the reduction of time spent on manual processes, creating the possibility that 75% of staff time in financial accounting departments will be directed to predictive analysis and decision support (BlackLine, 2019).

### **Requirements for implementing robotics in accounting**

In order to make the decision to implement and use RPA, the organisation's decision-makers need to consider a number of issues. These include: adaptability of RPA to accounting tasks and functions, identification of accounting processes that can be automated by RPA as well as those that do not meet the criteria for automation, analysis of the company's motivation for implementation and identification of risks and benefits, assessment of the quantitative and qualitative impact on performance parameters as a result of the decision to implement automated systems. (Kokina & Blanchette, 2019, p. 2)

The accountant's responsibility is carried out along the lines of skills training in the coding process, with the aim of reducing the dependency on the IT department to provide support in the implementation of the RPA process (Kokina & Blanchette, 2019, p. 11) The steps preceding the implementation of the process can be limited by: defining the purpose of the robotic accounting contour, assessing the costs of reference operations to determine the overall benefits of applying robotics in accounting, analysing the current situation of financial accounting processes to document the opportunities and methods of using RPA, standardising the accounting workflow and defining the procedures for applying the robotic process, recruiting specialised staff to implement the phenomenon. ("Robotic Accounting - 5 Use Cases, a Case Study, and Examples of RPA in Finance and Accounting Departments", 2018) Prior to the use of robotic systems in accounting, it is essential to have an enabling framework for implementation, represented by the existence of unified policies, procedures and systems. (The Impact of Robotic Process Automation in Accounting | BlackLine Magazine, 2021)

The main impact of robotics on the accountant's job will be reduced workload, improved quality of reporting, increased motivation for continuous learning and innovation, optimisation of IT and professional skills, and reduced competitive pressures. Successful implementation of RPA within the organisation requires proactive planning and the establishment of a robust governance system so that issues such as meeting specific timelines and planned budgets do not get in the way of the process. (Fernandez & Aman, 2018b)

### **Applicability and impact on organisational processes**

The replacement of accounting phenomena by robots is a certainty, which makes the accounting profession responsible for optimising university education and continuing professional training in terms of the new skills they need to possess. (Monga, 2015) Accounting robots are capable of managing the following accounting processes: preparation of financial statements, tax reports, statements, operational transactions within the framework of receipt and payment journals, reconciliation of accounts (reconciliation of bank transactions, reconciliation of suppliers, reconciliation between affiliated companies), financial closing, management of the process of receipts and payments. (Dilmegani, 2022)

Robotic accounting provides security for the operation of primary documents (invoices) outside of human intervention, providing assurance of the accuracy of the information processed. ("What Is Robotic Accounting?", 2016) The following illustrates an example of the process of robotic transactions within specific robotic operations units, as well as the duration of implementation, the paper contains a number of such point examples. In a company operating in the service sector, there is a need to standardise invoice formats through cognitive document processing. Automating the processing of 80% of invoices reduces document processing time from over 3 minutes to 5 seconds. The automation process is completed in just 3 weeks. We believe that companies' adaptation to the automation phenomenon depends on their readiness to embrace advanced technologies and their willingness to work with specialists in the field.

## **Robotics application for financial and accounting processes**

The accounting-robotization relationship becomes plausible and viable in the context of the proven performance of robots in the business environment, which holds the potential to impact the future of accounting by shaping a robotic accounting department (Rîșnoveanu & Ținică, 2021; Tucker, 2017) , "Employees" robots within accounting departments are not represented by mechanical creatures with physical form being rather identified with software robots living virtually on cloud servers. (Tucker, 2017) Timidly but surely, various transaction processing models amenable to robotic accounting are being outlined within the literature, an aspect that creates the appropriate framework setting the stage for implementation to explore the phenomenon. In a theoretical sense, the process of robotisation of accounting operations is based on the complexity of the process, which is increasingly being discussed in the literature, but the practical side of this process, in terms of companies' experience with automated systems, is still incomplete.

Modern technologies such as the internet and cloud computing provide the foundations for shaping the framework for adopting RPA in accounting (Invoice Matching with Robotic Accounting, 2022).

## **Accounting functions and tasks suitable for adoption of robotisation**

The main tasks performed by an accounting robot in a finance department include processing and reconciling transactions identified by online payment processors (PayU), processing and reconciling payments from the accounts of major delivery partners (Fan Courier, TNT), and processing transactions from bank statements. (Kevin the Accounting Robot by BestValue | Aggranda, 2022) The application of RPA in accounting and finance is reported to have a revolutionary impact on business departments through actions such as automatically validating and sending invoices to customers, reducing manual review processes, increasing data accuracy, minimising human effort in journaling in monthly closing processes, reducing human error. ('Robotic Accounting - 5 Use Cases, a Case Study, and Examples of RPA in Finance and Accounting Departments', 2018) RPA technology, along with complementary modern systems such as business process management and optical character recognition tools, has wide applicability in the financial sector, as highlighted in the table below.

Table 5.2 - **Activities suitable for automation in the area of finance and accounting**

| <b>ACCOUNTING</b>                    | <b>PAY</b>  | <b>ENTRIES</b>                                       |
|--------------------------------------|---|--|
| Automation of entry operations       | Introduction of non-electronic exchange of invoice data | Invoice generation and validation                    |
| Documenting and reconciling accounts | Performance of 2 and/or 3 ways of matching invoice data | Creation of reports (situation of uncollected debts) |
| Maintenance of fixed assets accounts | Processing of requests for approval of water supplies   | Dispute analysis and processing                      |
| Calculation and application of       | Completion of the audit                                 | Matching of bank transactions                        |

|   |  |   |
|---|--|---|
| the breakdown of expenditure                          | (duplication of payment transactions)                  | and the situation of uncollected receivables on the books |
| <b>FINANCIAL PLANNING AND ANALYSIS</b>                | <b>PAYMENT STATEMENTS</b>                              | <b>OTHERS</b>   |
| Building management reports                           | Flagging errors and omissions in the payment statement | Preparation of templates for external reporting           |
| Budget consolidation, forecasting and validation      | Audit of hours reported according to schedule          | Audit of high-risk transactions                           |
| Data collection and systematisation for data analysis | Calculation of payroll deductions                      | Preparation of bank transfer requests                     |
|   | Harmonisation of data in several registers             |   |

*Source:* (Plaschke et al., 2018)

Due to the specificity of the implementation requirements, the accounting and finance field, through the lens of congruence, tolerates the adoption of robotics in its tasks and functions. This is based on a number of characteristics of the field, such as the repetitive nature of transactions in processing operations, the collection of information from fragmented systems, and the reliance on data entry and manipulation accompanied by report generation. (Kokina & Blanchette, 2019; Miklos & M. Rozario, 2018; Tiron-Tudor et al., 2020) Thus, the applicability of RPA in accounting is recognised in the academic world and in the organisational field, with theorists and practitioners in the field attesting to the viability of the phenomenon in catching up with the standards and requirements of the modern world, with the core of the future of the accounting field being identified in the robotization of its processes and functions.

### **Challenges and opportunities in the implementation of financial accounting automation solutions**

Following a survey of a sample of 70 Taiwanese companies, 3 positive influencing factors were identified as being associated with success in the process of implementing RPA systems. These are: familiarity with the system to be adopted, a high level of trust from the company's management, and the predominance of male employees in the finance and accounting department. In a survey of Jordanian audit firms, a number of positive aspects of the audit process were identified as a result of the possibility of implementing RPA, including increasing the accuracy of financial and accounting information, optimising the audit process by influencing the competence and independence of the auditor, ensuring mental independence in training and supervision programmes, reducing audit fees, etc. (Dahiyat, 2022).

One of the biggest obstacles to implementing automation in accounting and auditing is the lack of guidance on what tasks are suitable for the process and how to program and operate robots for them. This complicates and delays implementation. The reasons for implementing RPA systems in the post-pandemic period on the accounting task side include: facilitating the work of the finance-accounting department team, optimising customer experience, ensuring

correct and consistent implementation of accounting best practices and rules across the organisation, extracting relevant data from emails for invoice processing, creating an ecosystem by digitising the invoicing process and streamlining the workflow. (Tajak, 2022)

The main concerns in the process of using RPA in accounting are related to the aspect of cyber risk and loss of control over work due to task fragmentation (Asatiani et al., 2020, p. 424).

### **Pragmatic aspects of the automation phenomenon inclusion in accounting. Automation protocol of the invoicing process**

By way of example, below are a number of specific applications that offer the opportunity to automate processes related to the field. These include ContaBot-Robot Tudor, DocuDroid, Bank Statement Processing Robot, InvOn, R. Daneel Banking Robot, CloudContaDoc, ExpertAccounts, Robot Ascent Group, RoboSelf, AI-Methica, NextUp AI, Fitekin, E-doc, Odoo, Profluo. The functionalities of each of the above applications are described in detail in the paper. The paper therefore illustrates 15 applications that offer the possibility of partial automation of accounting functions and tasks, as a minimum guide for organisations to support the decision to implement automated systems in organisational processes.

In our view, the need to shift the interest of the accounting industry and management structures towards the adoption of modern IT solutions requires prioritisation against the background of the accelerating digitalisation of the business environment and the continuous development of new emerging IT paradigms.

## **EMPIRICAL CLOUD ACCOUNTING APPLICABILITY STUDY**

### **Analysing accountants' perceptions of the impact of cloud accounting on practice**

The contribution of accounting professionals, as specialists in the field, is of added value in shaping the overall perspective on how the field and the profession are affected by the modernisation of accounting. Therefore, in order to reflect their views, we prepared and distributed a questionnaire entitled "Questionnaire on the perceptions of accounting professionals in relation to cloud accounting applications", whose main role was to identify the extent of the impact of the emerging technology as seen through the lens of practitioners and the pragmatic side of the field, against the backdrop of the acceleration of the digitisation of accounting as a result of the pandemic situation created by the emergence of COVID-19. The application of the questionnaire reflected the state of the field in terms of its receptiveness to modern information paradigms and the degree of their acceptance by practitioners.

During the pandemic period, 43.90% of respondents rated the impact of digitalisation processes on the profession as high, 28.50% rated the impact as medium, 21.20% of respondents rated the impact on the profession as very high and 0.6% rated the impact on the profession as very low. During the pandemic, 48.20% use traditional accounting applications, 33.70% have access to financial accounting information via an internet connection, 14.70% of

respondents use cloud accounting software. Before the global health crisis, 82.80% of respondents said they were familiar with the concept of cloud accounting, while 17.20% of respondents had never heard of the phenomenon. Prior to the pandemic period, 45.10% of respondents did not use cloud technology to perform financial accounting tasks, but intended to use it to perform accounting tasks, and 33.40% used it to facilitate specific accounting tasks. During the pandemic period, the percentage of those using cloud accounting to streamline accounting processes rose to 39.60%, an increase of around 6%, which is encouraging given the accelerating digitalisation of the sector.

Following the interpretation of the results collected through the questionnaire, I believe it is appropriate to continuously train accounting professionals on the massive technologisation of the field through the high level of dominance of emerging information technologies in the future of the profession and the field.

In order to validate, analyse and interpret the results obtained from the questionnaire on the analysis of accounting professionals' perceptions of cloud accounting in the context of the acceleration of the digitalisation of financial accounting processes, we have chosen to use the statistical package represented by IBM SPSS. We identified a set of 20 variables corresponding to the questions of different nature in the questionnaire applied during the two reference periods, associated with a set of 100 responses collected from the community analysed. The univariate descriptive analysis of the data requires the description of the situation in the sample for various variables in terms of the distribution of values, their central tendency and deviation from the central tendency. In the context of detailed analysis according to certain parameters of the study, the study by categories of subjects is used. The division of a data file into certain categories of subjects is carried out on the basis of a categorical variable according to which groups are defined. After data processing, the results are presented according to certain predefined categories of subjects.

A summary of the results by respondent gender shows that 56% of female respondents work in their own accountancy practice, 26% of whom are aged 50-54. At the other end of the spectrum, the largest proportion of male respondents are aged 45-49 and are most likely to be self-employed.

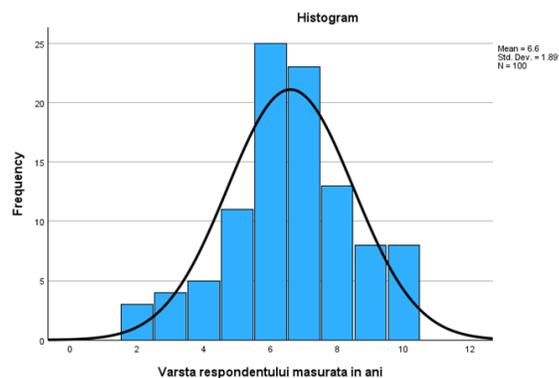


Figure 6.14-Histogram and frequency curve. Age distribution of respondents

*Source: SPSS version 29.0.2.0*

Histograms and frequency curves were used to show the shape of the age distribution of the respondents. The graph shows a normal distribution of the data analysed, as can be seen in the figure above.

Descriptive bivariate analysis procedures are closely related to the type of dependency relationship established between the variables analysed. Different association coefficients are used to express the degree of common variation between the two variables. The level of measurement is taken into account when specifying the methods of analysis.

In order to illustrate the descriptive bivariate analysis, we assume a correlation between the experience of the respondents and the proportion of Internet use in performing accounting tasks during the pandemic period. In the following, we therefore carry out a series of tests for descriptive bivariate analysis between the variable type of software used during the pandemic period and the variable represented by the degree of digitisation of accounting during the pandemic period, among which we list as examples:  $\chi^2$  bivariate test, Pearson correlation coefficient.

The analysis of variance is the general case of the independent samples t-test. The conditions for the applicability of the method are the independence of the samples, the normal distribution of the dependent variable, the absence of extreme values and the existence of equality of variance of the groups being compared (homoscedasticity). The Welch and Brown-Forsythe tests were also applied to the selected data set. The SPSS software also allowed the generation of a series of graphs with multiple meanings and interpretations.

### **Correlation analysis between the number of ICT specialists employed by the companies and the degree of use of cloud accounting technology as reflected by the acquisition of accounting and finance software in the form of cloud computing services**

The structure and objectives of the research in relation to the analysis of the correlation between the number of ICT specialists employed by the company and the degree of use of cloud accounting technology, reflected in the process of purchasing IT software in the field of accounting and finance in the form of cloud services, are presented below (the steps are presented in random order): Reviewing the literature, setting the objectives and defining the problem to be analysed, identifying the causal relationship between variables as a result of consulting the literature, determining the purpose of the econometric analysis, determining the source of the data sample, identifying the units of observation, describing the variables, specifying the type of econometric model; estimating and validating the econometric model by defining the simple linear regression model (form, variables, parameters, graphical approximation of the relationship between variables), testing the linearity of the model, determining the model-specific regression equation, estimating the model parameters, testing the parameters, testing the significance of the correlation and the parameters of the regression

model, testing the statistical significance of the regression model and the parameters by applying statistical tests, determining the quality aspect of the model, and then the final part will draw correlation aspects of interpretation, predictions and conclusions.

The literature points out the interdependent relationship between the integration of an emerging technology such as cloud computing at the level of organizational processes and the need for digital skills of people responsible for implementing and optimizing the phenomenon, in this case ICT specialists employed by the entity, which justifies the initiation of the pragmatic study based on correlation analysis. Therefore, the specific tests applied in order to test the validity of the model and the veracity of the data reveal the existence of a link between the two studied variables, namely the existence of correlation between the degree of use of cloud accounting applications based on their procurement process (the purchase of accounting software in the form of cloud computing services) and the number of the company's employed ICT specialists.

The analysis of the database generated by the questionnaire, based on the statistical application SPSS, completes the study's shortcomings in terms of graphical representations and statistical analysis. The complexity of the graphs produced by SPSS contributes to the consolidation of the study and to the further analysis of the perception of accountants on the degree of digitalisation of the sector and its influence on the development of the accountancy profession. The development of an econometric model at the level of the variables of the questionnaire survey is a desideratum for future research.

## **FINAL CONCLUSIONS, PERSONAL CONTRIBUTIONS AND RESEARCH LIMITATIONS**

In short, the main objective of the study was to identify how the paradigms of modernity affect the field of accounting, thus generating changes with a remarkable impact on the performance of its specific tasks. Thus, the achievement of the objectives set at the beginning of the work is summarised below:

**O1:** Outline the conceptual framework related to the emergence, evolution and manifestations of digital accounting. O1 has been outlined through the second and third chapters, which have been designed to reflect the indispensability of digital technologies in the economic and business environment, as well as in the accounting environment. The awareness of the business environment of the massive wave of digitisation that has occurred in the economic life of entities has thus been contrasted. The COVID-19 pandemic has been the catalyst for the massive digitisation of business processes, which justifies studying the impact of digitisation on the business environment and accounting processes.

**O2:** Reflect on how researchers report on the phenomenon of cloud accounting. The objective itself aimed to identify the level of interest of researchers in this area and how the pandemic has led to a change in the accounting paradigm. Cloud accounting technology is representative in the literature, which has been confirmed by an analysis using the bibliometric

tool. This proves to be a navigation guide for researchers in terms of research perspectives in the field of cloud accounting. This objective has been reflected through the fourth chapter, which presents defining aspects for the research universe of the central issue and reflects the indispensability of the cloud phenomenon in the tasks and functions of accounting.

**O3:** Analysis of the perception of accounting professionals regarding cloud accounting applications against the background of the acceleration of accounting informatisation as a result of the pandemic situation created by the emergence of COVID-19. The method of analysis was based on the collection and interpretation of the results of the questionnaire distributed among the members of the professional body of the Romanian Chamber of Tax Advisors. This objective was achieved by applying the questionnaire to the business community in order to analyse their perception of the changes that have occurred in the accounting field as a result of its accentuated digitalisation. This analysis tool thus responds to the need of decision-makers to identify how the pandemic has changed the rules of the game in the field of accounting, and to provide guidelines for active participation in the modernisation of organisational and accounting-related processes. The processing, analysis and interpretation of the results of the questionnaire using SPSS statistical software helps to reflect the added value of the research topic by using modern tools for the analysis of economic and financial phenomena.

**O4:** To identify the impact of the phenomenon of robotization and automation on the field of accounting. The objective is outlined in Chapter 5 of the paper, which includes aspects related to the readiness of accounting processes to be robotized, giving professionals in the field clues about the tasks that are in line with the requirements of implementing robotization, as well as how they are identified with the trend related to automation in accounting. The willingness of the accounting department to adopt automated processes proves to be significant.

**O5:** Analysis of the correlation between the number of ICT specialists in the companies and the degree of use of cloud accounting technology, reflected in the process of purchasing accounting and finance IT applications in the form of cloud computing services. The statistical analysis revealed a correlation between the two variables, an aspect that has significant implications for the business environment and its decision-making structures, in terms of exploiting the relationship between IT and finance department staff, as collaboration in this direction is essential to maintain the relevance of the finance department in modern social contexts characterised by the massive presence of new information technologies.

In line with the objective of outlining the conceptual and pragmatic universe of the research topic, and in accordance with the author's purpose, mission and vision, the added value of the research to the business environment and the academic community can be summarised as follows:

- Confirmation that cloud accounting technology is at the heart of how accounting processes and functions will be run in the future, and the significantly increased level of impact it will have on the accounting profession;

- Determine how to transform the performance of accounting tasks within the framework of the robotic processes adopted in financial accounting departments;
- Identify the degree of influence of the COVID-19 health crisis on the acceleration of the digitisation process of the accounting domain and its impact on the adoption of new information paradigms;
- Quantify the level of familiarity with new technological paradigms among management structures and staff in finance departments, and how they report on changes affecting the future of the profession;
- And so on.

#### *Own contributions*

As a result of the process of documenting and analysing the literature, and as a result of exploring the practical field of accounting, I believe that this thesis fills a gap in the field by outlining the universe of knowledge related to the paradigms of modernity and their role in accounting. Against this background, the author's main contributions can be identified along the following lines:

- The multi-purpose nature of the research framework methodology (combination of different research methods, techniques and tools);
- The multidisciplinary nature of the subject dealt with through the association of the concepts of accounting, information technology, history and statistics;
- Carry out a qualitative analysis of the literature in order to strengthen the information content of the thesis by analysing the existing information in the literature, critically examining it, systematising the information on the subject of the study in graphs, tables and figures, carrying out a comparative analysis of the information identified;
- Carry out qualitative analysis of information by presenting certain statistics, results of studies carried out in the business environment through comparative analysis;
- And so on.

#### *Research limitations*

However, without wishing to be exhaustive, we will illustrate below some of these limitations, which are set as a result of the completion of the research process, at the level of the proposed objectives. One of the main limitations faced by any researcher is the impossibility of achieving the attribute of complexity of the subject dealt with, an aspect justified by the volume of information, regardless of the field of study chosen. With regard to the qualitative quality of the work, we have identified a number of limitations, namely: restricted access to certain scientific databases and the possibility of accessing certain articles relevant to the field of study only on a paid basis. Also, given the lack of self-contained nature of the concept of cloud accounting and the issues related to it, we have resorted to an analytical approach to them before outlining the conceptual universe presented in the body of the paper.

From a quantitative point of view, in the pragmatic side of the paper, we encountered some difficulties in the bibliometric analysis, in the data collection through the questionnaire method and in the econometric analysis. Therefore, the main limitations of the quantitative side of the work are listed below: The use of only one scientific database in the bibliometric analysis (Web Of Science), without recourse to other databases such as Scopus, Dimensions, etc..The reliance on a limited number of software applications specific to the bibliometric method for the analysis, i.e. the use of VosViewer and Biblioshiny software, without the use of other specific applications, taking into account their current multiplicity; the distribution of the questionnaire only to a community of practitioners, i.e. the accountants of the Chamber of Accountants, which could compromise the results obtained, given the relatively low number of replies (326); etc.

It should be noted that the author has endeavoured to minimise the limitations of the research, but the limitations listed above could not be avoided. For example, the scientific approach includes a narrow analysis based on the interdisciplinary accounting-computing relationship that is prevalent in accounting.

The extension of the study can be achieved by increasing the number of practitioner communities and by including academic communities to optimise the representativeness of the data, in order to identify their position in relation to the technological future of accounting. Predictions for future research are made by extending the econometric study to include more meaningful data and by using specific software for econometric analysis and interpretation of the results obtained.

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