

CHALLENGES OF THE ACCOUNTING PROFESSION IN THE DIGITAL ERA: THE IMPACT OF CLOUD COMPUTING TECHNOLOGY

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***Abstract:** The literature presents both the advantages and opportunities that cloud accounting technology offers to the accounting profession and how the accounting profession adapts to technological progress by increasing efficiency and effectiveness in performing specific tasks. The aim of this research is to highlight the extent to which professional accountants are aware of the transformation of the profession under the impact of digitization. The research is descriptive using the questionnaire as a working tool, which was applied to a number of 289 respondents in area south Muntenia. The data collected has been processed using existing contingency tables in a statistical processing software. The main conclusions of the study show that professional accountants are aware and appreciate the need to integrate cloud computing information technology into their professional activity. In the same way, the study highlights the need to create an appropriate environment within the organization, which stimulates the interest and concerns of employees, acquiring new specialized knowledge, in order to have skills and abilities specific to the digital age.*

Key words: *cloud accounting, digital age, accounting profession, digital skills, statistics models and techniques*

JEL classification: M15, M40, M41, M42

Introduction

In the current period, the term business digitization is a buzzword found in all discussions of specialists, but also of business people. Under the impact of this challenge, adaptation solutions have been sought in all areas of activity, by implementing technologies and software applications that allow interaction in a secure virtual environment (Neicu et al., 2020). Cloud computing is one of such technology. The usefulness of technology for the accounting profession and its impact is the main topic of this paper. The digitization of accounting services has proved to be a necessity of the current period, on the one hand due to

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the technological advances offered and on the other hand due to the paradigm shift in the exercise of the accounting profession.

The current development of the business area is dependent on the advances made in the field of information and communication technology and in particular on the adaptation to the use of cloud computing platforms. The term cloud computing refers to the storage, processing and use of data on remote systems and accessed through the Internet (Dumitrache, 2014). This technology has the potential to reduce users' IT costs and encourage the development of a large number of new services. Cloud accounting is such a service with a special impact today for the management of businesses developed in modern economies (Ghasemi et al., 2011; Khanom, 2017). The interest in using cloud technology for both accountants and entrepreneurs is based on the fact that it generates very low costs, helps to use resources efficiently and can be strictly tailored to their needs (Alhaidari et al., 2020; Siegel & Kumar, 2020).

In this context, the main purpose of the article is to really determine the position of the professional accountant in the digital age, characterized by a transition to the use of technical and software infrastructures that offer the possibility of working in a secure online environment and interconnected with the services provided to business partners, the banking system, public administration. The authors' concerns were also related to the analysis of the difficulties and risks involved in the use of economic management applications such as cloud computing. Thus, the study aims to highlight the extent to which professional accountants are aware of the transformation of the profession under the impact of digitalization, from the advantages and opportunities offered to the difficulties and risks involved. The research question around which the study was conducted is: **Are the consequences of integrating cloud technologies into the practice of the profession known among professional accountants?**

Considering in this context we formulated the following research hypotheses:

Hypothesis 1. The assessments of professional accountants on the impact of the integration of cloud technologies in the exercise of the profession are relevant and appropriate, the degree of awareness of the effects being independent of the manner of exercising the accounting profession.

Hypothesis 2. In order to benefit from the opportunities of cloud accounting, it is necessary to develop specific IT skills.

This article is structured in 4 parts (fig. No.1): a review section of the literature, which summarizes the contribution of some authors to the enrichment of knowledge on the integration of digitalization in the financial-accounting activity; a section on research methodology and organization through which data collection is presented; a results and discussion section containing the results obtained from the analysis of the questionnaire, related to the research question and the hypotheses formulated; a section in which the conclusions of the study are formulated, as well as its limits and new directions of research.

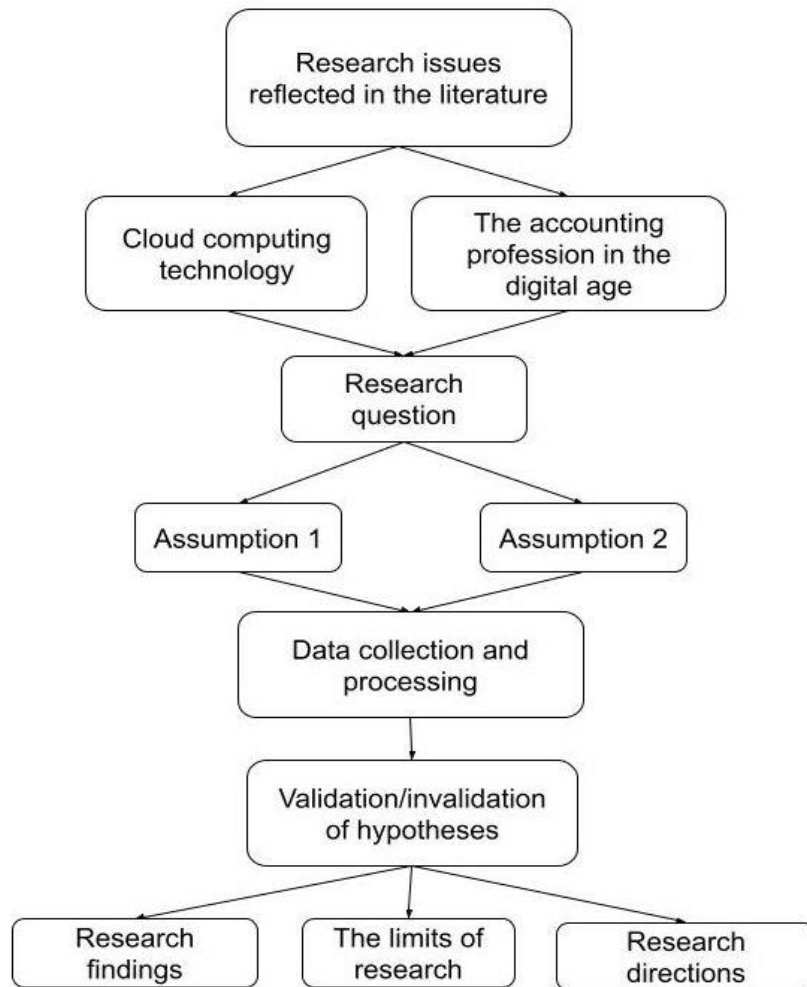


Figure 1. Workflow of the study performed

Source: authors' processing

Literature review

From the study of literature in the field (Dimitriu & Matei, 2014; Maria Cristina Bosoteanu, 2016; Sadighi, 2014), an accounting application based on cloud computing technology, is that application that can be accessed from anywhere through an Internet connection, without the need to be installed and managed on its own hardware infrastructure. This form of digital accounting removes the problem of very high costs for purchasing ERP (Enterprise Resource Planning) applications and the infrastructure needed to run them (Mihai, 2015). Cloud Accounting ensures increased flexibility and reduced technology costs by using a virtual application provided as a service (Bajan & Lazari, 2019). In this context, the choice of a cloud-based accounting solution for business accounting becomes easy because it is not necessary to purchase the software or infrastructure, it all comes down to the existence of an internet connection and the monthly payment of a subscription for the services used, facility encountered in the literature as Software as a Service (SaaS) (Christauskas & Miseviciene, 2012). The adoption of such a solution for organizing and managing the accounting has the follow benefit: i) generating in real time the notes and accounting documents for all types of economic operations carried out by the economic agent; ii) highlighting the circuit of primary documents due to the existence of a common database accessed through modules specific to each department within the company (Sekar & Maniatis, 2011). The suggestive representation of the cloud accounting concept is made in figure no. 2.

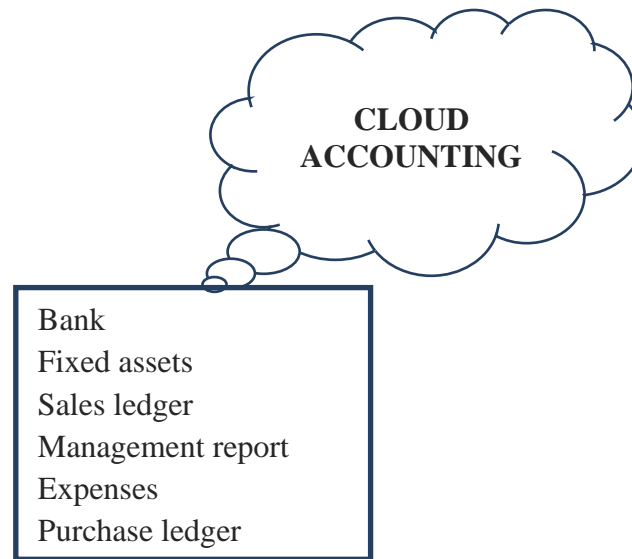


Figure 2. Representation of the concept of cloud accounting
Source: authors' processing

The advantages of cloud accounting applications made available on various platforms are represented by: high level of security (information security), the applications being hosted on private servers recognized as secure and stable; optimal IT maintenance costs compared to the software version installed on your own hardware resources; the possibility of remote access which opens the possibility of adopting new forms of activity (Marsintauli et al., 2021). This category of applications comes to complete the opportunities in the accounting services market, which, in 2022, needs cloud solutions to be able to work from anywhere only on the basis of an internet connection. At the same time, they meet the needs of generations of young entrepreneurs, familiar with information and communication technologies, who need more counseling to take advantage of the opportunities offered by today's dynamic socio-economic environment (Chyzhevskaya et al., 2021). This extraordinary openness to the digital transformation of modern societies also brings to the foreground the issue of choosing a cloud accounting platform that must be optimized according to the size of the company, workflow, organization of financial-accounting system and characteristics of products / services marketed (Popivniak, 2019).

The companies, in the desire to adapt to this business environment, make the decision to replace the accounting software used, due to the finding of some limitations (Asatiani et al., 2019; Ma et al., 2021) of current applications, such as: i) the existence several non-integrated management software applications with an impact on the high risk of errors and additional costs; ii) loss of control over the information entered and provided by the application, which implies delays in using the information necessary to substantiate the managerial decision, as well as loss of control over business processes; iii) the use of maladapted / improved accounting applications, along with the development of the business; iv) reducing the dependence on classic software solutions and equipment by using the latest technology (smartphone, tablet) as part of the business monitoring process; v) the need to expand the business in various geographical areas or related areas of activity, which makes flexibility and scalability an important factor in choosing cloud-based software solutions.

Cloud accounting has become a normal work tool, used by more and more professional accountants. As in previous industrial revolutions, the adoption of this way of working changed the relationship between the entrepreneur and the accountant. The main changes concern: i) flexibility in the migration of clients from one accountant to another. This

involves a customer mobility that can go away or come to an accountant who uses the same application in the cloud as the old accountant. In such cases, all that is needed is a new user account for the accountant to have access to the entire financial history of the company. Imports and exports, compatibility or incompatibility between programs will decrease over time; ii) increasing the quality of services provided by professional accountants.

Under the conditions of a complete digitization of services, accounting firms can offer clients consulting services aimed at: optimizing borrowing capacity based on existing banking products, the possibility of making capital available without affecting financial flows, determining the value of business in case of an exit plan, optimization of internal accounting services; iii) increasing competition in the provision of services. In an online world, promotion is the key to success. Newly marketed accounting firms with reasonable services, low rates and very good marketing management to attract more customers than companies with impeccable services, but of which only a few customers are very satisfied because they do not have an online presence; iv) remote accounting. In Romania there are accounting firms that offer services to companies with tax residence and that operate abroad, in the accounting system of that country, the main reason being the more convenient tariffs and the possibility of working with a computer system in cloud. It is a trend that will be amplified and supported by cloud applications (Ionescu & Barna, 2021a).

The transformation of companies in the field of accounting services, in order to become digital, does not only involve the technological side, but also the human factor, which must update its digital knowledge and skills. In this context, the organization must build a new climate, specific to societies based on a digital culture (Thipwiwatpotjana, 2021). At the national level, the Body of Expert Accountants and Certified Accountants in Romania implements various policies to modernize the accounting profession. Through the in-service training program, professional accountants go through advanced training modules to acquire the basic concepts related to business information management, the use of specific information and communication technology tools in office applications, or mastering the concepts related to social media in the financial-accounting activity. All these accumulations of information and practical skills related to the use of information technology in the professional activity allow professional accountants to perform the specific activities of the profession in a different way, represented by the transition from traditional accounting operations to strategic management guidelines offered to clients.

The authors (Ionescu & Barna, 2021a) state that future advances in digitization of accounting are related to the direct exchange and processing of data with the customer or supplier, reading or recognizing documents, importing electronic payments, replacing Microsoft Excel with other integrated automated calculation tools in ERP systems, providing much more prompt answers to technical questions in the field of accounting. All these changes to a digital world train professional accountants to move from routine activities to consulting, data analysis and strategic planning.

Improving the efficiency and effectiveness of accounting processing has been a permanent goal of adopting information and communication technology in accounting. As the "Y" generation (current age 20-30), familiar with the Internet and other technologies, enters the workforce, the way to build and manage business is constantly changing without changing the essence of accounting science. Working connected to technology from any location in the field of accounting means benefiting from technological progress in the classic flows of accounting-specific operations (supply-sales, human resources management, production activity management, fixed assets management). Today's young people, more than seniors, are eager for remote interactions mediated by mobile devices and at the same time give more confidence to computer applications stored on devices located in various locations around the world (Gheorghe, 2017).

The authors (Șova & Popa, 2020) stated that the adaptation to the digital age has led to the change of business models through technology and automation. The health crisis caused by COVID-19 has generated unexpected challenges for companies (financial, operational and personnel difficulties, etc.), regardless of their size and sector of activity. In response to technological developments and the challenges posed by COVID19, the role and skills of professional accountants need to evolve towards providing strategic advice to help companies ensure business continuity. The accounting industry's focus on cloud platforms is transforming the way we perform specific tasks, as follows:

- Traditionally, by using computer accounting applications, professional accountants do the same things: collecting, extracting and managing data, reconciling information provided by different systems, using limited information in the decision-making process;
- By switching to modern information technology, professional accountants do the same things differently: using automation and communication technologies based on self-learning and personal exploration;
- By adopting cloud accounting technology, professional accountants do different things by retraining and refining, focusing on: behavioral skills, digital skills (integration, synthesis, data analysis), communication improvement skills.

All these transformations at the level of the accounting profession under the impact of technological development are also supported by the educational system. Thus, 90% of students surveyed regarding the perception of the future of the accounting profession in the digital age, consider that digitalization in the field of accounting is reflected in increasing the quality of the educational process and reducing costs and time spent with documentation (David & Cernușca, 2020).

The digitization of accounting services is thus a necessity of the current period, due to the current technological advances (fast and easy communications, computing power at an acceptable cost) as well as the implementation of web portal applications by the banking industry and government services (Ionescu et al ., 2014).

Research design and methodology

The issue addressed in this paper is related to the exercise of the accounting profession in the conditions of business transformation under the impact of information technology. Accounting professionals are thus faced with complex challenges, related to the need to adapt the services offered to clients in the new context, dominated by the trend of almost complete digitization of the relationship between the entrepreneur and professional accountants. The advantages and disadvantages of using cloud technology in the accounting services industry have been addressed in numerous specialized papers (Ionescu & Barna, 2021b), which is why the study of the perception of professional accountants on them proves to be useful and timely in order to draw conclusions about the impact of information technology on human resources involved in the field.

The research method is the behavioral one, through which the correlation was made between the theoretical research (of the specialized literature) with the applied research (where the questionnaire method was used), aspects that will be detailed in the following paragraphs.

The study was conducted through a descriptive research using as a working tool the questionnaire, built on closed questions such as: single answer, multiple answer or answer based on a Likert scale from 1 to 4. Dissemination of the questionnaire was done online on the platform esondaje.ro, in the first two months of 2021, the recipients receiving by e-mail or other online communication channels the link to the questionnaire. The study was conducted

on a sample of 289 respondents, professional accountants who work either independently or as employees of economic entities. The collected data were processed and analyzed using SPSS version 26.

Results

The reliability test is used to calculate and determine the consistency of the data in the questionnaire. The reliability of the data is determined in the SPSS analysis application by applying the Cronbach's alpha coefficient test method. According to the literature (Taber, 2018), the reliability test is performed for a value of the Alpha Cronbach coefficient. This test applied to the elements that make up the analyzed questionnaire has a value that exceeds the threshold of 0.7.

Distribution of professional accountants by the forms of organization of the entities in which they exercise their profession (table no. 1). The structure of the sample is therefore made up of 72,66% employed accountants and 27.34% self-employed accounting professionals.

Table 1.

Distribution of professional accountants in the form of organization of entities

The category of professional accountants	Category of companies (number)					Total
	Partnership	Limited partnership	Corporation	Limited liability company	Self-employed	
Professional accountants employed	16	1	25	168	0	210
Independent accounting professionals	0	0	2	34	43	79
Total	16	1	27	202	43	289

Source: authors' processing using SPSS v26

The employed accounting professionals carry out their activity in economic entities mainly organized in the form of limited liability company (80%), while the self-employed carry out activity within some companies in a share of 45.56%, the rest acting as authorized individuals.

From the point of view of experience in the field, the sample is presented according to the data in table no. 2.

Table 2.

The experience of professional accountants

The category of professional accountants	Professional experience (number)			Total
	under 10 years	10 - 20 years	over 20 years	
Professional accountants employed	99	73	38	210
Independent accounting professionals	23	32	24	79
Total	122	105	62	289

Source: authors' processing using SPSS v26

From the analysis of the information in table no. 2 and through the graphical representation (figure no. 3), the accounting professionals with the highest share in total, have an experience in the field of less than 10 years, 34.26% (99/289), while the independent accounting professionals have mainly experience between 10 and 20 years, respectively 11.07% of the total (32/289).

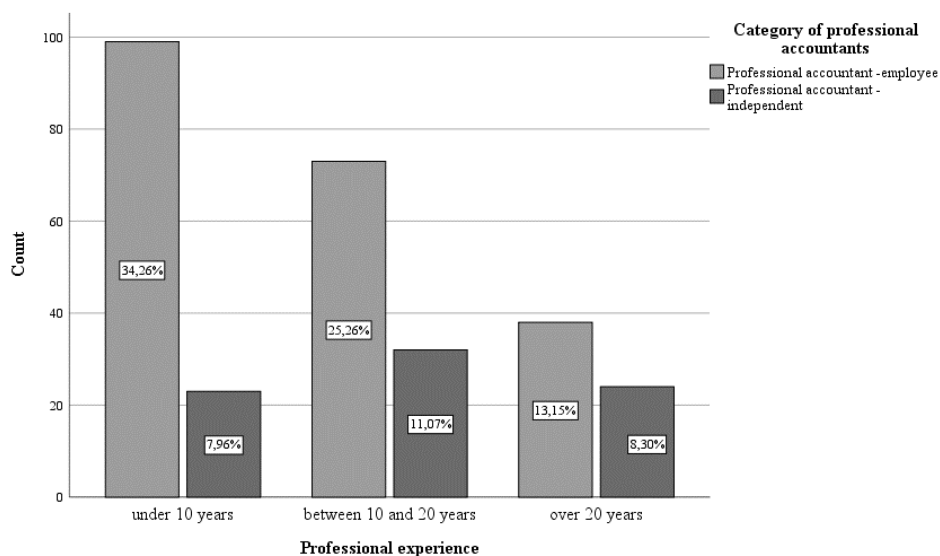


Figure 3. The experience of professional accountants
(Source: authors' processing using SPSS v26)

From the point of view of age (table no. 3), the group with the highest share in the case of both categories of professionals is the one between 35 and 50 years old, representing 50.95% of the total number of employed professionals and 55.69% of the total number of independent professionals.

Table 3.

Distribution by age groups of respondents

The category of professional accountants	Age group (number)				Total
	under 25 years	25 - 35 years	35 - 50 years	over 50 years	
Professional accountants employed	9	50	107	44	210
Independent accounting professionals	2	11	44	22	79
Total	11	61	151	66	289

Source: authors' processing using SPSS v26

The first step in the scientific approach is to analyze the importance that professional accountants attach to a series of seven opportunities for implementing cloud accounting, by expressing agreement / disagreement on them. In table no. 4. the result of this analysis is presented by highlighting the share of positive responses obtained, in total responses.

Table 4.

The weight of the “Agreement” answers for the appreciation of each type of opportunity offered by Cloud Accounting

Opportunity	Category of professional accountants (number)		Total
	Professional accountant -employee	Professional accountant -independent	
Facilitating access to data, scalability, data sharing and effective collaboration with stakeholders	74,28%	74,68%	74,39%
Task automation and elimination of repetitive processes	72,85%	73,41%	73,01%
Reducing operating costs, reducing time spent on	71,42%	68,35%	70,58%

accounting tasks and increasing efficiency			
Customizing customer service	65,23%	64,55%	65,05%
Providing solutions for making forecasts and predictions	63,80%	58,22%	62,28%
Detect anomalies and eliminate the risk of fraud	65,23%	63,29%	64,70%
New skills for professional accountants that can help increase the performance of the business entity	71,90%	72,15%	71,97%

Source: authors' processing using SPSS v26

Regardless of the category they belong to, professional accountants have expressed, in proportion of over 55%, the agreement on the opportunities offered by cloud technology for the provision of accounting services, materialized in a major transformation of the field.

Because the integration of digitalization has, in addition to the technological also human component, in the opinion of the authors, it is relevant to highlight the fact that, in proportion 71.97% (71.90% of employees and 72.15% of freelancers), professionals accountants believe that cloud technology offers them the opportunity to acquire new skills, designed to help increase the performance of economic entities benefiting from financial - accounting services (table no. 4).

The positive impact on the professional development of people in the financial accounting field also results from the processing of data collected regarding the benefits of using Cloud Accounting platforms for the profession, a place established based on respondents' assessment on a four-level scale, starting from “not at all important” to “very important” (see table no. 5).

Table 5

The importance given to the advantages of the Cloud Accounting system for the accounting profession

The category of professional accountants	Advantage assessment (number of responses)				Total
	Not important at all	A little important	Medium importance	Very important	
<i>Automating the flow of specific accounting activities</i>					
Professional accountants employed	1	6	54	149	210
Independent accounting professionals	4	1	12	62	79
<i>Eliminate duplicate information and increase data accuracy</i>					
Professional accountants employed	1	10	49	150	210
Independent accounting professionals	2	2	14	61	79
<i>Secure access to an accounting software running on a cloud server</i>					
Professional accountants employed	1	10	46	153	210
Independent accounting professionals	1	2	13	63	79
<i>Improving customer relationships</i>					
Professional accountants employed	1	12	48	149	210
Independent accounting professionals	2	4	18	55	79
<i>Increasing the quality of services provided by focusing on customer advice and reducing the effort to record documents</i>					
Professional accountants employed	3	9	43	155	210
Independent accounting professionals	1	3	13	62	79
<i>Reducing the time to classify information, enabling economic entities to process and transfer information quickly</i>					
Professional accountants employed	1	7	42	160	210
Independent accounting professionals	1	1	19	58	79
<i>Increasing the efficiency of human resources</i>					

Professional accountants employed	0	6	42	162	210
Independent accounting professionals	1	0	19	59	79

Source: authors' processing using SPSS v26

The favorable consequences of Cloud Accounting technology on the performance of human resources involved in the financial accounting activity are due to the major importance given to this advantage by 76.47% of respondents, 77.14% of employees and 74.68% of independents (according to table No. 5). Among the advantages of the cloud accounting system are established strong correlations ($\rho = 0.60 - 0.79$), as can be seen from table no. 6. This reinforces the fact that the use of a cloud accounting system has a strong influence on the activities performed by professional accountants.

Table 6

Correlations, scale means and standard deviation for the benefits of cloud accounting

Measures	Mean	SD	1	2	3	4	5	6	7
1. Automating the flow of specific accounting activities	3,671	,612	1,0						
2. Eliminate duplicate information and increase data accuracy	3,668	,607	0.697***	1,0					
3. Secure access to an accounting program running on a cloud server	3,692	,582	0.622***	0.651***	1,0				
4. Improving customer relationships	3,630	,638	0.562***	0.506***	0.498***	1,0			
5. Increasing the quality of services provided by focusing on customer advice and reducing the effort to record documents	3,682	,620	0.633***	0.652***	0.619***	0.750***	1,0		
6. Reducing the time to classify information, enabling economic entities to process and transfer information quickly	3,713	,550	0.591***	0.552***	0.609***	0.683***	0.721***	1,0	
7. Increasing the efficiency of human resources	3,737	,507	0.583***	0.571***	0.669***	0.639***	0.716***	0.795***	1,0

N=289, * $p < .05$, ** $p < .01$, *** $p < .001$

Source: authors' processing using SPSS v26

Up to this point in the study, the positive aspects of financial accounting activity in the digital age have been highlighted. However, any profound change in a field of activity comes with difficulties that have been analyzed in this study, also on the two dimensions, namely human resources and material resources.

Hypothesis 2 was based on the fact that, in terms of human resources, the entities may face the *reluctance of employees towards the usefulness of artificial intelligence in accounting* and may be faced with the decision to *downsize the need for human resources*.

Only 40% of professional accountants employed and 39% of freelancers consider that employees' reluctance towards new information technologies and their adoption in their daily work is a major impediment to the digitization of accounting. This means that there is hope that the development of IT skills / competences will be achievable through a proper motivation of the human resources involved.

However, the importance given to the difficulties related to the resizing of both human and material resources, the restructuring of information flows and work procedures, the risk of blocking the activity and the need for permanent investments in technology is much greater, as can be seen from table no. 7 below.

Table 7

The importance given to the difficulties generated by the decision to implement Cloud Accounting

Difficulty	Category of professional accountants (answers percentage)	
	Professional accountants employed	Independent accounting professionals
The need to resize the human resources	51,90%	49,36%
The need to restructure information flows and work procedures	53,80%	55,69%
Blockage of financial accounting activity at the time of occurrence of errors caused by new elements that were not taken into account when implementing the Cloud Accounting system	65,71%	65,82%
The need to make permanent investments in the field of IT in order to be able to keep up with the extremely fast technological progress and with the requirements imposed by various institutional environments. (financial administration, banking, etc.)	66,19%	73,41%

Source: authors' processing using SPSS v26

In order to ensure the human and professional competence required by the transformation of the economy through digitalization, decision-makers have more opportunities to train and develop IT skills and competences, both for employees of economic entities other than accounting professionals and for them regardless of the form of exercise of the profession. Among these possibilities, in the present study were selected: 1. Higher education adapted to the requirements of employers and innovations in the field; 2. Continuing professional training, through courses given by professional bodies; 3. Financial support by the company in the professional training of human resources; 4. Ensuring a work environment that facilitates the professional development of each individual, supporting training and self-improvement initiatives.

The results of the study revealed this last possibility of developing IT skills and competencies as the most important. Accounting professionals have thus confirmed that the success of any training program is based on the individualized satisfaction of training needs and their inclusion in financially supported training programs, Table 8.

Table 8.

Emphasis is placed on opportunities to train and develop IT skills and competences

Possibility of training and development of IT skills and competences	Category of professional accountants (answers percentage)	
	Professional accountants employed	Independent accounting professionals
Higher education adapted to the requirements of employers and innovations in the field	60,95%	64,55%
Continuous professional training through courses given by professional bodies	51,90%	56,96%
The financial support by the company of the professional training of the human resource	61,90%	50,63%
Ensuring a work environment that facilitates the professional development of each individual by supporting training and self-improvement initiatives	77,61%	79,74%

Source: authors' processing using SPSS v26

Conclusions

The results obtained confirms 100% the fact that there are no significant differences in the perception of the two categories of professionals, employees and freelancers, regarding the challenges of cloud technology on the accounting profession, regardless of opportunities and advantages, or difficulties and restrictions. This is because the exercise of the profession does not depend on the way it is organized, the mission being the same, the transformation under the impact of digitalization aimed at changing the roles of the accounting profession in relation to entrepreneurs, their needs are also under the impact of technological relations. Cloud Accounting technology enriches the way we practice the profession in the sense that it offers major opportunities and advantages that no other technology can offer.

Hypothesis 1 was validated by the answers received, the accounting professionals proving that they are aware and therefore appreciate the need to integrate in the professional activity of information technologies, in particular those of the cloud type, whose advantages and opportunities are obvious and whose importance it is also recognized by professionals. The same high level of awareness is found in terms of the difficulties and restrictions that the transition to digitization of accounting involves, both technologically and humanely. Based on the processing of the data collected, it can be concluded that the difficulties that can be acted upon more quickly in order to reduce or eliminate them completely are those related to human resources, which can be determined, motivated, stimulated to actively participate in the progress of the profession and beneficiaries of the services offered by it. Access to vocational training is facilitated by the digitization itself present in all areas of activity, voluntary training can be successfully carried out by each individual interested.

Hypothesis 2 is also validated, highlighting the need to create an appropriate environment within the organization, which stimulates the interest and concerns of employees, the acquisition of new, specialized knowledge to acquire skills and abilities specific to the digital age.

The limitations of this research can be considered the extension of research by examining the IT applications used by respondents, the categories of financial-accounting services for which such technologies are used, as well as the examination of the types of electronic services they used, in order to make work more efficient in the financial accounting field. Given both the results obtained and the limitations mentioned, we consider it useful to continue the study in order to examine the degree of effective use of different types of information technology, including the possibilities of preventing cyber-attacks on computer systems implemented within entities, specific to digitization.

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