Acceptance of digital instruments in the accounting profession*

*Melinda Timea Fülöp, Constantin Aurelian Ionescu, Nicolae Măgdaș, Dan Ioan Topor, Teodora Odett Breaz***

Abstract

The digital transition has affected and continues to affect all sectors of the economy. The COVID-19 pandemic forced many industries, including the accounting sector, to adopt digitization measures to maintain their activity during this restricted period. Innovative systems and advanced technologies thus became indispensable in the accounting profession, and despite its inability to replicate human intelligence, Artificial Intelligence (AI) was swiftly adopted for many accounting processes. The purpose of this study was to explore how the Romanian accounting profession accepted the digital instrument transformation. A deductive approach from the general to the particular was used to highlight the key aspects and their implications in the accounting profession. In addition, the technological acceptance model (TAM) was correlated with the external variables of the technology-organization-environment framework (TOE) to develop 13 hypotheses. A questionnaire was then applied, which validated 9 of these hypotheses. The research results indicated that the digital transition by the accounting profession in Romania is a complex process that is in a preliminary stage compared to that in European Union member states. This study has an inherent series of limitations, which can provide opportunities for future research in the field.

Keywords: digitalization; artificial intelligence; accounting; TAM; TOE.
JEL Codes: M40, M41.

Introduction

The field of accounting has been significantly affected by digitization and steps have been taken toward automating company accounting procedures; however,

* Received: 3.7.23, accepted: 11.9.23, 1 revision.

** *Melinda Timea Fülöp*, PhD, Lecturer, Faculty of Economics and Business Administration, Babeş- Bolyai University, Cluj-Napoca, Romania. Email: melinda.fulop@econ.ubbcluj.ro. Main research interests: accounting, audit, ethics.
Constantin Aurelian Ionescu (Corresponding author), PhD, Senior Researcher, Institut of Multidisciplinary Research for Science and Tehnology, Valahia University of Targoviște, Targoviste, Romania, PhD, Associated Professor,Faculty of Economics, Hyperion University of Bucharest, Bucharest, Romania. Email: ionescuaurelian89@gmail.com. Main research interests: accounting, managerial accounting, ethics.
Nicolae Măgdaș, PhD, Lecturer, Faculty of Economics and Business Administration, Babeş- Bolyai University, Cluj-Napoca, Romania, Email: nicolae.magdas@econ.ubbcluj.ro. Main research interests: accounting, audit, law.
Dan Ioan Topor, PhD, Professor, Faculty of Economic Science, 1 Decembrie 1918 University, Alba Iulia, Romania, Email: dan.topor@uab.ro. Main research interests: accounting, managerial accounting, environmental accounting.
Teodora Odett Breaz, PhD, Associated Professor, Faculty of Economic Science, 1 Decembrie 1918 University, Alba Iulia, Romania, Email: teodoara.breaz@uab.ro. Main research interests: management, ethics, sustainability

progress has been slow. Some examples of digitalization in the accounting industry include blockchain technology, machine learning, and virtual reality to visualize critical figures, although greater resolve by accounting firms is required to explore these technologies further (Berikol/Killi 2021). The main focus in the field has been that of digitizing accounting- or control-related procedures, while few companies have explored the considerable potential that directly usable digital invoice formats offer in areas such as big data and increased automation. According to KPMG (2019), up to 90 % of financial accounting tasks can be automated. Automatic data and document entry are essential for many companies; however, competent employees are necessary for the proper use of these resources in accounting departments. Digitization provides an opportunity to broaden the planning, budgeting, and control skills of workers that form the basis of modern and flexible corporate management (Leitner-Hanetseder/Lehner/Eisl/Forstenlechner 2021; Feghali/Matta/Moussa 2022). Given these developments, two critical accounting career paths are emerging: i) technical experts who deal with detailed questions and manage the activities in their specific fields and ii) data experts who ensure the error-free processing of automation and handle data interfaces. A survey conducted by the World Economic Forum (2023) identified the four basic skills that will be in demand in the future: i) problem-solving, ii) self-management, iii) collaboration, and iv) technological application or development.

In addition to the use of technological advancements, the accounting profession cannot survive without human soft skills such as empathy, creativity, and flexibility. Therefore, if accounting firms are to simultaneously undertake the challenges of sustainability and digitization, targeted policy designs that consider both factors will be required. This design includes a further expansion of energy networks, especially those of renewable sources, to cover the growing demand for power. The efficient use of resources requires a concerted effort toward energy efficiency and a circular economy, to which digitization can provide a sizable contribution (Thipwiwatpotjana 2021). Moreover, although intelligence concerning artificial neural networks is advancing rapidly, human knowledge remains a critical component of information technology (Guşe/Mangiuc 2022).

Neural networks process information in parallel as opposed to in sequence, which allows for a faster processing speed compared to that of computers, despite the slower flow of information (Seiffert 2004). In addition, neural networks can recognize and process fuzzy, noisy, and erroneous information, which is a particularly useful property in the financial sector (Kliestik/Valaskova/Lazaroiu/Kovacova/Vrbka 2020). Conventional analysis and forecasting systems are outdated and artificial neural networks are offered as alternative options that can solve problems that are nonlinear and have highly complex interdependencies, such as those that are often present in financial market data.

Considering the importance of digitization and its relevance in the accounting field, current conditions must be continuously analyzed, especially in emerging countries such as Romania that are beginning to implement these new technologies.

Limited studies have been conducted on the acceptance of new digital technologies by members of the accounting profession in Romania. Although several reports have evaluated the digitization of the accounting field in this country, none have been identified that specifically address the acceptance of new technologies. Considering this, and the objective to encourage new research efforts in this area, this study reviewed previous reports on digitization, with a focus on the application and acceptance of artificial intelligence in the accounting profession to evaluate the current state and identify possible future research directions. The complexity and importance of digitization in this field justify this analysis of the relevant contributions to understanding the level of acceptance of new technologies in the accounting profession.

This study presented a foray into the digitization of the accounting profession in Romania, especially focusing on the adoption of artificial intelligence, which is becoming more common in this field. The present research is among the first in-depth investigations of the acceptance of new digital technologies by accounting professionals in Romania. Therefore, we believe that this study can contribute to the development of specialized literature and future advances in research in this field. Moreover, the divergence between the field of general accounting research and the digitization subfield of the accounting profession is presented.

This study examined the current state of research based on the following question: What is the status of technological acceptance in the accounting business world as a result of digitalization? This paper is divided into several parts. This introduction is followed by Section 2, which presents a literature review to identify the gap in the literature; Section 3, which presents an empirical study of the technological acceptance of AI in the accounting profession based on the TAM and TOE framework; and Section 4, whereby the results from the systematic literature analysis are discussed and evaluated and the research question is answered.

1. A brief overview of digitalization

1.1. Conceptual definition and application status

Table 1 provides a subjective summary of the key definitions related to the digitalization of the accounting profession.

Table 1. Overall spectrum of digitalization

Concept	Definition	References
Digital technology	Digital technology takes information and breaks it down into its smallest components. By transforming an analogue signal into discrete pieces, digitalization makes it possible to manipulate information, text, graphics, software code, audio, and video in ways never before thought of, thus its informating, transforming capabilities.	Maxwell/McCain 1997
Digitization	Digitization is the process of changing from analog to digital form.	Liew/O'Leary/Perdana/ Wang 2022
Digitalization	Digitalization is the use of digital technologies to change a business model and provide new revenue and value-producing opportunities. It is the process of moving to a digital business.	O'Leary/Spangler 2018
	Digitalization is the use of digital technologies to change a business model and provide new revenue and value-producing opportunities—the process of moving to a digital business).	Gartner 2023
Digital (Business) Transformation	Digital (Business) Transformation is the process of exploiting digital technologies and supporting capabilities to create a robust new digital business model.	O'Leary 2009
Accounting	The system of recording and summarizing business and financial transactions and analyzing, verifying, and reporting the results.	Gartner 2023
Digital Accounting	Digital accounting can be defined as the accountancy specific to the current digital economy.	Tugui 2015
Cloud Computing	A model for enabling convenient, on-demand network access to a shared pool of configurable computing resources.	Tugui 2015
Internet of Things	Objects with digital network and internet are told to communicate physically and socially with their surroundings by giving them virtual identity.	Sarıgül/Oralhan 2022
Big data	Big data is high-volume, high-velocity and/or high-variety information assets that demand cost-effective, innovative forms of information processing that enable enhanced insight, decision making, and process automation.	Gartner 2023
Blockchain	A blockchain is an expanding list of cryptographically signed, irrevocable transactional records shared by all participants in a network.	Gartner 2023
Artificial intelligence	Artificial intelligence (AI) applies advanced analysis and logic-based techniques, including machine learning, to interpret events, support and automate decisions, and take actions.	Gartner 2023
Enterprise Resource Planning (ERP)	Enterprise resource planning (ERP) is defined as the ability to deliver an integrated suite of business applications. ERP tools share a common process and data model, covering broad and deep operational end-to-end processes, such as those found in finance, HR, distribution, manufacturing, service and the supply chain.	Gartner 2023
Ethics	Code of Ethics establishes ethical requirements for professional accountants	IESBA 2018

Concept	Definition	References
Digital ethics	Digital ethics is a branch of the philosophical discipline of information ethics. While information ethics generally takes a critical view of the use of information and information-processing technologies, digital ethics focuses specifically on the moral limits of digitization. The main themes are the relationship between man and machine and the standards of a society shaped by digital technology. Regarding artificial intelligence (AI), digital ethics asks, for example, to what extent decisions made by AI are traceable and to what extent humans can and should trust these decisions.	Becker/Nemat/Lucas/Heinitz/Klevesath/Charton 2022

Based on the key definitions in Table 1, we created a series of practical examples regarding the usefulness of digital technologies in the accounting field.

A fully digital accounting system overcomes the inconveniences of filing entities, paper jams, and boxes full of receipts that are sent to the accountant at the end of each quarter. Therefore, a greater number of companies are discontinuing the use of paper receipts in favor of maintaining and processing digital copies only (Nurdiansyah/Nawawi/Kosasih/Sundamanik 2021). The consideration of accounting-relevant data streams from other systems (ERP) is particularly relevant for networking the invoicing process (Yanagawa, 2023).

New possibilities for automation and data analysis in real-time are created when documents are made available in a digital format. Some tools and processes used in digital accounting are not required for traditional paperwork and depending on which software is used, there are other possible advantages. Furthermore, the digitization of processes allows companies to integrate their systems and share data (Kokina/Blanchette 2019).

Digitized accounting has a major advantage over traditional analog methods in that managing directors and other authorized persons in the company can access documents virtually from any location via a smartphone, laptop, or tablet. In addition, receipts can be photographed with a smartphone and forwarded directly in digitized form, allowing for up-to-date business evaluations and the identification of financial bottlenecks at an early stage (Korhonen/Selos/Laine/Suomala 2021).

The use of a secure online platform (cloud) provides further opportunities through the provision of an interface for the direct exchange of information between accountants, management, and tax consultants (Moll/Yigitbasioglu 2019).

Artificial intelligence can efficiently manage the accounting procedures of medium-sized companies. As opposed to creating rules and automatically processing transactions, AI gains an understanding of the transaction and develops suggestions, even when the framework conditions change. The system learns independently from historical data, as well as from accounting manuals and general accounting regulations. This creates a self-learning system that is comparable to

that of the human brain. In addition, AI solutions help to avoid errors and reduce risks. In phases of increased invoice volume, for example toward the end of a month, error susceptibility tends to increase with the pressure load. Incorrect postings can have serious consequences ranging from the additional use of resources to allegations of tax fraud. A considerable number of companies spend the first quarter of a new year correcting misbookings from the previous year (Zhang/Xiong/Xie/Fan/Gu 2020; Han/Shiwakoti/Jarvis/Mordi/Botchie 2023).

According to a study conducted by KPMG and Fraunhofer-Gesellschaft, those responsible for the finance function assume that accounting processes will be almost entirely automated in five to ten years (KPMG/FIT 2017).

In recent years, the digitization of accounting processes has shown little progress, which was confirmed by the "Digitization in Accounting 2020" survey by KPMG and the Ludwig-Maximilians-Universität Munich (2020). That study surveyed CFOs, chief accountants, and other senior executives from 331 companies in Germany, Austria, and Switzerland for the fourth time. The use of different technologies, including cloud solutions, big data tools, artificial intelligence, and blockchain technologies has not increased substantially in the accounting industry since 2018. AI is still unexploited in most areas of accounting, and according to that survey, the heterogeneity of documents, outdated systems, and data silos are responsible. AI is currently only used to record standardized documents, such as invoices, or to process incoming payments (KPMG 2020).

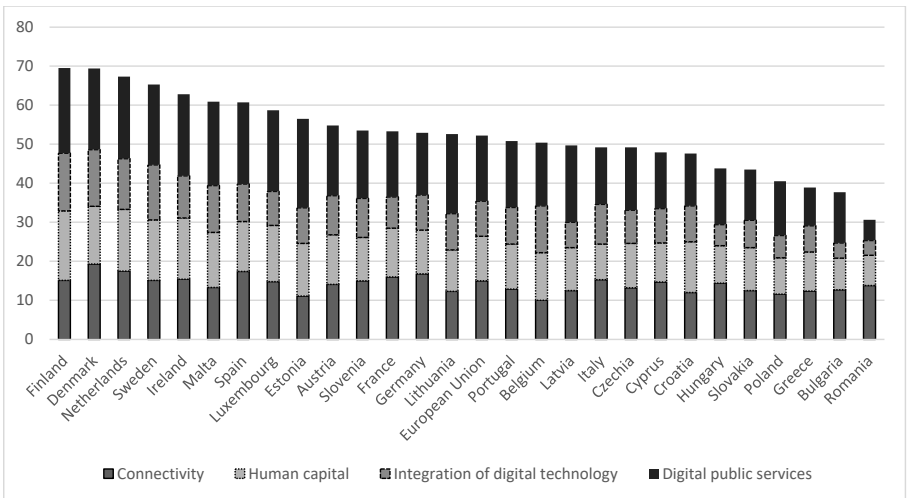
The KPMG Austria (2021) study "Digitization in Accounting" revealed that 36 % of those surveyed identified that partial harmonization of the system landscape was an essential first step to paperless processes, while 27 % named the comprehensive harmonization of their systems, and 61 % indicated that factors related to COVID-19 had boosted digitization in the accounting field. One-third (33 %) of respondents were of the opinion that no noticeable changes have occurred in relation to digitization projects, and 34 % of companies stated that they were testing artificial intelligence (AI) solutions for the collection of standardized data. However, 47 % stated that AI was not yet used in their systems (KPMG 2021).

A study released by KPMG in 2022 on the topic of digitization and sustainability identified that the majority of the companies surveyed had a low degree of digitization in their non-financial reporting procedures. Markus Kreher, a partner with KPMG, presented the advantages of digitalization, as follows: *"The recording of non-financial information in IT systems offers great advantages. For example, IT-supported data collection could support internal analyzes [sic] – for example in the context of evaluating ecological effects. About a third of the companies have shown key figures on employees and key figures on combating corruption in IT systems. In particular, the environmental indicators and the indicators for the respect of human rights present companies with challenges*

and are not yet read out automatically for the most part. There is still a lot of catching up to do here" (KMPG, 2022).

We used the Digital Economy and Society Index (DESI) to evaluate the current state of digitalization in EU countries and found that Finland had the highest score, while Greece, Bulgaria, and Romania presented the lowest digitalization values (Figure 1)

Figure 1 Digitalization levels in the European Union in 2022, by country

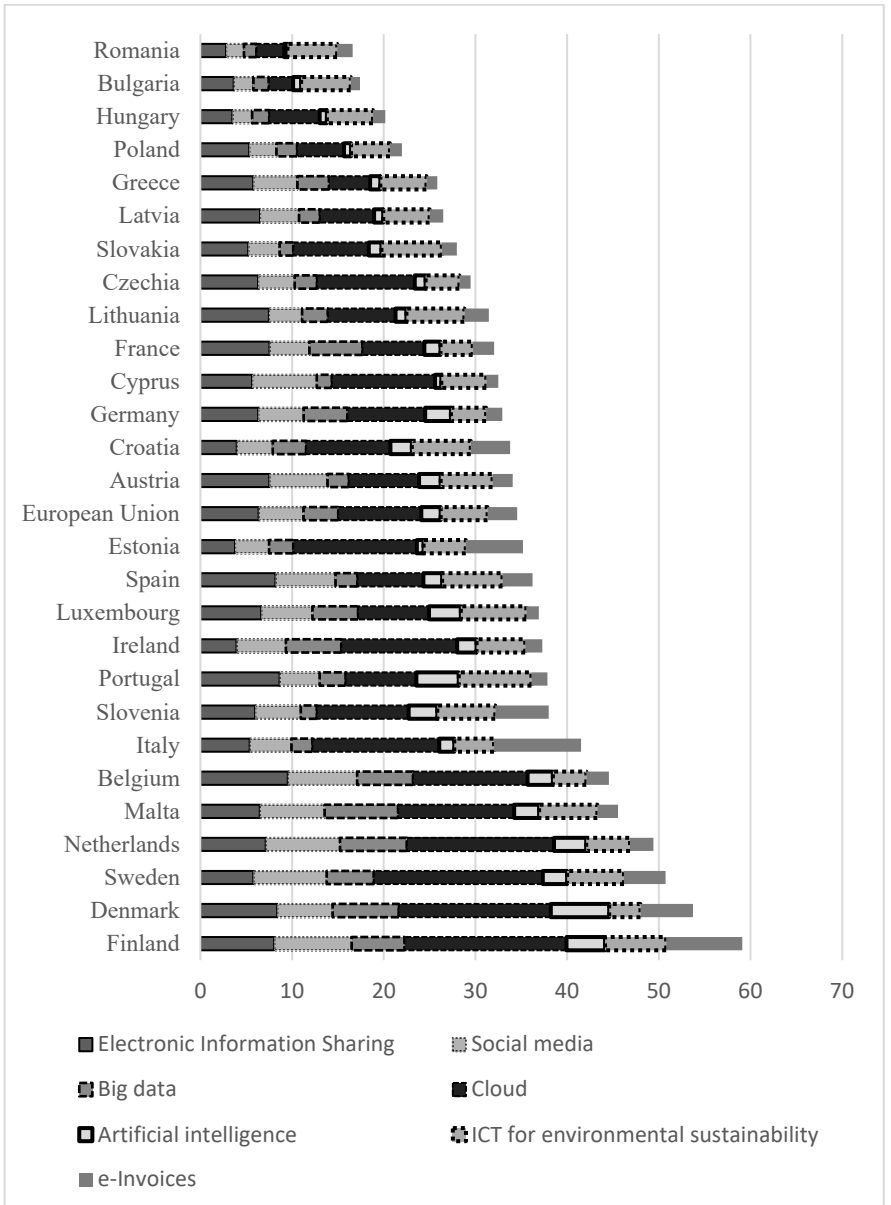


Source: https://www.statista.com/statistics/1245595/eu-digitalization-level/?fbclid=IwAR2Gehi1UHPj6ekn1ds5ZWEkXq7ulH8kz-i4rkrchT1oYJ6QQFbGfTwcIGw

Finland, Denmark, the Netherlands, and Sweden showed the greatest level of digitalization; however, these countries were still lacking in areas such as the penetration of advanced digital technologies like AI and big data. The widespread lack of relevant skills slows overall progress and leads to digital exclusion (Figure 2).

We note the weak position of Romania regarding digitization and the application of digital technologies. Despite these aspects, we considered it useful to analyze the acceptance of new digital technologies in the accounting profession in Romania because we consider this profession an essential decision-maker in the economic market.

Figure 2 Digital technologies for businesses



Source: Digital Economy and Society Index (DESI) https://digital-strategy.ec.europa.eu/en/policies/desi

1.2. Prior research

Companies are increasingly completely or partially digitizing their processes. Accounting systems are no exception, and a greater number of companies are working with digital innovations and utilizing technologies such as cloud solutions, artificial intelligence, big data, ERP systems, blockchain, and continuous accounting in their operations (Gulin/Hladika/Valenta 2019; Agostino/Saliterer/Steccolini 2022).

Similar to other software applications, a growing trend toward online solutions is occurring in accounting. Cloud accounting involves the use of accounting software that is accessed using an internet browser. This method offers a high degree of flexibility because permanent installation on a company server or workstation computer is not necessary. Each employee who has been assigned a password can use the accounting software from any location (Gulin/Hladika/Valenta 2019; Ionescu 2022a; Agostino/Saliterer/Steccolini 2022).

Big data involves the efficient use of large amounts of data for economic purposes. The information age recognizes millions of records every day, and big data is not just a buzzword; it is nothing less than a crucial marketing trend. AI-based software applications for accountants and controllers are currently in use. However, many of these solutions only cover relatively simple tasks and do not fully exploit the potential of AI (Ionescu 2022b; Agustí/Orta-Perez 2023).

Research is a systematic process through which information is collected and analyzed for a better understanding of concepts and phenomena. The present research approaches the subject of AI from the perspective of the hermeneutic tradition. In addition, the ethics of AI and robots have become a topic of concern in the age of digitization, in terms of the moral behavior of those who design, use, and adapt these technologies to the needs of the market (Etzioni/Etzioni 2017).

To provide an overview of the connection between AI, accounting, and ethics, we applied a hermeneutic methodology based on a semi-systematic literature review (Snyder 2019). Hermeneutics is a method for systematizing, understanding, and interpreting texts in a reflexive manner. The hermeneutic method is used in various fields, including philosophy, economic sciences, social sciences, law, and literature. “Hermeneutics” or “the hermeneutic method” refers to a procedure that uses reason to explain or interpret a work by understanding its meaning, breaking it down, and connecting it to human thoughts. This practice generally involves the interpretation and analysis of texts. Hermeneutics is not a tangible stepwise technique or method, and depending on the text, the focus of interpretation is on other aspects (Carter/Rogers/Win/Frazer/Richards/Houssami 2020; Supri/Usman/Dahri/Pontoh 2020; Losbichler/Lehner 2021). Due to the diversity that this form of research offers, our analysis followed hermeneutic cir-

cles in which the reader engages with the data in the form of a dialogue. Based on the key terms (Table 1), our research aimed to identify the AI challenges in the field of accounting, thus providing situational contexts and perspectives to uncover the issues faced by accountants in the application of AI.

AI is a branch of computer science that involves the development of intelligent machines that can function and react in a similar manner to that of humans. Automation has revolutionized finance; however, automation, by design, depends on the material that is initially programmed into the system. Thus, AI aims to introduce two new fundamental skills into technology: learning and problem-solving (Kokina/Davenpor 2017). Artificial intelligence can provide innovations to help people in their work and everyday life. The extent of these innovations depends largely on the trust that people have in the technology (Omrani/Rivieccio/Fiore/Schiavone/Agreda 2022). New technologies ultimately lead to discussions regarding social and scientific ethics that incorporate uncertainties and raise new moral issues, such as when AI instigates discriminatory factors or uncertain, risky consequences. A common fear is that adherence to values and ethical principles that are not consistent with the logic of the market will lead to disadvantages in free competition that cause economic declines (Smith 2018). Ethical principles and values are the starting point for trust in AI (Brendel/Mirbabaie/Lembcke/Hofeditz 2021), as they form the basis of possible regulation and certification of the related systems (Munoko/Brown-Liburd/Vasarhelyi 2021). AI should be developed to serve society and not create technical or economic constraints that violate ethical norms or restrict positive development.

Computer technologies have long passed the proof stage and are now in the midst of the implementation and application of AI period, especially in the field of accounting. The COVID-19 outbreak caused a greater number of activities to be implemented through digital processes. A new division of labor is expanding over the corporate world, whereby an increasing number of tasks are becoming automated, not only in production, where robots have been working for years, but in other areas, such as administration. Accountants are beginning to apply these new technologies in their daily work, despite their initial skepticism regarding the expected mass redundancies caused by the implementation of these technologies. Since human labor is required to support these technologies and robots can currently only assume routine and repetitive tasks, these layoffs will not happen overnight. The work of an accountant involves a series of activities that require decision-making and professional reasoning in addition to routine transaction processes (Zhong/Xing/Li/Liu/Fu/Xiong/Lu/Wu/Zhao/Tan/Li/Luo/Li/Chen/Zheng/Jiang 2018; Qasim/Kharbat 2020; Zakaria 2021).

Successful implementation and scaling of AI depends on understanding the changing roles and responsibilities within the organizational chart. This requires upskilling and reskilling employees to become "AI natives" and defining new ways of delineating jobs and tasks (Zemankova 2019; Kocsis 2019; Zhang/Xiong/Xie/Fan/Gu 2020; Gotthardt/Koivulaakso/Paksoy/Saramo/Martikainen/Lehner 2020; Munoko et al. 2020; Mökander/Floridi 2021; Leitner-Hanetseder et al. 2021).

Given the vast potential of these technologies, some of which will become universally adopted, there is a need for transparency, clarification, and regulation. Companies should create an ethical framework for their AI-based applications because organizations of all sizes will eventually be required to adopt AI to some degree. However, stakeholders rightly expect that the technologies will be used responsibly and in a manner that mitigates their risk. Regulations will often determine these framework conditions, such as those of tax or accounting legislation (Felzmann/Fosch-Villaronga/Lutz/Tamò-Larrieux 2020; Robinson 2020; Lehner/Ittonen/Silvola/Ström/Wührleitner 2022; Crossnohere/Elsaid/Paskett/Bose-Brill/Bridges 2022; Ashok/Madan/Joha/Sivarajah 2022).

The role of ethics in the use of AI is increasingly discussed among both researchers and practitioners. Similar to other professions, accounting is founded on a code of ethics, and considering the use of AI for routine and repetitive accounting activities, this code of ethics must consider AI-related factors. A possible method of implementing ethical approaches to AI is through the continuous training of employees who can recognize appropriate areas of application within the company and develop solutions that fall within ethical boundaries (Etzioni/Etzioni 2017; Nadeem/Juntunen/Shirazi/Hajli 2020).

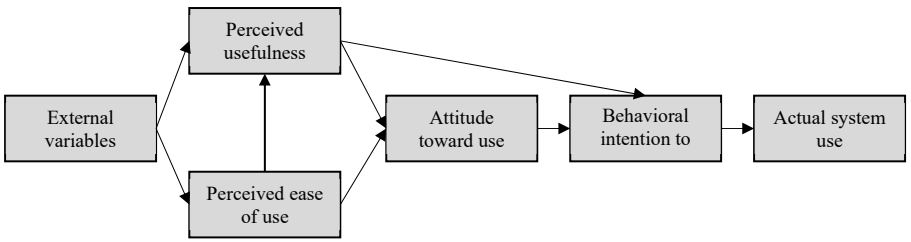
The effects of AI applications and technologies can substantially impact employees, applicants, customers, and other stakeholders of a company. The consequences of AI algorithms can be far-reaching; therefore, ethics experts should consult with the developers of these applications to ensure that ethical boundaries are not crossed during the development and implementation of these algorithms. Furthermore, once the AI-based applications are operational, companies must ensure seamless quality assurance throughout their lifecycles. Regular testing should be performed to confirm that the product does not violate the implemented ethical framework; this aspect is especially important for algorithms that are based on self-learning (Shi 2020; Lee/Tajudeen 2020; Bhargava/Bester/Bolton 2021).

2. Application of AI in the accounting profession

2.1. Methodology

Based on the technology acceptance model developed by Davis (1985, 1989), we investigated digital instrument adoption in the accounting profession. The model proposed by Davis is based on two essential factors, perceived usefulness and perceived ease of use (Figure 3).

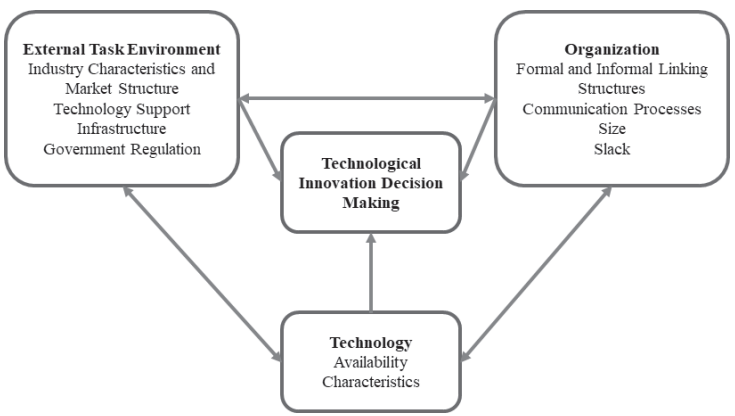
Figure 3. Technology acceptance model



Source: Davis (1989)

Figure 3 identifies that the model includes two primary factors, those relating to external forces and those attributable to attitude and intention with regard to the use of the technology. Thus, we used the technology-organization-environment (TOE) framework suggested by Tornatzky et al. (1990) for the external variables in the present research. This framework provides three primary contexts that can affect the adoption process of new technologies: technological, organizational, and environmental (Figure 4).

Figure 4. Technology-organization-environment framework



Source: Tornatzky et al. 1990

2.2. Hypothesis development

Technological Context

The use and application of AI in the accounting profession, and in general, is affected by technological characteristics. Several aspects must be considered when implementing a new technology, including ease of use, compatibility with existing systems and technologies within the company, and financial aspects, and these factors must be balanced with the advantages that these new technologies can provide (Tornatzky et al. 1990; Qader/Jamil/Sabah/Anwer/Mohammad/Gardi/Abdulrahman 2022). In addition, new technologies must integrate with existing systems, and qualified personnel must be available to operate this technology (Gangwar/Date/Ramaswamy 2015). Otherwise, the employed staff may postpone the use of the new AI and revert to applications with which they are familiar, despite the reduced efficacy of these systems. The specialized literature states that compatibility with existing technology is a barrier to the application of new technologies, whereby complicated structures that are difficult to access result in a reluctance by employees to adopt the new system (Barrett 2007; Li 2010; Han/Sa 2021; Rosli/Yeow/Siew 2012; Widuri et al. 2019; Katebi/Homami/Najmeddin 2022; Rawashdeh/Rawashdeh 2023). Employee reluctance also occurs when new IT systems are implemented with which the employees are unfamiliar. Humans generally struggle with adapting to new situations; therefore, the implementation of new technologies based on AI in the accounting profession can have negative impacts on the perceived usefulness (PU) and perceived ease of use (PEOU) of these systems. Thus, based on these factors and the existing literature, we formulated the following hypotheses regarding the influence of technological characteristics on PU and PEOU:

Hypothesis 1 (H1a). The technical context of AI has a positive influence on users' perceived ease of use of the technology.

Hypothesis 1 (H1b). The technical context of AI has a positive influence on users' perceived usefulness of the technology.

Organizational Context

Several organizational influences exist within a company, such as those of the organizational structure and culture, which can affect the intention to apply, use, and acquire new technologies (Tornatzky et al. 1990; Li 2010). Organizational culture has a considerable impact on corporate policy and can influence the implementation of AI in the accounting field. The attitude of employees toward new digital technologies can be considerably influenced by organizational culture and internal policies. Thus, the attitudes and reactions of employees can be motivated toward the acceptance and use of AI in their daily activities for more

efficient and effective results. In our research, we focused on the users of new technology based on AI, company policy, employee support through training courses to encourage the use of AI, and resource availability for each employee. As noted in previous research, employees are more willing to apply new digital technologies when they are supported by the company (Gangwar et al. 2015; Rosli et al. 2012; Widuri et al. 2019; Katebi et al. 2022; Rawashdeh/Rawashdeh 2023). Based on these findings, we formulated two hypotheses out of nine that are directed at the influence of organizational culture on PU and PEOU:

Hypothesis 2 (H2a). Organizational support toward AI has a positive influence on users' perceived ease of use of the technology.

Hypothesis 2 (H2b). Organizational support toward AI has a positive influence on users' perceived usefulness of the technology.

Environmental Context

The environmental context is another important aspect to consider when implementing and applying new digital technologies. External environmental factors such as competition can influence the motivation to use new AI-based technologies. In addition, social influences or public image can affect the acceptance of AI in the accounting profession (Gangwar et al. 2015; Rosli et al. 2012). Although limited research has been conducted on social factors that influence the acceptance and application of AI in the accounting profession, studies in other fields have shown a considerable effect of these factors (Tornatzky et al. 1990; Li 2010; Widuri et al. 2019; Katebi et al. 2022; Rawashdeh/Rawashdeh 2023). Environmental characteristics such as the adaptation of new technologies ahead of the competition to gain a competitive advantage or the adjustment in response to customer needs can influence the acceptance and use of AI in the accounting field. Based on these findings, we formulated two hypotheses regarding the influence of the environment in terms of PU and PEOU:

Hypothesis 3 (H3a). The environment in which the users work has a positive influence on users' perceived ease of use of the technology.

Hypothesis 3 (H3b). The environment in which the users work has a positive influence on users' perceived usefulness of the technology.

Personality

The personality of an individual encompasses the reactions of that person to certain situations (Katebi et al. 2022). Personality is defined in psychology as the aspect of the self that determines the actions or thoughts of a person; it is affected by genetic factors as well as social, geographic, and cultural conditions that surround a person from birth through adulthood (Rosli et al. 2012; Widuri

et al. 2019). Thus, the personality of each individual explains the reactions and perceptions of that person in similar or different situations (Tornatzky et al. 1990; Li 2010; Gangwar et al. 2015; Rawashdeh/Rawashdeh 2023). Therefore, personality can affect the attitude, intention, and non-state actions toward the application and use of AI-based technologies. Based on these concepts, we formulated the following hypotheses:

Hypothesis 4 (H4a). Personality and attitude toward AI have a positive influence on users' perceived ease of use of the technology.

Hypothesis 4 (H4b). Personality and attitude toward AI have a positive influence on users' perceived usefulness of the technology.

Perceived Ease of Use

The starting point is the ease of use of the technology. If a system is simple (i. e., self-explanatory) and can be operated or used based on the mental models of the users, a positive perception will ensue and the person using the technology will benefit from it. Therefore, the cost of using the technology is outweighed by the benefit obtained. However, the limitations of perceived usefulness and perceived simplicity should be emphasized (Li 2010; Gangwar et al. 2015). Perceived ease of use is based on the assessment of items such as sluggishness, learning curve, frustration level, controllability, rigidity and inflexibility, recollection ability, mental effort, understandability, intellectual potential, and ease of use (Katebi et al. 2022; Rawashdeh/Rawashdeh 2023). Perceived ease of use is therefore a subjective measure for estimating the effort involved in using the product.

Hypothesis 5. Perceived ease of use positively influences the perceived usefulness of AI technologies.

Hypothesis 6. Perceived ease of use positively influences the attitude toward the use of AI technologies.

Perceived Usefulness

Perceived usefulness can be defined as the degree to which users believe that they can increase their work performance by using the system. It can be described by the following ten items: quality of work, control over work, speed of work, improvement in productivity, increase in work output, ability to manage higher work volumes, rise in effectiveness, escalation of work efficacy, simplification of work, and availability of meaningful support. (Li 2010; Gangwar et al. 2015; Katebi et al. 2022; Rawashdeh/Rawashdeh 2023). Perceived usefulness and perceived ease of use have a direct influence on the attitude toward use, which justifies the behavioral intention and translates it into actual use.

Hypothesis 7. Perceived usefulness of AI positively influences the attitude toward the use of the technology.

Hypothesis 8. Perceived usefulness of AI positively influences the intention of using the technology.

Attitude toward Utilization

Generally, people see themselves as better able to use products or systems that are easier to handle. In addition, increased user-friendliness reduces the level of work required, which results in higher performance with the same amount of effort. This occurs as a result of the direct relationship between perceived ease of use and perceived benefit. The direct impact of the perceived benefit on behavioral intention allows a sizable benefit to counteract the negative attitude (Li 2010; Gangwar et al. 2015; Katebi et al. 2022; Rawashdeh/Rawashdeh 2023). The attitude model and decision theory demonstrate that the use of new technologies is dependent on the attitude of the user. Thus, based on these findings, we considered the response of an employee to use AI-based technologies as directly dependent on the attitude of that individual.

Hypothesis 9. The attitude toward the use of AI technologies positively influences the behavioral intention of the user.

Based on information from the specialized literature and the identified factors, we summarized our hypotheses in Table 2.

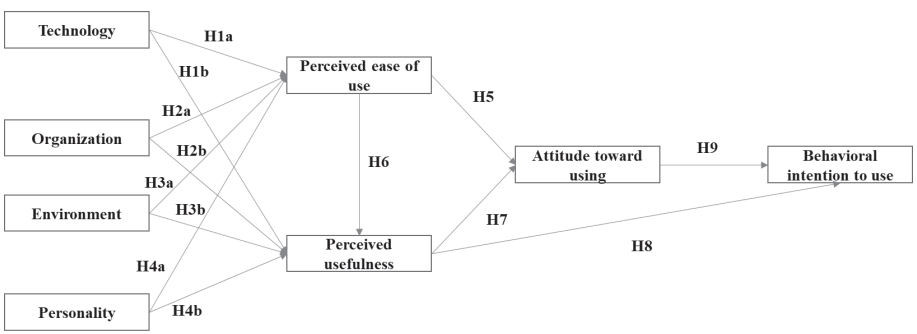
Table 2. Factor and hypothesis development

Variable	Hypothesis	Literature
Technological Context	**Hypothesis 1 (H1a).** The technical context of AI has a positive influence on users' perceived ease of use of the technology **Hypothesis 1 (H1b).** The technical context of AI has a positive influence on users' perceived usefulness of the technology.	Tornatzky et al. 1990 Li 2010 Gangwar/Date/Ramaswamy 2015 Barrett 2007 Han/Sa 2021; Qader/Jamil/Sabah/Anwer/Mohammad/Gardi/Abdulrahman 2022 Rosli/Yeow/Siew 2012 Widuri et al. 2019 Katebi/Homami/Najmeddin 2022 Rawashdeh/Rawashdeh 2023
Organisational Context	**Hypothesis 2 (H2a).** The organizational support toward AI has a positive influence on the users' perceived ease of use of the technology. **Hypothesis 2 (H2b).** The organizational support toward AI has a positive influence on the users' perceived usefulness of the technology.	Tornatzky et al. 1990 Li 2010 Gangwar et al. 2015 Rosli et al. 2012 Widuri et al. 2019 Katebi et al. 2022 Rawashdeh/Rawashdeh 2023

Variable	Hypothesis	Literature
Environmental Context	**Hypothesis 3 (H3a).** The environment in which the users work has a positive influence on users' perceived ease of use of the technology. **Hypothesis 3 (H3b).** The environment in which the users work has a positive influence on users' perceived usefulness of the technology.	Tornatzky et al. 1990 Li 2010 Gangwar et al. 2015 Rosli et al. 2012 Widuri et al. 2019 Katebi et al. 2022 Rawashdeh/Rawashdeh 2023
Personality	**Hypothesis 4 (H4a).** Personality and attitude toward AI have a positive influence on users' perceived ease of use of the technology. **Hypothesis 4 (H4b).** Personality and attitude toward AI have a positive influence on users' perceived usefulness of the technology.	Tornatzky et al. 1990 Li 2010 Gangwar et al. 2015 Rosli et al. 2012 Widuri et al. 2019 Katebi et al. 2022 Rawashdeh/Rawashdeh 2023
Perceived Ease of Use	**Hypothesis 5.** Perceived ease of use positively influences the perceived usefulness of AI technologies. **Hypothesis 6.** Perceived ease of use positively influences the attitude toward the use of AI technologies.	Li 2010 Gangwar et al. 2015 Katebi et al. 2022 Rawashdeh/Rawashdeh 2023
Perceived Usefulness	**Hypothesis 7.** Perceived usefulness of AI positively influences the attitude toward the use of the technology. **Hypothesis 8.** Perceived usefulness of AI positively influences the intention of using the technology.	Li 2010 Gangwar et al. 2015 Katebi et al. 2022 Rawashdeh/Rawashdeh 2023
Attitude towards Utilisation	**Hypothesis 9.** The attitude toward the use of AI technologies positively influences the behavioral intention of the user.	Li 2010 Gangwar et al. 2015 Katebi et al. 2022 Rawashdeh/Rawashdeh 2023

Source: author projection

Figure 5. Proposed model



Source: author projection

This research analyzed the factors influencing the intention and acceptance of AI-based technology by accounting professionals who work with employees or other individuals. To achieve the proposed objective, our research was based on the basic model of technology acceptance (TAM) with consideration of external variables as proposed by the TOE. Our proposed model is presented in Figure 5.

2.3. Data collection

To verify and test the hypotheses formulated based on the specialized literature, we created a questionnaire and distributed it among Romanian accounting professionals to capture the acceptance of new advanced technologies based on artificial intelligence. An accounting professional was defined as a person who is part of the body of accounting experts and authorized accountants in Romania and whose basic activity concerns accounting up to the reporting level. Financial auditors were excluded. The questionnaire was divided into three sections. The first part briefly explained the characteristics of artificial intelligence. The second section included demographic questions, and the third part consisted of 25 questions based on the variables included in the model. The questionnaire was validated using discussions with five accounting experts who were using the new technologies based on artificial intelligence, to ensure that the questions were understood correctly. Completing the questionnaire was simplified by the use of a five-point Likert scale in Section three.

The elaboration and transmission of the questionnaire were conducted through the platform www.isondaje.ro, whereby the generated link was distributed through social networks with the support of some accounting firms. The survey was created and distributed among accounting professionals between September and December 2022. The survey collected 157 responses, of which we validated 132. The hypotheses regarding the attitudes toward AI-based technology acceptance were checked and validated using the IBM SPSS Statistics 26 and AMOS 26 programs.

3. Results

Table 3 presents the demographic results of the questionnaire. The respondents included a considerable number of younger accountants, which can indicate an inclination toward new technologies and more advanced digital skills.

To establish the appropriateness of the factors involved in our study, we used an exploratory factor analysis (EFA) whereby the factorability of the data was tested using the Kaiser–Meyer–Olkin (KMO) test and the Bartlett test of sphericity. The KMO test returned a value of 0.678, which was greater than the 0.6 value required for the EFA (Iskamto/Ghazali/ Aftanorhan/Bon, 2020), more than that for the Bartlett test, in which the value of X^2 was 519867 with a p-value of 0.000

which was significant for factorable data (Spoorthy/Singh/Tikka/Hara, 2021). The preliminary test results allowed us to confirm that the EFA was appropriate for our study. In addition, we applied a Principal Component Analysis (PCA) with varimax rotation, and the communalities for the factors assessed ranged from 0.421 to 0.738, which were greater than the minimum accepted value of 0.3 (Zeynivandnezhad/Rashed/Kanooni, 2019).

Table 3. Demographic aspects

	N	Percentage
Sex	132	100 %
Female	97	73 %
Male	35	27 %
Age	132	100 %
20–25	34	26 %
25–30	26	20 %
30–35	19	14 %
35–40	21	16 %
40–45	16	12 %
Over 45	16	12 %
Degree	132	100 %
High school	16	12 %
Bachelor	46	35 %
Master's	69	52 %
PhD	1	1 %
Work experience	132	100 %
0–5	47	35 %
6–10	46	35 %
11–15	26	20 %
Above 16 years	13	10 %

To validate the assumptions, the first step was to ensure the adequacy of the model; therefore, we evaluated the reliability and validity of the data. The analysis of the indices confirmed that the model was suitable, as shown in Table 4.

Table 4. Fit indices

Indicator	Recommended value	Value obtained
Chi-squared	< 3.00	1.875
GFI	> 0.90	0.905
AGFI	> 0.80	0.840
NFI	> 0.80	0.911
CFI	> 0.90	0.947
RMSEA	< 0.10	0.023

Furthermore, to verify that the latent and measurement variables were correctly associated with the research model, a confirmatory factor analysis (CFA) was performed. This model is considered reliable when the value of Cronbach's alpha coefficient is above 0.7, and since all the measurement variables in the study exceeded this reference value, the model was considered reliable (Table 5). The convergent and discriminant validities of the measurement model were then evaluated by calculating the factor loading, average variance extracted (AVE), and composite reliability (CR) (Tables 5 and 6). Convergent validity is generally confirmed when factor loading, and AVE values are greater than 0.5 and CR is above 0.7. To highlight the details of the factors related to each element, an analysis of the factor load was performed; we analyzed the reliability of the elements (Table 5). All values fell within the recommended range. A reliability test was then used to determine the consistency of the data by applying the Cronbach's alpha coefficient test method. The reliability test is valid if the calculated Cronbach's alpha coefficient is greater than 0.7.

Table 5. Factor loading

Element	Factor loading Internal	Composite factor reliability >= 0.70	Convergent validity Average Variance Extracted; >= 0.50	Crombach's∝
Technological context	0.878 0.898 0.770	0.916	0.867	0.921
Organizational context	0,477 0.589 0.766	0.876	0.697	0.831
Environmental context	0.766 0.798 0.768	0.858	0.746	0.835
Personality	0.777 0.656 0.708	0.911	0.783	0.869
Perceived ease of use	0.698 0.798 0.718	0,878	0.683	0.815
Perceived usefulness	0.679 0.799 0.817	0.914	0.773	0.873
Attitude toward use	0.629 0.812 0.557	0.894	0.752	0.827
Behavioral intent to use	0.529 0.667 0.748	0.873	0.694	0.836

Table 6. Correlation matrices of the measurement model

Construct	1	2	3	4	5	6	7	8
Technological context	0.957							
Organizational context	0.782	0.942						
Environmental context	0.673	0.724	0.887					
Personality	0.684	0.412	0.480	0.934				
Perceived ease of use	0.866	0.768	0.645	0.628	0.998			
Perceived usefulness	0.638	0.721	0.612	0.599	0.607	0.899		
Attitude toward use	0.608	0.545	0.468	0.616	0.762	0.412	0,888	
Behavioral intent to use	0.466	0.202	0.373	0.502	0.493	0.384	0.495	0.927

The results of the structural model path analysis based on the calculations are presented in Table 7, which indicates that 9 of the 13 research hypotheses were confirmed. The technical context did not have a positive influence on perceived usefulness; therefore, H1b was invalidated. In addition, the work environment did not influence perceived ease or usefulness; consequently, these two hypotheses were invalidated.

Moreover, the respondents did not identify a positive correlation between the organizational support toward AI technologies and the perceived usefulness of each share. Therefore, the H2b hypothesis was invalidated. However, external variables such as technology, organization, and personality positively influenced the ease of new technologies based on AI as perceived by the end users.

Table 7. Hypothesis validation

Hypothesis	p (*** p < 0.001, ** p < 0.01)	Validation
H1.a	***	√
H1.b	0.17	X
H2.a	***	√
H2.b	0.677	X
H3.a	0.813	X
H3.b	0.099	X
H4.a	***	√
H4.b	***	√
H5	***	√
H6	***	√
H7	***	√
H8	***	√
H9	***	√

In this study, the factor that had the greatest influence on the adoption of AI-based technology in the accounting profession was the usefulness as per-

ceived by the end user. In contrast, environmental factors had little influence on whether new innovative technologies were accepted and adopted in the accounting profession.

4. Discussion

Decision-makers and experts in various industries require a method to adequately address the potential of AI, machine learning, and deep learning. However, knowledge of the possibilities of automation is increasing, as is the potential for corresponding digitization projects (Pizzi et al. 2021). This raises the question: To what extent is AI utilized in the accounting field?

Nine of the thirteen research hypotheses we formulated were validated and four were rejected. Previous research has confirmed the positive influence of the technical context on the acceptance and adoption of new innovative technologies based on artificial intelligence. Therefore, this aspect was expected to be validated in the accounting profession (Barrett 2007; Han/Sa 2022; Qader et al. 2022). New technologies bring a series of benefits and raise a number of questions, especially in terms of the adaptation to these technologies. However, we must also appreciate the efficiency and effectiveness of these innovations.

According to Orlikowski (1992), cultural and organizational aspects affect the acceptance of new innovative technologies. Similarly, Tamilmani/Rana/Wamba/Dwivedi (2021) stated that cultural and organizational aspects can positively affect the acceptance of new technologies. Our results revealed that the organizational aspect positively influenced the perceived ease of use, while it negatively influenced the perceived usefulness.

Environmental factors did not influence perceived usefulness or ease of use. This aspect can be affected by the organizational culture and a tendency toward conservatism, whereby maintaining the comfort zone is preferred over confronting something new and unknown. Although the pursuit of long-term sustainability involves increased discussions regarding the efficiency of resources, this study discussed both natural and human resources. The fear of job loss and the ethical aspects of new technologies are important factors considered by accounting professionals. Early education and the proactive involvement of professional bodies in mediating and familiarizing accounting professionals with new technologies would positively impact the organizational and cultural environment.

This raises the possibility of the automation of financial processes. Each form of automation is based on intelligent networks assuming the simple work that was previously performed by an employee. This also applies to tasks within the internal finances of a company. For example, if an accounting program

is responsible for the pre-allocation in accounting, an AI usually runs in the background and suggests the results (Berikol/Killi 2021).

This minimizes the error rate and reduces the workload for accountants and tax advisors. Moreover, if incorrect allocations are undetected, sophisticated accounting programs can manually repost and correct these entries. In addition, the system also records these "manual" changes and uses that information to ensure the entry is correctly pre-allocated in the future (Leitner-Hanetseder et al. 2021).

The patterns that AI recognizes can be used to create intelligent reports and make essential predictions about critical figures, liquidity, or bad debts. Furthermore, errors or irregularities in reports and performance indicators are automatically detected and can be verified more quickly, although the final verification remains with the accountant. Thus, AI-supported software eliminates the need for a considerable amount of accounting and control work (Berikol/Killi 2021; Feghali et al. 2022).

Moreover, AI requires no breaks or sleep. The data received is immediately loaded into the system and processed. The system then provides an up-to-date overview of the data, which simplifies the formulation of future decisions.

Furthermore, an AI language assistant offers advantages for employees who are not directly involved in the accounting and control aspects of a company. Critical information regarding customers can be immediately accessed by the language assistant to be transmitted to the sales, management, or marketing department without requiring lengthy inquiries to the accounting department. Salespeople are then informed of open items by the receipt of reminders when they are meeting customers, thus enabling them to query key figures on their way to meetings (Leitner-Hanetseder et al. 2021; Pizzi et al. 2021).

In addition, AI can be used to automate accounting processes, particularly those with repetitive tasks. Missing information can be enriched using AI because the lack of information can be time-consuming for accounting employees who must manually add this data (Guşe/Mangiuc 2022; Feghali et al. 2022).

In the future, technologies based on artificial intelligence will increase the efficiency and effectiveness of companies, which will enable them to obtain competitive advantages over those that do not adopt these new technologies. The successful implementation of these technologies will be possible by considering the enabling factors proposed in this study.

AI has limitations, such as its lack of reason and intuition. In addition, when errors occur, a responsible individual must be available to manage the situation. Accounting decisions are continually checked and assessed within their overall context. Despite the increase in available data and analytics, humans must still use their reasoning and decision-making to structure the analyses for a specific

(intuitive) reason. AI can assume many routine day-to-day tasks, which allows accountants to orient their activities toward strategic and problem-solving roles (Thipwiwatpotjana 2021).

The limits of accounting applications, especially in predictive analytics, are that decisions derived from algorithms must be entirely understandable and encompass the transparency required in the accounting field.

Professional accountants generally understand systems, possess problem-solving skills, and understand business, and they must react flexibly to change. Companies will need to support their finance departments in managing this change. The companies that are able to exploit the abundance of available information will prosper over those who hesitate to venture into these new technologies.

Conclusion

The first wave of technology is currently engrained in most accounting firms. Various solutions have been introduced and possibly become defunct. In addition to initial experiences with profitable innovations, many companies are changing how they procure software because those responsible for new digital acquisitions understand that specific knowledge from each department is required for sustainable decisions when purchasing software.

This study aimed to expand the knowledge regarding the level of acceptance of new artificial intelligence technologies in the accounting profession in Romania. We analyzed the literature and the main influencing factors on the acceptance of AI in the accounting profession in Romania to gain an understanding of the theoretical, practical, and managerial implications.

The managerial implications of the study can be useful for the development and acceptance of new digital technologies by accountants. Management plays an important role in supporting and encouraging the use of these new technologies. In addition, policymakers influence the adoption and use of digital technologies.

Generally, management has the final decision regarding digitization projects in accounting. However, the involvement of internal experts from specialized departments and software users in important decisions can be beneficial. In this regard, companies are gradually becoming more progressive, and many decision-makers have found reasonable solutions for managing digitization in accounting.

In accounting, AI is used to optimize accounting and documentation processes to improve efficiency, minimize errors, increase trust in the figures generated, and conserve valuable capacity.

AI develops an understanding of the accounting material by learning from historical data, accounting manuals, and general accounting rules. Based on the

information collected, the system independently develops proposals, whereby the AI gradually expands and improves its knowledge with each document and posting.

AI will allow numerous routine tasks to be assigned to software that performs such tasks with outstanding speed and precision. AI will significantly reduce repetitive, manual work and make the daily business agenda easier for key accounting employees while helping to avoid errors and reduce risks.

However, AI has its limitations. It relies on past data to make predictions and lacks intuition, visionary thinking, and innovative, creative drive. The significant advantage of AI is that it relieves employees of time-consuming and energy-depleting repetitive work, which allows them more freedom to focus on shaping the future of the company through creative, agile, and innovative processes. The accounting profession will undergo a reorganization from the routine, repetitive activity of entering data to a focus on consulting. To manage these changes, entities must increase their investment in the development of IT knowledge. This aspect can be considered a practical implication for the accounting profession.

We have identified several advantages of the digital transition. However, the process is in a fundamental stage and societies must continue to apply these new innovative technologies. Similar to most research, this study has a series of limitations, such as its overly specific approach to the application of digital technologies within the accounting profession, which indicates that the results cannot necessarily be generalized. Moreover, a parallel analysis of the evolution of the digital transition and an evaluation of the energy and sustainability implications of the digital transition would be beneficial. In addition, this study focused on accountants and not auditors and only on those in Romania; therefore, the study could be extended to other categories of professional accountants and different countries. Furthermore, the sample size and analyzed factors could be considered limitations of the research. Moreover, an analysis of the size of investment in the digitization process could be of interest.

We believe that the results of the research can provide a basis for future research through the existence of the sample or the expansion of the influencing factors. In addition, future research could investigate factors that could affect the success of entities, such as market competition, economic conditions, and their interaction with accounting digitization.

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