A STATUS QUO ON THE LITERATURE OF DISRUPTIVE TECHNOLOGIES IN ACCOUNTING – IMPLICATIONS FOR ADOPTION DECISION

Andreea CORDOS (M. LABADITIS)[1]**,** ORCID ID: 0000-0001-5530-5635
Adriana TIRON-TUDOR ORCID ID: 0000-0001-5530-5635

Abstract: *The accounting industry is undergoing an extensive digital transformation through the immersion of new technologies. From an organizational perspective, the digital revolution poses questions about their ability to successfully integrate the changes advocated by current digitalization trend. At the same time, practitioners face challenges, as the organizational roles are being scrutinized and expected to undergo massive changes in a world where technology adoption is at its early stages and still poses profound structural and adequacy questions.*
Although the details of the impending changes brought by digital transformation are profoundly obscure, knowledge remains the foundational element for a successful transition to new technology, and academic literature must be regularly updated to keep up with the dynamics of real-time transformation.
With this purpose, the current study interrogates the state of the accounting literature, with a particular emphasis on emerging technologies in the discipline, and their niche considerations in the face of potential adoptions.
The research uses a hybrid approach of qualitative and quantitative analysis. The implications of technology adoption in the accounting field are being structurally divided into advantageous and disadvantageous effects, while elaborating based on the organizational and user ramifications. The pillars on which the analysis is built represents the different technologies that are most commonly refenced by the accounting literature. The originality of the paper stems from its endeavor to cross-reference every pertinent technology with literature-referenced implementation considerations.

Keywords: *disruptive technologies, accounting, digitalization, literature review, technology.*

JEL Classification: M41, O14, O33

Introduction

Fast-forwarding technological changes trigger a fundamental reconfiguration of the actors involved. In the global arena, the accounting profession also embraces its responsibilities in the face of this astounding transformation and is mandated to redesign itself due to new technologies that emerged in the sector (Vărzaru, 2022).

At the pinnacle of technological advancement, the ability to collect and manipulate enormous data volumes (Yoon, 2020), take advantage of remote databases for organizational needs (Saha *et al*., 2020) as well as incorporate high end process automation (Moll & Yigitbasioglu, 2019) present a huge opportunity for businesses to maneuver to full potential. The work and shape of accounting organizations are expanding due to technological progress.

The influence of developments such as Artificial Intelligence (AI), Big Data and Data Analytics (BDA), Robotic Process Automation (RPA), Blockchain, Cloud Computing (CC) drives

[1] Lecturer, Finance Department, Faculty of Economics and Business Administration, Babes Bolyai University. Corresponding author: gabriela.muresan@econ.ubbcluj.ro
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the accounting organizations into a complete transformation from the early days of manual bookkeeping to present days where automation touches most processes (Onwughai, 2022).

The accounting literature approached different angles in addressing the analysis of the implications of digital transformation on organizations. An angle tries to assess resistance towards implementation (Hsiung & Wang, 2022) while others asses technological limitations (Losbichler & Lehner, 2021) or simply discuss the organizational needs and shortages that arise from full or partial adoption (Popivniak, 2019).

In response to these challenges, the paper is conducting a Literature Review of the emerging technologies in accounting in order to create a comprehensive and integrated picture of the current state of digital transformation. The study also delves into examining each technology individually in light of new requirements posed by users and organizations.

Following a two-angled approach, the study significantly advances the discipline of accounting. First, it provides a structured classification of most pervasive disruptive technologies that have entered the field of accounting, as the foundation for additional study. Secondly, the study will allow for the recognition of the current dynamics of new technology adoptions, feeding each technology with the pertaining clarifications regarding current implications in case of adoption. The study will assist practitioners in their endeavor to further deepen their digital acumen, as well as organizations immersed into further maturing their internal technologies.

The structure of the literature review follows current trends of research, and brings its contribution through originality of data classification, following three pillars of technology definition, user and organizational impact, as well as advantageous or disadvantageous angle. The study offers technical and conceptual input for practitioners and organizations at once.

The structure of the paper contents the following: Section 2 offers details about technologies in scope of the research and literature-based approaches of previous studies. In a further sequence, the methodology in line with the structure of a Literature Review will be described in Section 3. Section 3 will also provide visual and scripted input on the results of the research. Then, sections 4, 5 and 6 will detail the outcome of the qualitative cross-analysis, together with the findings and conclusion of the research.

Literature Review

Illustrating the landscape of technological opportunities in the accounting profession

As a result of digitalization, the world is changing quickly, creating a framework where industries must emulate on the movement triggered by the immersion of emerging technology. Digital technologies are changing how the accounting sector operates and affecting everyone who is engaged, from users to organizations (Oesterreich & Teuteberg, 2019). Thus, it becomes vital to have a clear understanding of the concept and applications of these technologies.

The following technologies have been found to address the topic of adoption implication throughput literature. They will be further presented following the complexity principle.

Cloud Computing (CC) is widespread and has high impact in the accounting community (Zhyvets 2019; Saha *et al.*, 2020). Studies encourage organizations to use it for startups and SMEs as it fosters innovation and employment, moreover it calls for governments to act towards improving people's perception and extending implementation (Saha *et al.*, 2020). CC enforces innovation also through shifting responsibilities and infrastructure to the service provider, allowing companies to focus resources and time towards different initiatives (Moll & Yigitbasioglu, 2019).

Robotic Process Automation (RPA) is set to confine a specific role in the life of accountants, a stage called "robotic accounting" that is not very far from present days (Bakulina *et al.*, 2020). Research identifies the changing role of the accountant surrounding the imminence of RPA and while job displacement is an existing concern (Cooper *et al.*, 2022), research implies that new jobs and role will be formed around new technology (trainer, explainer or identifier), where

human intervention is necessary and enhances the work of the accountants (Kokina *et al.*, 2021), rather than seeing it as a terror of modern days.

Artificial Intelligence (AI) is at the peak of technological development (Li & Zheng, 2018). Automation varies greatly mundane task elimination to complete elimination of human intervention in accounting processes (Cooper *et al*., 2019). AI undertakes many tasks from reporting (Hasan, 2021) to auditing and fraud detection (Vărzaru, 2022).

The study of AI raises concerns about how we define and perceive intelligence as it is a technology that has the ability to simulate mental processes (Li & Zheng, 2018), but it still needs more time to determine how these processes will diverge over time and how they will develop in relation to human thought.

Big Data and Data Analytics (BDA) experiences one of the fastest adoption rates in the world (Sun et al., 2020; Sarkar et al., 2021). An increasing volume of devices in use encourages the expansion of the technology, nonetheless the question of unstructured data and data reliability still poses great challenges to adoption (Cavélius *et al.*, 2020; Sun *et al*., 2020). Despite this, BDA continues its transformational journey and reshapes the accounting processes and the accounting job itself along the way (Moll & Yigitbasioglu, 2019). By enabling the full use and development of AI technologies, BDA development is anticipated to overcome the aforementioned problems and thrive in the accounting world of the future (Nielsen, 2022).

Blockchain is set to change the principles of the double entry accounting (Milosavljevic *et al*., 2019; Bonsón & Bednárová, 2019). Despite its slow evolution (Schmitz & Leoni, 2019) the accounting community must seize the current hype and provide the accounting literature with the necessary tools for organizations and communities interested in blockchain implementations.

The new technology in the industry have had some impact on all aspects of accounting *(Barac et al.*, 2021). Understanding the reverberations of technology adoption within each accounting stream is vital towards creating an optimal landscape in which businesses can thrive alongside challenges imposed by their digital transformation, rather than bearing the brunt of a reactive approach. The current study aims to act as a guide through previous adoption experiences throughout literature that can serve as a basis for academic, practitioners and organization to use in their respective journey.

Reviewing technology adoption decision elements diagnosed within literature

The accounting literature approached different angles to analyzing the impact of new technology in accounting. One direction aims at targeting possible resistance within the market, towards adoption of new technologies, revealing elements that counterbalance such behavior. Several factors have been revealed throughout literature that positively influence adoption desire. Self-efficacy and effort expectancy are found to enable AIS adoption (Alamin *et al.*, 2020) while performance expectancy and social influence appears as key enabler to Blockchain integration (Milosavljevic *et al.*, 2019). Interestingly, one research found that attitude towards using RPA is strongly correlated to male employees, system familiarity, as well as CEO support (Hsiung & Wang, 2022).

A second view completes the accounting literature with an approach based on addressing the change management environment that must be present in all organizations and its influence in all levels of the organization. Change management must start at the top of the organization and it ultimately spreads throughout all areas, performing a complete makeover of the traditional accountant (Li & Zheng, 2018). Change management is discussed from an organizational perspective, where it is seen as pivotal for gaining and maintaining competitive advantage in today`s market (Tiron-Tudor *et al.*, 2021) yet it is also seen as a technical management skill that are vital for the accounting organization (Pilipczuk, 2020). Proper change management becomes a necessity in the process of digital transformation, whether organizations recognize this or not. Studies discuss this philosophy once they go through at least one implementation (Kokina &

Blanchette, 2019), nonetheless pro-activeness in formulating a robust change management can help enterprises engage more easily into their digital transformation journey.

A third approach towards understanding the implications of technology adoption discusses the changes that involve the human capital and the companies` struggle to adapt to the dynamics of changed competencies that arise in the market. Many papers identify skills such as IT or data analytics as becoming the "must have" in terms of competencies (Pilipczuk, 2020; Schmidt et al., 2020; Sarkar *et al.*, 2021). Moreover, harder skills such as programming (Lin & Hazelbaker, 2019), scripting languages (Oesterreich & Teuteberg, 2019) and advanced analytics (Korhonen *et al.*, 2021).

The benefits of technology adoption are predicted to transform the industry through revealing patterns, anomalies, and insides deep into business processes, and reshaping decision-making processes (Austin, 2021). New technologies enable faster and more secure environments for data manipulation (Bonsón & Bednárová, 2019) and focus on data interpretation and critical thinking, while enabling discovery and innovation through technology adoption (Dow *et al.*, 2021).

In this sense, the accounting profession was called to action, to adopt new technology or be bound for the history books (Schmidt *et al.*, 2020). The current paper addresses this call and enriches the accounting literature and analytical and technical insight into the adoption challenges and benefits of new technology. The methodology section will further apply quantitative and qualitative methods in tackling the accounting literature and the results and conclusion section will benefit from a methodical discussion and representation of the research findings.

Methodology

Research Questions Development

This paper has the purpose to provide answers to the following research questions:

• Which technologies are digitalizing the accounting profession?

The first research question (RQ1) will outlay the relevant technologies that impact the accounting literature, providing valuable analytical and critical input surrounding each of them.

• What is the literature standpoint in terms of defining the implications that emergent technologies have in the process of adoption?

The second research question (RQ2) synthesizes the findings of implications, challenges and effects, benefits and threats that the literature proposes in relation to the defined technologies that impose changes to the accounting profession.

Data Collection & Sampling

The paper uses three major databases for search purposes: WOS, Scopus, and ProQuest, in order to obtain an understanding of the body of current literature in the topic. By doing this, the research seeks to incorporate a wider range of publications that address the topic of digital transformation in the accounting field.

A total of eight keywords were chosen in order to best reveal the technologies in scope, while two keywords narrowed the search to the accounting relevant literature and ensured optimal results. The combinations were made with the intention of focusing on accounting-related technologies that may significantly affect the growth of the sector.

The literature of technologies was selected by the following keywords "Cloud", "RPA", "Robotic Process Automation", "AI", "Artificial Intelligence", "Big Data", "Data Analytics" and "Blockchain", while the industry was selected by refining the search through the keywords "Accountant" and "Accounting". A total of 16 combinations resulted from the keyword combination. The applied research formula can be seen in ***Table 1***, together with the total number of search results.

Keyword 1	Keyword 2	Articles in WoS	Articles in ProQuest	Articles in Scopus
"AI"	"Accountant" / "Accounting"	1923	844	617
"Artificial Intelligence"	"Accountant" / "Accounting"	308	732	1731
"Big Data"	"Accountant" / "Accounting"	1583	742	1023
"Blockchain"	"Accountant" / "Accounting"	554	655	516
"Cloud"	"Accountant" / "Accounting"	2017	5777	2611
"Robotic Process Automation"	"Accountant" /"Accounting"	41	110	49
"RPA"	"Accountant" / "Accounting"	78	143	91

Table 1: Applied research formula

The sample includes articles up to the last day of 2022. From the extracted articles, a total number of 86 articles were selected from the three databases. A duplicate check eliminated 23 articles. Additionally, a manual refining was performed to consolidate a database of articles that refer to implications of previous implementations. In this sense, all topics surrounding challenges and effects, benefits, and costs or simply, implications of adoption were selected. Articles discussing technologies in general without offering adoption insight were removed from the list. In this way, a total number of 24 articles were eliminated. The final database for the quantitative and qualitative analysis consisted in its final format of 39 articles.

Data Reliability

The primary author individually read the first ten articles and rated them in accordance with the expected research result. The second author underwent the same process and rated the same ten articles. Finally, the outcome was compared, and the results confirmed the logic for decisional basis. With this argument both authors continued to rate all articles in the chosen database.

Secondly, as a reliability measure, the Krippendorff's alpha was used as a metric to confirm coding decision between the two co-authors (Hayes & Krippendorff, 2007). The exercise resulted in a score of 0.88, placing the exercise above the recommended threshold of 0.80 (Krippendorff, 2018) and this offering a second confirmation of data reliability.

Data Coding and Interpretation

The literature selection and analysis follow the structure of a thematic analysis approach. Such structure guides the researcher through several steps in order to obtain a robust and comprehensive view of the studied literature. Initially, the authors must undergo content scanning for each article to identify recurring themes (Fereday & Muir-Cochrane, 2006; Kiger & Varpio, 2020). Secondly, the approach classifies sets of information and thus, codes the themes that are most recurrent. In a final step, a relationship between the defined themes must be established (Thorne, 2000; Kiger & Varpio, 2020) .

The coding takes place in several steps. Initially each article is labeled with a specific description based on its individual theme. Secondly, a list of all short descriptions is ensembled and commonalities are being derived, thus reducing the list to smaller groups of data. Lastly, the categories are crosschecked with theory derived coding that can assist the research better group the data. In this manner, a smaller yet consistent set of codes are remaining, that will be assigned to each article in scope.

The authors designed the coding system in accordance with the study questions while delimitating areas of interest and approaches within each paper. The final setup of the coding elements is based on two pillars: firstly, a quantitative analysis, where research is analyzed by year of publication, publisher, research method, or country; the second is a qualitative approach, which also serves as the foundation for the research questions. It reveals the primary technologies that serve as the basis for each article, as well as analyzes the approach that each paper covers in terms

of technology adoption. The latter is ultimately split between positive and negative connotation of new adoption, as well as whether the feature is mainly impacting users or organizations.

Results

The results section seeks to provide insight into the quantitative and qualitative examination of disruptive technologies in accounting within the available accounting literature. The findings range from an objective classification based on primary quantitative components such as country of origin, year of publication, or research method to a more in-depth qualitative approach that attempts to tie the technologies in scope to other preset subjects. Each of the dimensions examined will be described in detail in the results section, in the aforementioned order.

Quantitative analysis of the literature of technology adoption in accounting companies

The results are initially analyzed as per objective criteria, following the theme search structure of a Thematic Literature Review (Kiger & Varpio, 2020). An initial structuring of the analyzed data puts not perspective two relevant feature of the researched articles. One feature refers to the year of publishing which generates overview of the years in which the defined theme becomes relevant. At the same time, a cross analysis against the total citation number will reveal those year in which attention was given most to the analyzed topic.

The discussion around disruptive technologies in accounting starts in 2018, with a small presence percentage (2.6%) and it shows a peak in 2022 (33.3%). ***Table 2*** shows that preoccupation over technology's influence in accounting is very recent, it peaks in the recent years and has little presence within literature before 2020. This finding is in line with the novelty of the subject and the increased focus it attains in recent publications.

The citation volume is a representation of source quality within a given research (Cuozzo *et al*., 2017). At the same time, the citation volume is a dynamic figure that increases in volume throughout the years. ***Table 2*** shows the total citation number as extracted from Google Scholar at 01.04.2023. For the purpose of uniformity, a single platform was decided for the analysis of the total citation number, and a single date of extraction was agreed upon, meaning 01.04.2023. Although it is expected that the citation number grows over the year, the paper also reveals the most powerful articles, that had an impact in literature and obtained a high number of citations. In 209, the average citation per article is 132. The second place is set for articles dating 2022, which obtained an average of 60 citations per article.

Year	No of Published Articles	Percentage of published articles per year	Total number of citations per year	Average number of citations per article
2018	1	2.6%	24	24
2019	8	20.5%	1057	132
2020	13	33.3%	230	18
2021	10	25.6%	309	31
2022	7	17.9%	419	60
Grand Total	**39**	**100.0%**	**2039**	**52**

Table 2: Year of publishing & Total citation number at 01.04.2023

A top three most citated articles have been analyzed to complete the picture form ***Table 2***. As such, the most impactful articles from the analyzed literature as presented in ***Table 3***. First place is occupied by the extensive literature revie performed by Moll and Yigitbasioglu in 2019, touching on most of the technologies that impact the accounting profession (Moll & Yigitbasioglu, 2019). The following articles pick one main area of research, RPA and Blockchain, and undergo similar analyses within the literature to depict main characteristics or features of the two technologies (Madakam *et al.*, 2019, Schmitz & Leoni, 2019). Having literature reviews take the first places

within the most cited articles emphases on the importance that these types of studies have within literature and the help they provide for end users of the information, such as researchers, organizations, and employees.

Author	**Title**	**Google scholar citations**
Moll and Yigitbasioglu, 2019	The role of internet-related technologies in shaping the work of accountants: New directions for accounting research	320
Madakam et al., 2019	The future of digital workforce: Robotic Process Automation (RPA)	316
Schmitz & Leoni, 2019	Accounting and Auditing at the Time of Blockchain Technology: A Research Agenda	246

Table 3: Top 3 most cited articles

The research methods used for analyzing a given theme reveals much information about the current state of interest in the topic, about the preferred approaches surrounding different themes, as well as study limitations in certain areas. The implications that disruptive technologies have in the accounting profession are mostly studied through review of literature. The implies that data regarding these technologies is constantly being reanalyzed and summarized for the benefit of the readers. Secondly, there are large number of surveys, questionnaires and case studied indicating that literature appears robust in the empirical studies allocated on the topic. The research method split follow the guidelines set by (Dumay *et al.*, 2016), resulting in 5 categories, as seen in ***Table 4***.

Research method	**No of Published Articles**
Literature review	14
Survey/questionnaire/other empirical	12
Case/field study/interviews	6
Content analysis/historical analysis	5
Commentary/normative/policy	2
Grand Total	**39**

Table 4: Research methods within the literature

Table 5 validates the reliability of the data presented in the research by revealing the top 3 publishers relevant for the analyzed articles. Emerald Group Publishing Ltd, American Accounting Association and MDPI, all contain high end publications relevant for the accounting field and propose quality work in the literature of accounting research.

Publisher`s name	**No of Articles**
Emerald Group Publishing Ltd	8
American Accounting Association	7
MDPI AG	7

Table 5: Top 3 publishers

Qualitative crosscheck of the implications of technology adoption in accounting organizations (R.Q. 1 & 2)

The current section aims to acknowledge the two research questions RQ1 - *Which technologies are digitalizing the accounting profession?* and RQ2 - *What is the literature standpoint in terms of defining the implications that emergent technologies have in the process of adoption?*

The first research question aims to identify those technologies that impact the life of accountants and their presence within the specialized literature. ***Figure 1*** shows the technologies that the literature discusses in relation to the digitalization of the accounting profession, as well as the percentage in which the technologies appear within the search. It can be observed that a large

number of studies refer to more than one technology (23%) signaling the interdependence and integration between them.

Secondly, ***Figure 1*** brings light over the AI presence within the literature. AI has the power to completely change the face of accounting (Li & Zheng, 2018). It`s importance and imminence within the profession has been captured also by researchers and academics, occupying 23% of the total interest in the field. Next technology that gathers the interest of researchers is Big Data together with Data Analytics (18%). They are sometime found together treated within an article or separately, however due to their interconnectivity, this paper will treat them cumulatively. BDA adoption is also widespread (Sarkar *et al*., 2021) which can explain the interest it gains within the literature. RPA makes 16% of the total share, while Cloud Computing and Blockchain each make 10%, thus revealing a well-balanced split between the technologies in scope for the paper.

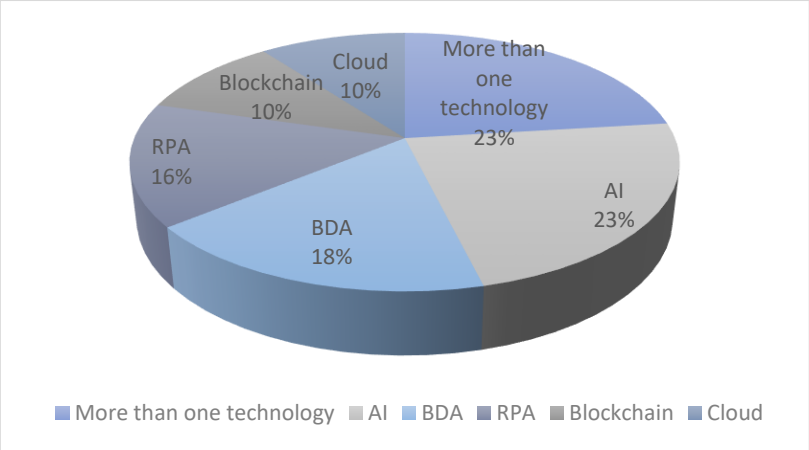

Figure 1: Studied technologies in scope of research

The following section covers R.Q.2, which clarifies the standpoint of the literature in terms of defining the implications that emergent technologies have in the process of adoption. The qualitative analysis splits the characteristics of new implementation into advantageous and disadvantageous perspectives, while it also separate the organizational and user perspective, providing a broader image of the implications of technology adoptions. ***Figures 2*** and ***Figure 3*** offer visual representations of each technology and its individual features into its adoption journey, while each individual characteristic is represented in a percentual manner, for the total number of references found for that particular technology.

Cloud Computing (CC) is mostly viewed through its advantages in reducing organizations costs (Asatiani *et al.*, 2019; Faccia *et al.*, 2019; Yoon, 2020;). The 24% occurrence of cost reduction topics is the benefit of the ability to bill according to usage (Moll & Yigitbasioglu, 2019; Saha *et al.*, 2020; Moudud-Ul-Huq *et al.*, 2020), as well as the multi tenancy feature of the public cloud (Asatiani *et al.*, 2019; Faccia *et al.*, 2019; Yoon, 2020; Kašćelan *et al.*, 2020). Implementation costs are also a main benefit of CC as the pre-defined structure of the cloud platform enables faster roll-outs and easier integrations (Asatiani *et al.*, 2019; Faccia *et al.*, 2019). Similarly, from an organizational perspective, the benefits of CC arise from an improved communication between clients and customers (Asatiani *et al.*, 2019; Yoon, 2020; Saha *et al.*, 2020) and many companies see the benefits of increased electronic security of data (Stefanovova et al., 2020; Saha *et al*., 2020), thus offering high data transparency and security in percentage of 24%. Data quality and process quality take 20% of the total share of CC topics, as they are ensured by minimal standard deviation through pre-packaging (Moll & Yigitbasioglu, 2019, Yoon, 2020). From a user perspective, CC offers the benefit of optimizing decision making through the limited standard deviations it entails, showing an occurrence rate of 10% with the literature (Yoon, 2020; Saha *et al.*, 2020; Faccia *et al*., 2019; Asatiani *et al.*, 2019).

Robotic Process Automations (RPA) is a simplistic automation that replaces basic human work (Madakam *et al*., 2019) and its advantages strive from this feature. The technology is mostly used for its ability to reduce cost (Cooper *et al*., 2018; Burns & Igou, 2019; Madakam *et al*., 2019; Stefanovova *et al.,* 2020; Kašćelan *et al*., 2020; Yoon, 2020; Kokina *et al*., 2021) and time (Burns & Igou, 2019; Madakam *et al*., 2019; Kašćelan *et al.,* 2020; Stefanovova *et al.,* 2020; Kokina *et al*., 2021; Hsiung & Wang, 2022), in a total of 45% from the total features mentioned within articles. The simple conversion of repetitive tasks to a robot activity ensures the reduction of human errors, amounting to a 19% share of the total literature references (Yoon, 2020; Cooper *et al*., 2018; Madakam *et al*., 2019; Hsiung & Wang, 2022). From a user perspective, the elimination of mundane tasks inevitably triggers a reshaping of the accountant job description, forcing it towards value adding and decision support roles (Cooper *et al.,* 2018; Madakam *et al*., 2019; Kokina *et al*., 2021).

Artificial Intelligence (AI) presents the most heterogenous split of characteristics, while it appears to touch on almost off of the defined categories throughout literature. The main feature, gathering 16% of the total occurrences, is represented by its ability to reduce cost and time of activities. The time effort of regular business processes is reduced (Yoon, 2020; Gavrilova *et al.,* 2020; Hasan, 2021; Vărzaru, 2022) and cost savings are ensured through automation and optimisation of decision making (Moll & Yigitbasioglu, 2019; Yoon, 2020; Shi, 2020; Gavrilova & Gurvitsh-Suits, 2020; Hasan, 2021). Other features of AI perfect busines processes (14%) through data quality and accuracy increase (Faccia *et al.,* 2019; Lin & Hazelbaker, 2019; Yoon, 2020; Gavrilova & Gurvitsh-Suits, 2020; Vărzaru, 2022), or even auditing processes (Lin & Hazelbaker, 2019; Moll & Yigitbasioglu, 2019; Hasan, 2021) and fraud detection operations (Moll & Yigitbasioglu, 2019; Shi, 2020; Mhlanga, 2021). From a user perspective, AI advantages are vastly present throughout literature showing a 19% occurrence, and show the redesign of the accounting role (Madakam *et al*., 2019; Shi, 2020), while 12% occurrence for optimizing the work of accountants through life balance improvements (Madakam *et al.,* 2019; Shi, 2020), as well as better decision support through analytics and predictions (Moll & Yigitbasioglu, 2019; Lin & Hazelbaker, 2019; Yoon, 2020, Gavrilova & Gurvitsh-Suits, 2020; Li *et al.,* 2020; Hasan, 2021; Vărzaru, 2022).

Big Data and Data Analytics (BDA) shows greater advantages from a user perspective than from an organizational perspective. It is said to optimize decision making with an occurrence of 12%, through access to large amounts of data for analysis (Moll & Yigitbasioglu, 2019; Oesterreich & Teuteberg, 2019; Yoon, 2020; Austin *et al.,* 2021; Sun *et al.,* 2020; Cavélius *et al.,* 2020; Korhonen *et al.,* 2021). Innovation and redesign of the accounting roles are viewed as user advantages amounting to 19% of the total features detected (Moll & Yigitbasioglu, 2019; Oesterreich & Teuteberg, 2019; Sun *et al.,* 2020; Cavélius *et al.,* 2020; Pilipczuk, 2020; Schmidt *et al.,* 2020; Korhonen *et al.,* 2021; Dow *et al*., 2021; Sarkar *et al*., 2021). Nontheless BDA also shows improvents at organisational level, especially at data and process quality (14%) through improved reporting and forecasting capabilities (Moll & Yigitbasioglu, 2019; Faccia *et al*., 2019; Sun *et al*., 2020; Tiron-Tudor *et al*., 2021; Dow *et al.,* 2021).

Blockchain improvements strive mainly from data transparency and securty improvements in a total share of 38% (Moll & Yigitbasioglu, 2019; Bonsón and Bednárová, 2019; Schmitz & Leoni, 2019; Faccia *et al*., 2019; Yoon, 2020; Tiron-Tudor, *et al.,* 2021). Subsequent improvements are found to enable auditing processes (Moll & Yigitbasioglu, 2019; Bonsón and Bednárová, 2019; Schmitz & Leoni, 2019; Faccia *et al*., 2019; Tiron-Tudor, *et al*., 2021;) and to trigger cost reductions for transactions in the future (Moll & Yigitbasioglu, 2019; Bonsón and Bednárová, 2019; Tiron-Tudor, *et al.,* 2021), in equal shares of 19%. From a user perspective, the role redesign (8%) comes from the possible creation of new jobs, related to the new technology adoption in accounting (Schmitz & Leoni, 2019; Bonsón and Bednárová, 2019).

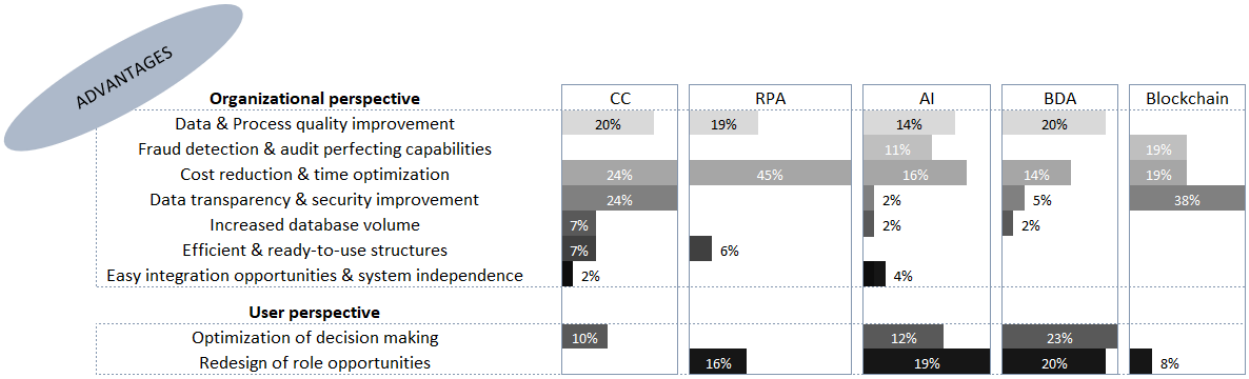

Figure 2: Advantageous perspectives to adoption of technologies in scope of research

Further on the challenges faced by organizations willing to implement new technologies are summarized in ***Figure 3***. CC faces challenges of data reliability and fragility due to concerns of security due to multi tenancy (Faccia *et al*., 2019; Burns & Igou, 2019; Popivniak, 2019; Yoon, 2020), or through reduced control through outsourcing (Saha *et al*., 2020) . Implementation costs only appear in the case CC (Saha *et al*., 2020) showing that companies understand the long term benefits if technology adoption, therefore do not see costs as a main impediment for adoption. RPA is still presenting low level of quality (Stefanovova *et al*., 2020) and require human intervention (Kašćelan *et al.*, 2020), results that are similar to those referring to AI technology, where the user limitation in terms of knowledge (Moll & Yigitbasioglu, 2019; Gavrilova & Gurvitsh-Suits, 2020; Losbichler and Lehner, 2021; Hasan, 2021) as well as system limitations based on system attributes (Moll & Yigitbasioglu, 2019; Losbichler and Lehner, 2021) represent a main concern. At the same time, AI poses questions of ethics as it is said to potentially suppress our moral compass and extend the borders of our moral expression (Gavrilova & Gurvitsh-Suits, 2020). BDA triggers infrastructure changes due to the increased data bases it uses (Moll & Yigitbasioglu, 2019, Sun *et al*., 2020), and the challenge of dealing with an extremely high volume of unstructured data remains of main concern within literature (Sun *et al*., 2020; Cavélius *et al*., 2020; Dow *et al*., 2021; Sarkar *et al*., 2021). Lastly, Blockchain technology is still fragile as it can incorporate criminal activity and it is non easily regulated (Moll & Yigitbasioglu, 2019, Schmitz & Leoni, 2019), while its implementation is still in the early stages and poses complexity challenges (Bonsón and Bednárová, 2019).

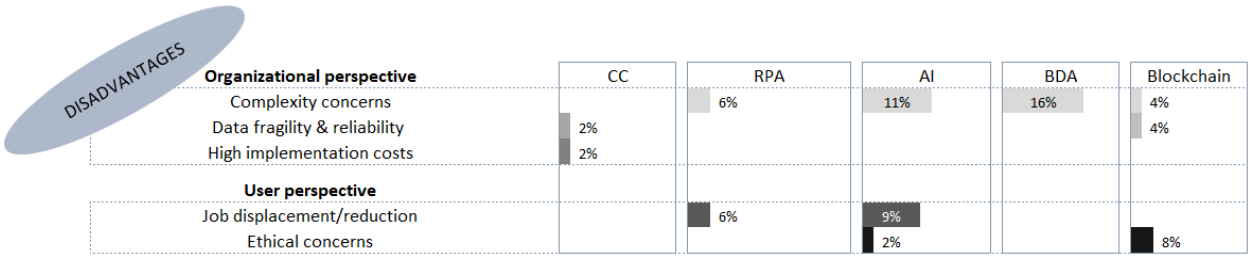

Figure 3: Disadvantageous perspectives to adoption of technologies in scope of research

Technology adoption presents numerous challenges to organizations as well as employees, yet they appear to take up less space in the literature as compared to the benefits of the adoption process. One possible explanation for the limited negative implications found in the literature in comparison to the advantageous features is that most articles, even if they primarily cover one or several challenges of new adoptions, tend to enumerate and emphasize the benefits obtained from implementing a particular technology, thus increasing the occurrence of advantageous implications over disadvantageous implications.

Discussions of the findings of the literature on accounting technology adoption

In pursuance of assisting the accounting community, a united front must gather practitioners, academicians, employers, and representatives from all layers of the accounting industry, to provide the groundwork for a seamless and successful transition into the digital era of new technology.

The current study contributes to the aforesaid goal by establishing the status quo of accounting literature with a focus on emerging accounting technology. Furthermore, the study delves deeper into the implications of technology adoption by cross-referencing each important technology with the advantageous and detrimental viewpoints on new adoptions. The study provides a response to the question of why to deploy new technology and maybe why to defer adoption depending on specific demands or stages of growth, while also painting a complete picture of the technology landscape as it is currently described in the literature.

The innovative side of the study comes from the angles from which adoption of technology is being analysed. Firstly, the literature was split based on positive and negative benefits of adoption found throughout literature, thus assisting the accounting community towards having a clear view on the ratios of advantages over disadvantages. Secondly the study separated the perspectives of the users and organisations, helping organisations understand how to approach employees in their attempt to increase technology adoption, but also how to build the business case necessary prior to implementation.

In times of great technological transformation, assessment needs to be constant to be able to properly monitor the market changes and provide immediate answer to changing dynamics. In this sense, the current study summarizes three focus groups which can benefit from the results of the research, organisations, practitioners and technology developers.

Implications for organizations

The study's findings demonstrate that the ability of new adoptions to maximize time and cost variables, accounts for most of the interest awarded to them. Technologies display different particularities in how they reach these goals. Cloud Computing optimizes costs through sharing platforms (Moll & Yigitbasioglu, 2019) and usage-proportional billing (Saha et al., 2020; Moudud-Ul-Huq *et al.,* 2020), RPA improves time through eliminating volumetric, yet basic tasks (Burns & Igou, 2019; Kokina *et al.,* 2021), while Big Data and Data Analytics (BDA) work towards optimizing the work of management accountants and auditors (Yoon, 2020; Austin *et al*., 2021). Other technologies such as Blockchain show little current success in the endeavor of cost reduction and time optimization, yet literature emphasizes on its ability to develop into a technology able to attain this, also based on its general ability to verify transactions or preconditions at no or low cost (Benson & Bednárová, 2019).

Secondly the literature focuses on the improved data and process quality that organizations can benefit from. Cloud Computing ensures through minimal standard deviations (Moll & Yigitbasioglu, 2019; Yoon, 2020), while RPA eliminates human error from repetitive tasks (Cooper *et al*., 2022, Hsiung & Wang, 2022). Artificial Intelligence is known to detect any fraudulent activity or standard deviation through complex logic and investigation potential (Shi, 2020; Mhlanga, 2021). Lastly, Big Data and Data Analytics are still in the process of perfecting behavior over unstructured data analysis, and thus generating a higher base of structured, usable data that companies can use in the future (Moll & Yigitbasioglu, 2019; Sun *et al*., 2020).

Thirdly literature discusses that digitalization triggers further innovation and optimization (Moudud-Ul-Huq *et al.,* 2020). A company set on its journey towards digital transformation can benefit from further innovations. One example is the possibility of outsourcing accounting operations by refining and standardizing accounting systems with the purpose of incorporating new technology. Inherently, technologies such as cloud, tend to standardize accounting operations (Moll & Yigitbasioglu, 2019) hence paving the way towards an increased potential of outsourcing different processes. Study finds that cloud users are more likely to outsource operations and thus efficientisise their overall costs (Asatiani *et al*., 2019). On the other hand, the ever-increasing

volume of data, also known as Big Data, is inevitably triggering optimizations in services provided, predictive capabilities and information safeguarding (Sun *et al*., 2020).

The ability to restructure jobs is a significant advantage of technology adoption that is shown in the majority of the studied subsections. From the user's point of view, it presents excellent opportunities, but the coin flip illustrates how aversion to change can harm the job progress. However, the perspective also takes into account organizations since a recent labor shortage caused a vigorous talent battle in the sector (Hsiung & Wang, 2022). This suggests that businesses should prioritize providing incentives for staff members to adopt new technologies, as well as making sure they have access to resources and sufficient training (Saha *et al*., 2020).

The research presents ramifications for organizations by laying forth a framework for decision-making and technology implementation. The advantages and difficulties of each technology are underpinned for interested organizations based on unbiased research. A company can decide which technology will best suit their needs by overlaying their existing requirements against the advantages that each technology offers using the empirical findings of this study.

Implications for practitioners

The hot topic in literature regarding the changes that accounting professionals experience in relation to new technology opens the discussion of the ownership that they must take for the reconfiguration of their professional career (Lin & Hazelbaker, 2019). Practitioners have the responsibility to act proactively and not reactively towards the digital revolution that organizations undergo (Kokina *et al*., 2021). Change is inevitable and the future of the accounting professionals depends to a great extent on their ability to adapt to the changing environment (Saha *et al*., 2020). Even with basic automations such as RPA, the robot is expected to perform end-to-end business process (Madakam *et al*., 2019), nonetheless enabling such a scenario required an organization where job positions like process architect, technologist and maintenance regulator are required, jobs that entail less sophisticated IT competencies compared with traditional application development (Madakam *et al.,* 2019). In more complex scenarios accounting professionals are urged to develop AI capabilities, learn the fundamentals of the technology and find ways to combine functional and software work in the field (Shi, 2020).

In addition, the enhancement of hybrid teams of human-robot collaboration is the setup of the future (Kokina *et al*., 2021). In this sense, the work of an accountant can be enhanced by intelligent software such as Intelligent Virtual Assistants that can be voice activated and commanded to initiate business operations (Burns & Igou, 2019) and even auditing can benefit from developments like the GL Anomaly Detector (GLAD) from EY which is used for the detection of fraudulent data (Hasan, 2021).

It is common assumption that technology implementation will improve work life balance of personnel, which is agreed by most employees except for lower-level employees (Cooper *et al*., 2022). This finding reveals the inertia of the workload allocation which return to a default level, in the case of lower-level employees, despite the automation occurring at company level. Such challenges can only be surpassed by grasping the opportunity that technical development offers and growing at the same pace with technology. As new roles unfold within organizations, the accountant must be willing to embark on a journey of continuous learning and development and becoming owners of the new capabilities that arise from the business changes (Kokina *et al*., 2021).

The findings of the study show that technology unlocks enormous potential in improving the daily routines of professionals. Decision making processes are undergoing transformations due to the ability to access large volumes of unstructured data and use them for analysis, predictions, and forecasting (Hasan, 2021). Although machines are expected to independently generate management recommendations (Li *et al*., 2020), the underlying technology is still in the early stages of development and still cannot be trusted independently for generating trustworthy advice (Losbichler & Lehner, 2021), therefore accountants are still needed to enable these processes, and such they are

urged to take advantage of these hanging times and grow at the same pace with technology (Li & Zheng, 2018).

Research limitations

The study collected information from a limited number of papers that were considered as best fit for the current study. The total volume of literature touching on the subject of new technologies in accounting is much greater, this creating a limitation of the current research. Due to time and resource constraints, a number of 39 articles with optimized set of information related to both the accounting profession but also to the new technologies that is impacting to, were chosen.

Further research must incorporate a larger number of studies and keep always a most updated version of the standpoint of the literature for the given theme. Since the field of research is a dynamic one, constant re-assessment is recommended to provide regular status for the beneficiaries of the research findings with the most up to date image of the researched topic.

Conclusions

Accounting practitioners are urged to keep up with the dynamics of the current times. They are ultimately holding the responsibility for enhancing their skills and adapting the functional capabilities, through eliminating barriers in the face of the imminence of technology and adopting a change mindset (Shi, 2020). Opportunities and obstacles collide, opening the path of the accountant towards value adding roles (Kokina *et al*., 2021).

At the same time, organizations should tap on the advantages that new technology brings. There is a huge variety of improvements and optimizations that automations bring forth as they are underlined in the current article, thus companies have a database to consult for finding the best technological compatibility for reaching their long-term goals.

The analysis of quantitative factors synthetized during a literature review, bring clarity over the quality and reliability of the analyzed data, and emphasize the value of the current study. The findings draw an image of a comprehensive set of articles that embody the content of the study. The quality of the data is in line with the requirements of high-end articles in the industry, the research methods provide an equal allocation towards different types of study approaches, while the citation volume reflects the recent interest for the given topic.

The qualitative section offers a summary of the recurring themes found within literature that are related to a particular technology adoption, as well as a portrayal of the advantageous and disadvantageous perspectives to individual adoptions. The study brings value for the organizational, academic as well as user level by portraying an up to date, constructive structure of the technology adoption learning within the accounting literature.

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