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Accounting and Auditing Profession in the Era of Digitalization

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Abstract

The third phase of technological advancement, also known as digitalization, involves significant changes at many levels such as society, business domain, organization and process. Accountants and auditors worldwide face an alert pace of digitalization which could potentially move the profession beyond its traditional paradigm. This study reviews the existing literature on accounting and auditing in the era of digitalization by using a structured literature review (SLR). Doing so, this paper critically discusses the research status in this area and gives directions for future research. Findings show that there is an increased interest for research in digitalization of accounting and auditing area, especially on big data and data analytics, but also on other subareas of digitalization such as cloud computing, blockchain, digital reporting and robotic process automation. However, research in this domain is in its infancy and yet there are still gaps in the literature that needs to be developed.

Key words: *digitalization; accounting; auditing; structured literature review (SLR);*

JEL Classification: *M41, M42*

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Introduction

Digitalization brings with it many changes around the world, and especially in those fields where technology is indispensable. Accounting and auditing are such fields where technology made its tool. The objective of this paper is to synthetize and critically review the existing literature in accounting and auditing digitalization and to give directions for future research. The motivation of this study arises from the need for more research in this field given the current circumstances and the increased interest especially from the practice.

Using a SLR as a research method, this study seeks to answer the following research questions:

RQ1: How is the research for accounting and auditing digitalization developing?

RQ2: What is the focus and critique of the literature on accounting and auditing digitalization?

RQ3: What is the future for research in accounting and auditing digitalization?

Massaro et al. (2016) state that, when writing a SLR, authors must follow a rigid set of rules, which is not necessary when writing a traditional literature review. Moreover, the paper should have a specific plan and needs to be well structured. Previous studies used the SLR method in different accounting areas such as mandatory IFRS disclosure (Tsalavoutas et al., 2020) or integrated reporting (Dumay et al., 2016).

The analysis indicates that there is an increased interest in the area of digitalization in accounting and auditing and researchers have turned their attentions in many directions. Following the review, findings show that the most researched subarea of digitalization is given by big data and data analytics, and especially on the way students need to be prepared in order to meet employers' needs. Furthermore, cloud computing, blockchain, digital reporting and robotic process automation are other subareas of interest. However, research in accounting and auditing digitalization is in its early stage and it needs more development.

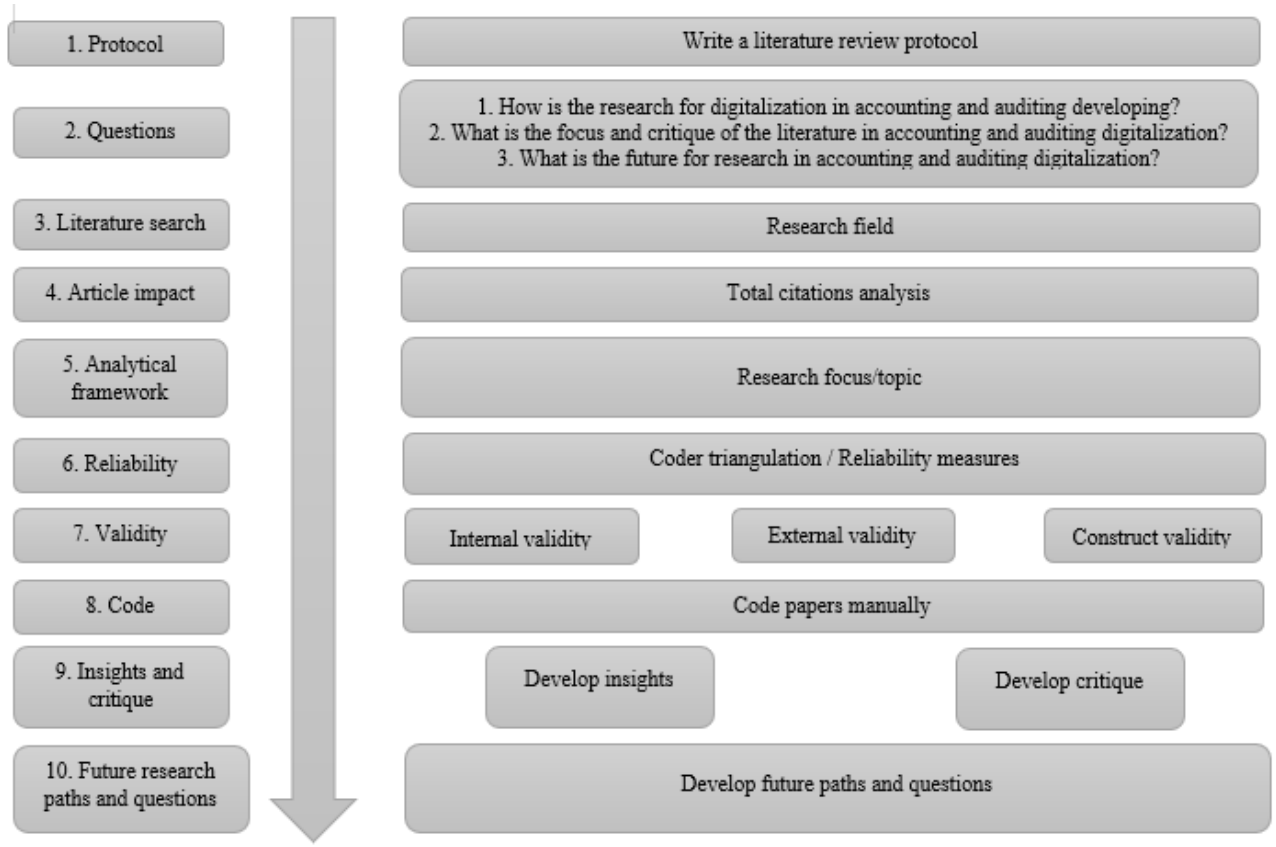
The present study contributes to the literature in accounting and auditing digitalization as it gives an overview on the most recent studies in this area by critically discussing the status of the research. Also, following the synthesis of the literature, authors give paths for future research in different subareas of digitalization that could be of interest for researchers in accounting and auditing domain. To the best of authors' knowledge, this is the first study that reviews the academic works in accounting and auditing digitalization using a structured literature review. Other studies conducted literature reviews in accounting and auditing digitalization areas, but they used different approaches. For example, Knudsen (2020) critically reviews the existing literature in financial accounting by using a systematic literature review and Moll and Yigitbasioglu (2019) used a traditional literature review to discuss the findings in accounting and auditing areas.

The paper is structured as follows. The first section describes the methodology used by discussing each step for writing a SLR. The second section gives insights and critique for the reviewed literature and the last section presents the main conclusions, directions for future research and limitations of the study.

1. Methodology

In order to provide a clearer picture of the academic studies about digitalization in accounting and auditing, we have used a SLR as a research method. Massaro et al. (2016) state that, when preparing a SLR, a traditional literature review is not necessary, because this one will be presented in the findings section. Therefore, we will start with the methodology part, and more specifically, with a presentation of the ten steps for conducting a SLR which are developed by Massaro et al. (2016). These steps are presented in the ***Figure no. 1***.

Figure no. 1. The process for develop a SLR



Source: Adapted from Massaro et al. (2016), p. 8

The first step was to write a literature review protocol for defining the research boundaries. The synthesis on the literature is made on digitalization in auditing and financial accounting, as a branch of accounting field. Given that the literature on accounting and auditing digitalization is continuously growing and the technology is constantly evolving, our literature review has been limited to a period of ten years, starting with 2011 until 2021. Furthermore, we have selected only articles from accounting journals that are indexed in Scopus database. Knudsen (2020) argues that the use of Scopus database helps in limiting the search for relevant and published papers, excluding other unpublished material and proceedings.

In the second step, we have defined our research questions by following Massaro et al. (2016, p.7) model. The three research questions are presented in ***Figure no. 1*** and in the introduction, each of them having an important role in conducting a literature review. The first one aims in providing an answer on the accounting and auditing digitalization history under review and on the contribution of the prior literature to where accounting and auditing digitalization research is today. The role of the second question is to make a critical analysis of the existing literature's builds upon and focus (Massaro et al., 2016). The third question helps in detecting the gaps in the literature regarding to the studied phenomenon.

The third step was to determine the type of research studies and to carry out an extensive literature search. As we discussed in the first step, we have only sought in accounting journals from Scopus database, but we also made sure that these journals were available in Science Direct or Google Scholar databases. In **Table no. 1** we present the journals where the data has been collected from and the number of selected articles per each journal. The search process was based on keywords search. As suggested by Massaro et al. (2016), this

search type is suitable when selecting a group of journals because the findings are already narrowed. Also, previous studies have used keywords search in conducting a literature review in the accounting digitalization field. As a few examples, we found Knudsen (2020), who discusses about digitalization in accounting by using a systematic literature review and Moll and Yigitbasioglu (2019), which synthetize and *analyze* academic articles, reports from professional accounting bodies and articles made by professional services firms regarding internet related technologies in accounting.

Table no. 1. Accounting and auditing digitalization articles' status on the reviewed journals

Ref. No.	Journals in review	Articles count
1	Advances in Accounting Education: Teaching and Curriculum Innovations	1
2	British Accounting Review	2
3	International Journal of Accounting Information Systems	15
4	Journal of Accounting and Public Policy	1
5	Journal of Accounting Education	10
6	Journal of International Accounting, Auditing and Taxation	1
	TOTAL	**30**

Source: Authors' own research

Initially, we only sought for the keywords "digitalization" and "digitalisation", but as expected, this query did not return many articles. In order to extend our dataset, we followed Knudsen (2020) suggestion, and we then sought for other words closely related to digitalization. The interrogation we used in the search process returned a total number of 212 articles. Below, we present the query which shows the keywords, the time frame and the selected journals.

[title-abs-key ("digitalization" OR "digitalisation" OR "digital" OR "big data" OR "analytics" OR "cloud" OR "cyber" OR "mobile" OR "social media" OR "robotization" OR "robotisation" OR "automatization" OR "automatisation" OR "artificial intelligence" OR "blockchain" OR "platforms" OR "internet of things" OR "bots" OR "robots" OR "RPA" OR "automation") AND PUBYEAR > 2010 AND PUBYEAR < 2022 AND SRCTITLE ("Journal of Financial Economics" OR "International Journal of Accounting Information Systems" OR "Journal of Accounting and Economics" OR "Journal of International Accounting, Auditing and Taxation" OR "Accounting, Organizations and Society" OR "Journal of Accounting and Public Policy" OR "Critical Perspectives on Accounting" OR "Asia Pacific Management Review" OR "Advances in Accounting" OR "Journal of Accounting Education" OR "European Research on Management and Business Economics" OR "China Journal of Accounting Research" OR "Management Accounting Research" OR "British Accounting Review")]

In selecting the relevant articles for our research study, we read the abstract for each paper, and we excluded articles not related to financial accounting and auditing. The final dataset consisted in 30 academic studies which are presented in **Appendix A**.

In the fourth step, we measured the articles impact by using the number of citations from Google Scholar, which is considered an indicator of interest for the research area (Dumay et al. 2016), and also a valuable data source for evaluating the impact when using a SLR method (Massaro et al., 2016). The total number of citations for the reviewed articles was 1232 as of July 2021 which shows that there is an increased interest in this field. Dumay (2014) argues that the most recent articles need to be excluded from the review having that there was not enough time for them to get cited. However, given that digitalization in accounting and auditing is a relatively new topic, and most of the articles presented in the Appendix A were publishes in the last three years, we chose to kip them in our review. The total number of citations for the academic papers published in 2019, 2020 and 2021 was 409. The top three most cited articles were Sledgianowski et al. (2017), with 144 citations, which discuss about big data and technology in accounting and auditing, Pincus et al. (2017), that got cited 134 times for digitalization in accounting education and Janvrin and Watson (2017), cited 118 times for big data in accounting.

The fifth step was to define an analytical framework for our SLR. As such, we considered one unit of analysis relevant for our review, more specifically research focus. As presented in the Appendix A, authors have directed their attention on many areas of digitalization such as big data and data analytics, cloud computing, blockchain, other digitalization areas or digitalization in general for both accounting and auditing.

In the sixth step, the literature review reliability was established through the separate codification of the papers by each author, and the analytic unit of analysis turned up to be similar.

Seventh, the literature review validity was tested for each way discussed by Massaro et al. (2016). Internal validity was established when authors individually coded the papers. External validity was ensured through exclusions of irrelevant articles from the total number of 212 papers as discussed in the third step. Construct validity was done through the analysis of citations, which has been presented in the fourth step.

The eighth step was to code the data. This has been done as discussed in the fifth step by using one unit of analysis and then searching for different items. For this procedure, we did not use any computer-aided coding. Instead, we chose to code the data manually.

2. Insights and critique

This section covers the ninth step and presents the literature on accounting and auditing digitalization by giving answers for the first two research questions: "how is the research in auditing and accounting digitalization developing?" and "what is the focus and critique of the literature on accounting and auditing digitalization?". In what follows, we will discuss each item of the unit of analysis research focus by outlining the insights and critique.

This unit allows us to understand where researchers on accounting and auditing digitalization directed their attention. Previous studies used research focus as a unit of analysis in the accounting area for conducting literature reviews (Guthrie et al., 2012; Englund and Gerdin, 2014; Serenko and Dumay, 2015a). As we stated in the previous section, for this unit, we found different items that could be analyzed such as cloud computing, big data and data analytics, blockchain, and other digitalization related areas or digitalization in general. Appendix A shows the framing of each paper on digitalization areas.

2.1. Research focus – Cloud computing

According to Mell and Grance (2011) "cloud computing is a model for enabling ubiquitous, convenient, on-demand network access to a shared pool of configurable computing resources (e.g., networks, servers, storage, applications, and services) that can be rapidly provisioned and released with minimal management effort or service provider interaction.". Unlike traditional in-house implemented IT models, cloud computing has the potential to provide IT resources that are accessible through internet by third party cloud services providers, usually on pay-per-use basis or a subscription (Marston et al., 2011; Stanoevska-Slabeva and Wozniak, 2010). In accounting, cloud solutions are available for many applications at a sophisticated implementation level, surrounding the depth and breadth of enterprise resource planning functionality (ICAEW, 2015a).

In our reviewed papers about cloud computing in accounting, authors aim in providing an understanding regarding the rationale for cloud-based accounting solutions adoption by small and medium practices by focusing on the identification of the factors that affect actual adoption and to provide insights into the disruptive technology impact on small and medium practices (Ma et al. 2021). The authors of this study found that the direct benefits of cloud accounting are positively associated with the adoption of cloud. Also, relationship benefits, client service and external pressure were significant adoption motivators. Moreover, the authors found that clients were less concerned about cloud technology risks and a potential explanation is that they are already familiar with other internet-based technologies, for example, internet banking. The second paper about cloud accounting focuses on the understanding of the behavioral differences between cloud users and non-cloud users. Findings show that cloud users are more likely to outsource accounting services in comparison to non-cloud users having that due to cloud the digital information could be easier disseminated (Asatiani et al. 2019). The third paper reviews the literature on cloud computing for both accounting and auditing and gives paths for future research (Moll and Yigitbasioglu, 2019).

With regards to cloud computing in auditing authors seek to investigate the external auditors' perception of its adoption in Australia. The findings show that firms often opt for hybrid or private solutions instead of cloud even though cloud computing is perceived as a strong foothold. One of the reasons is related to the perceived importance

of information confidentiality and security. In contrast, the interviewees stated that security in cloud could be better than traditional IT systems, especially in the case of third-party audited vendors with a good reputation (Yigitbasioglu, 2015).

Thus, we find that the literature in cloud computing for accounting and auditing is quite small and only 4 out of 30 papers discuss it. Also, the focus of the literature in cloud computing only consists of the understanding regarding the rationale for cloud-based accounting solutions adoption by small and medium practices, behavioral differences between cloud users and non-cloud users, the perception of external auditors on the cloud adoption and an overview of the literature followed by directions for future research.

2.2. Research focus – Big Data and data analytics

Big Data represents the sheer speed and volume at which data is generated by using electronic transactions, texts, website clicks, photographs, Facebook activity, videos and others (Fay and Negangard, 2017). Data analytics is defined as "extensive and systematic use of data, statistical and quantitative analysis, exploratory and predictive analysis, and fact-based management to drive business decisions and actions" (Davenport and Kim, 2013, p. 3). Alles and Gray (2016) argue that, while data analytics and big data are two different concepts, they could be interrelated. There are three main attributes that characterize big data: velocity, variety and volume (Laney, 2001). Having these three characteristics of big data, data analytics tasks are complex and ambiguous (Laney, 2001; IBM, 2012).

Given that these two concepts are interrelated, we chose to treat them together. Most of the papers in our literature review discuss about accounting education and the need for data analytics in the accounting curriculum. For example, Sarkar et al. (2021) investigate the ways accounting information systems and academic courses could be adapted in order to prepare students with the necessary knowledge and skills for addressing employers needs with regards to big data. They found that both focus approach and hybrid approach are used by universities to include data analytics. The hybrid approach was also supported by Dzuranin et al. (2018). Furthermore, students must understand how to learn, know how to communicate, understand the need of paying attention to details, develop technology skills in order to meet employers' requirements (Sarkar et al., 2021). Moreover, McKinney et al. (2017), found that higher order skills as understand the analysis limits and the ability to ask questions are other important skills in the era of big data in addition to data analysis skills. With regards to knowledge, skills and abilities (KPAs) that accounting students need to acquire, Ballou et al. (2018), identified that, next to traditional accounting, holistic business knowledge, technology and tools, research skills, data analytics, writing/communication and unstructured problem solving are other additional KPAs that accounting graduates should have. In addition, Messa (2019) states that a sensemaking perspective which animates approaches on how data analytic competencies are learned and taught through the inclusion of accounting disciplines can determine if graduates achieve resilient capabilities or entry-level skills in an environment such as big data.

Some authors suggest education methods for facilitating information system and technological competencies integration into the accounting curriculum that are relevant to business analytics and big data (Sledgianowski et al., 2017). Others provide study cases on how to utilize data analytics skills to address big data (Fay and Negangard, 2017). Another interesting aspect is related to audit textbooks and how well they integrate data analytics (Blix et al., 2021). The authors of this paper found that some books have an entire chapter about data analytics, while others only mention it as an additional tool and, because of that, students will probably not understand how data analytics is used in audit or the way data analytics will impact the profession. Furthermore, Richardson and Shan (2019) investigate the time and the way data analytics will be included in the accounting education. Using a survey as a research method, they found that more that 90% of the accounting department chairs think that data analytics need to be integrated into the accounting curriculum, but only about 33% of these departments currently teach data analytics and more than half plans to introduce data analytics in the next five years. In contrast, Andiola et al. (2020) conclude that accounting departments implemented accounting analytics and technology components as required by Standard A7 which refers to Information Technology Skills and Knowledge for Accounting Graduates (AACSB, 2013).

While reviewing the selected academic papers on big data, we determined that authors turned their attention on auditing rather than accounting, not surprisingly having that big data sets are usually used by financial auditors. Alles and Gray (2016) state that, while Big Data exists in auditing, its application in this domain is less clear than in

other fields because the way it works depends on the auditor's choice about the type of data that will be included and the way the data will be analyzed. In addition, Krieger et al. (2021) found that the audit firm's technological capability affects successful technology adoption for analyzing big data. With respect to data analysis, authors discuss different technics used by financial auditors. One of the most common techniques is process mining, which can be used instead of collecting information through interviews or document inspections because it produces reliable process models in an automatic manner for all the transactions. As an example, Werner (2017) proposes an alternative approach to deduct the control flow by financial auditors using process models. However, Werner et al. (2021) argue that process mining has some limitations because it can only be used for transactions recorded in the system and other procedures and transactions that cannot be recorded are not covered by this technique. Another data analysis technique used in financial auditing and discussed by authors is machine learning. In this respect, Hunt et al. (2020) provide an analysis on the likelihood of switching the auditors by a company and examine the relationship between audit quality and this likelihood for clients that do not change their auditors. Moreover, Dilla and Raschke (2015) discuss data visualization techniques and how these can be used in detecting fraud.

In summary, big data and data analytics research is highly discussed among researchers. The reviewed papers gave us important information about data analytics, how it should be integrated into the accounting curriculum for addressing big data and digitalization in general, what the skills that students need to acquire are in order to meet employers needs in this era and whether universities provide students with data analytics courses. Also, authors discuss different techniques used in financial auditing such as process mining, machine learning and data visualization tools. However, as Moll and Yigitbasioglu (2019) state, more research is needed to address big data.

2.3. Research focus – Blockchain

A blockchain represents a distributed ledger, and more specifically, a chronological chain of 'blocks' in which each block includes a record of a valid network activity since the latest block was added to that chain (Bogart and Rice, 2015). The primary advantage of this technology is that, as long as a transaction is being approved by the nodes in a network, its reversal or re-sequence is not possible. This incapacity is essential for its integrity and ensures that each party involved has accurate and identical records. Having that the blockchain is distributed, all changes in a ledger could be seen by all the members, hence, its transparency is ensured (Treleaven et al., 2017).

In our reviewed papers we only found one article that discusses about blockchain in accounting and its applicability. More specifically, this paper designs an information system that could increase the representation faithfulness for financial information reporting. In this respect, blockchain is used for balancing public access with privacy by developing the existing accounting recordkeeping concepts (McCallig et al., 2019). We also found another paper that reviews the literature on blockchain for accounting and auditing and addresses paths for future research (Moll and Yigitbasioglu, 2019).

With respect to auditing, authors provide blockchain architectures to address different challenges that auditors meet during an audit, such as the problem of collecting important digital audit evidence. Also, this architecture has the potential to address issues as for example, access to data, investment costs, privacy and security (Vincent et al., 2020). Furthermore, research discuss about the auditing role in the blockchain space and where this technology is needed in this area (Alles and Gray, 2020). The authors of this paper suggest that while auditing the blockchain especially when it is private may have some value, it is more important to investigate whether the records that are stored on the blockchain has a correspondent in the reality.

As we can see above, research in blockchain is quite small with only 4 out of 30 papers discussing this architecture in accounting and auditing. Literature shows that blockchain could be used for enhancing the representation faithfulness of financial reporting and to address challenges met by auditors during an audit. Moreover, authors suggest that auditors need to pay attention to the real existence of blockchain stored records.

2.4. Research focus – Other digitalization areas

In addition to cloud computing, big data, data analytics and blockchain, we also found other papers related to digitalization in accounting and auditing areas, but because their proportion in the total reviewed papers was very small, we chose to treat them together. These papers

approach digital reporting and robotic process automation (RPA). Digital reporting is supported by XBRL, that is an open standard for analyzing, exchanging and creating business information on the Internet (Eierle et al., 2014). RPA is a tool that uses software bots in order to automate highly repetitive and routine tasks which are usually performed by people, thus enabling faster handling time, higher volumes, reduced errors and costs (Deloitte, 2017). Also, a few articles discuss about digitalization in accounting and auditing in general and their allocation on different areas was difficult.

With respect to digital reporting, authors in our review investigate two aspects. The first one examines whether financial reports presented through a digital format can minimize functional fixation's occurrence and thus gives support to financial reports' users to adjust for differences in the positioning of key financial information (Ghani et al. 2011). Findings show that the presentation of financial reports in digital formats was not a factor that assisted in overcoming the functional fixation. The second one discusses about factors that influence voluntary adoption of digital reporting by small companies from UK for their statutory financial information and whether these companies can obtain benefits following the voluntary adoption (Alkhatib et al. 2019). The authors of this paper identified five significant factors: costs, complexity, relative advantage, management support and technology competence.

In the case of RPA, as well as in the case of digital reporting, we only found two papers that analyze this aspect. The first one presents the RPA in the context of accounting and the second one presents it in the context of auditing. More specifically, the one in accounting seeks to understand the issues related to accounting digitalization and to identify accounting tasks that are suitable for the implementation of RPA (Kokina, and Blanchette, 2019). Findings indicate that labor intensive, high volume, repetitive, digital form and rule-based tasks or tasks that use structured data and multiple systems are suitable for RPA implementation. Also, the authors found that companies are challanged by the complexity of RPA. The study in auditing proposes a 4-stage framework useful for applying RPA in audit (Huang and Vasarhelyi, 2019).

Regarding digitalization in general, the authors conducted literature reviews in accounting and auditing, Delphi studies and surveys. For example, Knudsen (2020), addresses a systematic literature review on the financial accounting area and Moll and Yigitbasioglu (2019) present a traditional literature review in the areas of accounting and auditing. Also, one paper discusses about the forces for higher education change following digitalization in accounting (Pincus et al., 2017), and another one conducts a Delphi study in order to provide a prevision to the auditing industry by examining the consequences that are probable to occur due to changes driven by digitalization expected in the next five to ten years (Tiberius and Hirth, 2019).

In summary, articles in other related digitalization area are divided in three different categories. First, we discussed about digital reporting that is a field of accounting, and more specifically financial reporting, rather than auditing and this can be deducted from the analyzed papers. Second, authors present the robotic process automation in both accounting and auditing areas. The third category is given by the papers that cover the digitalization in general without focusing on o specific area.

Conclusions

This study conducted a structured literature review on digitalization in accounting and auditing area focusing on studies published in Scopus database between 2011 and 2021. More specifically, the objective of this paper was to identify the way research in accounting and auditing digitalization is developing and the status and critique of the literature in this domain. Findings show that there is a growing interest in this field and researchers turned their attention on different subareas of digitalization. As revealed in the second section, big data and data analytics received notable attention, especially on the education side, followed by cloud computing, blockchain technology, digital reporting and robotic process automation. Even though there is an increased interest for digitalization in accounting and auditing, the research in this area is on its early stage and it still needs to be developed.

In the previous section we have given answers for the first two research questions and based on these we will discuss some paths for future research, which aim in providing the answer for our third research question. Cloud computing is one of the digitalization subareas that needs more development. As we discussed in the findings section, only four out of thirty studies discuss this subject with one paper performing a structured literature review. The first paper presents the determinants and benefits of

cloud adoption by small and medium practices (Ma et al. 2021). Future studies could investigate this subject only from the perspective of accounting and auditing companies, but also including possible risks when working in cloud. The second paper discusses about cloud users and non-cloud users and whether there is a difference between them with regards to accounting outsourcing decision (Asatiani et al. 2019). Researchers could also investigate whether accounting companies that use cloud, benefit for more clients than those that do not do it so.

With respect to big data and data analytics researchers emphasized the need for knowledge and skills for accounting graduates by analyzing on different ways the accounting curriculum on data analytics. Future studies could investigate how data analytics skills could impact the recruitment process for a position of accountant or auditor and to what extent graduates that not own such skills could be rejected after an interview. Another interesting aspect could be related to the evaluation process within a company. In this regard, researchers could investigate whether data analytics skills and knowledge represent a factor that could impact the promotion decision of an employee and also whether this could influence the salary increase. In the big data research, authors gave also attention to practice and especially on the analysis techniques. On this respect, more research is needed to find out how challenging is for accountants and auditors to work with these techniques and to identify the most suitable tasks that could be performed by using data analytics techniques.

Blockchain is another area of research that needs to be developed. In accounting, research focuses on designing an information system that could increase the representation faithfulness for financial information reporting (McCallig et al., 2019). Future studies could investigate to what extent companies use blockchain technology and whether this would be a factor that threats the accountants' jobs. Also, researchers could examine the skills that accountants and auditors need following the implementation of the blockchain technology.

Research in digital reporting could be more investigated by analyzing its status in different countries, whether XBRL standard is adopted by these countries and how well companies compete with this standard. With regards to RPA future studies could explore whether accountants and auditors have necessary skills to help IT people in creating the software bots to automate the processes and to what extent employees in the accounting field may lose their jobs or what are some future jobs possibilities due to occurrence of RPA. Also, in auditing future studies could research what tasks are suitable for automatization through RPA.

The present paper differs from other similar studies from several perspectives. First, this study uses a structured literature review as a research method unlike previous studies that used systematic literature review (Knudsen, 2020) or traditional literature review (Moll and Yigitbasioglu, 2019). Second, this research analyzes the areas of accounting and auditing, while Knudsen (2020) only analyzes the area of accounting. Third, our analysis also covers the most recent academic works that are not included in the other researches.

Our study should be of interest for researchers as it synthesizes high quality academic papers on the area of accounting and auditing digitalization by giving insights and critique. Also, after analyzing the papers, this study gives directions for future research which could be considered a starting point for those interested in digitalization in accounting and auditing research. Moreover, this research could be of interest for practice and education, as it summarizes the research findings on this field.

The study results should be taken in line with some limitations. Even though we used Scopus database to search for papers, we could not search in all accounting journals given the limited access to these resources. Also, the decision to keep or exclude the articles from the entire sample was based on authors' judgement.

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Appendix A – Selected articles list

Ref. No.	Journal	Title	Topic / field	Year	Authors	No of Citations
1	*Advances in Accounting Education*	Data analytics in the accounting curriculum	Data analytics – Accounting	2019	Richardson, V.J., Shan, Y.	8
2	*British Accounting Review*	Functional fixation: Experimental evidence on the presentation of financial information through different digital formats	Digital reporting – Accounting	2011	Ghani, E.K., Laswad, F., Tooley, S.	21
3	*British Accounting Review*	The role of internet-related technologies in shaping the work of accountants: New directions for accounting research	Digitalization – Accounting and auditing	2019	Moll, J., Yigitbasioglu, O.	95
4	*International Journal of Accounting Information Systems*	External auditors' perceptions of cloud computing adoption in Australia	Cloud computing – Auditing	2015	Yigitbasioglu, O.M.	40
5	*International Journal of Accounting Information Systems*	Data visualization for fraud detection: Practice implications and a call for future research	Data analytics - Auditing	2015	Dilla, W.N., Raschke, R.L.	69
6	*International Journal of Accounting Information Systems*	Incorporating big data in audits: Identifying inhibitors and a research agenda to address those inhibitors	Big data – Auditing	2016	Alles, M., Gray, G.L.	82
7	*International Journal of Accounting Information Systems*	Financial process mining – Accounting data structure dependent control flow inference	Data analytics – Auditing	2017	Werner, M.	26
8	*International Journal of Accounting Information Systems*	Impact of accounting process characteristics on accounting outsourcing – Comparison of users and non-users of cloud-based accounting information systems	Cloud computing – Accounting	2019	Asatiani, A., Apte, U., Penttinen, E., Rönkkö, M., Saarinen, T.	36
9	*International Journal of Accounting Information Systems*	Establishing the representational faithfulness of financial accounting information using multiparty security, network analysis and a blockchain	Blockchain - Accounting	2019	McCallig, J., Robb, A., Rohde, F.	19
10	*International Journal of Accounting Information Systems*	Determinants of the voluntary adoption of digital reporting by small private companies to Companies House: Evidence from the UK	Digital reporting – Accounting	2019	Alkhatib, E., Ojala, H., Collis, J.	11
11	*International Journal of Accounting Information Systems*	Early evidence of digital labor in accounting: Innovation with Robotic Process Automation	Robotic process automation – Accounting	2019	Kokina, J., Blanchette, S.	48
12	*International Journal of Accounting Information Systems*	Applying robotic process automation (RPA) in auditing: A framework	Robotic process automation – Auditing	2019	Huang, F., Vasarhelyi, M.A.	60
13	*International Journal of Accounting Information Systems*	Blockchain architecture: A design that helps CPA firms leverage the technology	Blockchain – Auditing	2020	Vincent, N.E., Skjellum, A., Medury, S.	9
14	*International Journal of Accounting Information Systems*	"The first mile problem": Deriving an endogenous demand for auditing in blockchain-based business processes	Blockchain – Auditing	2020	Alles, M., Gray, G.L.	11
15	*International Journal of Accounting Information Systems*	Elusive boundaries, power relations, and knowledge production: A systematic review of the literature on digitalization in accounting	Digitalization -Accounting	2020	Knudsen, D.-R.	28

Ref. No.	Journal	Title	Topic / field	Year	Authors	No of Citations
16	*International Journal of Accounting Information Systems*	Cloud-based client accounting and small and medium accounting practices: Adoption and impact	Cloud computing – Accounting	2021	Ma, D., Fisher, R., Nesbit, T.	0
17	*International Journal of Accounting Information Systems*	Explaining the (non-) adoption of advanced data analytics in auditing: A process theory	Data analytics – Auditing	2021	Krieger, F., Drews, P., Velte, P.	0
18	*International Journal of Accounting Information Systems*	Embedding process mining into financial statement audits	Data analytics – Auditing	2021	Werner, M., Wiese, M., Maas, A.	0
19	*Journal of Accounting and Public Policy*	Using machine learning to predict auditor switches: How the likelihood of switching affects audit quality among non-switching clients	Data analytics – Auditing	2020	Hunt, J.O.S., Rosser, D.M., Rowe, S.P.	6
20	*Journal of Accounting Education*	The need for 'skeptical' accountants in the era of Big Data	Big data – Accounting	2017	McKinney, E., Yoos, C.J., Snead, K.	61
21	*Journal of Accounting Education*	Manual journal entry testing: Data analytics and the risk of fraud	Big data – Auditing	2017	Fay, R., Negangard, E.M.	35
22	*Journal of Accounting Education*	Toward integration of Big Data, technology and information systems competencies into the accounting curriculum	Big data - Accounting and auditing	2017	Sledgianowski, D., Gomaa, M., Tan, C.	144
23	*Journal of Accounting Education*	Forces for change in higher education and implications for the accounting academy	Digitalization – Accounting	2017	Pincus, K.V., Stout, D.E., Sorensen, J.E., Stocks, K.D., Lawson, R.A.	134
24	*Journal of Accounting Education*	Data-driven decision-making and its impact on accounting undergraduate curriculum	Data analytics – Accounting	2018	Ballou, B., Heitger, D.L., Stoel, D.	34
25	*Journal of Accounting Education*	Infusing data analytics into the accounting curriculum: A framework and insights from faculty	Data analytics – Accounting	2018	Dzuranin, A.C., Jones, J.R., Olvera, R.M.	59
26	*Journal of Accounting Education*	Accounting students' learning processes in analytics: A sensemaking perspective	Data analytics – Accounting	2019	Mesa, W.B.	7
27	*Journal of Accounting Education*	Integrating technology and data analytic skills into the accounting curriculum: Accounting department leaders' experiences and insights	Data analytics – Accounting	2020	Andiola, L.M., Masters, E., Norman, C.	25
28	*Journal of Accounting Education*	Developing institutional skills for addressing big data: Experiences in implementation of AACSB Standard 5	Big data – Accounting and auditing	2021	Sarkar, S., Gray, J., Boss, S.R., Daly, E.	0
29	*Journal of Accounting Education*	How well do audit textbooks currently integrate data analytics	Data analytics – Auditing	2021	Blix, L.H., Edmonds, M.A., Sorensen, K.B.	0
30	*Journal of International Accounting, Auditing and Taxation*	Impacts of digitization on auditing: A Delphi study for Germany	Digitalization – Auditing	2019	Tiberius, V., Hirth, S.	46