

Past, Present, and Future Ethical Implications and Considerations of AI in Accounting: A Systematic Literature Review

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Abstract

Artificial Intelligence (AI) is seen as a disruptive innovation that is affecting many industries and businesses, particularly accounting. This paper systematically reviews the current accounting literature, specifically focusing on the ethics of AI in accounting. The study uses the SPIDER tool, PRISMA Protocol, and NVivo software for the identification and analysis of journal articles and book chapters that included publications from 2019 to 2024. The paper identifies themes of trustworthiness, transparency, data privacy and security, awareness, accounting education and accountability. Additionally, the advantages included automating tasks or processes, cost savings or reduction, and competition, while disadvantages surround biases and black boxes. Future research opportunities are also discussed around the ethical implications of AI for the accounting profession.

Keywords: Artificial Intelligence (AI); Accounting; Ethics; Systematic Literature Review

Introduction

Ethics is the cornerstone of the accounting industry, ensuring integrity, transparency, and fairness in financial reporting and decision-making (Bayou et al., 2011; Henderson & Henderson, 2001). Ethical

practices are the primary responsibility of accountants as they uphold public trust, protect stakeholder interests, and sustain the credibility of the profession. Indeed, ethical foundations are uncompromising in the accounting industry (Chiang, 2023). Internationally, primary accounting organisations create their own statements on ethical behaviours, principles, or standards (Brumm, 2023). In accordance with relevant institutions such as the International Ethics Standards Board of Accountants (IESBA) or the American Institute of CPAs (AICPA) accountants must comply with established ethical guidelines. The fundamental ethical principles from these institutions are connected with integrity, objectivity, professional competence and due care, confidentiality and professional behaviour. Additionally, there is a demand for ethics to be taught by the accounting industry, as well as organisations, governments and professional societies (Francisco, 2023).

Accounting technology has changed and is continuing to change the way professional accountants work and how information is accessed (Pieters, 2019). Today, innovative AI systems are revolutionising the accounting profession, and this in turn has heightened the ethical responsibilities of accountants¹. AI as an “*umbrella term*” (Seligson & Lehner, 2022, p. 268) has meant the responsibilities of accountants who use computers have changed. This includes machine learning such as generative AI (Greenman et al., 2024). As an evolving technology, this requires accountants to adapt their approaches. With AI's transformative potential, it brings new challenges and issues that require ethical vigilance to align technological innovation with the profession's core values of transparency, fairness and public interest (Assidi et al., 2025).

AI has increasingly integrated into accounting processes through tools like Robotic Process Automation (RPA), which uses pattern recognition to execute basic discretionary decisions for data processing tasks (Zhang et al., 2020). Munoko et al. (2020, p. 216) critique RPA systems as merely “*doers rather than thinkers*,” lacking true intelligence. Moreira et al. (2023) further distinguish RPA as a tool within AI, while Grzeszczak (2020) highlights that in accounting software, RPA involves algorithms that integrate various applications, automating repetitive and monotonous tasks that require no critical thinking.

¹ Three widely used classifications of AI are: Assisted AI; Augmented AI; and Autonomous AI (Munoko et al., 2020). Where, Assisted AI are systems that support humans in decision-making or actions but lack learning capabilities; Augmented AI are systems that enhance human decision-making by continuously learning from interactions with people and the environment; and Autonomous AI are capable of adapting to varying situations and operating independently without human input (PwC, 2017).

Currently, most accounting software leverages RPA, Assisted AI, and Augmented AI to perform repetitive tasks. These systems improve speed and efficiency, yet they remain limited in autonomy and self-awareness (Munoko et al., 2020). While AI is revolutionizing accounting, it operates predominantly as a complement to human decision-making rather than an independent actor, and it is thus important to establish guidelines² about AI ethics (Ashok et al., 2022)³.

The use of AI in Accounting is an emerging field of research, with studies being conducted on AI's development (Hasan, 2021), regulation (Buckley et al., 2021), and education (Hsiao & Lei, 2023). Nonetheless, the disruptive and transformative aspects of AI remain topics that require further research (Bani Ahmad, 2024; Gaviria et al., 2022). Hasan (2021) notes that as AI is a tool that will shape or influence the accounting profession, research about industry-specific ethical guidelines is needed. Specifically, there is a demand for empirical-based research on the impact AI technology has on accountants (Hasan, 2021; Ucoglu, 2020; Zemankova, 2019).

This Systematic Literature Review (SLR) provides a comprehensive review related to the ethical impact and future considerations of AI in the accounting profession. There have been other systematic reviews that have explored the intersection of artificial intelligence (AI) and accounting (see Greenman et al, 2024; Rusingwanto, 2024; Tiron-Tudor et al., 2024; Schweitzer, 2024). Of these, only one has explicitly addressed the combined themes of accounting, ethics, and AI (Schweitzer, 2024). While the Schweitzer (2024) paper contributes to the conversation, its methodology provides limited information on the framework employed or the search terms used.

The present review enhances methodological clarity by explicitly explaining and adopting the widely used SPIDER framework and the search strategy and inclusion criteria. This level of detail enhances the rigour of our study and ensures that future research can easily be replicated. Furthermore, an analysis of the references used in the prior SLRs reveals minimal overlap with the literature captured in this review, underscoring the originality and relevance of this contribution. Importantly, the present study does not compete with or displace prior work; rather, it complements them. Taken together, these studies can collectively enrich understanding and help shape an informed dialogue in this critical area of accounting, ethics and AI now and in the future.

² The International Financial Reporting Standards (IFRS) and the International Ethics Standards Board of Accountants (IESBA) do not have AI conceptual frameworks published.

³ Some ethical guiding principles for AI, in the case of robotics, came to existence from a fictional baseline, such as Asimov's three laws of robotics (Asimov, 1941; McCauley, 2007).

The principal research question underpinning the present SLR is: What ethical challenges arise from the incorporation of AI in accounting?

This is followed by three sub-questions:

- Which themes surround the ethics of AI in the accounting profession?
- What are the advantages or disadvantages of AI in accounting?
- What future research is suggested relating to ethics and AI in accounting?

Overall, the SLR found 31 sources published from 2019 to 2024. These were analysed using EndNote, Zotero and NVivo. The major ethical AI themes were trustworthiness, transparency, data privacy and security, awareness, accounting education, and accountability. The advantages included automating tasks or processes, cost savings or reduction, and competition, while the disadvantages included bias and black boxes. Future research opportunities are also discussed around the ethical implications of AI for the accounting profession. The next section provides an overview of the methods, which is followed by the results, discussion and conclusion.

Methods

This study uses the PRISMA-P method, which is a key standard of what characteristics a systematic review should have (Moher et al., 2015). This method has been used widely in other SLR's related to accounting on topics such as emerging technologies (Kroon et al., 2021), blockchain (Bellucci et al., 2022), management accounting (Vale et al., 2022), education (Gittings et al., 2020), ethics of AI (Khan et al., 2022), and AI ethics and education (Wiese et al., 2025). This study adapts and incorporates many of the methods from the aforementioned studies.

Search Strategy

The presented SLR includes published literature found in two major databases - SCOPUS (Bellucci et al., 2022; Kroon et al., 2021; Vale et al., 2022) and EBSCOhost (Ashok et al., 2022; Greenman et al., 2024; Gusenbauer & Haddaway, 2020). The method used to specify the study characteristics is the SPIDER framework (Sample, Phenomenon of Interest, Design, Evaluation, Research). The SPIDER tool is depicted as an extension of the PICO search strategy tool (Cooke et al., 2012). The SPIDER framework was used as a tool to identify and structure relevant keywords for the literature search (Khan et al., 2022). The initial search terms used were selected from a priori information from the research questions, industry knowledge and preliminary literature reviewed. Table 1 refers to the keywords initially used.

Table 1: SPIDER tool framework for key search terms

SPIDER tool	Search Terms
S - Sample	“accountant” OR “CPA” OR “Certified Public Accountant”
PI - Phenomena of Interest	“artificial intelligence” OR “AI” OR “automation” OR “processes” OR “robotics” OR “information systems” OR “accounting” OR “audit”
D - Design	“questionnaire” OR “survey” OR “interview” OR “focus group” OR “case study” OR “observation” OR “data” OR “review”
E - Evaluation	“technological impact” OR “implementation” OR “implication” OR “concern” OR “consideration” “effect” OR “affect” OR “ethics” OR “ethical impact” OR “impact”
R - Research type	“qualitative” OR “quantitative” OR “mixed method”

In this instance, the initial search returned minimal results, suggesting that the original keyword set was too narrow. To address this, we refined the search strategy by reducing and broadening the keywords to capture a wider range of relevant studies. Boolean operators such as OR AND were used to combine keywords, allowing us to link related concepts and synonyms. This ensured that the search remained focused on the research topic while increasing the number of relevant results (see Khan et al., 2022; Wiese et al., 2025). The final keyword search consisted of (“ethic*”) AND (“impact*” OR “implication”) AND (“accounting” OR “accountant*” OR “accountancy”) AND (“AI” OR “artificial intelligence” OR “automation”). The term (“audit*”) was intentionally excluded from the search strategy. Whilst it is connected, auditing is a distinct function⁴ which was not a primary focus of the research questions. Including audit-related studies would have introduced a broader body of literature.

Additionally, sources were included only if they met all the following inclusion criteria (see Khan et al., 2022, p. 386):

1. The source must be about accounting and not auditing (it can include both, but not be solely about auditing).
2. The source must be in English or have an English version available.
3. The source must be published academic material e.g., journal articles and book chapters (not media articles, poems or conference proceedings)
4. The source must be published in 2019 or after⁵.

⁴ The following definitions are used to explain the difference between accounting and auditing. Where, “*accounting is the art of recording, classifying, and summarizing in a significant manner and in terms of money, transactions and events which are, in part at least, of a financial character and interpreting the results thereof.*” See Ghasemi et al., (2011, p. 112). On the other hand, “*Auditing is a service industry that provides examination of an organization’s financial statements.*” See Dai & Vasarhelyi (2016, p. 6).

⁵ The initial search had no results prior to 2019.

Kroon et al. (2021) and Khan et al. (2022) provide a useful screening process of the inclusion and exclusion criteria for papers. A simplified version of this criterion is provided in Table 2.

Table 2: Inclusion/exclusion criteria

Inclusion/Exclusion Criteria:		Reasoning:
Exclusion Criteria:		
No Full text	NFT	No full text.
Not related	NR	The article does not deal with the accounting profession, accountants' role or skills, AI technologies, automation, or ethics.
Loosely related	LR	The article addresses the accountants' role or skills, from a student's or educator's perspective OR The article addresses the accountant's role or skills or the accounting profession without making a connection with AI technologies, automation, or ethics OR The article addresses artificial intelligence automation, or ethics, without making a connection with the accountants' role or skills or with the accounting profession.
Inclusion criteria:		
Related	R	The article focuses on the ethical impacts of AI technologies on accounting OR the article focuses on the impacts of AI on accountants' role and accounting profession.

Data Collection

In January 2024, a basic keyword search of the terms found using the SPIDER tool were input within SCOPUS and EBSCOhost (similar to Ashok et al., 2022). The results of both database searches returned 75 results, with five being duplicates. After the duplicates were removed, a reading of titles and abstracts using Table 2 as a guide supported additional removal of not related (NR) and loosely related sources (LR). Moreover, (NR) results provided the removal of 28, leaving 42 for the (LR) screening process which then allowed for a further 16 results to be removed. The final process allowed for an additional reduction of four due to no full text (NFT). This left 22 results that were found to be related (R). Two additional results classified as (R) were excluded from the total for being website articles. An additional four results that were classified (R) were excluded for being conference proceedings; this left the SLR with 16 for analysis. Subsequent research updates seeking new sources were conducted in March, May, and September 2024. These found 21 additional results, of which five were (R). A final updated search was conducted in February 2025⁶ and found an additional five (R), nine (LR) and seven (NR). In total, this meant there were 26 results to be analysed.

⁶ The search was conducted in February 2025, yet these had 2024 publication dates. There were no papers with a 2025 publication date.

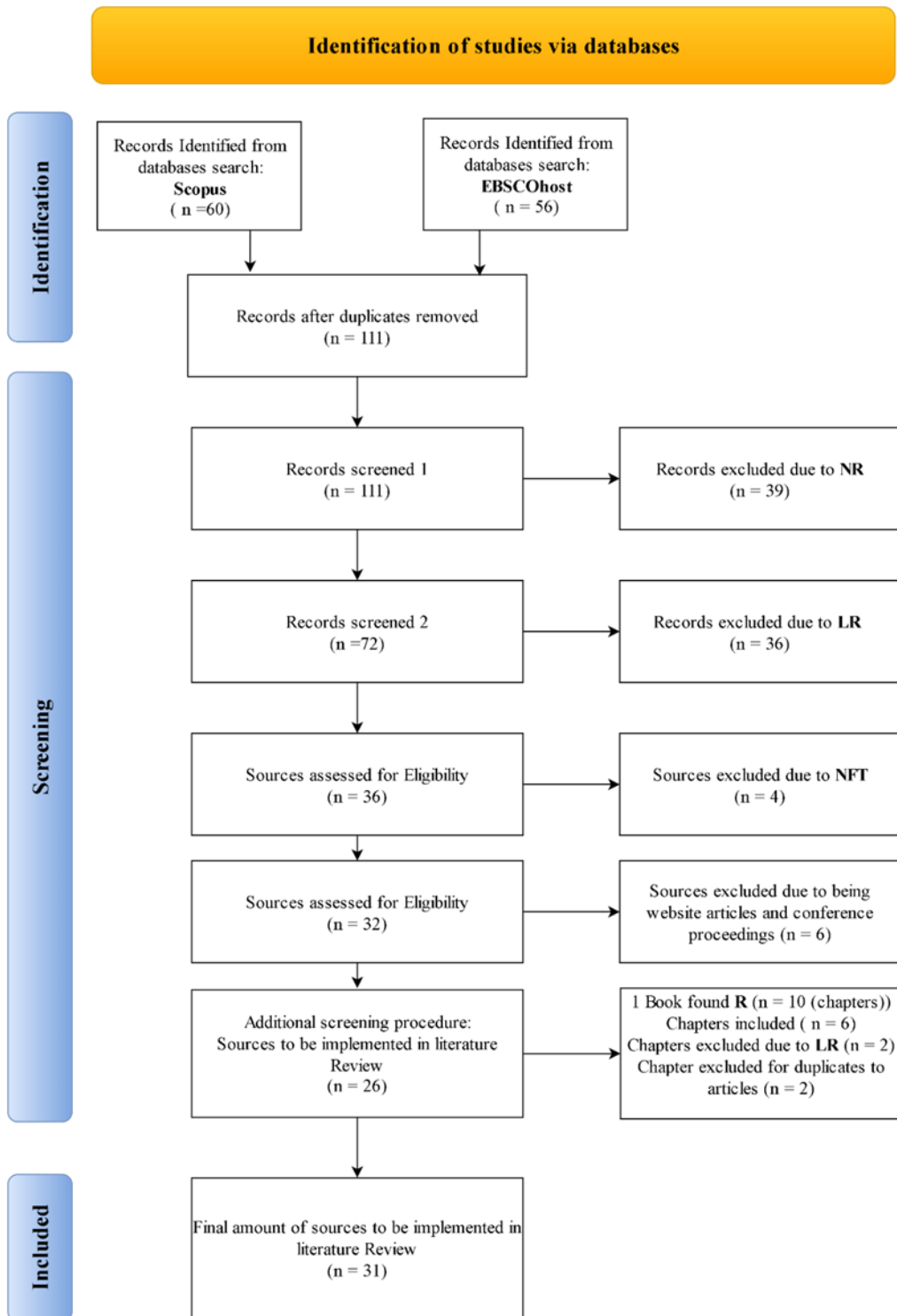


Figure 1: PRISMA-P Screening process

Among the 26 results was one book, which included ten chapters. Two of these chapters were duplicates with different titles (Lehner et al., 2022a; Losbichler & Lehner, 2022), and two were excluded (one of which had relevance to auditing and the other LR). In total six book chapters were included, and this brought the total number of results to 31 for analysis. The data collection screening process is summarised in Figure 1.

Analysis processes

The analytical process utilised one researcher having primary coding responsibility, with two others reviewing and suggesting alternative coding options. This approach enabled the refinement of codes. The content analysis was primarily conducted by the lead researcher, who systematically categorised themes using the NVivo software. Provisional Coding was used for the starting list, in which codes were created from a range of preparatory material that included the preliminary literature review, the research questions, and prior knowledge and experience of the researchers (Saldaña, 2013). After the first iteration, the authors discussed the validity of the suggested codes and agreed on which were best suited. The collaborative approach to coding improved coder reliability. As an example, a consensus was reached by the research team to include the code “job displacement” as an aspect of the broader “education” code. This reclassification was based on the interpretation that job displacement as a consequence of AI can result in accountants seeking additional education to secure future or alternative forms of employment.

The analysis process started by collecting the relevant sources and storing them in EndNote. Once organised, the papers were transferred into Zotero (Valverde-Berrocoso et al., 2020) where an initial analysis was undertaken. This included extracting pertinent sections from articles, making notes and preliminary code selections. The process of analysing each source was structured using the following criteria:

- Brief summary
- Type of paper
- Methodology
- Important researcher notes on i) ethics, ii) accounting, and iii) AI
- Future research

Among the important notes composed by the researchers were a range of key issues and emerging themes, along with the advantages and disadvantages of AI. These firstly served as validity indicators for the preliminary code selections, and secondly provided thematic guidance for the last analytical reading in NVivo. The papers were transferred into NVivo for the final in-depth coding and analysis, using the initial codes developed in

Zotero. Through this analytical process, six key themes emerged that were used to categorise codes and are subsequently used as sub-headings within the results section. These key themes were: Trustworthiness; Transparency; Accountability; Data privacy and security; Awareness; and Education.

Results

Overall summary

The SLR showed that AI has wide-ranging effects that can potentially impact and change the role of financial accountants, management accountants and auditors (Almulla et al., 2024; Grzeszczak, 2020; Jauhiainen & Lehner, 2022; Kruskopf et al., 2022; Lehner et al., 2022c; Leitner-Hanetseder et al., 2022b; Losbichler & Lehner, 2021; Tiron-Tudor et al., 2024; Vărzaru, 2022; Zhang et al., 2023). Specifically as it relates to accounting, AI is considered disruptive which was mentioned by six authors (Jauhiainen & Lehner, 2022; Khuong et al., 2023; Lehner et al., 2022c; Leitner-Hanetseder et al., 2022b; Seligson & Lehner, 2022; Tiron-Tudor et al., 2024), transformative which was mentioned by seven authors (Alqahtani, 2023; Chávez-Díaz et al., 2024; Gaviria et al., 2022; Nair et al., 2024; Leitner-Hanetseder et al., 2022b; Losbichler & Lehner, 2021; Seligson & Lehner, 2022), and a technology that has the potential to revolutionize the accounting profession (Almulla et al., 2024; Bani Ahmad, 2024). AI was also described as an influence or agent of the 4th industrial revolution by five authors (Chávez-Díaz et al., 2024; Gaviria et al., 2022; Khuong et al., 2023; Kruskopf et al., 2022; Vărzaru, 2022). There was also widespread agreement that in the future, accountants will need to work alongside AI systems to observe their performance and results and improve their functionality (Jauhiainen & Lehner, 2022).

In terms of ethics, the influence on decisions that AI has in accounting is raising concerns (Batiz-Lazo et al., 2022). Ethical views surround the responsible innovations and development of AI (Alqahtani, 2023), and organisations need to learn to integrate AI ethically (Gaviria et al., 2022; Leitner-Hanetseder et al., 2022b). Lehner et al. (2022c) noted that Artificial Intelligence Driven Accounting (AIDA) needs a well-structured set of ethical principles, and the ethical governance of AI within organisations is important (Munoko et al., 2020).

Descriptive Results

Table 3 shows the years of the publications. The edited textbook was published in 2022, which led to the high number that year. The two duplicate results within the 2022 book were moved to their respective journal publications year.

Table 3: Results year of publication

Year of publication						
2019	2020	2021	2022	2023	2024	Total
1	3	1	10	5	11	31

Graphical interpretation of themes is used in SLR studies to provide insight for the reader (Kroon et al., 2021; Vale et al., 2022). Figure 2 provides a graphical representation of major themes identified across the analysed papers (Table 4). This SLR finds that most sources tend to focus on future research (22), automating tasks (21), transparency (20), education (20), trust (19) and bias (19). The least addressed topics were the black box issue (4) followed by competition (8) and cost saving (10). Geographical analysis is also used for generalisability in SLR studies (Kroon et al., 2021; Wiese et al., 2025). Figure 3 demonstrates the first authors by country and continent. The country with the most sources was the United States of America (USA) (5), followed by Romania (3). The continent analysis found that 31% of studies originate from Europe and Asia, followed by North America 23%. No underlying trend can be interpreted from the geographical data, although it does illustrate that the ethical implications of AI on the accounting profession are of global research interest.

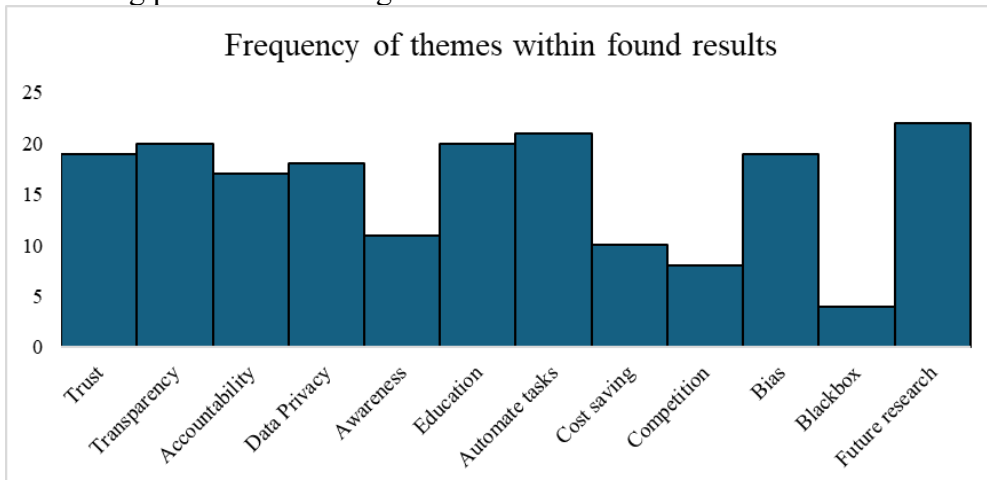


Figure 2: Themes, advantages and disadvantages and future research in the sources

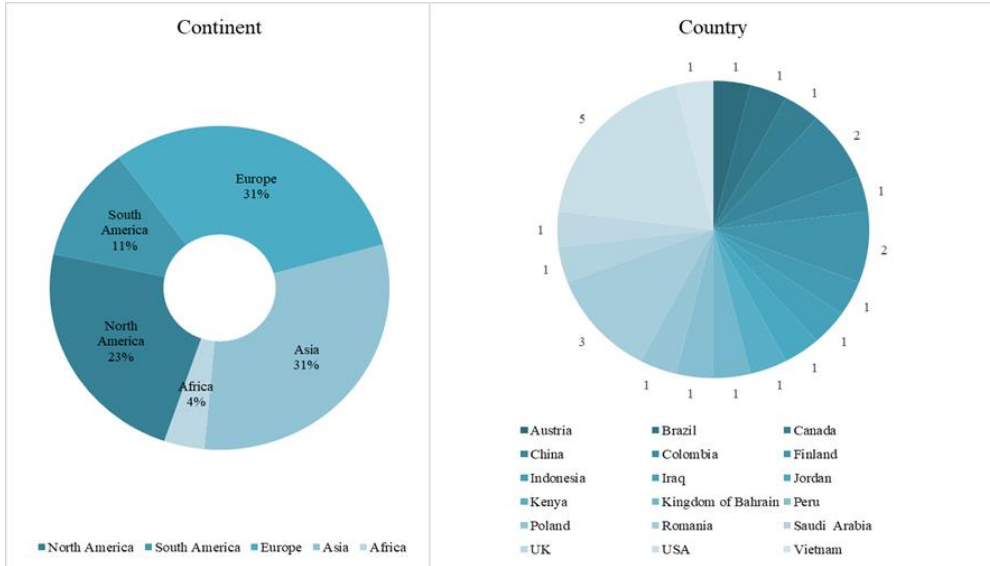


Figure 3: Geographic distribution

A word frequency query was conducted through NVivo. The search consisted of grouping⁷ with exact matches, words with the same stem and synonyms and a minimum word length of three. The top five percentage weighted words were: accounting (3.12%); followed by data (1.63%); ethical (1.21%); technology (1.19%) and systems (1.17%). Figure 4 shows a 100-word frequency query within a word cloud. It was generated to highlight the significance of the most used words associated with the papers in this SLR (see Khan et al., 2022), and represents the top 5 and smaller percentage words found. Vale et al. (2022, p. 13) labels a word cloud “*thematic coupling*” to stress the importance of the words used in the topic of analysis. Moreover, the word cloud provides that the sources found indicate themes that surround accounting, data, technology, ethics and systems. These support the validity of the initial search strategy conducted.

⁷ See https://help-nv11.qsrinternational.com/desktop/deep_concepts/understand_text_match_settings.htm



Figure 4: NVivo word cloud from word frequency count

Content Analysis Results

The following section answers the research sub-questions.

SQ1: Which themes surround the ethics of AI in the accounting profession?

The themes within the SLR surround trustworthiness, transparency, accountability, data privacy and security, awareness, and accounting education. Table 4⁸ illustrates the prevalence of these themes, and the sources.

Table 4: Information on sources and their themes

Title of Source	Journals/Books	Authors	Country of first author	Year	Themes
Government accounting optimization based on computational linguistics	Cognitive Systems Research	Li, Jiyou	China	2019	F
Learning from machine learning in accounting and assurance	Journal of Theoretical Accounting Research	Cho, S., Vasarhelyi, M. A., Sun, T., Zhang, C.	USA	2020	TP, AW, AT, B, F
The Ethical Implications of Using Artificial Intelligence in Auditing	Journal of Business Ethics	Munoko Ivy, Brown-Liburd Helen L, Vasarhelyi, Miklos	USA	2020	T, TP, A, D, AW, E, AT, CS, C, B, BB, F
Intelligent Support of Accounting IT Systems	Studies in Computational	Grzeszczak, M.	Poland	2020	A, E, AT, B

⁸ Table 4 legend/key - T = Trustworthiness, Transparency = TP, A = Accountability, D = Data privacy and security, AW = Awareness, E = Education, Automate tasks = AT, Competition = C, Cost saving = CS, Bias = B, Blackbox = BB, Future research = F

in Modern Enterprises	Intelligence				
Limits of artificial intelligence in controlling and the ways forward: a call for future accounting research	Journal Of Applied Accounting Research	Losbichler, H. Lehner, O. M.	Austria	2021	T, TP, A, D, E, AT, B, F
Artificial intelligence based decision-making in accounting and auditing: ethical challenges and normative thinking	Accounting, Auditing and Accountability Journal	Lehner, O. M., Ittonen, K., Silvola, H., Ström, E., Wührleitner, A.	Finland	2022	T, TP, A, D, AW, AT, B, BB, F
Artificial Intelligence in Accounting: Organisational and Ethical Implications	Book	Lehner, O. M. Knoll, C.	Finland	2022	T, TP, A, D, AW, E, AT, CS, C, B, BB, F
Assessing the Impact of AI Solutions' Ethical Issues on Performance in Managerial Accounting	Electronics	Vařzaru, A. A.	Romania	2022	T, TP, AT, C, F
The Spread of Artificial Intelligence and Its Impact on Employment: Evidence from the Banking and Accounting Sectors	Palgrave Studies of Cross-Disciplinary Business Research	Batiz-Lazo, B., Efthymiou, L., Davies, K.	UK	2022	T, E, CS, C, B, F
Influence of the Fourth Industrial Revolution on the Ethics of the Colombian Accounting Professional	Procedia Computer Science	Gaviria, D. A. G., Polo, O. C. C., Martinez, E. M. C., Garcí'a- arango, D. A.	Colombia	2022	T, E, AT
Application of Artificial Intelligence in Carbon Accounting and Firm Performance: A Review Using Qualitative Analysis	International Journal of Experimental Research and Review	A. S. H. Alqahtani	Saudi Arabia	2023	TP, A, D, AT, B
Ethical concerns associated with artificial intelligence in the accounting profession: A curse or a blessing?	Journal of Business Economics and Management	Fülöp, M. T., Topor, D. I., Ionescu, C. A., Cifuentes-Faura, J., Măgdaş, N.	Romania	2023	T, TP, A, D, AW, AT, F
Ethical impact of artificial intelligence in managerial accounting	International Journal of Accounting Information Systems	Zhang Chao, Zhu Weidong, Dai Jun, Wu Yong, Chen Xulong	China	2023	T, TP, A, D, E, B, F
Factors Affecting Decision to Adopt Artificial Intelligence During COVID-19 Pandemic Period:	Vision	Khuong, N. V., Anh, L. H. T., Ha, L. T. N., Cuong, L. V., Ngan, N. P. T., Thu, H. T. M.,	Vietnam	2023	T, E, AT, CS, C, F

Evidence from PLS-SEM and fsQCA		Minh, L. K.			
The impact of data analytics and artificial intelligence on the future accounting profession: perspectives from accounting students	Journal of Theoretical Accounting Research	Hsiao Daniel, Lei, Han	USA	2023	TP, D, E, F
AI in the Workplace: A Systematic Review of Skill Transformation in the Industry	Administrative Sciences	L. Babashahi, C. E. Barbosa, Y. Lima, A. Lyra, H. Salazar, M. Argôlo, et al.	Brazil	2024	T, TP, A, D, AW, E, AT, CS, B, F
Artificial intelligence in accounting and auditing: bibliometric analysis in Scopus 2020-2023	Indonesian Journal of Electrical Engineering and Computer	J. M. Chávez-Díaz, L. Aquino-Perales, J. L. De-Velazco-Borda, J. A. Villagómez-Chinchay, W. S. Flores-Sotelo	Peru	2024	TP, E, AT, B, F
Bias and ethics of AI systems applied in auditing - A systematic review	Scientific African	W. Murikah, J. K. Nthenge, F. M. Musyoka	Kenya	2024	T, TP, A, D, AW, E, AT, CS, B, BB, F
Ethical implications of artificial intelligence in accounting: A framework for responsible ai adoption in multinational corporations in Jordan	International Journal of Data Network and Science	Bani Ahmad, A. Y. A.	Jordan	2024	T, TP, A, D, AW, E, AT, B, F
Exploring The Impact Of Artificial Intelligence On Financial Accounting: Opportunities, Challenges, And Future Directions	Financial and credit activity problems of theory and practice	A. X. Γarea	Iraq	2024	T, TP, A, D, E, AT, CS, C, B, F
Potential Impact Of Artificial Intelligence On The Accounting Profession: Will Artificial Intelligence Be The New CPA?	International Journal of Accounting, Economics & Finance Perspectives	M. Hubler, C. Waddell, J. Felder-Strauss, K. Blanchard, B. Martinez and S. W. Self	USA	2024	TP, A, D, AW, E, AT, C, B, F
Process and Impact Evaluation of Artificial Intelligence in Managerial Accounting: A Systematic Literature Review	International Journal of Computing and Digital Systems	Almulla, D., Abbas, M., Al-Alawi, A., Alkooheji, L.	Kingdom of Bahrain	2024	T, TP, A, D, E, AT, C, B, F
The accounting profession in the Twilight Zone:	Accounting, Auditing & Accountability	A. Tiron-Tudor, W. Rodgers, D. Deliu	Romania	2024	T, TP, A, D, AW, E, AT, CS, B, F

navigating digitalisation's sided challenges through ethical pathways for decision-making	Journal				
The Impact of Artificial Intelligence (AI) on the Scope of Accountancy: Difficulties and Challenges in a Literature Review	Socio-Economic and Humanistic Aspects for Township and Industry	F. H. Rusgowanto	Indonesia	2024	T, D, E, AT, CS, F
AI-enabled FinTech for innovative sustainability: promoting organizational sustainability practices in digital accounting and finance	International Journal of Accounting & Information Management 2024	A. J. Nair, S. Manohar, A. Mittal	Canada	2024	T, TP, A, D, AW, E, B,
An Analysis of the Impact of Artificial Intelligence on the Accounting Profession	Journal of Accounting, Ethics & Public Policy	C. Greenman, D. Esplin, R. Johnston and J. Richards	USA	2024	T, TP, A, D, E, AT, CS, B,

Trustworthiness

The SLR found that trust (an individual's willingness to be vulnerable to another) is noted in 19 sources (see Table 4). Trustworthiness of AI is needed in the digital world; however, this can be difficult because of a one-way relationship. Specifically, AI systems are self-learners and do not gain morality (Lehner et al., 2022b). Accounting professionals using AI have little choice but to trust these systems. Accountants must also be careful not to blindly trust AI outputs (Greenman et al., 2024). The intangible nature of AI, however, creates mistrust (Lehner et al., 2022b) with regard to its implementation. In particular, this can be found within accounting organisations where employees are the indicator of how much trust is given towards an AI system. This can create organisational challenges that must be addressed in the future (Lehner et al., 2022b). Alternatively, governing supervision of AI innovation in the accounting industry is needed for trustworthy AI (Murikah et al., 2024). With the incorporation of digitalisation in the profession, it can raise trust or trustworthiness standards in accounting (Gaviria et al., 2022), however, a balance between technological efficiency and privacy must be maintained (Tiron-Tudor et al., 2024). Overall, the ethical dilemma surrounding trust relates to almost every aspect of big data and AI (Jauhiainen & Lehner, 2022).

Leitner-Hanetseder et al. (2022b) provide insight into the degrees of trust to give an AI system. Accounting professionals can use an AI system to advance accuracy and quality, which can increase transparency and trust of

stakeholders (Hubler et al., 2024). Alternatively, Grzeszczak (2020) notes that the lack of transparency provided by the AI or its algorithm can lead to issues of trust and the bias of results (Gatea, 2024). The goal of lowering output of AI bias is important to trustworthy AI (Nair et al., 2024). The use of third-party AI systems can lead to the need for higher levels of trust between accounting firms and AI developers (Munoko et al., 2020). Zhang et al. (2023) find in managerial accounting that trust and transparency are related and are a common challenge for all stakeholders. Likewise, Värzaru (2022) presents trust as the main interchangeable variable and one of the most important antecedents of all ethical issues for users of AI. Seligson and Lehner (2022) suggest that the rate of trust in AI amongst stakeholders such as practitioners, managers and policymakers is growing, however, at a slower pace. Babashahi et al. (2024) find that there are trust issues among academia and industry, as there is a lack of qualified AI-focused educators. Overall, this study identified that stakeholders need to develop comprehension on this subject, or receive education, to enhance the intensity of trust (Bani Ahmad, 2024).

Transparency

The SLR found 20 sources that noted AI had transparency-based issues (see Table 4). Basic principles of adopting AI within an accounting practice call for transparency in algorithms and data (Almulla et al., 2024; Alqahtani, 2023; Gatea, 2024; Greenman et al., 2024; Nair et al., 2024; Lehner et al., 2022b; Losbichler & Lehner, 2021; Murikah et al., 2024; Värzaru, 2022). AI adoption is characterised by computer-based technological advancements, improved transparency facilitated by code sharing, and the availability of open-source software (Babashahi et al., 2024). Lehner et al. (2022c) explain that transparency of applied algorithms implies several meanings, which are dependent on the participant and is considered an abstract concept. A summary of issues that include transparency and trust by Zhang et al. (2023) identifies that AI users who are concerned about theoretical models will meet difficulties when working on real data and dealing with complex situations. Similarly, Munoko et al. (2020) suggest that the complex nature of AI algorithms causes a deficiency in the AI's decision-making process, including what type of data the AI considers for the decision output, and the supporting evidence of the recommendation. These uncertain decision-making eventualities cause higher risk, potentially leading to unintended consequences such as lawsuits or regulatory action (Cho et al., 2020). Fülöp et al. (2023) note that AI that operates in background processes must be developed to be transparent for all applicable stakeholders. Deficiency in data transparency is a leading concern in AI bias (Lehner et al., 2022b). Analyses of reports from the Big 4

accounting firms (see Seligson & Lehner, 2022), show that newer streams of data are a complementary change and can increase data transparency.

Bani Ahmad (2024) implies that organisations and stakeholders should show full transparency of their intentions with AI use and have human judgement in cases where there can be extensive implications for individuals. Hubler et al. (2024) assert that to maintain ethics and transparency, IT professionals and accountants should work together to guarantee that financial reporting and client privacy are protected. There are consequences of transparency, such as the “*transparency paradox*” (Cho et al., 2020, p. 6), which indicate that the more transparency that is provided the greater the risk for data exposure. A time-consuming yet viable solution to transparency issues is provided by Jauhiainen and Lehner (2022), the Human-in-the-loop mechanism⁹. Humans can act as auditors and verify whether the output of the data through the AI is being correctly interpreted at certain inputs of the AI’s algorithm. Overall, the goal of transparent AI is important in building trust between stakeholders (Rusgowanto, 2024).

Accountability

The ethical principle of accountability is at risk due to the imposing implications of AI, and this was noted by 17 sources (see Table 4). Losbichler and Lehner (2021), for example, provide that a solution to accountability is to first understand the cognitive capabilities presented by AI systems. Bani Ahmad (2024) suggests that human oversight is a necessary requirement for the future of AI systems. There should be implementation of accountability procedures to measure mistakes and unexpected consequences that can occur from decisions that are assisted by AI. For example, as AI makes basic discretionary decisions, questions arise on who is accountable (Greenman et al., 2024). Munoko et al. (2020) find that accountability is of increasing importance, particularly if an augmented AI is developed by a third party. Zhang et al. (2023) reported that managers should be responsible for the successful implementation of AI, as managers are usually responsible for AI adoption. Zhang et al. (2023) also indicate that accountability for using AI correctly should be shared among stakeholders such as regulators, managerial accountants, system developers, and client firms. Lehner et al. (2022b) noted that inexplicable algorithms that have difficult or incomprehensible designs can potentially enforce accountability on the developer rather than the firm, decision makers, or auditors. Alqahtani

⁹ Human-in-the-loop is defined as “*A human-in-the-loop mechanism is a mechanism in which a human is in the middle of the AI process validating its results throughout operation. To describe it simply, the system will be unable to continue the process unless a human has approved an intermediary output and confirmed it is ready to proceed to the next phase.*” see Jauhiainen, T., & Lehner, O. M. (2022, p. 164)

(2023) calls for the need for more transparency within intricate AI algorithms; however, this can also lead to the rise in accountability concerns. Similarly, Seligson and Lehner (2022) find that accountability is a recurring ethical implication within the accounting profession, and it is linked to transparency.

In AI integration, Murikah et al. (2024) find that the lack of transparency erodes accountability. Lehner et al. (2022c) reported that, along with transparency, accountability of algorithms is a core topic within the realm of autonomous accounting. There is a need for accountability in relation to transparency of AI algorithms, as transparency acts as an antecedent or moderator to accountability (Lehner et al., 2022b; Tiron-Tudor et al., 2024). Fülöp et al. (2023) find that the field of digital ethics is closely related to the topics of trust and responsibility so a defined version of accountability must be created to ensure transparency.

Data privacy and security

Implications can arise that concern data privacy, security and collection within AI, and the SLR noted this in 18 sources (see Table 4). As AI relies on large volumes of data (Big Data) there is growing importance of concern related to data privacy and security (Bani Ahmad, 2024; Lehner et al., 2022c; Leitner-Hanetseder et al., 2022a; Tiron-Tudor et al., 2024). Greenman et al. (2024) postulate that for accountants to maintain client trust, data privacy and security is a priority. Additionally, as AI evolves, its output can affect data privacy and unconscious biases (Seligson & Lehner, 2022). To reduce this risk, AI developers should follow standards and regulatory codes to create AI systems by using quality data (Zhang et al., 2023), because data quality affects bias (Bani Ahmad, 2024). Partially structured data or incomplete data can lead to a reduction in AI's efficiency and accuracy (Almulla et al., 2024). Rusgowanto (2024, p. 443) states “...*a comprehensive framework is needed to address AI ethics, data privacy, and security*”, all of which are critical to the accounting profession.

Awareness

Accounting stakeholders must be aware of challenges and ethical concerns presented by AI, as noted by 11 sources (see Table 4). The lack of awareness about complex algorithms can affect stakeholders' ability to trust AI (Lehner et al., 2022b). Fülöp et al. (2023) noted that many accountants have a simple, or basic, understanding of AI, which produces concerns about the technology. In their study, Fülöp et al. (2023) further observed that the majority of their participants perceived a problem with the interaction between ethics and AI. Inadequacy of AI awareness can impact freedom of choice (Tiron-Tudor et al., 2024). Similarly, a lack of awareness can present

issues for technology integration (Babashahi et al., 2024). Bani Ahmad (2024) finds that informed consent of data use and user awareness are related, especially where AI is used to impact decisions. Bani Ahmad (2024) also noted that corporations should prioritise ethical awareness. Additionally, Kruskopf et al. (2022) propose that soft skills required by accountants now and in the future include ethical awareness. Munoko et al. (2020, p. 227) state: “*Professional bodies and academic institutions should be aware of the use of autonomous systems within the profession.*” An ethical stance by Lehner et al. (2022c) uses Narvaez and Rest’s (1995) four-component model that engages with morality. Their overall purpose was to raise awareness of the essential need for humans to look deeper into understanding the concepts and processes of AI, and to pioneer ethical decision-making during difficult situations. Seligson and Lehner (2022, p. 294) provide a potential “*way forward*” with awareness of the unforeseen risks that new innovative technologies have when unsupervised (Munoko et al., 2020). Similarly, Zhang et al. (2023) found that managers who are aware of AI, and are in control of AI adoption have the greatest influence on AI’s development and application. Hubler et al. (2024) noted that accountants must be aware of the possibilities that AI can present, apply it to their work tasks, and educate themselves on how AI can make them more efficient.

Education

AI plays a role in accounting education, and the SLR found 20 sources referring to this (see Table 4). Due to the innovation of AI, accountants, auditors, and other stakeholders in the profession need to adapt, or improve on their IT knowledge and skills. Unfortunately, there is a gap between accounting education programs and what the industry is demanding (Hsiao & Lei, 2023; Kruskopf et al., 2022; Leitner-Hanetseder et al., 2022a; Ruscgowanto, 2024), with graduating students generally not prepared to transition into an AI supported industry (Hsiao & Lei, 2023). Leitner-Hanetseder et al. (2022a) list qualities and skills of professional¹⁰ and technical skills¹¹ for future accountants, identifying that IT is a needed proficiency. In addition, the nature of ethics, values and attitude of an accountant are characteristics that are needed to assess AI results (Grzeszczak, 2020; Hubler et al., 2024; Leitner-Hanetseder et al., 2022a; Leitner-Hanetseder et al., 2022b). Zhang et al. (2023) find that ethics is a

¹⁰ These include communication, teamwork, critical thinking, and AI-supported problem solving.

¹¹ These include quantitative methods; core management competencies; technology; process management and improvement; governance, risk management, and compliance (GRC); external reporting and analysis; planning; analysis and control; taxation compliance and planning; information systems; assurance; and internal control.

priority in education for both managerial accountants and AI developers. A review of ethics from the academic perspective for accounting students is important due to the need for students to understand the ethical principles and the professional principles expected in the industry (Gaviria et al., 2022). Leitner-Hanetseder et al. (2022b) found that there is an urge for bookkeepers to broaden their IT skills for the developing changes within accountancy and this can have an impact on companies and the education industry alike. Consequently, accountants within industry practices should pursue additional education due to the risk of losing their job to AI technology (Seligson & Lehner, 2022). Bani Ahmad (2024) extends this idea and notes that further education and training is required to address emerging employment opportunities. The education of end users, or consumers of AI-created products, services or functions, is of increasing importance. This is due to the uncertain nature of technological implications and ramifications. Losbichler and Lehner (2021) give insights on how to improve education standards for human-machine collaboration. Overall, accounting education teachers must keep pace with AI innovations and integrate AI in the classroom so students can meet the evolving job market (Gatea, 2024).

SQ2: What are the advantages or disadvantages of AI in accounting?

The most useful advantage (noted by 21 authors) was that AI automates tasks or processes that include data and analysis, leading to improved quality of output. In the accounting context, AI is being employed to automate tasks that require repetition in for example, Expense Management, Accounts Receivable and Payable Processing, Artificial Intelligence-powered Invoice Management; and Supplier Onboarding (Babashahi et al., 2024; Chávez-Díaz et al., 2024; Gatea, 2024; Greenman et al., 2024; Hubler et al., 2024; Jauhiainen & Lehner, 2022; Murikah et al., 2024; Kruskopf et al., 2022). By managing routine tasks AI can minimise the risk of fraud (Rusgowanto, 2024).

As AI progresses, the cost savings also become more noticeable (Munoko et al., 2020). An organisation can reduce operational costs by utilising AI (Rusgowanto, 2024). Almulla et al. (2024) provide that the use of AI-based accounting software has decreased labour spending. Adoption of AI can save wages (Khuong et al., 2023). Indeed, the Big 4 accounting firms are promoting digital technologies such as AI specifically for its cost-saving ability (Seligson & Lehner, 2022). With automation, AI can save time on accounting tasks (Gatea, 2024; Greenman et al., 2024; Jauhiainen & Lehner, 2022; Kruskopf et al., 2022; Seligson & Lehner, 2022; Tiron-Tudor et al., 2024). AI use or adoption further increases competition and provides a competitive advantage through AI efficiency (Batiz-Lazo et al., 2022; Hubler et al., 2024; Lehner et al., 2022c; Munoko et al., 2020), or organisations

adopting AI in their systems (Gatea, 2024; Jauhiainen & Lehner, 2022; Khuong et al., 2023; Vãrzaru, 2022). This leads to sustainable growth and financial management improvement (Almulla et al., 2024) and innovation (Gatea, 2024). Moreover, the Big 4 invest in AI to remain competitive worldwide (Seligson & Lehner, 2022).

The main identified disadvantage of AI relates to Data or algorithmic bias. AI algorithms and data can be susceptible to biases (Alqahtani, 2023; Babashahi et al., 2024; Greenman et al., 2024; Nair et al., 2024; Rusgowanto, 2024), which can cause result distortion (Zhang et al., 2023) or bias in results (Bani Ahmad, 2024; Chãvez-Díaz et al., 2024). Cho et al. (2020) distinguish the different types of bias in machine learning. Bias in AI happens due to the algorithms and data being produced by humans (Lehner et al., 2022b) and AI can learn human biases (Hubler et al., 2024). Additionally, AI algorithms have the potential to tarnish businesses by causing significant losses, affecting business decision-making, and causing inadvertent risk (Jauhiainen & Lehner, 2022).

Another disadvantage is the Black box. Jauhiainen and Lehner (2022, p. 136) state: “*The black box concept refers to an autonomous system that makes decisions by itself and the users and developers are unable to understand and justify the reliability of its outcome.*” AI algorithms are a black box and the topic of transparency needs to be revised and refined by regulators (Lehner et al., 2022c; Murikah et al., 2024). Additional ethical issues that surround the black box include transparency (Lehner et al., 2022b; Zhang et al., 2023), accountability, bias, decision-making, and reliability (Jauhiainen & Lehner, 2022).

SQ3: What future research is suggested relating to ethics and AI in accounting?

In the SLR 22 papers provide information on the suggested areas for future AI research, with the most notable being: ethics of AI in accounting (Batiz-Lazo et al., 2022; Chãvez-Díaz et al., 2024; Cho et al., 2020; Lehner et al., 2022c; Losbichler & Lehner, 2021; Murikah et al., 2024; Rusgowanto, 2024; Tiron-Tudor et al., 2024; Vãrzaru, 2022; Zhang et al., 2023); behavioural based studies (Almulla et al., 2024; Fülöp et al., 2023; Gatea, 2024; Greenman et al., 2024; Khuong et al., 2023; Tiron-Tudor et al., 2024; Zhang et al., 2023); accounting education implications (Hsiao & Lei, 2023; Leitner-Hanetseder et al., 2022a; Losbichler & Lehner, 2021); Change of the accounting organisation’s structure due to AI implications (Hubler et al., 2024; Jauhiainen & Lehner, 2022; Leitner-Hanetseder et al., 2022b; Losbichler & Lehner, 2021; Seligson & Lehner, 2022); and creating ethical frameworks or regulatory standards for AI in accounting (Almulla et al.,

2024; Bani Ahmad, 2024; Cho et al., 2020; Losbichler & Lehner, 2021; Munoko et al., 2020; Murikah et al., 2024; Tiron-Tudor et al., 2024).

Munoko et al. (2020) stress the importance of research into ethical implications of AI in accounting and call for future behavioural studies, such as case studies, where ethical cases are solved by professionals to demonstrate how ethical thinking and a code of ethics are applied. Empirically based studies evaluating the impact in professional settings can provide valuable insights (Tiron-Tudor et al., 2024). Munoko et al. (2020) also suggest a repository should be kept of all the ethical dilemmas encountered by AI for future research. There are also calls for future research regarding ethical risks and implications of AI and the potential impact on the accounting industry (Chávez-Díaz et al., 2024; Cho et al., 2020; Zhang et al., 2023). Future research is required to combine a human-centred, legal, accounting, and IT approach to look into questions that surround the fairness of AI and governance of big data (Lehner et al., 2022b; Lehner et al., 2022c). Losbichler and Lehner (2021) also extend an invitation to embrace the research area of organisational transformation in the field of AI and accounting with various epistemological approaches and their necessary research designs. Specifically, when focusing on ethical implications, research needs normative perspectives of ethical boundary implementation, which are found by using the different voices of society.

Kruskopf et al. (2022) call for future research into AIDA to guide businesses, accounting and auditing practitioners and society as a whole in the direction of developing skillsets and human-machine cooperation. Leitner-Hanetseder et al. (2022a) note a few future ethics-based research questions, including: what is the result of using a social justice perspective to guide the implementation of AI and its impact on the workforce? Can AI algorithms complete ethical decision-making scenarios even though they may present bias and have no transparency? Can fiction-based works on AI, such as Asimov's three laws of robotics, be used in creating the ethical guidelines or regulations in AI or robotic process automation?

Jauhiainen and Lehner (2022) also noted that research into AI's impact on policymakers' decisions and regulation creation is needed. Related to this, Murikah et al. (2024) suggest research into legal oversight for an independent ethics board. Seligson and Lehner (2022) call for multiple future research areas or studies, including additional critical perspectives of the real and tangible effects of AI within accounting and auditing; the trustworthiness of AIDA non-financial reports and their credibility; and the work/life balance of accountants with the integration of AI. Research should also be conducted from other cultural starting points, and with firms other than the Big 4, to gauge whether the AI issue is the same worldwide or significantly differentiated. Vařzaru (2022) suggests future research on the implications

of AI solutions on managerial accountants' decision-making processes and the additional effects, such as bias and identification of underlying determinants, with the adoption of AI in managerial accounting. Batiz-Lazo et al. (2022) found that there is a lack of articles that explore AI and the impact the technology has on the accounting profession. Finally, Greenman et al. (2024) call for future research of empirical research that includes interviews or surveys of accountants to study their perception of AI tools.

Conclusion

Overall, the present SLR found 31 sources published between 2019 and 2024 on the ethics of AI in the Accounting profession. The major ethical themes were trustworthiness, transparency, accountability, data privacy and security, awareness and education. The advantages of AI in accounting included automating tasks or processes, cost saving or reduction, and competition, while the disadvantages were bias and black boxes.

The present study complements prior research on AI and Accounting. Combined with others, it makes available a wide range of resources on the important intersection of AI, ethics and accounting. Like the present findings, Greenman et al. (2024) noted job displacement and skill adaptation were AI considerations, while also finding data governance, privacy and data security were important. Similar to the current study, Ruscgowanto (2024) also noted that the advantages of AI were automating processes and cost saving, while the risks were bias, data breaches and ethical dilemmas. Tiron-Tudor et al. (2024) also reported that autonomy, privacy, balance of power, and security were important as well as human dignity and non-maleficence. Finally, Schweitzer (2024) noted transparency, accountability, privacy, bias, and fairness as important AI implications, as well as explainability and societal impact. Like the present study, Schweitzer (2024) noted that the future accountant should be ready for AI's transformation of the industry. Absent from most studies is that the present study provides more insight into the future research areas into AI and ethics, as noted in the third sub-research three (see SQ3).

The present study identifies that there is a need for a foundational ethical conceptual framework for accountants that can inform future research and practical applications concerning AI in the accounting industry. While some prior studies mention aspects of a proposed framework, the list is not as comprehensive as suggested by this SLR. A recommendation from this study is a conceptual framework that incorporates Trustworthiness, Transparency, Accountability, Data privacy and security, Awareness, and Education. Importantly, education and awareness have not been discussed within a framework in other studies.

Future research could also include a critical evaluation of current ethical oversight committees and their standards of AI within the industry. The present study was narrow in that it focused specifically on ethical considerations of AI in the accounting profession. It also differed somewhat in its methodology and keyword search. This study has demonstrated the strength and effectiveness of the SPIDER search strategy tool to evaluate the ethical implications of AI in the accounting industry. Combining the SPIDER tool and a computer-assisted qualitative data analysis tool, such as NVivo, has enabled a great depth of analysis. Utilising this same approach for future research, for example, applications of AI in accounting education could be explored.

There are a number of limitations to this study; however, these can be used to conduct further research. One limitation is that only two databases were used, and this could be expanded in the future. The present study restricted some papers to English only, while NFT studies were excluded. Furthermore, the present study omitted from the search the use of *audit* in the keyword search, and future studies may incorporate auditing. Future research should also focus on empirical studies (e.g., interviews, surveys, or focus groups) to gain further insight into how accountants use AI. The empirical studies should be targeted at all areas of accounting, such as managerial, financial, taxation, forensic, etc. This can be used to gain broader distinctions between AI tools within each area. Additionally, it can lead to the creation of conceptual frameworks from empirical-based research relating to specific AI use by accountants. Future research could also debate and extend the proposed conceptual framework suggested in this study. For the benefit of all stakeholders (including regulators, educationalists and the accounting profession itself), further research is needed that recommends solutions to ethical dilemmas that arise from AI in the accounting profession, and these need to be documented.

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