

## **Book Review**

### **Othmar M. Lehner and Carina Knoll (Eds.), *Artificial intelligence in accounting: organisational and ethical implications*, Routledge Studies in Accounting (Taylor & Francis), 2022**

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Artificial Intelligence (AI) is expanding its range of applications (Winston, 1984) including in the accounting and auditing field (Sutton et al., 2016). Indeed, organisations and consultants exploit AI-based applications to perform accounting and auditing practices, such as collecting and analysing large amounts of data to interpret past trends and predicting future ones, assessing the probability and impact of risks for a due organisation, and communicating information in a timely and effective manner for internal and external purposes (Chen et al., 2012; Earley, 2015).

The extensive usage of AI-based applications in accounting and auditing practices is driven by several factors. For instance, AI can boost the rationality of tasks by providing evidence-based options to professionals (Athota et al., 2023; Han et al., 2023), perform daily tasks more efficiently than humans in terms of both time and costs (Davenport, 2018), and elevate professionals to more strategic tasks (Jarrahi, 2018).

At the same time, the use of AI-based applications in the accounting and auditing field is not free from controversies; for instance, there are debatable issues such as machines inheriting cognitive biases from programmers (Alelyani, 2021; Char et al., 2018), the lack of privacy restrictions on the data processable by AI tools (Rodríguez-Barroso et al., 2020), the low transparency of Machine Learning (ML) algorithms underlying operations in long-term use (Kokina and Davenport, 2017), as well as the dystopian perspective of human replacement (Huang and Rust, 2018).

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Nevertheless, the debate so far has only seen a clash between the utopian perspective, based on isolated advantages of specific AI uses, and the dystopian perspective, based on as many isolated criticalities of as many specific AI uses. This witnesses the absence of a clear and systemic framework to guide organisations and policy makers across all implications of using AI tools in accounting and auditing.

To fill this gap, Othmar M. Lehner and Carina Knoll provide a timely contribution by editing the book *Artificial intelligence in accounting: organisational and ethical implications*. The book has two main objectives. First, it aims to critically review dystopian and utopian narratives about the use of AI throughout the transformation of accounting and auditing practices. Second, the book aims to depict a future outlook on ethical and organisational implications about opportunities, risks, and limitations arising from the use of AI in accounting and auditing. As a whole, the book aims to orient professionals, students, researchers, and policy makers across the ethical and organisational challenges of AI-based applications in accounting and auditing.

The book is divided into three key parts. The first part (chapters 1-2) introduces the readers to the concepts of AI and Big Data in accounting including related organisational and ethical perspectives. The second part (chapters 3-8) analyses the organisational implications with a particular focus on the human role in governing AI tools. The third part (chapters 9-11) investigates the ethical implications. The chapters are written by top scholars and researchers in the fields of AI and accounting.

At the beginning of the first part, chapter 1 introduces readers to the book by highlighting the research context and developing the essentials of AI, Big Data, and implications of their use in accounting and auditing. The chapter continues by describing the contents of the remainder of the book. Chapter 2 addresses the heart of the theme. In the first introductory section, Artificial Intelligence-driven Accounting (AIDA) is described as a research field oriented to improving accounting and auditing processes. Some first ethical issues that emerged from literature are also shown besides the development of automations (e.g. the dichotomy between humans and machines in taking responsibility for AI-based decisions). The rest of chapter 2 is dedicated to explaining the formation of AIDA systems, which result from interviews conducted with experienced scholars and practitioners. Experts' answers, in the form of written emails, were collected and analysed through the inductive Delphi method. Outcomes show how the transition from an AIDA system from the first stage (i.e. AI supports data preparation,

planning, and reporting) to the second (i.e. AI controls and supports the internal advisory role of accountant) to the third (i.e. AI works as an accountant and advisor with advanced cognitive abilities) requires the support of studies that are not limited to the accounting field. Indeed, an interdisciplinary research approach is needed to guide organisations, and society in general, to solve dilemmas such as “Who ultimately controls the firm and its resources and for what purposes?”.

Diving into the second part of the book, which focuses on organisational implications, chapter 3 explores the enhancement of the human factor within the so called “Fourth Industrial Revolution”. The authors of this chapter deny the dystopian visions of a future characterised by machines as protagonists, rather foreseeing and pushing towards a prolific collaboration between humans and machines. Within this collaboration, AI-based applications would continue to perform the simpler and repetitive tasks of accounting (i.e. expense management, receivables, and payables processing) and auditing (i.e. detecting fraud and inconsistencies), while humans would keep performing more strategic tasks (i.e. selecting relevant information to make decisions). To achieve such human-machine collaboration as desired, the authors indicate some hard skills that humans will have to acquire in the coming years. Indeed, in addition to the basic knowledge on accounting international standards and specific industry regulations, humans will even be required to have the ability to provide, view, and analyse the information elaborated by automatic systems as well as solve their small technical issues. Soft skills, such as patience, flexibility, and leadership, are even required. Chapter 4 highlights the need for humans to acquire new technical skills to ride the digital revolution and, through interviews with 138 accounting and auditing experts, the authors attempt to describe the desired job of accounting professionals in 2030. The outcomes report that: the simpler functions of the Bookkeeper will be replaced by digital data exchange formats, but the human will ensure correct functioning; the Financial Accountant will exploit new data sources (i.e. Internet of Things) to value assets and liabilities and will need to understand the dynamics underlying AI’s decisions to ensure compliance with accounting and ethical principles; the Controller will become a consultant with skills in AI-based analysis, forecasting, and data visualisation; the Business Data Analyst will manage coding languages (e.g. R, Python, MATLAB) to trace corporate environmental trends and patterns; the Treasurer and Risk Manager will rely on Reg-Techs (AI-based regulation modules) to comply with legal and reporting requirements; the Financial System and Process Manager will organise

the accounting and finance department by coordinating digitalisation and automation practices. The authors of chapter 5 perform a Structured Literature Review (SLR) on accounting education journals to understand the state of skills at the time of digitalisation. Major attention is paid to technical skills that accountants need to acquire to ride digitalisation. In particular, beyond a stronger focus on IT skills, the authors suggest attention is paid to accounting education courses towards process automation (e.g. ERP-Systems, Blockchain, Robotic Process Automation) and data analytics (e.g. programming languages, BI-tools, AI-based algorithms, cyber security). Chapter 6 firstly deals with three main AI limits of forecasting: *Bremermann's Limit* concerns intrinsic limited information processing capacity of any AI based system; matters of limited controllability and detectability of complex systems once those are put to work; AI inheritance of humans' cognitive biases through inputs to algorithms. Chapter 6 continues by posing future research questions within five major areas: organisational transformation triggered by the use of AI-based applications; human-machine collaboration in terms of characteristics and outcomes; regulation on AI applications and through AI applications; technological innovation to improve corporate accounting practices effectively and efficiently; and corporate ethical decision made about AI systems and through AI systems. The authors of chapter 7, firstly, provide a substantial background on AI-based applications in organisations and how these can represent new risks to be managed. In this sense, of particular interest is the issue signalled on pages 138-139, where the algorithmic models are critically described as "black boxes". Indeed, once human developers feed ML algorithms through input data, the system itself create rules and functions that will be applied to continuously process new data, until human developers lose understanding of the function and outputs of the algorithmic models. Secondly, through semi-structured interviews with 14 professionals of 10 organisations, the authors aim to detect corporate governance structures and mechanisms to handle AI-based accounting systems in organisations. In brief, respondents identified the CFO as the owner of the AI-based accounting system and manager of related risks. On the other side, the board of directors is supposed to be responsible for the risk management of such systems as well as in charge of developing a strategic plan for the implementation of an AI-based accounting system throughout the organisation. Chapter 8 deepens the topic of cybersecurity in accounting and auditing by performing a literature review on 39 studies, resulting in a synthesis of affirmed research

streams and suggestions for future ones. The affirmed research streams recognise cybersecurity as: *i*) a critical risk to be included among internal auditing controls, *ii*) a source of corporate investment to be undertaken through specific models, and *iii*) a system of corporate activities to be voluntarily disclosed due to the positive effect on the market value of the firm. On the other hand, suggested streams for future research include: *i*) implementation of cybersecurity strategies, *ii*) regulation effects of cybersecurity information disclosure, and *iii*) improving investors and auditors' reactions to cybersecurity activities disclosed.

The third, hence the last, part of the book focuses on ethical implications. In chapter 9, the authors address future research on technology ethics of the Accounting Information System (AIS). In particular, the authors first suggest an in-depth study of a specific technology followed by investigation of whether that specific technology triggers unique ethical issues when employed for the AIS. Moreover, it is suggested that future accounting researchers ensure that ethical issues univocally emerge from AIS technologies without influences of other contextual factors, and that such control can be achieved through accurate experimental studies. Chapter 10 represents a crucial juncture for the contents of the book as, through a rigorous methodological approach of interpretative accounting research on relevant papers, the authors evaluate in a combined perspective: the AI based applications, decision-making scenarios, human-machine collaboration, and ethical issues. In particular, in an uncertainty scenario – where few risks and opportunities are known – AI can assist humans by providing real time information to take fast decisions. Nonetheless, the critical issue related to the lack of transparency on how and which data is processed by AI algorithms remains. In a complexity scenario – where there is so much data that exceed human's processing ability – AI serves humans by selecting, analysing, and effectively presenting data to professionals who firmly remain responsible for decisions. Nevertheless, several challenges (e.g. transparency and objectivity of AI algorithms, poor data protection, and humans' trust in AI) could undermine the perfect success of this collaboration. In an equivocality scenario – where stakeholders have different interests in a decision domain – AI can overcome equivocal situations by analysing sentiments and anticipating different reactions to corporate decisions. In this scenario, beyond all the criticalities mentioned above, the issue of accountability for decisions taken is included. In fact, despite machines building the optimal decision, humans need to retain the capacity to sell that decision to stake-

holders. The book concludes with chapter 11 in which the authors empirically analyse the value proposition reported in the documents issued by the Big 4 accounting firms regarding the transition to AIDA. The results show the swing between the pros and cons of this transition. In fact, the Big 4 accounting firms initially focus on the benefits that AIDA would generate: improving the quality, and the speed, of accounting and auditing practices as well as the skills of the individuals who deal with them. Also discussed are the critical issues of the transition within the professional world, among others: the difficult governance and transparency of algorithmic models and the lack of trust that human operators place in systems that threaten to replace their duties.

Overall, the book offers a comprehensive and critical look at the AI applications in accounting and auditing. Thanks to a rich and authoritative theoretical background, combined with a wise use of qualitative research methodologies, all the authors of the book add relevant pieces of knowledge to understand such a divisive and dynamic topic. As can be guessed, the final judgment on AIDA (Artificial Intelligence-Driven Accounting) is neither categorical nor definitive; rather, the possible perspectives are described so that professionals, researchers, and policy makers can withstand the digitalisation profitably and safely. However, the authors of this book review wish to draw attention to a further element that could enrich future contributions on this topic. Specifically, chapter 7 of the book reports biases that ML algorithms could incorporate through input data, and these are mainly statistical biases (e.g. Historical bias, Representation bias). In this framework, we suggest considering the diverting effect of cognitive biases, which intrinsically affect reasoning of all human beings (Tversky and Kahneman, 1974), including professionals' training of ML algorithms through input data. In practice, cognitive biases may divert professionals when choosing which input data to feed ML algorithms, thus generating statistical biases. Definitively, considering cognitive biases in this phase could increase practical and theoretical implications of contributions on this topic.

## References

- Alelyani S. (2021). Detection and Evaluation of Machine Learning Bias. *Applied Sciences*, 11(14), 6271, doi: 10.3390/app11146271.
- Athota V.S., Pereira V., Hasan Z., Vaz D., Laker B. and Reppas D. (2023). Overcoming financial planners' cognitive biases through digitalization: A qualitative study. *Journal of Business Research*, 154, 113291, doi: 10.1016/j.jbusres.2022.08.055.
- Char D.S., Shah N.H. and Magnus D. (2018). Implementing machine learning in health care – addressing ethical challenges. *The New England Journal of Medicine*, 378(11), pp. 981-983, doi: 10.1056/NEJMp1714229.
- Chen H., Chiang R.H. and Storey V.C. (2012). Business intelligence and analytics: From big data to big impact. *MIS Quarterly*, 36(4), pp. 1165-1188, doi: 10.2307/41703503.
- Davenport T.H. (2018). *The AI advantage: How to put the artificial intelligence revolution to work*. (MIT Press).
- Earley C.E. (2015). Data analytics in auditing: Opportunities and challenges. *Business Horizons*, 58(5), pp. 493-500, doi: 10.1016/j.bushor.2015.05.002.
- Han H., Shiwakoti R.K., Jarvis R., Mordi C. and Botchie D. (2023). Accounting and auditing with blockchain technology and artificial Intelligence: A literature review. *International Journal of Accounting Information Systems*, 48, doi: 10.1016/j.accinf.2022.100598.
- Huang M.H. and Rust R.T. (2018). Artificial intelligence in service. *Journal of Service Research*, 21(2), pp. 155-172, doi: 10.1177/1094670517752459.
- Jarrahi M.H. (2018). Artificial intelligence and the future of work: Human-AI symbiosis in organizational decision making. *Business Horizons*, 61(4), pp. 577-586, doi: 10.1016/j.bushor.2018.03.007.
- Kokina J. and Davenport T. H. (2017). The emergence of artificial intelligence: How automation is changing auditing, *Journal of Emerging Technologies in Accounting*, 14(1), pp. 115-122, doi: 10.2308/jeta-51730.
- Rodríguez-Barroso N., Stipcich G., Jiménez-López D., Ruiz-Millán J. A., Martínez-Cámara E., González-Seco G., Luzón M. V., Véganzones M. A. and Herrera F. (2020). Federated Learning and Differential Privacy: Software tools analysis, the Sherpa.ai FL framework and methodological guidelines for preserving data privacy. *Information Fusion*, 64, pp. 270-292, doi: 10.1016/j.inffus.2020.07.009.
- Sutton S.G., Holt M. and Arnold V. (2016). “The reports of my death are greatly exaggerated” – Artificial intelligence research in accounting. *International Journal of Accounting Information Systems*, 22, pp. 60-73, doi: 10.1016/2016.07.005.

Tversky A. and Kahneman D. (1974). Judgment under Uncertainty: Heuristics and Biases. *Science*, 185(4157), 1124-1131.

Winston P.H. (1984). *Artificial intelligence*. (Addison-Wesley Longman Publishing Co., Inc.).