Accounting for the future: practice, Artificial Intelligence and regulation

Octavian OPREA
The Authority for the Digitalization of Romania, Bucharest, Romania
Octavian.oprea@adr.gov.ro

Răzvan HOINARU
Queen Mary, University of London, London, UK
r.hoinaru@qmul.ac.uk

Cătălin-Paul PĂCURARU-IONESCU
Bucharest University of Economic Studies, Bucharest, Romania
paul@pacuraru.com

Daniela NEAMȚU
Ștefan cel Mare University, Succeava, Romania
dana.neamtu@usm.ro

Abstract. *This paper is a feed-in regulatory analysis for the ongoing EU legislation on Artificial Intelligence (AI). The main argument is that accounting was left behind by this EU proposal for regulation and its three risk categories. The future of the Artificial Intelligence Act is both inclusive (specifically addressing many activities) and exclusive (takes out from the scope of regulation certain industries and applications). Despite the rather extensive sphere of (non)application of the proposal of regulation, accounting falls in a third category of unaddressed industries. Our argument is that accounting should be taken into consideration and be included in one of the categories, according to the regulatory proposal classification. By creating a regulatory framework for accounting in AI, a certain sense of certainty can be created in the markets and in the profession. Accounting is a decision-making tool with control capacity over financial and social behaviour, due to its informing capacity and pro-cyclicity influencing value, hence being able to create risks and possible moral hazards.*

Keywords: Financial reporting, Artificial Intelligence (AI), EU Regulation

Introduction

Regulating AI is currently a struggle in the EU, US and China and also for supra-national bodies like Council of Europe, OECD, UNESCO and also for (want-to-be-)self-regulators. Interesting enough is that there seems to be a competition for regulation, then an international cooperation, as relatively limited discussions and cooperation happen among the involved actors. Also, there seems to be a partial overlap between these institutions, in EU and global regulations, save that there is a small twist in perspectives.

This article is focused mainly on the EU proposal for regulation on Artificial Intelligence and policy suggestions for taking accounting into account for better results and regulation. Accounting is important as via its informing capacity it has the power to influence and alter behaviour and economic decisions with social and societal impacts. This is especially significant as a more stakeholder oriented approach seems to be projected more and more into the accounting

profession. Despite the characteristics mentioned by IASB Conceptual Framework such as stewardship, prudence and despite arguments over neutrality, there is common sense knowledge and comments on accounting manipulations especially under FVA (Fair Value Accounting) and modelling, especially on level 3 type of assets. Once accounting is coupled with AI a different framework would be needed to address challenges that should not be ignored. Hence the Research Question of this article is: *To what extent AI accounting reasoning is different from the current EU AI regulatory purposes?*

In addressing this Research question this paper is structured as follows: first, the authors will present an institutional mapping, both international regional and national. We are going to check if there is any overlap in between AI regulation as envisioned by different organisations whose main purposes stands in the area of human rights and ethics. Once we have cleared out all actors and their perspective, the focus will be on the European Union's proposal for regulation, risk categories and standardisation. The second part of the article concentrates on AI and financial reporting and departs from the purpose of the regulation proposal. This second section discusses the role of AI in accounting practice and surveys both professional (ACCA, ICAEW, Accountancy Europe) and academic literature. Both of them show the limitation of interaction between accounting domain and the AI regulation and also reveal technical and human challenges. Last part is represented by a conclusion which sums up the arguments and also discusses how AI managed to leave accounting behind, and in turn accounting having its own particular interactions with various forms of AI, generating risks.

Institutional mapping

The Council of Europe, which is an international organisation, hosted in Strasbourg, has the AI perspective on human rights, rule of law and democracy. Council of Europe's Committee *Ad hoc* on Artificial Intelligence (CAI; formerly CAHAI) is responsible for the feasibility study on AI and curiously enough it asked for binding legislative powers over AI regulation, in the forms of an international treaty, as opposed to non-legislative recommendations which was normally its practice (Council of Europe, 2020).

UNESCO, which is an UN body, has only the power to issue recommendations in terms of sustainability of AI. Its 193 Member States adopted the first ever global ethics recommendation on AI, which might serve as further legal infrastructure for the next pieces of legislation. There are four massive pillions that this proposal is based on, starting with data protection, including one's own control over its data and how much access should the government get, leading to banning of mass surveillance, yet some monitoring and evaluation is allowed. Lastly, the environment is addressed and the text reads as: '*it also aims at reducing the environmental impact of AI systems and data infrastructures. It incentivizes governments to invest in green tech, and if there are disproportionate negative impact of AI systems on the environment, the Recommendation instruct that they should not be used.* ' In addition to its massive importance in the UNESCO text, AI does not get juridical personality and both responsibility and accountability is with human beings. In this respect an AI Ethics Officer or similar position in each member state has to be established (UNESCO, 2021).

OECD obviously carries an economic and social perspective, establishing principles more than anything else. Their general framework for action is in regards to poverty eradication, peace, culture and sustainability. Surprisingly enough, none of the organisations mention financial reporting, in spite of the fact that OECD is an economics related organisation, while the EU

institutions have some committee cross-checks. However, their set of principles is based on human centric values, transparency, environment and global policy coordination on AI (OECD, 2019).

The European Commission's proposal for regulation on the Artificial Intelligence has more binding powers, yet, it has a rather erroneous title, as it does not regulate AI per se, however the use of AI, risks associated with its use, users and consumer protection. As it is mentioned in the reasons for and objectives of the proposal: '*This proposal aims to implement the second objective for the development of an ecosystem of trust by proposing a legal framework for trustworthy AI. AI should be a tool for people and be a force for good in society with the ultimate aim of increasing human well-being. Rules for AI available in the Union market or otherwise affecting people in the Union should therefore be human centric, so that people can trust that the technology is used in a way that is safe and compliant with the law, including the respect of fundamental rights.*' (EU Artificial Intelligence Act Proposal, 2022).

The text and annex concentrate on risks and divide them into three categories:
● limited risks;
● high risks;
● unacceptable risk;

These categories of risk are not that extreme as they sound, risk sometimes being equivalent to infringement or special rules considering the use of biometric data, involvement of human supervision, etc. Limited risk is the first category, where, for instance, chat boots can be included. Interestingly enough there is no medium category, and from limited risk the next category jumps straight to high risks, which are credit scoring, obtaining a bank loan or being allocated a place at university by an AI system, AI performing medical surgery, as well as firing a person. The last category is more debatable as current negotiations take place about what should be included and excluded from this category, where AI can be used to manipulate people, influence behaviour and affect human rights. By exclusion there is also a category of no risk used by video games and by low application of such futuristic AI technologies (EU Artificial Intelligence Act Proposal, 2022).

The European Parliament has a special committee on AI named Special Committee on Artificial Intelligence in a Digital Age (AIDA). Members of the European Parliament (MEP) base their analysis on quality of data and the democratic use of it. There are also some alarm signals as in a ranking it turned out that only 8/200 EU companies are high up, yet the EU considers itself a global leader, this posing a risk of becoming a digital colony of US and China. In this respect, MEP Voss argued that: '*Europe should concentrate more on business models that would enable the transformation of research into products, ensure a competitive environment for companies and prevent a brain drain.*' (European Parliament, 2021).

When looking at more hands-on business self-regulator, as opposed to legal frameworks, self-regulators in AI are concerned with technical matters and standards like electricity and others more specifically AI powered features. Currently, there is no bespoken AI self-regulator (only cross-sectorial standards) as this is not favoured by regulators as devolution of power is not an option in this domain, being considered risky. Yet, AI producers like Google, Facebook, Microsoft and others, may actually get enough bargaining power (Computers Weekly, 2021).

This struggle over regulating the AI in an old fashioned command and control type, where the state and supra state organisations act in the public interest, monitoring performance and enforcing legislation in a top down perspective. As an alternative, smart regulation was an option, especially as the subject is future-proof and rather very technical. Standard setting organisations are told to start working and also harmonise with other national and regional bodies by the proposal of regulation and the compromises produced by the French Presidency of the Council, regardless that yet there is no agreed definition of AI.

Some negotiations were held under EU-U.S. Trade and Technology Council (TTC) for both hardware and software AI products; however, regulatory uncertainty exists and creates comments from civil society who want more consistent categories and comprehensive sets of vulnerabilities: *"the removal of the high threshold for manipulative and exploitative systems' under Art. 5 and ensure that the Art. 60 provides a public database that is user-friendly, freely accessible."* (Brookings Institution, 2022).

In the US, both the Trump and Biden administrations tried practical use of AI in the work of some governmental departments and agencies like the Department of Transport and Food and Drug for better management, data collection and results. The National Institute of Standards and Technology came up with the *Artificial Intelligence Risk Management Framework* to build public trust and address various aspects of „design, development, use, and evaluation." (Federal Register, 2021). This is important especially as digital companies would diversify and the Consumer Financial Protection Bureau raised some concerns about the connections between AI and financial services and the impact on consumers. Other institutions building on this in a broader digital regulatory manner, like the US Senate proposed an accountability and transparency act (Tech Policy Press, 2021).

As far as now this paper presented a mapping of institutional proposals for regulation, binding and not, naming actors and their perspectives. What seems to be ignored by them, yet it exists for niche sectors with cross-sectorial applicability are the accounting self-regulators on AI. Organisations like IASB, EFRAG and Accountancy Europe and other national, or EU level and professional bodies like ICAEW produce impact studies and debate about the role of AI in the accounting profession and accountancy. Next, AI from a financial reporting perspective shall be explained, as well as some legal ambiguities.

Artificial Intelligence and Financial Reporting

Artificial intelligence has been around since the 1950s, yet, it has not reached its full potential. Also, there is a difference between machine learning (ML), where the machine learns by themselves based on data and past experiences, while Artificial Intelligence tries to imitate as much as possible human behaviour. Many reports bring into discussion AI, as they use it interchangeably with ML, or consider ML as part of genre AI, despite the difference and the use of one or another; yet some authors use AI for software that trades on stock exchanges, puzzling understanding (Forbes, 2016). Some other studies differentiate further also between Artificial Intelligence and Intelligent Autonomation (IA), where the latter performs some low-level jobs, especially in repetitive processes, exact calculations, etc. For now, Intelligent Automation is the heart of Artificial Intelligence (IBM,2021), even though critics argue that when AI would be fully developed, IA should only be a small part of it, turning the situation the other way around. In effect and in the lack of a proper legal framework it is hard to produce a hierarchy or a clear differentiation among them, each organisation adapting perspective for its own bespoke needs.

In regards to financial reporting and artificial intelligence one could debate if Intelligent Automation is a more appropriate term to describe what current accounting software is doing. However, ICAEW (2019) issued a report explaining how accountants work with AI, even though at times the characteristics seem to be more of ML or IA, or rather more generally called 'general purpose technology'. Firstly, accountants use software that is outside these categories. For now, they mostly use conventional software or just simple computer programmers to structure data, model data and generate analysis, regardless how complicated technical knowledge fed in our output is.

The ICAEW report suggests that users can make their own decisions, in regards to clients or further actions and that currently AI is just a non-human support feature for human decision making. More precisely, by data cheeks and feeds, accountants can save time on rather repetitive activities and can concentrate more on decision making and accounting professional judgement. In spite of this situation, professional accountants are concerned about ethics and the impact on corporate finance, especially as only the M&A deals at global level reached $4trn in 2018, with huge potential for both growth or distraction of value. In terms of AI in the UK, this can contribute with a £232bn growth by 2030 ICAEW (2019). Other numbers show that world wide AI would generate 15.7 trillion USD by 2030 (Stancu and Dutescu, 2021).

In business terms, more transparency and better timeliness can increase financial reporting efficiency. In addition, AI can structure and communicate data in intelligible ways, make adjustments, estimates, predictions and cut down on costs on the entire accounting process. Presumably, this would mean that neutrality will be reinforced as one of the core accounting principles as a different weight will be assigned to it against other options (FRC, 2019).

Already XBRL was a great step in advancing machine reading of accounts, a tool that is very useful for both governments checking on data and also preparers. Visma, a Dutch company, performed an analysis on the future of accounting in regards to XBRL and AI. Their research came up to some rather interesting conclusions, as for now XBRL used XML, while AI is more based on Python and works better with CSV and JSON. This means that currently, AI is not that smart enough to match up with an already used accounting innovation, as it would be difficult to process, filter and flatten properly accounting data, not to mention multidimensional data analysis (VISMA, 2020).

This is a very practical challenge for accountants to structure data in a way AI algorithms may understand it (XBRL, 2020), using primarily value and secondary value data sets, teaching machine learning accounting principles like accruals and even more tricky aspects of bad debts and fraud detention; there are also additional challenges of big data (Duțescu et al., 2019). This may mean that successful and less successful models can be created by this symbiosis between accountants and AI, especially as new skills have to be learned by both and additional supervision has to be performed by humans in terms of faithful representation and reliability, as well as ethical standards, up until the AI with its IA and ML facilities creates an inside engine powerful enough to be trusted with corporate reporting data and actually perform tasks on viability of business models and market opportunities and risks, rather than simply cutting costs on human capital and challenging the accounting profession ICAEW (2019).

 EY (2020) findings consider the opposite, as it argues that: „*banks are using AI for real-time identification and prevention of fraud in online banking. The AI checks the plausibility of clients' credit card transactions in real time, compares new transactions with previous amounts and locations, and blocks them if it identifies a risk.*" Among the benefits of AI, this BIG 4 company mentions and includes 24/7 service which would be hardly possible for human preparers, unless at a higher price for special clients, who would afford such a luxury, even though there would be no real need for such an exquisite service. Because data is continuously updated, this would mean time saved for accountants who can focus more on human professional accounting judgement in different tasks. Deriving from this there are some questions on data security, compliance with regulations and aspects on personal data, confidentiality and governance (EY, 2020).

Mark Carney, Governor of the Bank of England, argued that: „*the use of AI in fraud detection, automated threat intelligence and prevention, credit assessments, wholesale loan underwriting and trading. He also said that the use of such technology could make it easier for smaller companies to access finance.*" ICAEW (2019).

Some considerations from the academic literature Stancu and Duțescu (2021) show that not only AI needs to adapt to human needs, but also humans need to adapt to AI as well, redesigning in effect the accounting profession. Their argument is that AI complements human jobs and there is currently no risk of accountants becoming redundant. According to their findings, about a third of repetitive tasks are now done by machines in 2018, and 61% in 2021. Hence, some of the book-keeping practice will disappear in the time to come. These scholars' literature review also reveals the limited amount of studies one on integrating AI solutions into the accounting profession and that more research is needed in this area. Some innovative companies of accounting are already using modern AI solutions, however with a narrow applicability, as accounting is a traditional profession, where the use of new technologies may generate a new paradigm.

Stoica and Feleagă (2021) took into consideration the digital driver. Their argument is that the use of robotic and digital processes will improve efficiency. Similar to Stancu and Duțescu (2021) there are claims made on the limited knowledge on the interaction between AI and accounting. In a study of ACCA (2020) they quote digital transformation has three stages: 1. Technology as an enabler; 2. General acceptance of technological usage; 3. Extra societal value. Accountants, especially from the millennial generation are tempted to use automation processes and corporations are also tempted to use automation processes, for very different reasons. While for preparers some repetitive and boring tasks are to be avoided, corporations seek to reduce on costs and maximise on profit, leading to a conflict between the needs of employees and the needs of employers.

Referring this back to the EU proposal for regulation of AI, it seems that the proposal as such was done in a regulatory vacuum, as legislation prescribes rules to a technology that is not available yet. Normally, legislation has a more descriptive characteristic, in its logical sense. Also, recital 61 and article 40 on standards follow the same pattern. The standard setting organisations are a self-contained world, very complex consisting of a mix of private and semi-private organisations, that are both technical and political. Some organisations are acting as worldwide influencers for the EU, as partly they are founded from the EU budget, while others keep a general international dimension. An Oxford Internet Institute Study noticed a nuance between common specifications and standards mentioned in by now art. 3 as well as a further interplay between international level, Commission level and Member States, which may create potential dangerous multi-level negotiations and uncertainty in the market (Oxford, 2021).

In terms of accounting, the Norwalk Agreement on common US and global standards was put on hold as harmonisation was hard and negotiations on certain criteria did not advance. Synchronising AI and accounting standards may prove to be difficult due to existing recent historical record, despite efforts from both IASB (International Accounting Standards Board) and FASB (Financial Accounting Standards Board) sides.

Furthermore, there is a well-established tension between accounting logic and economists' logic as the two hold different ambitions in regards to current and future financial value and how accounting numbers and narratives should interact with capital markets in regards to information exchange. While economists consider future financial value, same like financial analysis, accountants may focus more on decision usefulness, company needs vs investors needs and ultimately being committed to capital maintenance, in a prudent and conservative manner. This approach which is widely mentioned in the IASB Conceptual Framework helps capital markets efficiency, material adjustments within some limits, as well as avoidance of capitalisation of a firm to be decoupled from real earnings. In this regards it may be difficult for a machine to understand past, present and future valuation for assets and liabilities, equity buffers, as well as a perspective for investors as a primarily user group and stakeholder perspective, especially in non-financial

reporting which is very important in terms of capital formation and also of ESG and CSR (Haslam et al. 2015; Hoinaru et. al. 2021; Awawdeh, 2021; Ngo, Q.-T, et. al 2021; ACCA, 2021).

„Economists consider the current value of a business enterprise to be measurable by capitalising the expected earnings of that company…Accountants find expected earnings unacceptable for most accounting uses. The reason is found in an unwillingness to cut loose their thinking and their service from the provable objectivity of accounts kept and financial statements made in terms of costs actually incurred by this enterprise before the current date."

(Littleton, 2011, pp. 4-5)

In this respect, financial disclosures can modify behaviour by feeding in information, affecting decision usefulness, decision making and Fair Value Accounting matters. As the Maystadt report noted: *"policy choices in the field of accounting involve public interest stakes"* and *"accounting standards are more than a mere language convention. By influencing the behaviour of actors in financial markets, they can have an impact on the stability of those markets."* (Maystadt Report, 2013, p. 5). Commenting on this Haslam et al. (2015) provides the following analysis: *„first, accounting standards and financial disclosures have become increasingly focussed on the needs of investors and capital markets at the expense of a broader group of stakeholders. Second, changes to accounting standards and financial disclosure have complex compound impacts that can effect changes to a firm reported financial stability and thereby signal adjustments in the stewardship and governance of resources in ways that can translate into a real moral hazard to society."* (Haslam et al. 2015).

Just by looking at the numbers, some calculations point out that British companies can increase their value by 120% by 2030 if they invest properly in their development with AI. A Mckinsey report reads further that: *„AI could potentially deliver additional economic output of around $13 trillion by 2030, boosting global GDP by about 1.2 percent a year."*, is about helping workers, brand companies and making a difference which would positively impact on the quality of products and services, yet, might affect certain jobs and countries where a certain part of a value chain of the business is currently outsourced to. Also, companies, including SMEs are at great risk of fines, new GDPR requirements are algorithms may be hard to work with or supervised and there is a risk of bias (Mckinsey, 2018).

Conclusions and discussions

In conclusion, AI regulation is currently under discussion by most of the institutions, in EU, USA, regional and international organisations like OECD, OSCE, Council of Europe, UN, etc. The title of the regulatory proposal, at least in the EU, is misleading, as it does not necessarily address AI as such, however, the use of AI in different situations and products. From this perspective, a rather more comprehensive title matching the legal requirements in the text is welcomed.

The common concerns all these institutions have related to AI and ethics in various forms and even future risks. It is rather bizarre how the EU wants to create a future-proof parameter and regulate a technology that did not reach its maturity yet, in a rather prescribing way, possibly hindering innovation, especially as world wide only 8 EU companies are in top 200 (European Parliament, 2021).

Also, AI, IA and ML are energy intensive aspects which should be taken into consideration as a risk and addressed appropriately by non-financial reporting. In 2020 alone humans produced about 65 zettabytes of data, and by 2030 about 2 000 terabytes a day are expected world wide. Currently, AI uses 250-300 watts to process 45 terabytes of information and some predictions show that AI will be consuming 10% of the entire energy produced globally, more than an average US

household (MIT, 2019; Dhar, 2020). As financial reporting and non-financial reporting is becoming more detailed and extensive and also follows other IT coding languages, AI may turn out to be a risk in itself, which is not appropriately addressed in the EU proposal for regulation.

ACCA (2021) surveys from accounting professional organisations show that accountants are also worried about ethical nature in AI: 66% think that ethics in AI is prioritised as much as profit is, negative impact is feared as much as positive impact and changes brought to the profession. For the time being, only 19% of accounting professionals use AI in their work, a percentage diminished to 7% when auditors are considered. Yet, there are also more practical concerns, as currently the AI solution developed in a bespoken manner for accounting like XBRL uses XML while most of AI is based on Python and works better with CSV and JSON. In addition, accounting professional judgement is far too complicated for the current technological level of AI, especially when it comes to accruals and bad debts (XBRL, 2020; VISMA, 2020).

European Commission calculated that SME should normally invest 6-7000 euro EUR to comply with new rules EU Artificial Intelligence Act Proposal (2022), yet, CNBC advanced the sum of 31 bn EUR out of which about 11 bn euro just for the next five years in compliance costs, training people, etc characterising this regulation as rather restrictive and one that comes with great costs (CNBC, 2021).

For now, accounting is not mentioned in any risk category, despite we tried to prove in this article that financial reporting via its informing capacity has the tools to manipulate and influence decision makers and primarily users of IFRS. Stress tests in accounting (see Haslam et al., 2015) has to be redesigned to take into consideration AI which is more and more present, yet, legal certainty needs to back up information feed into markets. The EU AI proposal for regulation needs to consider accounting, and the accounting profession should revisit AI, in the sense that there should be mutual understanding and Conceptual Framework need to address regulatory present and future proof challenges and AI regulation should not leave accounting behind.

Bibliography

ACCA (2021). *Ethics for sustainable AI adoption: connecting AI and ESG.* Availabe at https://www.accaglobal.com/gb/en/professional-insights/technology/ai_ethics.html.

Awawdeh, A.E., Ananzeh, M., El-khateeb, A.I. and Aljumah, A. (2021). *Role of green financing and corporate social responsibility (CSR) in technological innovation and corporate environmental performance: a COVID-19 perspective, China Finance Review International*, Vol. ahead-of-print No. ahead-of-print. https://doi.org/10.1108/CFRI-03-2021-0048.

Brookings Institution (2022). *The EU and U.S. are starting to align on AI regulation.* Available at https://www.brookings.edu/blog/techtank/2022/02/01/the-eu-and-u-s-are-starting-to-align-on-ai-regulation/.

Computers Weekly (2021). *Self regulation of AI is not an option.* Available at https://www.computerweekly.com/blog/Cliff-Sarans-Enterprise-blog/Self-regulation-of-AI-is-not-an-option.

Council of Europe (2020). *1384th meeting. Ad hoc Committee on Artificial Intelligence.* Available https://search.coe.int/cm/Pages/result_details.aspx?ObjectID=09000016809fa65b.

CNBC (2021). *Europe's proposed A.I. law could cost its economy $36 billion, think tank warns. Available at* https://www.cnbc.com/2021/07/26/aia-europes-proposed-ai-law-could-cost-its-economy-36-billion.html.

Dutescu A., Pugna I. and Stanila G. (2019). *Reframing business reporting in a Big Data world.* Proceedings of the International Conference on Business Excellence, Vol.13 (Issue 1), pp. 696-706. https://doi.org/10.2478/picbe-2019-0062.

EU Artificial Inteligence Act Proposal (2022). *Laying down harmonised rules on artificial inteligence.* Available at https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri= CELEX:52021PC0206&from=EN.

European Parliament (2021). *AI: We need to act fast to realise the EU's potential (interview).* Available at https://www.europarl.europa.eu/news/en/headlines/society/20211118STO17612 /ai-we-need-to-act-fast-to-realise-the-eu-s-potential-interview.

EY (2020). *How to make the most of AI in corporate reporting.* Available at https://www.ey.com/en_gl/audit/how-to-make-the-most-of-ai-in-corporate-reporting.

Federal Register (2021). *Artificial Intelligence Risk Management Framework.* Available at https://www.federalregister.gov/documents/2021/07/29/2021-16176/artificial-intelligence-risk-management-framework.

Forbes (2016). *What Is The Difference Between Artificial Intelligence And Machine Learning*? https://www.forbes.com/sites/bernardmarr/2016/12/06/what-is-the-difference-between-artificial-intelligence-and-machine-learning/?sh=17a47c62742b.

FRC (2019). *Artificial Intelligence and corporate reporting.* Available at https://www.frc.org.uk/getattachment/e213b335-927b-4750-90db-64139aee44f2/AI-and-Corporate-Reporting-Jan.pdf.

Haslam et. al. (2015). *Stress Testing International Financial Reporting Standards (IFRS): Accounting for Stability and the Public Good in a Financialized World.* Available at https://www.degruyter.com/document/doi/10.1515/ael-2015-0006/html.

Haslam, C., Hoinaru, R., & Daniel, B. (2019). *Accounting for the future: How will corporate business models deliver sustainability*?. In Proceedings of the International Conference on Business Excellence (Vol. 13, No. 1, pp. 817-828).

Hoinaru, R., Robe, A. D., Stanciu, A. M., Damasaru, C., & Niţă, S. (2021). *Human resources accounting and accountability: medical aspects, regulation and economics of burn out in non-financial reporting.* In Proceedings of the International Conference on Business Excellence (Vol. 15, No. 1, pp. 695-704).

IBM (2021*). Inteligence Automation.* Available at https://www.ibm.com/cloud/learn/intelligent-automation.

ICAEW (2018). *Artificial intelligence and the future of accountancy.* Available at *https*://www.icaew.com/-/media/corporate/files/technical/technology/thought-leadership/artificial-intelligence-report.ashx.

Kagwaini, D. (2019). *The Role of IASB on Corporate Reporting Disclosures: Use of Artificial Intelligence.* Available at http://repository.daystar.ac.ke/bitstream/handle/ 123456789/3577/The%20Role%20of%20IASB%20on%20Corporate%20Reporting%20D isclosures%20Use%20of%20Artificial%20Intelligence.pdf?sequence=1&isAllowed=y.

Littleton, A. C. (2011). Economists and Accountants. *Accounting, Economics, and Law: A Convivium,* 1(2), Article 2.

McKinsey (2018). *Notes from the AI frontier modeling the impact of AI on the world economy.* Available at https://www.mckinsey.com/~/media/McKinsey/ Featured%20Insights/Artificial%20Intelligence/Notes%20from%20the%20frontier%20M odeling%20the%20impact%20of%20AI%20on%20the%20world%20economy/MGI-Notes-from-the-AI-frontier-Modeling-the-impact-of-AI-on-the-world-economy-September-2018.ashx.

MIT Tech Review (2019). Training a single AI model. Available at https://www.technologyreview.com/2019/06/06/239031/training-a-single-ai-model-can-emit-as-much-carbon-as-five-cars-in-their-lifetimes/.

Dhar, P. (2020). The carbon impact of artificial intelligence. *Nature Machine Intelgence* 2: 423-425, https://doi.org/10.1038/s42256-020-0219-9.

Ngo, Q.-T., Tran, H.A. and Tran, H.T.T. (2021). The impact of green finance and Covid-19 on economic development: capital formation and educational expenditure of ASEAN economies, *China Finance Review International*, Vol. ahead-of-print No. ahead-of-print. https://doi.org/10.1108/CFRI-05-2021-0087.

OECD (2021). *Recommendation of the Council on Artificial Intelligence.* Available at https://legalinstruments.oecd.org/en/instruments/OECD-LEGAL-0449.

Oxford Commission on AI and good governance (2021). *Harmonising artificial intelligence.* Available at https://oxcaigg.oii.ox.ac.uk/wp-content/uploads/sites/124/2021/12/Harmonising-AI-OXIL.pdf.

Tech Policy Press (2021). *Document: Senators Propose Platform Accountability and Transparency Act.* Available at https://techpolicy.press/document-senators-propose-platform-accountability-and-transparency-act/.

Sejnowski, T. (2018). *The deep learning revolution: Artificial intelligence meets human intelligence.* London: The MIT Press Cambridge Mass. Retrieved from: https://www.academia.edu/38223831/Sejnowski_Terrence_J._The deep_learning_revolution_2018_.pdf.

Stancu, M. and Duțescu, A. (2021). The impact of the Artificial Intelligence on the profession, a literature's assessment in *Proceedings of the International Conference on Business Excellence*, Vol.15 (Issue 1).

Stoica O. and Ionescu-Feleagă L. (2021). The accounting practitioner as a driver of digitalization pace. *Proceedings of the International Conference on Business Excellence*, Vol.15 (Issue 1), pp. 768-782. https://doi.org/10.2478/picbe-2021-0072 .

UNESCO (2021). *UNESCO member states adopt the first ever global agreement on the Ethics of Artificial Intelligence.* Available at https://en.unesco.org/news/unesco-member-states-adopt-first-ever-global-agreement-ethics-artificial-intelligence.

XBRL (2020). *How can XBRL and AI work together?* Available at https://www.xbrl.org/news/how-can-xbrl-and-ai-work-together/.

VISMA (2020). *XBRL and AI.* Available at https://info.vismaconnect.nl/blog/xbrl-and-ai.