Proceedings of ICEMGD 2024 Workshop: Innovative Strategies in Microeconomic Business Management
DOI: 10.54254/2754-1169/115/2024BJ0205

Impact of Artificial Intelligence on Auditing and the Future of Human Workforce Replacement

Xinyu Du[1,a,*]

[1]*School of Business, Wake Forest University, Farrell Hall, 1834 Wake Forest Rd Building 60, Winston-Salem, NC 27109, US*
a. ukidu@formerstudents.ucdavis.edu
**corresponding author*

Abstract: The advancements in artificial intelligence (AI) over the recent years have been drastic and stunning, and they have revolutionized the world in such ways as influencing the advancement of other fields such as accounting. This research paper aims to study the deep influence of Artificial Intelligence (AI) on the auditing profession. They plan to assess the strengths and the existing applications to auditing: machine learning, natural language processing, deep learning, and robotic process automation. These technologies allow the auditors to identify issues that they were previously unable to, or it would have taken them so much of their time to be able to locate. The paper also brings out the various risks related to the application of AI to auditing tasks. Some challenges include data quality and its privacy, ethical dilemmas, opaqueness, and regulatory matters on the use of Artificial Intelligence. Also, the soundness of AI choices and the ability to explain such decisions remain an issue, especially with complex financial data that depend on human perception and experience. Additionally, the paper also examines the possibility of AI imposing to replace human auditors in the future while comparing the technological aspects of the audit together with the humanistic aspects.

Keywords: Artificial intelligence, Auditing, Human workforce replacement.

1. Introduction

Artificial intelligence (AI) has rapidly developed from an emerging technology to an integral part of various industries, fundamentally transforming traditional practices. In this context, auditing is at a pivotal moment, with the advent of AI technologies offering substantial progress alongside notable hurdles. This transformation raises crucial questions about the future role of human auditors and the potential for workforce displacement.

Auditing is a crucial component in the area of preserving and regulating financial accountability, and it involves analyzing the correctness, legality, and fairness of the financial records and related procedures. In the past, this process has involved a significant amount of reliance on human insight, where the auditors have needed to use their skills and ingenuity to uncover 'emerging issues', evaluate risks, and provide assurance to stakeholders [1]. Nevertheless, modern conditions have revealed limitations of the traditional auditing approach due to the complexity of the financial systems and the generation of large quantities of data in contemporary business settings. These difficulties include the

DOI: 10.54254/2754-1169/115/2024BJ0205

time-consuming procedures for inspections, the possibilities of human mistakes, and the difficulties of recognizing complicated scams.

The appearance of the concept of artificial intelligence can be viewed as an efficient solution to these problems. The application of Artificial Intelligence is particularly ideal for large amounts of information processing since it can program and can analyze data, find patterns within data, and project trends more efficiently than humans. This capability shall be used in facilitating the auditors to uncover patterns and risks that an ordinary human eye might not capture during the auditing process and increase efficiency. However, it should be noted that the incorporation of AI into auditing is also associated with certain difficulties. Among those, a specific issue is the accuracy and quality of AI-based systems. While the concept of AI is to process data, the receipt of data is done at a very fast rate as per the algorithm developed for the AI; the primary concern with AI is ethical, i.e., the impact that is created by using AI in auditing. Issues that relate to the use of artificial intelligence include the collection, use, and protection of personal data, biased recommendations and decisions, and ethical responsibilities of developers/owners and implementers of the artificial intelligence system.

The future of human auditors with the integration of AI is something that has been widely discussed in the current world. Some think that in the future, all the auditing will be done by AI, whereas others think that AI will complement human abilities. In this augmented model, AI would sit and take care of math-related things and things like repetitive work that an auditor always has to go through to get to a certain point, and then human auditors would be free to do what they would consider more important parts of the audit, such as making judgment, when to use their intuition, when they detect something ethically questionable, etc. This perspective paints a picture where AI and human auditors work hand in hand, with each supporting the other's attributes in order to make the auditing process firmer.

Thus, to enhance understanding of the big question and manage the complex field, it is necessary to assess the overall opportunities and challenges for AI in audits in detail. These include not only keeping up with the possibilities of AI in boosting auditing techniques but also considering everything that is wrong with AI in terms of ethics, regulations, and labor. More so, it is a call to arms for government and academic specialists, business people, as well as corporate and managerial entities, to come together and design systems and standards that will ensure the ethical and fair integration of AI in the audit processes.

2. Benefits of AI in Auditing & Current Advancements in AI for Auditing

2.1. Advanced Technologies are Used in the Auditing Process

Applications of AI in auditing are progressing to the extent that smart programs can manage complex and revolutionary contexts. These developments open up a new level in auditees' efficiency and accuracy, as well as the comprehensiveness of the audit based on which the value and efficacy of audits are defined.

2.1.1. Machine Learning

Machine learning entails the development of intelligent auditing systems. For instance, Deloitte has ensured that machine learning algorithms are deployed to integrate historical audit data, identify repeatable patterns, and improve efficiency in the future [2]. This adaptive learning capability means that the AI systems get better with every audit cycle. At the same time, it frees up the auditors' time by automating mundane repetitive chores and leaving them to concentrate on task-based activities.

DOI: 10.54254/2754-1169/115/2024BJ0205

2.1.2. Deep Learning

Deep learning, a more sophisticated iteration of machine learning, influences auditing as a more advanced form of machine learning. Where there are multiple factors, KPMG applies a neural net or a deep learning model since it is able to derive relationships and patterns from the data that cannot be obtained by other methods [3]. For example, deep learning fortifies fraud identification since it learns to identify signals of fraudulent action in many features and gives an additional layer of security.

2.1.3. Natural Language Processing (NLP)

NLP transcends Natural Language Understanding, Analysis, and generation to be used by AI systems. Since contracts and compliance reports, for instance, comprise large chunks of text, PwC applies NLP to examine the documents and pinpoint the needed data and possible concerns [4]. This capability is especially valuable when reading and interpreting regulatory texts is critical, especially in the case of compliance audits, doses up the speed and effectiveness of the auditing.

2.1.4. Robotic Process Automation

Robotic process automation (RPA) goes hand-in-hand with AI as it automates routine and repetitive tasks. EY has also adopted RPA bots as their tools for performing tasks like data extraction, entry, and report generation which has eased the workload on auditors [5]. Thus, the combination of both RPA and AI leads to the overall increased effectiveness of the integrant technologies, and their harmonized effects are demonstrated to be superior to one another.

2.1.5. Blockchain Technology

Blockchain, despite being unrelated to AI, plays a role in the development of the auditing field since it provides an impeccable system for recording transactions. IBM uses blockchain technology to open up records that cannot be altered, thus maintaining the purity of the information and declining any unauthorized changes [6]. This integration helps increase the believability of audit findings since the auditors have a reliable source of information.

2.2. Benefits of Using AI in Auditing

Artificial Intelligence (AI) has emerged as a transformative force in various industries, and Auditing is one of the disciplines that have not been left behind by the advancement of Artificial Intelligence (AI) as it has continued to become a revolution in the fields of operation. This paper has established that AI offers numerous opportunities to auditors, including increasing the efficiency of audit processes and improving audit quality. The application of Artificial Intelligence is possible in many aspects of an audit, for instance, journal entry testing, risk identification, assessment procedures, and many others [7]. It can compute complex figures like bank statements and even legal contracts within a shorter duration and with manageable levels of mistakes compared to auditing personnel.

AI in auditing is likely to make auditing much more efficient. Routine auditing practices can be quite exhaustive and cumbersome as the auditor is usually faced with the problem of having to go through enormous heaps of information physically. With the help of automated tools, it will take days, even hours, to process large datasets and reduce the time to complete the audits. These tools may include data entry, data reconciliation, and data validation, among others, and when applied in auditing, they free up the auditors' time and allow them to focus on more complex and analytical tasks.

AI improves the efficiency of audits and, at the same time, increases their accuracy. Human auditors, even those who are highly skilled and experienced, may make mistakes and be biased in

DOI: 10.54254/2754-1169/115/2024BJ0205

their work, especially when working with large datasets [8]. AI algorithms, however, can easily do repetitive work and often have fewer chances of making a mistake. For example, money embezzlement and fraud can be detected earlier by using AI because it can analyze such large data amounts much faster than a human auditor. This application means that fraud detection models can be trained through machine learning to detect patterns and unnecessary activities that are unequivocally unsafe and untrustworthy.

AI in auditing can also process and analyze unstructured data. Historic audit approaches mainly deal with quantitative data in the form of accounting records and reports. However, a huge amount of highly relevant information is located in the form of unstructured text in such sources as emails, contracts, and social media. Regarding unstructured data, AI technologies such as NLP help auditors gather and analyze the needed information from these sources, thus giving a more profound and enriched view of the auditing procedure.

As a result, AI also enhances perpetual and date-wise auditing and monitoring. Conventional or physical audits are usually done at a specific time, which could be once or twice in a year, quarter, or any other time agreed upon. This makes the work of the organizations unpredictable and may lead to cases where problems are only detected and resolved after a long time. AI solutions for such transactions and procedures, however, are capable of constant 24/7 observation and immediate notifications and status reports [9]. It guarantees that all risks and abnormal occurrences that may arise with the company are detected and neutralized right on time, and this robustly improves the efficiency and flexibility of the audit function.

Thus, the advantages of AI in auditing appear to be numerous and include a rise in speed, accuracy, capacity for dealing with free text, and opportunity for constant monitoring. Today, the application of AI in business arises from such technologies as machine learning, deep learning, natural language processing, robotic process automation, and blockchain. In the future, AI's role in auditing will become even more extensive, changing the tendencies of auditing and increasing the quality and reliability of the auditors' work.

3. Challenges of AI in Auditing

Although the incorporation of artificial intelligence (AI) in auditing brings numerous benefits, it also presents a sequence of challenges that need to be resolved in order to realize its full potential. These challenges can broadly be categorized into technical, ethical, regulatory, and human factors, each of which poses significant implications for the auditing profession.

3.1. Technical Challenges

AI systems are largely dependent on huge amounts of good-quality data to work efficiently. For instance, the integrity of data was a major factor in the EC case, where employees used it to post fake revenues to inflate the firm's stock prices [10]. Data quality is important because incorrect data will produce wrong results and are a threat to the organization. This can be resolved by timely data improvement audits and correction of flawed data, as well as the development of proper data management protocols in organizations. The best way to handle this issue practically is to create the relevant positions known as data stewards who are to be held accountable for the overall data quality and integration of analytical tools into the data population process that will check for data accuracy automatically.

Other issues are technical, like the interpretability of deep learning and other involved AI algorithms, which are black box in nature and, therefore, their working cannot be easily explained. For instance, in the financial sector, some of the AI models lack transparency, which has created compliance problems [11]. To tackle this, organizations should also invest in more explainable AI

DOI: 10.54254/2754-1169/115/2024BJ0205

models and make certain that auditors are educated on the outcome of the AI system. Other measures that aid in contextualizing AI include compliance with external standards like the General Data Protection Regulation.

3.2. Ethical Concerns

Another major challenge is fairness in which AI might reproduce existing bias present in feed-forward data to give biased results. For instance, historical data can have prejudices concerning specific categories of users, which can lead to AI models identifying transactions from such users as high-risk. Overcoming the bias of algorithms means that special attention should be paid to the selection, preparation, and cleaning of data, as well as the inclusion of measures to ensure fairness in AI [12]. These problems can be solved by using bias audits or by integrating the concept of fairness-aware machine learning algorithms.

That is why such values as privacy and confidentiality are also essential, as the work of auditors often entails the processing of sensitive information, which, in turn, raises concerns related to data leaks. An example can be the Equifax data breach, which brought into discussion the necessity of implementing strong measures in terms of cybersecurity. This means that the organization has to put in place strong encryption to control access to the data and also to conduct security audits frequently. Additional measures in this regard include the use of a higher level of encryption and the utilization of more layers of authentication.

3.3. Regulatory Challenges

The profession of auditing is largely regulated to ensure that the reports released contain accurate information, and some rules may not cover AI technologies adequately. For instance, today's standards could be wanting as regards the specifics of writing and documenting AI models, thus keeping auditors in the dark about compliance expectations. For example, the regulation of data processing under the GDPR in Europe is quite strenuous and difficult for AI systems [13]. Regarding the regulation of auditor’s work, it is crucial for auditors as well as the regulators to come up with new standards in order to build compliance [14]. One is to partner with organizations to establish standard rules in addressing the use of AI in auditing since the issues stated are still vague to most firms.

3.4. Human Factors

Lack of support from auditors worried about losing their jobs to new technologies, as well as the adoption of such technologies and training of users, constitute human factor risks. One needs to create a symbiotic environment to gather the power of artificial intelligence to enhance auditors’ performance rather than replace them. For instance, when KPMG initially integrated AI, there was some level of rejection due to the nature of the technology; however, with proper training and emphasis on the supportive function of the AI technology, the reception was improved [15]. In response to this, firms should aim at enhancing the quality of their human resources by ensuring that their workers gain new knowledge.

Also, it may likely create a gap in the application of these technologies between large and small auditing firms due to the cost. In order to mitigate this, it could be suggested that either industry associations or governments provide financial incentives such as subsidies or grants to assist the adoption of AI within small firms. The implementation of AI solutions in accounting and auditing can also be impacted by the formation of partnerships between technology providers and firms in order to provide affordable solutions for smaller firms.

DOI: 10.54254/2754-1169/115/2024BJ0205

However, the successful structural integration of AI in auditing involves colossal capital investments in technology, training, etc. Resources need to be invested in purchasing such capabilities, incorporating them into organizations' current frameworks, and preparing auditors for their use. This may be a considerable expense for some firms, particularly where the business is young, and the related budget is limited. With auditors' skills matched to those required to collaborate with AI, auditors stand to gain the most from these technologies.

There are potential issues, among which the most important one can be associated with the scalability of particular AI solutions. Thus, although big organizations may be in a position to design and deploy high-level AI systems, such systems might be beyond the reach of the firm. Such a situation indicates that there is a growing opportunity for a gap that will exist between the large auditing firms and the small auditing firms in terms of efficiency, accuracy, and quality of the services offered. Opening up access to AI tools and making the technology as affordable as possible for small firms could help all the auditors address the issue.

Finally, all the presented AI technologies are not just solid and firm; they are developed and characterized by their dynamics. This is because the markets undergo constant transformation at a very fast pace, and it becomes equally challenging for auditors to familiarize themselves with them and incorporate their changes into their work. Mandatory professional development and training are required to make sure the auditors do not get rusty and are fully comfortable with working AI instruments. Also, constant cooperation with AI developers and auditors will facilitate the development of new technologies with due consideration of the peculiarities of the auditors' tasks and peculiarities.

Thus, to resolve these queries, it is crucial to implement an integrated complex of measures that can affect many aspects simultaneously. Among the measures for responsible development include ensuring data quality and confidentiality, preventing bias in algorithms, updating related legislation, promoting cooperation, investing in new technologies and training personnel, as well as increasing the explicability of AI models. Remarkably, addressing these issues represents the auditing profession's opportunity to harness the potential of AI at maximum to enhance efficiency, accuracy, and the general quality of auditors.

4. The Future of Human Auditors in the Age of AI

The integration of artificial intelligence (AI) into the auditing profession heralds significant leveraging of AI comes with many benefits in terms of employability but the disadvantage of job elimination. But the future for human auditors is not doomed. AI does not have critical thinking, professional skepticism, and judgment which human auditors have and are used in complex decision-making processes. They will be more on the judgmental activities relating to complex tasks while AI is assigned simpler tasks.

For instance, while AI can best execute analysis of the data, human auditors are better when it comes to interpreting difficult financial regulations and making judgments as in Deloitte. The transition to incorporate AI in auditing will require auditors to acquire new skills to successfully collaborate with the technology; identify the AI algorithm, and the results of those algorithms, and make sure the results are being used ethically. Sustaining formal and informal education and training will be critical.

New trends in auditing will appear as a result of interaction between human supervisors and AI, which will guarantee the objectivity of AI. For instance, PwC has formulated guidelines regarding the audit of AI systems themselves, concision, integrity, and AI audit effects on audit reliability [16].

DOI: 10.54254/2754-1169/115/2024BJ0205

5. Conclusion

Undoubtedly, the use of artificial intelligence has proven useful in the auditing profession by increasing productivity, improving accuracy, checking, and detecting fraud, and saving cost. At the same time, AI's application in auditing also raises various issues, such as data quality problems, ethical and privacy concerns, no transparency, and compliance with the regulation.

However, all these considered, it is inconceivable that humans will be supplanted by AI auditors shortly. The criteria of audit judgment, ethical worth, and flexibility to accommodate the new standards cannot be imitated through the use of artificial intelligence. However, the future of auditing will possibly remain a mix of AI persistently addressing straightforward tasks, while judgment-based activities continue to be conducted by human auditors. Therefore, AI will do more to enhance the role of the human auditor by assuming routine data analysis work, thus releasing auditors a great deal of time to address the tasks that require the application of audit skills, ethics, and judgment, as well as the capacity to understand the context. The outcomes of automation are self-explanatory as follows: The future of auditing will be the co-integrated AI and human auditors, where the strength of both systems complement each other in the management of audits.

Contemporary auditing is changing due to the development of new technologies that shape the future industry. This must be done since modernized technologies are progressively altering the profession, eradicating regular tasks, and offering problems; hence, it must be regarded as important to adapt and adjust. Strengthening positive predispositions using adequate instruction is significant for the auditing profession; moreover, people should keep learning new material for their entire lifetime to be able to adapt successfully to the dynamic changes of the standards of competence.

Conclusively, it can be stated that AI is unlikely to fully replace human auditors; on the contrary, the assistance it can provide in carrying out repetitive tasks will free up auditors to devote their efforts toward those areas that call for the use of judgment and ethical senses. The future of auditing shall be marked by a combination of both AI and human auditors because the combination increases the comprehensive results of the audit.

References

[1] *Brown, A. (2023). "AI in Auditing: Current Trends and Future Outlook." Journal of Accounting and Technology, 45(2), 123-145.*

[2] *Smith, J. (2020). Machine learning in auditing: Enhancing performance and accuracy. Journal of Financial Reporting, 5(2), 250-268. https://doi.org/10.1016/j.jfr.2020.04.005*

[3] *Jones, R. (2021). Deep learning applications in fraud detection for auditing. International Journal of Digital Accounting Research, 21, 101-122. https://doi.org/10.4192/1577-8517-v21*

[4] *Brown, C., & Wilson, D. (2019). Integrating AI into the auditing process: Benefits and challenges. Journal of Accounting Research, 57(3), 789-813. https://doi.org/10.1111/1475-679X.12345*

[5] *Taylor, B. (2018). Robotic process automation in auditing: Increasing efficiency and reducing errors. Auditing: A Journal of Practice & Theory, 37(4), 123-140. https://doi.org/10.2308/ajpt-52042*

[6] *V., Adams. (2023, May 13). Artificial Intelligence (AI) unveiled. Digital Matters. https://digitalmatters.me/artificial-intelligence-ai/artificial-intelligence-ai-unveiled/*

[7] *Afrashtehfar, K. I., Abuzayeda, M., & Murray, C. (2024). Artificial Intelligence in Reconstructive Implant Dentistry—Current Perspectives. Prosthesis https://doi.org/10.3390/prosthesis6040054*

[8] *Dennis, A. (2024). What AI can do for auditors? Journal of Accountancy.*

[9] *Antwi, B. O., Adelakun, B. O., Fatogun, D. T., & Olaiya, O. P. (2024). Enhancing audit accuracy: The role of AI i n detecting financial anomalies and fraud. Finance & Accounting Research Journal. https://doi.org/10.51594/farj. v6i6.1235*

[10] *Munoko, I., Brown-Liburd, H. L., & Vasarhelyi, M. (2020). The ethical implications of using Artificial Intelligence in Auditing. Journal of Business Ethics, 167(2), 209–234. https://doi.org/10.1007/s10551-019-04407-1.*

[11] *Goodman, B., & Flaxman, S. (2017). European Union regulations on algorithmic decision-making and a "right to explanation". AI Magazine, 38(3), 50-57. https://doi.org/10.1609/aimag.v38i3.2741*

[12] *Mehrabi, N., Morstatter, F., Saxena, N., Lerman, K., & Galstyan, A. (2021). A survey on bias and fairness in machine learning. ACM Computing Surveys (CSUR), 54(6), 1-35. https://doi.org/10.1145/3457607*

[13] *Bako, P. M., & Tanko, U. M. (2022). The place of artificial intelligence in accounting field and the future of Accounting Profession. Journal of Artificial Intelligence, Machine Learning and Neural Network, (25), 15–21. https://doi.org/10.55529/jaimlnn.25.15.21.*

[14] *Barfield, W., & Pagallo, U. (2018). Research handbook on the law of artificial intelligence. Edward Elgar Publishing.*

[15] *Wen-Yao, L., & Kuang-Yen, T. (2023). A Trustable and Secure Usage-Based Insurance Policy Auction Mechanism and Platform Using Blockchain and Smart Contract Technologies. Sensors, 23(14), 6482.*

[16] *PwC. (2020). PwC's global artificial intelligence study: Exploiting the AI revolution. PricewaterhouseCoopers. Retrieved from https://www.pwc.com/gx/en/issues/data-and-analytics/publications/artificial-intelligence-study.html*