

Transformation of Artificial Intelligence in the Accounting Profession toward a New Technology Era

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Abstract. Artificial Intelligence (AI) has changed the landscape of the accounting profession by having a significant impact. AI delivers the ability to process data quickly, identify patterns, and make intelligent decisions, changing the way accountants work. This study aims to analyze the impact of AI on the accounting profession and its implications for their roles and responsibilities. In this study, we explain the basic concepts of AI, such as machine learning, natural language processing, and cognitive computing, and describe how AI is applied in accounting. We identify various benefits of AI in the accounting profession, including increased efficiency and accuracy, real-time data processing, and better analytical capabilities. However, there are also negative impacts that need to be considered, such as the potential for replacing the work of accountants by AI systems, challenges to data privacy and security, and ethical issues that arise. The roles and responsibilities of accountants have also changed. Accountants need to develop new skills, such as understanding technology and interpretive analysis, and have the ability to adapt quickly. Efforts to adapt and develop the professionalism of accountants are the key to facing challenges and optimally utilizing the potential of AI. This study provides insight into the impact of AI on the accounting profession and the importance of understanding the changes that are taking place. This research also encourages further discussion on issues related to AI in accounting. It is hoped that this knowledge can help accountants deal with change and leverage AI technology to increase the efficiency and quality of their work.

Keywords: Accounting, Artificial Intelligence, Capabilities and Skill

Introduction

Nowadays, technology and information are developing rapidly in all professional fields where you are required to work quickly. Artificial intelligence, or AI, is a type of algorithm that allows human intelligence to be simulated to perform tasks more intelligently or independently [1]. AI technology refers to the creation of a human mind that can learn natural language, plan it, understand it, and process it [2]. This is considered machine intelligence that imitates human actions in communicating and making decisions.

According to [3], artificial intelligence refers to the field of computer science that focuses on the research and development of computer systems capable of demonstrating a certain level of intelligence. In another context, artificial intelligence technology is a system capable of learning, thinking logically, and generating new concepts and tasks to draw conclusions about the world, understand natural language, and perform various actions that require human-like abilities.

AI technology is able to obtain more accurate results and time savings in processing large amounts of data that are known in various fields of activity [4]. Artificial intelligence (AI) adheres to the machine learning (ML) paradigm, which allows the machine to automatically learn from experience according to the task and measure its performance. ML has a new branch called deep learning, which utilizes the power of the human brain in processing images, text, sound, etc. and so on [1]. Machine Learning (ML) In contrast to conventional computer code developed by software developers to produce program output based on specific input, machine learning uses data to create statistical code. Regarding the new branch of ML, namely deep learning (DL), which comes from the system's ability to see more relationships than humans can practically code in software, or even relationships that humans cannot see [3].

Deep learning, which is a machine learning algorithm, has the ability to continuously learn at various levels and respond to various levels of abstraction. Typically, this is achieved through the utilization of artificial neural networks and statistical models, in which learning at various conceptual levels plays an important role. At this level, high-level concepts are determined by low-level statistical models, and low-level concepts help in describing and articulating many high-level concepts [5].

Current developments in AI technology can provide very innovative new shortcuts to keep up with the current situation. AI technology is currently used in various fields of human life, namely business and economics, finance, health, food, and many more. In the business and economic fields, AI technology is applied to the e-commerce field, namely the many online shopping sites in Indonesia currently, which make it easier for people to buy and sell remotely. In the business sector, especially e-commerce, AI technology algorithms are able to carry out analytical studies on past data related to sales, human resources, marketing, and customer purchasing patterns. Then the results of these analytics can help to maximize profits and sales as well as optimize resources [5].

With the existence of artificial intelligence technology, increasingly sophisticated and creative innovations have a significant impact on human life today. On the other hand, artificial intelligence technology can also pose a threat to human labor due to the existence of technologically advanced machines designed to increase performance efficiency, thereby possibly replacing human jobs [6]. Currently, there is widespread discussion regarding the use of AI technology in the accounting field. The field of accounting, which is a branch of business and economics, especially related to financial analysis, can also be replaced by more sophisticated technology today. In the financial sector, they are usually interested in new technology with various services and functions that can be integrated through technological advances.

In the accounting sector, following the development of AI technology, the aim is to be able to create several tasks automatically, which will make the work of accountants easier and faster. According to [7] AI is a field of study related to intelligent thinking that is useful for carrying out calculations. The aim of using artificial intelligence (AI) technology in calculations is to create a more structured computer system, which can make workers' work easier. However, AI technology still has its advantages and disadvantages, especially due to the lack of adequate information in the accounting field. Therefore, accounting science and the accounting profession must continue to develop and adapt to environmental changes. It is important for them to update their vision regularly in order to provide timely and relevant benefits [8].

If jobs in the financial sector are taken over by financial robots, such as intelligent data collection, automatic monthly payments, and automatic tax payments, then banking and

other professions such as accounting will be freed from large amounts of repetition. Even so, accountants still enter data and complete financial procedures to the end to avoid errors and fraud. AI technology can also check at any time regarding company funds, banks, and taxation to ensure the authenticity of company data [9].

AI technology has benefits for workers in various fields, namely that it can make work more effective and efficient. As time goes by, AI technology can take over human decision-making tasks. For years, accountants have used technology to increase the effectiveness and efficiency of their work [10]. Artificial intelligence can be utilized by accountants as financial robots as an efficient tool to help carry out work effectively, but there are also requirements for accountants that they must be more professional, have comprehensive analytical skills, and understand finance and management in the future [4]. The accounting field has had a long history with AI technology for approximately 25 years. The most important areas in this context are financial reporting and audit tasks. Accountants and auditors have the responsibility to prepare and examine company financial reports. This aims to ensure that the information presented is accurate, tax payments are made on time, and the amount is as it should be. [11] says that 95 percent of accountants have experienced changes, namely job losses caused by AI technology taking over the role of data analysis and numbers. It is anticipated that technological developments, especially artificial developments such as artificial intelligence (AI) and robotic machines, will revolutionize the accounting profession in the next 20–30 years. The routine and manual work normally performed by accountants will be transferred to robotic machines.

The Impact of Artificial Intelligence on the Accounting Profession

Regarding the description explained in the background, there will be an effect of artificial intelligence (AI) on the accounting sector, namely technological developments that can change business. There are a large number of assets that have a technical nature (related to technology) and are not physically tangible, so they do not require many staff, including accounting staff. Companies are no longer relying on the concept of a physical location as they operate virtual offices and use the latest approaches when it comes to marketing and sales [12].

One of the major accounting companies, namely Deloitte, has developed several technology-based applications, namely the development of an insight-based organizational framework (IDO) that helps organizations achieve strategic goals. IDO integrates analysis, data, and reasoning in the decision-making process and provides project scaling throughout the company to make business more efficient. Transforming larger amounts of data makes it scalable and creates a long-term competitive advantage in data resources. IDO can also help in increasing the speed and superiority of decision-making and reducing decision costs [13]

The role of accounting will change significantly over the next 20 years; there will be more emphasis on consulting, business development, advisory services, and risk management. Therefore, an accountant's specialization and use of technology are very important [14]. AI technology can also help an auditor's work when conducting analysis related to documents that must be reconsidered by a company. Various types of documents examined by auditors are nothing new, but with artificial intelligence, it can help minimize the auditor's time when auditing financial statements, and these documents can be processed automatically and connected to a transaction without any interference from the auditor in the future [15].

In research [12], it was said that according to predictions from Xero Research, around 59% of small business owners believe that ten years from now they will not need accountants. Meanwhile, almost all accounting processes can be mastered by computer

software, from recording transactions to making financial reports. This software is designed to be used by people who are unfamiliar with accounting. In fact, the accountant's role has only shifted since the introduction of AI technology; today, accountants also need to learn new skills and abilities to stay relevant in a changing world. The most important abilities for an accountant to have are business management, risk analysis, and information technology. Not only is the accounting profession experiencing a shift, but all professions will be affected, which can damage it with current technological developments. Even the IT profession itself can be affected. Companies can use infrastructure, platforms, software, and even data without having to make an investment.

In the future, artificial intelligence (AI) technologies may be involved in observing and evaluating regulations, organizational policies, and employee reviews. It's clear that the use of software by an accountant is nothing new. The use of software in tax filing, for example, will not replace the role of an accountant but will actually make the accountant's work more efficient. However, the newly created software can allow multiple users, so it no longer requires the profession of an accountant. Opinions differ as to how the role of the accountant might change. Some emphasized that major changes would occur, for example, in the transportation industry with the presence of the Grab application. Some believe that less complex tasks will be shifted to software within the business itself. However, because of that, it still requires someone's expertise to carry out audits and deal with complex regulations.

The Impact of Artificial Intelligence on the Auditor Profession

With the existence of AI technology, it can help the work of an auditor become automated, which was previously done manually. In the "confirmation" process, AI technology can accommodate preparing, authorizing, distributing, collecting, managing, and evaluating results. In addition, according to [16], artificial intelligence can help in inventory management by visiting customers directly and observing or calculating the inventory of goods owned by customers. The process of calculating and identifying inventory can be done automatically using artificial intelligence with the help of camera software. In the auditing process, not all processes are carried out by artificial intelligence because they still require consideration from an auditor, which cannot be replaced by technology.

On the other hand, the problem is that artificial intelligence-based technology cannot determine the completeness of information or documents that may be required by the parties for a transaction, who is not involved, and whether the asset valuation is accurate or not, so the application of AI technology still requires the role of an auditor. Artificial intelligence can help an auditor in the confirmation process, such as preparing, authorizing, sending, collecting, and evaluating the results of the confirmation. In the future, it is hoped that artificial intelligence will be automated with cameras and software so that there is no need to physically count inventories [16].

With the sophistication of AI technology, the task of the auditor will be increasingly assisted, or conversely, the auditor's role will be taken over by an AI technology machine with a low risk of error. However, in auditing, there is a required "consideration", which cannot be replaced by machines or technology because the end result of the audit process is the opinion presented by an auditor on the client's financial statements. Consideration is an opinion that is a pure thought from the human mind, so that it cannot be carried out by a system or machine.

The benefits of AI for the auditor profession *first*, AI-automated data collection can be used to automate data collection from various sources, such as company databases, accounting systems, external data sources, and other sources [17]. This includes capturing data in a specific digital format or structure.

AI automates data collection from various digital sources, such as company databases, accounting systems, websites, or business applications. Data collection from the internet is done by searching and extracting data from websites. These activities are useful in audits involving public information, such as news reports or public financial reports. This includes capturing data in formats that can be processed, such as CSV, Excel, or API, and digital documents such as email, PDF, text documents, and financial reports in digital formats [18]. Auditors use programmed AI to monitor data sources in real-time and collect new or changed data automatically as it becomes available. An example is real-time monitoring of financial transactions or stock market data. Even more sophisticated are programs to schedule data collection at specific times or based on certain events. For example, collecting monthly data from the accounting system at the end of each month and then sending notifications or alerts to auditors or stakeholders when relevant data or data that requires special attention is found.

Second, AI can be used to extract data from multiple sources automatically. In an audit context, optical character recognition (OCR) technology can be used to convert text from physical documents or images into a digital format that can be processed actions so that the final results of the company's inventory are known. The working technique is to convert text from physical documents or images into a text format that can be processed by a computer. A number of documents are scanned simultaneously, and OCR is used to convert them all into digital text in one process. Next, OCR extracts important information from various documents, such as financial reports, invoices, contracts, or other transaction documents, allowing auditors to take physical documents, such as annual reports or invoices, and convert the text printed on them into digital format [19]. Important information such as the date, invoice number, transaction amount, or customer name from the document is also extracted into the audit database. The advantage of using OCR in audit data extraction is that it increases efficiency and reduces the risk of human error. However, keep in mind that OCR performance may vary depending on the quality of the original document, font type, language, and software used. Therefore, auditors must ensure that the OCR tools they use meet their needs and monitor extraction results closely to ensure data accuracy.

Third, Natural Language Processing (NLP) is very useful in identifying important context and entities in audit data. NLP is a branch of artificial intelligence that focuses on the understanding and processing of human language by computers. Audits using NLP can make it easier to identify entities that appear in audit documents, such as company names, customer names, vendor names, and related individuals. This is useful for understanding who or what is involved in a transaction or report. Furthermore, NLP also provides sentiment analysis tools contained in the audit text. For example, analysis in financial statements or management reports using NLP can help identify whether the text is positive, negative, or neutral to the performance of the company or entity being audited [20]. Another advantage of utilizing NLP in the audit process is that it helps in understanding the context around words or phrases in audit documents. This can help differentiate the use of the same words in different contexts and explain relationships between entities, transactions, or events in documents, as well as ensure consistent use of terminology and concepts in audit documents, which can improve data clarity and interpretation [20]. The process helps in extracting hidden data in the audit text, such as patterns or trends that may not be immediately visible to the auditor.

Fourth, big data analysis technology has an important role in supporting the audit process by managing, analyzing, and evaluating information sourced from large and complex volumes of data. Big data analysis technology allows auditors to collect data from a variety of different sources, including internal company data, external data, transaction data, real-time

data, and structured and unstructured data [21] . This includes data in different formats, such as text, images, audio, and video. This technology also facilitates the integration of data from various sources into one comprehensive view. Big data technologies such as Hadoop and Spark enable fast data processing and high scalability to handle large volumes of data in a short time. Auditors can easily access, process, and analyze data in real-time or near-real-time [17]. This drives real-time or near-real-time audit reports, which can improve responsibility and decision-making capabilities. By utilizing big data analysis technology, auditors can identify risks earlier, gain deeper insights from audit data, and increase the efficiency of the audit process. However, it is important to understand this technology well and ensure that regulatory compliance and data security are maintained throughout the entire audit process.

Although artificial intelligence (AI) can provide various benefits to the accounting profession, such as automation of routine tasks and faster and more accurate data analysis, there are several negative impacts to consider:

1. The implementation of AI in accounting could result in the elimination of jobs in some fields that previously required human intervention. Routine tasks, such as data entry or transaction matching, may become automated, which can reduce the demand for human labor in those jobs.
2. Changes in required capabilities. Along with automation, accountants will need to develop different skills. They must become more focused on data analysis, an understanding of AI technology, and the ability to think creatively to solve complex problems.
3. AI is not properly implemented or managed, there is a risk of errors that could have a significant impact on audits or financial reports.
4. Dependence on technology. Relying too much on AI technology also has its own risks. If the AI system fails or technical problems occur, this can disrupt the accounting process and cause disruption in the provision of accounting services.
5. Privacy and data security. When using AI, especially in data analysis, it is necessary to pay attention to data security. The risk of a data breach or misuse of sensitive information may increase if proper measures are not taken to protect it.
6. The use of AI in auditing and accounting also raises ethical questions. How does AI handle conflicts of interest or situations that require ethical judgment? Ensuring that AI operates with ethical integrity is a challenge that must be overcome.
7. AI implementation requires significant investment in hardware, software, and human resource training. These costs may not be affordable for small businesses or professionals.
8. Skill gaps can exist between experienced accountants and the younger generation that grew up with AI technology. This can create an imbalance in the understanding and application of these technologies within the organization.

The reconstruction of the AI-based accounting curriculum is an important step to prepare students with the relevant skills and knowledge to face the increasingly technology-driven world of accounting. Here are some guidelines for designing an AI-based accounting curriculum:

Stage 1: Identify Goals and Needs

Identify goals. Determine the main goals of the AI-based accounting curriculum reconstruction. What to achieve by integrating AI into the curriculum The main goal of AI-based curriculum reconstruction is to prepare students with relevant skills and knowledge to

deal with the significant changes caused by artificial intelligence (AI) in various aspects of life and work.

Accounting scholars recognize the importance of keeping up with the rapid development of AI technology and ensure that students must be able to understand and apply the development of AI technology to the accounting profession. Therefore, the curriculum must be ensured to support graduates in having the skills needed to succeed in a world of work that is increasingly close to the use of AI, including jobs that may not exist at this time. Identification of industry needs by inviting stakeholders such as companies or accounting firms to understand industry needs related to AI skills and knowledge desired from accounting graduates

Stage 2: Basic Understanding of AI

Develop courses that integrate the basic implementation of AI, which includes an understanding of AI concepts, types of AI (including machine learning and deep learning), and AI applications in various industries, including accounting. Introducing basic-level data analysis skills that focus on developing data analysis skills, including the use of data analysis software such as Python or R, statistical understanding, data collection and cleaning, and data visualization

Stage 3: Application of AI in Accounting

Incorporate the use of AI in auditing courses, particularly regarding the understanding of AI tools used in audit sample selection, risk identification, and detection of fraud or anomalies in audit data. Incorporate AI implementations to automate routine accounting tasks such as matching transactions or preparing reports in some practice-oriented accounting courses.

Stage 4: Practices and Projects

The curriculum includes practical projects that involve the use of AI technology in real-world cases in the world of accounting. Students must be able to develop AI solutions for accounting problems. The curriculum includes industry case studies involving the use of AI in auditing, taxation, financial analysis, or other accounting activities.

Stage 5: Ethics, Privacy, and Compliance

The curriculum should encourage students to consider the ethics of using AI in accounting, including issues of data privacy, fairness, and social impact. The curriculum must have the ability to encourage students to learn and understand regulations related to the use of AI technology in accounting and the importance of complying with regulations.

Stage 6: Critical and Creative Thinking Skills

The curriculum must be able to stimulate students to develop critical thinking skills in dealing with AI technology, including the ability to evaluate information and decisions generated by AI systems. The curriculum must be able to stimulate students to use AI as an effort to increase creativity and innovation in data analysis, problem solving, or developing business solutions.

Stage 7: Evaluation and Update

Periodically evaluate and update the curriculum in accordance with the latest developments in AI technology and industry needs. Maintain collaborative relationships with accounting companies or organizations to ensure the relevance of the curriculum and enable students to gain practical insights from the real world. An updated AI-based accounting curriculum will help ensure that graduates have the necessary skills and knowledge to face future challenges in an accounting profession that is increasingly connected to AI technologies.

Conclusion

Even though artificial intelligence does not completely replace an accountant, the accounting profession must still play an active role in responding to the impact of artificial intelligence. AI has the potential to replace some of the tasks performed by accountants, especially those that are routine, repetitive, and can be automated. However, it is important to understand that this replacement does not mean that AI can completely replace the accounting profession. AI can be used to automate mechanical accounting tasks such as recording transactions, data processing, and financial reporting. This can reduce the need for tedious and time-consuming manual work. AI can help analyze financial data better than humans. While accountants have strong analytical skills, AI can help them identify patterns, anomalies, and trends in data more quickly and accurately. In the audit process, AI can be used to audit data quickly and efficiently. This can improve audit efficiency and enable better detection of violations or non-compliance with regulations. Accountants can use AI to provide more sophisticated consulting services to their clients. With the help of AI, they can provide deeper strategic insights in terms of tax planning, risk management, and financial management. Although AI can automate a number of accounting tasks, there are some aspects of an accountant's job that cannot be replaced by technology, including context-based decision-making, where financial decisions often require understanding the business context and complex legal aspects. Accountants often act as important advisors in corporate strategic decision-making. Furthermore, it is related to creativity and problem solving, where accountants are often faced with complex financial problems and have to develop creative solutions. This ability is difficult to replace by AI. What is difficult to replace by the next AI is interacting with clients, where explaining financial reports and providing personal advice are important aspects of the accounting profession that cannot be completely replaced by technology. So, while AI can automate a number of accounting tasks, the accountant's role in providing complex, context-based judgment, interpretation, and advice remains invaluable. They need to continuously develop skills and adapt to technological developments to maintain relevance in their profession.

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