The Use of Artificial Intelligence Techniques in Accounting Practices – A Case Study of Leading Companies in Accounting and Auditing –

استخدام تقنيات الذكاء الاصطناعي في ممارسات المحاسبة – دراسة حالة لشركات رائدة في المحاسبة والتدقيق –

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الملخص: تهدف هذه الدراسة إلى تحليل أثر تطبيق تقنيات الذكاء الاصطناعي في تطويرممارسات المحاسبة والتدقيق داخل الشركات، من خلال تحسين كفاءة العمليات وجودة اجراءات التدقيق، اعتمدت الدراسة على المنهج الوصفي التحليلي باستعراض الأدبيات ودراسة تطبيقات لشركات عالمية. وأظهرت النتائج أن الذكاء الاصطناعي يساهم في تعزيز الرقابة الداخلية والكشف المبكر عن المخاطر.

الكلمات المفتاحية:الذكاء الاصطناعي، مهنة المحاسبة، تحديات الذكاء الاصطناعي.

Abstract This study aims to analyse the impact of applying artificial intelligence (AI) technologies on the development of accounting and auditing practices within companies, by improving operational efficiency and the quality of audit procedures, and highlights the role of these applications in intelligent automation.

The study adopted a descriptive-analytical approach, involving a review of the literature and an examination of applications in global companies. The results showed that artificial intelligence contributes to strengthening internal control and the early detection of risks.

.keyword:Artificial intelligence.Accounting profession,challenge of artificial intelligence.
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1. Introduction :

Since knowledge is considered one of the primary forces behind economic progress in every nation on earth, interest in the knowledge economy has grown dramatically in recent years. Numerous beneficial technical applications, such as artificial intelligence (AI) applications that improve productivity and financial performance, have emerged as a result of this increase in knowledge. Large volumes and flows of information have been produced by these advancements. It is clear that the use of information technology has become both practical and necessary for organisational operations, as well as a competitive advantage. This has led to an increase in the number of events and operations during the fiscal year, which has increased the complexity of accounting and financial procedures.

The use of cutting-edge technologies in the accounting industry raises important questions about the nature of this change and how it will affect the operations of large businesses that specialise in this area. With an emphasis on the experiences of top accounting and auditing firms, this study attempts to investigate the impact of AI use on accounting procedures. The primary issue arises from the necessity to comprehend how the transition to AI technologies affects accounting procedures and how these businesses might take advantage of this advancement to raise the calibre of their offerings and boost operational effectiveness.

The primary study question can be stated as follows in light of the aforementioned: What impact does the use of AI technology have on accounting procedures in large accounting firms?

Sub-questions:

- What is the definition, traits, and significance of artificial intelligence as a conceptual framework?
- Which AI technologies are most commonly utilised in accounting and auditing?

- What impact do AI technologies have on accounting operations' efficiency?
- What impact have AI applications had on the evolution of auditing procedures in multinational corporations like Deloitte and KPMG?

Research Hypotheses:

- Improving the comprehension and uptake of these technologies in the accounting industry is facilitated by a well-defined conceptual framework of artificial intelligence, including its definition, traits, and significance.
- There is a statistically significant correlation between the degree of performance development in accounting and auditing and the variety of AI technologies employed, including automation, machine learning, and natural language processing.
- By cutting expenses and time while improving processing accuracy, the application of AI technologies improves accounting process efficiency.
- By boosting risk detection, speeding up auditing processes, and improving examination quality, the use of AI in multinational corporations advances auditing techniques.

Study Objectives

This study aims to achieve the following objectives:

- To determine the fundamental ideas and theoretical underpinnings of artificial intelligence;
- To elucidate the primary AI tools and applications utilised in the accounting industry;
- To showcase the most significant AI-based accounting software;
- To investigate the adoption of AI technologies by top accounting firms.

Methodology

The study uses a descriptive-analytical approach to address the research problem and provide answers by examining the theoretical literature on artificial intelligence, identifying the major technologies

utilised in the accounting industry, and assessing their influence on the field. Additionally, the experiences of top businesses using AI technologies in accounting are presented using a case study methodology.

Structure of the Study

The research is split into the following three major portions in order to solve the primary research topic and accomplish the study objectives:

- **Section One:** discusses artificial intelligence theory.
- **Section Two:** How AI technology is affecting the accounting industry.
- **Section Three:** An analysis of top accounting firms using artificial intelligence.

2. The Theoretical Framework of Artificial Intelligence

2.1. Definition of Artificial Intelligence:

The ability to use a digital computer or a robot under its direction to carry out duties associated with intelligent humans by programming computers to accomplish extremely complicated tasks like finding proofs of mathematical theorems is known as artificial intelligence (AI) (COPELAND, 2023).

Another definition of artificial intelligence (AI) is a subfield of computer science that focuses on creating machines that can carry out tasks that call for human intelligence. It employs methods like natural language processing and machine learning to help computer systems comprehend, evaluate, and interpret data. This enables intelligent decision-making and interaction between systems and their surroundings.

Artificial intelligence is "the ability of a computer or other machine to exhibit or simulate intelligent behaviour", according to the Oxford English Dictionary (Mohamed Ali, Abdullah, & Khattab, 2022).

Accordingly, according to the aforementioned definitions, artificial intelligence can be defined as a method of processing data and

carrying out tasks quickly, effectively, and efficiently while utilising algorithms, which serve as AI's main engine. After that, these data are kept in electronic databases and big data—large, unstructured data sets that serve as the foundation for algorithm training.

2.2. Characteristics of Artificial Intelligence:

The features and benefits of artificial intelligence can be summed up as follows (Amirhom, 2022, p. 257):

- Its capacity to mimic human thought processes and solve problems, especially those that may be extremely complicated and unique;
- Its capacity to decipher and analyse symbols, including those that aren't numerical in nature;
- Its function in bolstering human competence by offering substitutes and answers that help professionals make wise and logical choices;
- Its capacity to resolve extremely complicated issues even when there is insufficient information and data;
- Its ability to process visual information creatively and to perceive, comprehend, and visualise it.

2.3. Importance of Artificial Intelligence:

Because of its sophisticated analysis, processing, and decision-making capabilities, artificial intelligence is becoming more and more significant in improving many facets of daily life. Several crucial domains provide examples of this significance:

- Education: AI helps the education sector develop adaptive learning strategies, allowing for individualised learning experiences that are tailored to each student's unique requirements and skills.
- Operational efficiency: AI enhances process performance in a variety of industries, resulting in lower time and effort requirements and higher levels of production.

- Security: Using cutting-edge technology for intrusion detection and thwarting cyber threats, it is also employed in the field of security to fortify protection systems (Poole, 1998).
- Support for decision-making: AI helps to improve the quality of strategies implemented, especially in complicated corporate situations, by accurately assessing large volumes of data.
- Offering creative solutions: AI expands the possibilities for creativity by providing original answers to challenging issues, which speeds up advancements in science and technology.
- Expanding scientific research: By allowing academics to evaluate complicated data and find novel patterns and models, it significantly contributes to the expansion of scientific study.
- Improving human-machine interaction: AI raises the degree of technological interaction and enhances user experience by creating more intelligent and effective user interfaces.

3. The Impact of Using Artificial Intelligence Technologies on the Accounting Profession

3.1. Artificial Intelligence in the Field of Accounting:

In general, artificial intelligence (AI) is regarded as a subfield of computer science that focuses on creating intelligent systems and information technologies for computer programming. The simulation of human cognitive processes is made possible by these technologies and systems. AI works by utilising qualitative traits as well as logical and mathematical connections between descriptions of objects and processes to analyse them more rapidly and accurately.

According to Wang (2019), artificial intelligence in accounting refers to the application of technologies like machine learning and natural language processing to enhance and improve accounting procedures. AI is used to precisely guide financial decision-making, enhance the accuracy of financial reporting, and analyse financial data.

Artificial intelligence, according to Zhang (2019), is the application of sophisticated computing methods, such as machine learning and data analytics, to enhance and expedite accounting

procedures. It seeks to improve financial reporting accuracy, offer sophisticated strategic analysis, and support financial decision-making. AI can also be used to analyse financial trends and enhance quality control.

3.2. Advantages of Artificial Intelligence in Accounting:

Artificial intelligence in accounting is characterized by the following features (F.D., 2023):

- The capacity to manage challenging and complex tasks even in the absence of all required information;
- The capacity to handle and evaluate data that is both numerical and non-numerical;
- Encouraging human competence by offering a variety of system options that aid in decision-making;
- Using a method of problem-solving that is comparable to human reasoning;
- Predictive ability and autonomy;
- The ability to monitor and govern.

3.3. Benefits of Using Artificial Intelligence in Accounting and Auditing (Mahmoud, 2022):

Since the accounting and auditing industry has experienced fundamental changes as a result of technology improvement, it can be confirmed that artificial intelligence technologies and contemporary approaches have played a key part in the development of the accounting profession. Many smart technologies have surfaced, including digital accounting, which is regarded as one of the primary tools of artificial intelligence since it increases the productivity of auditors and accountants (F.D., 2023).

Additionally, via the use of contemporary technology, new services have been made available to clients, such as accounting studies and financial consultancy (Mahmoud, 2022). The most significant uses and advantages of artificial intelligence in businesses, especially in the accounting division, are highlighted here.

3.3.1. Monitoring expenses and cost control:

The efficient tracking and management of organisational expenses is facilitated by artificial intelligence technologies. These technologies make it possible to identify activities that don't demand a large investment and industries that need more money. Spending and expenditures can therefore be allocated to sectors that are anticipated to yield more earnings. This greatly increases consumption efficiency, which boosts the profitability of the company.

3.3.2. Formulating the Accounting Strategy:

Since AI technologies like machine learning allow for an efficient contribution to data collecting and analysis processes, automation is the primary benefit of AI. Without requiring human intervention, they automatically produce the data that the accounting system depends on.

AI technology, for instance, can advance the use of past financial data and information to connect financial occurrences. Forecasts on profitability, revenues, and budget planning can be produced by combining these data with reports and studies. This helps direct decision-making processes and goes beyond standard reporting, which is restricted to recording past performance. Consequently, it greatly aids in the creation of an integrated accounting strategy for the business.

3.3.3. Data Entry and Validation:

The ability of artificial intelligence systems to identify all kinds of documents and automatically extract data and information from them, regardless of whether the papers contain text, photos, or any other format, is what distinguishes them. Following that, the data is categorised, processed, and displayed in various formats based on its kind.

Recent advances in artificial intelligence have demonstrated the usefulness of optical character recognition (OCR) technology in accounting. Data pertaining to expenses and other accounting information can be automatically entered thanks to this technology. Additionally, it automatically classifies expenses after scanning invoices or paper documents to collect data. As a result, there is much

less need for human data entry and classification (Mahmoud, 2022, p. 482).

3.3.4. Improving Work Efficiency and Reducing Errors:

Algorithms that uphold the continuous improvement concept are the foundation of artificial intelligence technology in accounting. They make a substantial contribution to improving the accuracy of auditing and review procedures without requiring pauses, mistakes, or gaps.

Numerous standard accounting operations, such as data entry and recording, invoice reconciliation and registration, expense reporting, pricing tracking, account settlement, transaction sorting, and the creation of numerous financial reports, can also be automated by AI systems.

Certain advancements allow for up to 80% cost and time savings in certain procedures. Consequently, this increases concentration on making critical decisions and boosts productivity.

3.3.5. Ensuring Accuracy and Data Validation:

Artificial intelligence-based accounting solutions make it possible to guarantee precise audits and compliance procedures. This involves confirming that an organisation's accounting and financial transactions adhere to the relevant legal and regulatory framework.

This procedure is accomplished by monitoring and evaluating papers, as well as by reporting any problems or irregularities. AI tools make it possible to compare data and distinguish between right and wrong patterns. These systems can comprehend norms and regulations and implement them automatically without the accountant's human participation thanks to repeated processing and transaction customisation. This greatly lowers the number of cases of fraud and manipulation.

3.3.6. Income Diversification:

Through automated trading and purchasing skills, artificial intelligence technology helps find new sources of funding. This feature makes it possible to buy or sell assets anywhere in the world without having an adverse effect.

AI systems can also provide alerts about invoice due dates, which boosts revenue and gives businesses and financial institutions a competitive edge.

3.3.7. Automated Monitoring of Accounts and Transactions:

Financial analysis and management have greatly benefited from artificial intelligence technologies, especially when it comes to identifying dishonest and fraudulent activity. Companies have reportedly lost about 5% of their capital as a result of these actions.

At the moment, AI systems are able to spot fraudulent transactions and suspicious activity that human analysis could find difficult. Examining expense reports and looking for financial irregularities are also part of this.

Additionally, by combating fraudulent activity, these technologies greatly lessen the extent of financial losses.

3.3.8. Decision-Making Support:

By examining past and present financial data, artificial intelligence systems can forecast market conditions and trends. It is possible to evaluate market circumstances and forecast cash flow and revenue levels using such analysis.

Additionally, these technologies can support important decision-making processes when growth or the start of new operations is taken into consideration. Their advantages go beyond this; by examining past transactions, they may also forecast consumer behaviour and preferences.

3.4. Artificial Intelligence Technologies in Accounting and Auditing:

The following technologies are employed in the application of artificial intelligence in the accounting and auditing fields (Hasan, 2022):

3.4.1. Continuous Auditing:

Continuous auditing, according to Rezaee (2002), is the methodical gathering of electronic evidence as a legitimate foundation for voicing an opinion on the equitable presentation of financial data in

a paperless accounting system and in real time. Additionally, he mentioned that continuous auditing is an accurate electronic auditing technique that allows auditors to offer a certain degree of assurance about ongoing data at the time of disclosure or soon after.

Continuous auditing is linked to paperless accounting information systems, substantial technical difficulties, a lack of norms and procedures, and the importance of rapid audit reporting and real-time financial data, according to Zhao (2004). Both "continuous reports" and "on-demand reports" are possible outcomes of ongoing auditing. It is applicable to the three primary categories of professional services that independent auditors usually offer: audit, attestation, and assurance services.

3.4.2. Decision Support Systems (DSS):

A computer-based tool that helps in decision-making is called a Decision Support System (DSS). It is an interactive, flexible, and adaptive computer system intended to assist in resolving unstructured managerial issues in order to enhance decision-making.

While Expert Systems (ES) are intended to automate decision-making and eventually replace human decision-makers, the main goal of DSS is to identify alternatives and outcomes so that intelligent decisions can be made. Different unstructured accounting and auditing jobs use DSS systems (Hasan, 2022, p. 452).

3.4.3. Natural Language Processing (NLP):

Training artificial models to comprehend and analyse human speech is the main goal of the discipline of natural language processing (Deloitte, 2018). It is a crucial technological tool in artificial intelligence that seeks to mimic human language and communication patterns.

Processing unstructured textual data, automatically and methodically acquiring and examining documents, and spotting high-risk situations that stray from specified terminology are some of its uses (Zhang, 2019).

3.4.4. Genetic Algorithms:

Search techniques based on Charles Darwin's theory of natural evolution are known as genetic algorithms. To create superior answers to optimisation and search issues, they mimic natural evolutionary processes and rely on elements inspired by nature, such as genetic variety, crossover, and selection.

Genetic algorithms are thought to be a suitable method for handling account and transaction classification issues. Genetic algorithms may be used to mimic auditor conduct in fraud detection decision-making, according to Baldwin (2006).

3.4.5. Robotic Process Automation (RPA):

One type of intelligent process automation (IPA) is robotic process automation (RPA). It uses robots that operate mostly with organised data and adhere to preprogrammed rules. Its primary goal is to improve productivity by redefining work processes and rerouting human efforts toward higher-value jobs.

Simple tasks like interpretation, decision-making, action execution, and self-learning can be carried out by RPA robots. It is a technology solution that automates standardised and rule-based processes using scripts.

Artificial intelligence is data-driven, while RPA is process-driven. Data preparation for auditing procedures, file organisation, data integration, simple Excel audit testing, data copying and pasting, and handwritten annotations are some examples of its use cases.

3.4.6. Hybrid Systems:

Some hybrid systems incorporate both qualitative estimation and quantitative analysis, while others blend the two.

Hybrid AI systems are the best option in these situations since they can incorporate a number of the aforementioned AI methods.

3.4.7. Machine Learning (ML):

A technology called machine learning makes it possible for a system to grow and learn from its experiences. When faced with an issue, it looks for a solution; if that doesn't work, it looks for different

strategies until one is found. It can learn how to do things through experience since it keeps the successful model.

3.4.8. Deep Learning (DL):

One of the most effective methods for artificial intelligence is deep learning. It involves learning a particular domain with little to no human supervision by employing sophisticated algorithms that imitate the neural networks of the human brain (AMARI, 2021, p. 707).

3.4.9. Robotics:

Robots appear intelligent because they can sense their surroundings, provide themselves with energy, and move using a variety of sensors, such as pressure sensors (hands), light sensors (eyes), ultrasonic and auditory sensors (ears), chemical sensors (nose), and task-specific sensors (tongue) (Emetaram & Uchime, 2021, p. 17).

3.4.10. Expert Systems:

Expert systems are sophisticated computer-based systems that gather specialist knowledge, or domain-specific expertise, and organise it such that computers can use it to solve related or comparable issues.

Numerous accounting domains, including auditing and audit planning, evidence gathering, audit risk assessment, audit decision-making, and financial data analysis, can make use of expert systems.

Expert systems can be used in financial accounting to create accounting information systems, process invoices, and assess accounting standards. They can be applied to management control system diagnostics, inventory control, and cost and variance analysis in cost accounting.

Expert systems in auditing have been extensively studied, but their usage is not common because of problems including bias and application limits. Thus, there seems to be a chance to investigate further AI technologies in order to enhance the accounting and auditing industries.

3.4.11. Artificial Neural Networks (ANNs):

One area of artificial intelligence that simulates the electronic architecture of the neural systems in the human brain is artificial neural

networks. Neural networks rely heavily on experience in their training and learning processes. Neural networks, which represent a major advancement in human cognition, are regarded as one of the most crucial areas in control engineering and artificial intelligence.

3.4.12. Fuzzy Logic:

One theory that can be used to create expert systems is fuzzy logic. In order to draw conclusions in the face of ambiguity, it is a logical framework that generalises conventional binary logic (Al-Samarrai et al., 2020, p. 18).

3.5. Main Accounting Software Powered by Artificial Intelligence:

The financial and commercial markets, as well as the world economy, now depend heavily on artificial intelligence technologies. As a result, a company's capacity to keep up with technology advancements will increasingly determine its performance and destiny.

Numerous businesses and organisations have incorporated artificial intelligence into the accounting industry due to the advantages and effects of these technologies on the calibre of financial and accounting services. Some of the most well-known AI-powered accounting software options are as follows (Daftra, 2023):

3.5.1. O-Counting:

This technology makes inventory management easier by using AI tools that handle numerous inventory-related tasks without needing a large number of personnel. AI is also used in the management of expenses. Thanks to clever contemporary technology, the software can analyse massive amounts of data and create vast databases that are always accessible. It may also monitor all accounting activity and transactions across several branches of the same business.

3.5.2. Divvy:

Divvy is an accounting program that manages spending and budgeting using artificial intelligence. It uses contemporary algorithms to automate repetitive processes like bookkeeping, invoice classification, and payment matching. Additionally, it can process

purchases, track and manage spending, and produce budget and cost reports.

3.5.3. Blue Dot:

Through process automation, transaction reconciliation, and financial report preparation, Blue Dot offers businesses smart accounting services. Its AI technology guarantees that all operations adhere to relevant rules and regulations while enabling financial performance measurement, cash flow forecasting, compliance support, and monitoring.

3.5.4. Planful:

Planful provides accounting services with AI help that automate difficult and repetitive operations. By building databases and records specifically for each user and their transactions, it employs AI algorithms to document assets and financial activities. This aids in forecasting and strategic financial planning and gives a comprehensive financial picture of the business.

3.5.5. Gridlex Sky:

An "AI-powered advisor" for profits, revenues, expenses, and inventory is a component of this product. In order to produce insights and suggestions for enhancing the business's financial performance, it gathers information from a variety of sources, including financial statements, reports, invoices, and receipts.

3.5.6. Docy:

Numerous tedious accounting tasks are automated by Docyt, an AI-based accounting program. It estimates cash flow, creates balance sheets and profit and loss accounts, and offers insights into a company's financial performance through machine learning.

Artificial intelligence technology often guarantees ongoing financial monitoring, minimises human mistakes, and sends out alerts when certain actions or transaction classifications are needed.

3.5.7. AIQ:

In addition to creating monthly financial assessments and reports pertaining to the business's operations, this programme can automate repetitive tasks.

Furthermore, this programme's sophisticated technologies guarantee the correctness of financial data and information, prevent processing errors, and offer a thorough picture of the company's overall state. Additionally, it uses machine learning skills to provide projections and insights into the productivity of the company's business operations.

3.5.8. Daftra:

One of the most popular ERP systems for handling sales, accounting, and other facets of corporate operations is Daftra. It is regarded as one of the top Arab systems utilising AI technologies to streamline accounting procedures.

For instance, the system has an integrated Chabot that allows users to request the execution of particular accounting activities, collect necessary data, or create personalised financial reports. Compared to conventional ERP systems that are not AI-based, this procedure is completed faster, saving more time.

3.5.9. Zeni:

All conventional repetitive duties, including bookkeeping and spending tracking, are automated with Zeni. It can access, assess, and classify every transaction based on its kind using machine learning methods.

Additionally, the system offers a user interface driven by AI that makes all information accessible at all times. It provides graphical representations and visual dashboards for the analysis, display, and explanation of financial data. It can also predict credit amounts and currency exchange rates. Additionally, Zeni employs artificial intelligence tools to support compliance and monitoring procedures while managing all tax files, both local and federal.

The Impact of Artificial Intelligence on the Accounting and Auditing Profession

Given their substantial influence on improving the quality of accounting system outputs and creating accounting procedures, the increasing usage of artificial intelligence technologies is causing a qualitative revolution in the accounting industry. Through the rapid and accurate automation of numerous regular operations, including the processing and analysis of financial data, these technologies help to increase the efficiency of accounting procedures. This improves the accuracy of accounting data and decreases human mistakes.

Large amounts of historical data can be analysed using artificial intelligence technology, especially machine learning, to make highly accurate predictions about future financial trends. Furthermore, these technologies are essential for identifying anomalous patterns that might point to fraudulent activity, which increases the efficacy of internal control systems.

In this regard, the use of artificial intelligence helps shift the accountant's position away from typical regular operations and toward greater value-added responsibilities like financial analysis and strategic decision-making. As a result, incorporating AI technologies into accounting systems might be seen as crucial to raising the calibre of their outputs in terms of dependability and relevance.

However, a look at how the Big Four accounting firms use AI shows two key patterns. The first is the steady rise in funding for these technologies and their incorporation into essential business processes. The second is the understanding that artificial intelligence will play a key role in determining how the accounting industry develops in the future (Zhang Y., 2020).

4. Case Study of Deloitte and KPMG in the Application of Artificial Intelligence

There has been a notable advancement in communication technologies and information exchange systems, particularly with regard to accounting information, in the setting of the modern corporate

environment, especially with the growth of multinational organisations. This development has increased the accounting and auditing industries' need to stay up to date with information technology developments in order to boost productivity and raise the calibre of services rendered.

The nature of financial reports and accounting data that businesses compile has also been directly impacted by this technological shift, which in turn affects their competitiveness and shapes their future directions in the financial and business markets.

Additionally, accounting companies are investing in the creation of AI-based service solutions for a variety of clientele. The Big Four accounting firms are anticipated to take the lead in integrating artificial intelligence into the accounting and auditing industry. This section presents each company's major accomplishments in artificial intelligence after giving a quick summary of them.

4.1. Deloitte Case Study

Over 286,000 specialists and tens of thousands of professionals work under the Deloitte brand globally. The business offers services in risk management, taxation, auditing, financial advice, and other relevant fields. It has operations in over 150 nations and territories worldwide (Deloitte, 2023).

In order to integrate innovation and machine learning into the workplace, the company entered into a contract with Kira Systems in March 2016 (Zemánková, 2019, p. 572). Due to this collaboration, Deloitte created Argus, a cognitive auditing tool intended for auditing. In order to automatically recognise and extract accounting information from a variety of electronic document forms, this application concurrently leverages cutting-edge machine learning and natural language processing technologies while learning from human interactions.

Deloitte received the International Accounting Bulletin's "Best Innovation in Auditing" award in 2018 as a result of this effort. According to studies by Hasan (2022, p. 458) and Boubaya (2022, pp.

667–668), the business has used AI technology in the following additional areas of its operations:

- **Deloitte AI Robot:** By extracting and analysing data from documents including loan agreements, asset management contracts, lease contracts, and financial statements, this tool automates auditing processes. Over 90% less time was spent on document audits. Additionally, it automatically searches supplier and customer databases to find hazards associated with audited businesses. It also improves auditing time and efficiency by 86% and cuts labour costs by 100%. It is extensively utilised in financial processes, including printing and processing invoices, automatically stamping and sorting them, responding to enquiries, and facilitating conversations on financial terms and auditing standards. By utilising drones to deliver real-time remote inventory services, the integrated smart inventory solution STOP1 reduces manpower costs and inventory time by thirty per cent.
- **Deloitte Auvenir Platform:** integrates audit procedures and offers services like data analysis, information security management, project management, and client communication.
- **Deloitte Cobalt Platform:** uses AI to give thorough and intelligent risk sensing for audited organisations' operational, financial, and reputational threats.
- **Deloitte Coinia Platform:** enhances Deloitte's capacity to audit block chain applications by verifying digital data kept in cloud environments, such as smart contracts on block chain systems.
- **iCredit Platform:** A clever credit risk monitoring system that does complete credit checks (100% rather than sampling), allowing auditors to concentrate on high-risk areas and alert management in advance.
- **Deloitte Report Wizard:** increases speed and efficiency by automatically reviewing reports and logging remarks.

- **Argus / Optix / Signal Applications:** Instead of using conventional sampling techniques, use machine learning to extract important financial data from electronic documents and evaluate transactions to find possible dangers.
- **Brain Space Tool:** A machine learning and clustering analysis-based self-learning tool used in legal applications to analyse unstructured material and find possible supporting evidence. According to Deloitte, auditing legal papers, contracts, invoices, financial statements, and board meeting minutes now takes less than half as long thanks to AI technologies.

4.2. Case Study 2: Ernst & Young (EY)

When Ernst & Young (EY) released the beta version of EY Blockchain Analyser in April 2018, it started incorporating block chain technology into its auditing process. The purpose of this technology is to assist auditors in gathering transaction data from various block chain ledgers. Auditors can review, assess, and spot irregularities in transactions once the data has been gathered. The tool was created especially to assist auditors examining businesses that use digital currencies and allows for a thorough examination of Bitcoin company transactions.

Crypto currencies, including Bitcoin, Ether, Litecoin, and Bitcoin Cash, are tested using the technique. Experience dealing with international clients, such as exchange platforms, investment funds, and other service providers, served as the foundation for its development. This invention intends to enhance the audit process as a whole and was developed in response to evolving customer needs. EY concentrates on creating cutting-edge audit techniques to provide capital markets trust, according to Jane Boylett, EY's Global Assurance Innovation Leader.

With an emphasis on deep learning, machine learning, and automation, EY combines its advancements in block chain technology with artificial intelligence. In order to support auditors in a digital setting, the organisation employs AI to evaluate data through sophisticated pattern recognition. Important features include the ability

to extract information from unstructured data, such as contracts, invoices, and photographs, in order to gather audit evidence and to analyse massive datasets in order to identify potential material errors and risks. Natural language processing for document evaluation and data extraction from contracts is another aspect of machine learning (Cahyadi, 2020, p. 24).

Ernst & Young also created the Helix and EY platform to increase audit efficiency by utilising automation. An audit analytics tool called EY Helix was created to improve data-driven auditing by freeing up auditors to concentrate on data analysis instead of data collecting. By analysing recorded entries, the system finds anomalies and suggests actions.

Business operations, accounting rules, and governance structures are among the details from prior clients that are used to educate EY Helix algorithms. These days, the technology can produce pertinent queries to help auditors draw conclusions from various kinds of data. Additionally, it now analyses additional audit components like inventory, accounts payable, mortgages, and audit scope.

In order to increase audit transparency and quality, the platform facilitates real-time correlation monitoring, improves client communication, streamlines administrative processes, and strengthens project management (Ernst & Young, n.d.; Cahyadi, 2020, p. 24).

4.3. Case Study 3: KPMG

Digital automation, predictive analytics, and cognitive technology are KPMG's three primary pillars for audit innovation. KPMG Clara, an intelligent audit platform created in partnership with top IT firms including Microsoft Azure and IBM Watson, embodies these characteristics.

The platform, which is based on the International Standards on Auditing (ISA) and KPMG's audit methodology, aims to give professionals better comprehension and clearer insights. Through improved analytical skills, it enables auditors to work more productively and provide audits of a higher calibre. Additionally,

KPMG Clara has statistical model-based algorithms that enable whole population testing in lieu of sampling methods. This makes it easier to spot irregularities and allows auditors to concentrate on high-risk areas. KPMG Clara, a digital workflow platform for audit engagement management and documentation, took the role of eAudIT in 2020. KPMG Clara incorporates a number of AI technologies. Large-scale financial data analysis may identify discrepancies without using sample techniques thanks to IBM Watson, a cognitive computing system built on natural language processing, inductive logic programming, and deep learning. Cloud computing and real-time data analysis capabilities backed by machine learning and predictive analytics are offered by Microsoft Azure. Reconciliations, audit confirmations, and data collection from disjointed systems are among the other tasks that robotic process automation (RPA) is utilised for. Furthermore, cognitive technologies facilitate the gathering of evidence by applying optical character recognition (OCR) and natural language processing to financial documents.

According to KPMG, cognitive technology is an AI component that uses human interpretation and judgement to process data and provide outcomes. In order to effectively use the advantages of the system, human auditors assess the hypotheses that are produced to support decision-making using deep learning, machine learning, and predictive analytics (Cahyadi, 2020, p. 24).

4.4. Case Study 4: PwC

(Pricewaterhouse Coopers)

In 2018, PwC introduced a two-year Digital Accelerator programme for 1,000 workers to improve their digital abilities in order to teach them and maintain a high level of digital competence.

Automation; artificial intelligence, including machine learning; and data analytics are the program's three primary foci. Data cleaning, block chain, cyber security, drones, and 3D printing are among the topics covered. Attending weekly training sessions, participants work on "digital-heavy" projects to tackle actual client problems in place of

their regular activities. In order to keep PwC competitive in the market, the objective is to give staff members more advanced technology capabilities.

By using technology to increase operational efficiency, the program also seeks to lower expenses for clients. PwC claimed that this project was one of its biggest investment areas in 2018, without disclosing the precise investment amount.

The primary auditing technologies used by PwC are Connect, Aura, and Halo. Halo is a data auditing platform that identifies business risks, directs audit activity, and offers insights through the visualisation of internal and external client data. Additionally, it is made to assess the dependability of data and use deep learning algorithms to continuously increase accuracy. Features including identifying high-risk transactions, enhancing revenue testing, evaluating investments, and assessing audit risks have all been added to Halo throughout time. It functions as a completely automated system that allows for quicker audit procedures and real-time analysis.

Aura, a worldwide enterprise resource planning solution that guarantees uniformity and quality throughout audit phases, supports Halo. By identifying audit risks and facilitating the systematic risk management of PwC's global network, Aura plays a crucial role in audit planning. To determine audit-specific risks, it concentrates on client business trends, strategic direction, macroeconomic conditions, and business hazards (Cahyadi, 2020, p. 25).

5.Conclusion

This report emphasises how crucial it is for top accounting and auditing firms to use artificial intelligence (AI) technologies in their accounting procedures. The findings show that accounting procedures have undergone a qualitative change, with AI playing a major role in boosting productivity and data accuracy. Large companies have proven they can improve accounting services in a creative way, gaining from accurate data analysis and quicker reporting procedures. As a result, a number of important conclusions and suggestions have been made.

Findings:

- AI technologies show a strong ability to carry out intricate audit procedures with remarkable accuracy and great time efficiency, which improves the calibre of auditing procedures. Through automation and accurate data analysis, these technologies also assist auditors in lowering errors brought on by human carelessness or computational errors.
- AI systems can handle massive amounts of data in real time, which lowers the risk of losing important information and raises the possibility of finding mistakes and irregularities in financial reports. Additionally, these technologies improve risk management and auditing procedures and aid in early fraud identification by enabling financial risk assessment during financial statement analysis.
- On the other side, the increasing use of technology and artificial intelligence in several professional domains presents labour market issues because it may lessen the demand for some traditional jobs, which could lead to higher unemployment rates.
- In this regard, artificial intelligence technologies are used by multinational auditing firms like Deloitte and KPMG to examine data and improve the effectiveness and speed of auditing procedures across all of their branches.

Recommendations:

- Increasing awareness and training programmes for auditors in the field of artificial intelligence is one of the most crucial recommendations. This will give them the skills they need to use these technologies efficiently and raise the degree of audit automation.
- In order to facilitate the organised and dependable integration of artificial intelligence technologies into professional practices, it is also advised that regulatory and supervisory bodies in charge of the auditing profession create and update international

standards in accordance with current technological advancements.

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