Artificial Intelligence in the Accounting Profession: The Case of Egypt

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ABSTRACT

A significant portion of an accountant's job involves gathering and evaluating reams of financial data. The accountant is supposed to derive insights about the operation and health of a firm from the accuracy data. However, a wide range of computer-based tools are now readily accessible to help with financial analysis activities. Artificial intelligence (AI) is one of the most well-known tools. The word "AI" in computer science refers to a computer's capacity to imitate human learning, evaluation, problem-solving, and decision-making processes. Artificial intelligence in accounting is used to make fundamental tasks and procedures more effective, which eventually results in better business decisions. The main purpose of the research is to investigate how applying artificial intelligence affects accounting performance. Additionally, it is the goal of the investigation to understand the advantages and difficulties of using artificial intelligence. In order to reach this aim, the research relied on the qualitative approach. Where primary data will be used as well as secondary data. Using secondary data from 54 articles on AI in the accounting field. Then, preliminary data was used, by conducting 20 interviews with experts and managers in the accounting sector in Egypt about their opinion on the adoption of artificial intelligence and its influence on accounting performance.

Keyword: Artificial Intelligence, Accounting profession, qualitative analysis.

الملخص

يتضمن جزء كبير من عمل المحاسب جمع وتقييم كميات كبيرة من البيانات المالية. من المفترض أن يستمد المحاسب رؤى حول تشغيل الشركة وصحتها من بيانات الدقة. ومع ذلك، أصبح الآن من السهل الوصول إلى مجموعة واسعة من الأدوات المعتمدة على الكمبيوتر للمساعدة في أنشطة التحليل المالي. يعد الذكاء الاصطناعي (AI) أحد أكثر الأدوات المعروفة. تشير كلمة "الذكاء الاصطناعي" في علوم الكمبيوتر إلى قدرة الكمبيوتر على تقليد عمليات التعلم البشري والتقييم وحل المشكلات واتخاذ القرار. يتم استخدام الذكاء الاصطناعي في المحاسبة لجعل المهام والإجراءات الأساسية أكثر فعالية، مما يؤدي في النهاية إلى اتخاذ قرارات عمل أفضل. الغرض الرئيسي من البحث هو معرفة كيفية تأثير تطبيق الذكاء الاصطناعي على الأداء المحاسبي. بالإضافة إلى ذلك، فإن هدف البحث هو فهم مزايا وصعوبات استخدام الذكاء الاصطناعي. ومن أجل الوصول إلى هذا الهدف اعتمد البحث على المنهج النوعي. حيث سيتم استخدام البيانات الأولية وكذلك البيانات الثانوية. استخدام البيانات الثانوية من ٥٤ مقالة عن الذكاء الاصطناعي في مجال المحاسبة. ثم تم استخدام البيانات الأولية، من خلال إجراء ٢٠ مقابلة مع خبراء ومدراء قطاع المحاسبة في مصر حول رأيهم في اعتماد الذكاء الاصطناعي وتأثيره على الأداء المحاسبي. الكلمات المفتاحية: الذكاء الاصطناعي، مهنة المحاسبة، التحليل النوعي.

1. **INTRODUCTION**

The fields of finance and accounting have been significantly impacted by artificial intelligence (AI). In fact, because they save time and offer in-depth insights, AI-enabled accounting and financial systems are the means for businesses to remain formidable competitors in a market that is becoming more and more competitive. The exponential rise of data produced by the Internet and IoT devices as well as the calculation of this data are the two main factors driving Industry 4.0's quick adoption of AI. With adaptive reactions to shifting demands of consumers, suppliers, vendors, and partners, new technology is defining Industry4.0 in every sector. With automation, workers may do various repetitive jobs in between 80 and 90% less time than they used to. Because there are fewer human errors, the result is of higher quality (Mhlanga, 2020).

AI has automated almost all accounting processes, including payroll, tax, banking, and audits, upending the accounting sector and bringing about a significant shift in how company is conducted. While increasing transparency and auditability, AI also increases output quality and productivity. Additionally, AI offers a wide range of options and reduces the traditionally time-consuming tasks of the finance team, allowing them to focus on finding new prospects for company growth. AI also aids in accurately projecting financial figures. Finance experts may forecast future trends using machine learning (ML) and past data/records. RPA, which automates repeated work in corporate processes, is incredibly effective at doing repetitive tasks like document or data processing. The finance staff can stop getting slowed down by non-value-added duties now that RPA is in place. They should instead concentrate more on assuming strategic and advising roles (Kaya et al., 2019).

The application of AI technology, which includes machine learning algorithms and natural language processing, to automate and enhance

accounting operations is referred to as AI in accounting. This covers activities like data analysis, fraud detection, auditing and compliance, and financial reporting. AI in accounting may assist boost precision and effectiveness, cut expenses, and offer insightful forecasts that can aid with decision-making. Data input, analysis, and report production are just a few of the accounting-related jobs that AI is capable of doing. AI and other cutting-edge technologies can help and enhance accountants' job, but they cannot fully replace them since they lack the capacity to exercise crucial human abilities like judgment, communication, and critical thinking. In order to assure accuracy and moral usage, CPAs are still necessary for sophisticated accounting operations that require human monitoring and upkeep (Smith, 2018).

AI is used in accounting to automate monotonous operations, spot trends in financial data, and offer knowledge to support business decision-making (Mohammad et al., 2020). Several particular applications of AI in accounting include:

Processing and reconciliation of invoices: The accounting and finance divisions must handle invoices and reconcile their balances. However, these procedures can be time-consuming and prone to mistakes, which may cause payments to be delayed, financial reports to be erroneous, and ultimately have a detrimental effect on the bottom line of the business (Kommunuri, J., 2022).

Detecting fraud: Systems for detecting fraud driven by AI are capable of evaluating massive amounts of financial bases to spot abnormalities and atypical patterns that could be signs of fraud or other financial irregularities. Accounting professionals can effectively keep track of financial transactions and enhance the precision and effectiveness of their auditing procedures (Bao et al., 2022).

Financial Prediction Analysis: Data is essential for forecasting financial outcomes, and AI is exceptional in analyzing vast amounts of financial data

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to offer current insights into a company's financial health. A fantastic example of AI-driven technology that displays these capabilities is Futrli. Through pattern recognition, Futrli's machine learning helps businesses make educated judgments about risks and opportunities while also improving financial planning, risk management, and identification of fraud. Forecasting cash flows, which is essential for firms to manage their finances and make investment decisions, is possible using predictive analytics. AI can accurately estimate cash inflows and outflows by examining past data and market patterns, allowing firms to prepare their financial strategy appropriately (Busulwa and Evans, 2021).

Forecasting and Budgeting: Accounting businesses may automate and streamline these procedures while saving a lot of time and money by using budgeting and forecasting software. AI can assist firms in creating precise and trustworthy financial projections that may be used to enhance strategic decision-making by analyzing financial data. Real-time insights into a company's financial performance may also be provided by AI, allowing organizations to see possible dangers and opportunities early on (Stancheva-Todorova, 2018).

Tax Preparation and Compliance: AI examines financial data to find tax credits and deductions, saving time and assisting businesses in lowering their tax obligations. To verify compliance with rules and optimize tax savings, it also finds mistakes or omissions in tax files (Ardichvili, 2022).

Data entry and accounting: For organizations to retain correct financial records, bookkeeping and data entry are crucial jobs. While machine learning allows AI to categorize accounting transactions, it's still necessary to utilize it in conjunction with human experience (Qasim and Kharbat, 2020).

Audit Support: In order to guarantee that financial statements and records are correct and pertinent to accountant standards, auditors and accountants might use AI-powered audit assistance systems. Additionally, AI can assist

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with document management, making it simple for auditors to find and access pertinent financial documents and data. This may greatly simplify the audit procedure and cut down on the time and resources needed to finish the audit (Naja et al., 2021).

As a result, the study's goal is to investigate the impact of artificial intelligence on accounting performance. Furthermore, this research seeks to understand the benefits and obstacles of using artificial intelligence, with the goal of providing an essential reference for decision makers and accounting specialists regarding artificial intelligence and strategies to develop it in the accounting industry. There are numerous sections to the research. The first section provides an overview of the use of artificial intelligence in the accounting business. The second section looks at artificial intelligence from a literary standpoint and its influence on accounting performance. The third section is about research methods. The fourth section debates the process of analyzing the interviews and their results. The fifth section, consists of a discussion of the conclusions of the interview analysis. The sixth section is the research conclusions. The sixth section consists of recommendations for decision makers. The last section presents the limits of the research as well as gives some suggestions to future researchers.

2. **THEORETICAL PERSPECTIVE**

In this section, the literature that dealt with the definition of artificial intelligence will be dealt with, as well as provide an overview of it, its fields of work, and so on. Furthermore, this section introduces the history of artificial intelligence and how it has been developed over time. The enabling tendencies of AI are also discussed. In addition, this section reviews ways of ethical use of artificial intelligence. Finally, this section deals with the previous literature that dealt with the influence of adopting artificial intelligence on accounting performance.

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Overview of Artificial Intelligence

Artificial intelligence is the imitation of human cognitive processes by computers, primarily computer systems. Specific AI applications include expert systems, natural language interpreting, speech recognition, and machine vision. As the hype around AI has increased, vendors have been hurrying to showcase how AI is incorporated in their products and services. What they call AI is frequently only a component of technology, such as machine learning. AI necessitates a foundation of specialized hardware and software for the construction and training of machine learning algorithms. Python, R, Java, C++, and Julia are all popular among AI engineers, although no single programming language is uniquely identified with AI (Mishra et al., 2018).

AI systems frequently consume large amounts of labeled training data, which they then evaluate for connections and patterns before applying these patterns to anticipate future states. An image recognition program may learn to detect and describe items in images by analyzing millions of cases, similar to how a chatbot given text samples may learn to make lifelike chats with people. Generative AI approaches are able to produce realistic text, graphics, music, and other media (Baidoo-Anu and Owusu Ansah, 2023).

The potential for AI to change the way humans live, work, and play is considerable. In business, automation of human professions such as customer service, lead generation, fraud detection, and quality control has proved effective. AI is capable of executing a variety of tasks far more efficiently than humans. AI systems are typically capable of doing repetitive, detail-oriented tasks, such as evaluating a huge number of legal documents to ensure crucial fields are accurately filled in. AI may provide businesses with operational insights they may not have known about due to the enormous data sets it can analyze. Product design, marketing, and

education will all benefit from the fast-growing community of generative AI technologies (Whittlestone and Clarke, 2022).

In fact, improvements in AI methods have given rise to totally new business options for some bigger corporations in addition to helping drive an explosion in efficiency. It would have been tough to conceive employing computer software to link passengers with cabs before the current wave of AI, but Uber has achieved Fortune 500 status by doing precisely that. Alphabet, Apple, Microsoft, and Meta are just a few of the biggest and most prosperous businesses in existence today. These businesses leverage AI technology to streamline operations and outperform rivals. For instance, AI lies at the heart of Alphabet subsidiary Google's search engine, Waymo's autonomous vehicles, and Google Brain, which developed the transformer neural network design that supports recent advances in natural language processing (Rikap et al., 2023).

Artificial intelligence has been employed in a variety of markets. Machine learning algorithms, for example, are being integrated into analytics and customer relationship management (CRM) platforms to understand how to better serve customers. Chatbots have been put into websites to provide clients with immediate assistance. It is anticipated that the fast development of generative AI technologies, such as ChatGPT, would have far-reaching effects, including the abolition of employment, a revolution in product design, and a disruption of business models (Dogru et al., 2023).

Moreover, using AI to media and entertainment Targeted advertising, content recommendations, distribution, fraud detection, screenplay creation, and movie production are all areas where the entertainment industry makes use of AI. Newsrooms may simplify media operations by using automated journalism to save time, money, and complexity. AI is used in newsrooms to automate repetitive chores like data input and proofreading, as well as to do subject research and provide assistance with headlines. It's unclear how journalism can consistently employ ChatGPT and other generative AI to

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produce content. While integrating robots into the workflow has been made possible by applying AI in production. Cobots, that are more compact, multifunctional robots that work alongside people and take on greater responsibility for the job in warehouses, factories, and other workplaces, are a prime instance of industrial robots that were previously programmed to execute single tasks and kept apart from human employees (Lachman and Joffe, 2021).

Buyers should proceed cautiously since AI and machine learning are at the upper position of the list of buzzwords security providers use to advertise their solutions. Nevertheless, a number of cybersecurity-related tasks, such as anomaly detection, addressing the false-positive issue, and undertaking behavioral threat analytics, are being effectively carried out using AI approaches. Machine learning is used by organizations to identify irregularities and unusual activities that indicate to hazards in security information and event management (SIEM) software and related domains. By examining data and using logic to detect similarities to existing malicious code, AI may detect new and evolving attacks far sooner than human employees and previous technological iterations (Bertino et al., 2021).

Personal finance software such as Intuit Mint or TurboTax may so use AI to disrupt banking institutions. This type of application collects personal data and provides financial advice. Other technologies, including as IBM Watson, have been deployed in the home-buying process. Artificial intelligence software now handles a substantial percentage of Wall Street trading. Furthermore, banks are effectively employing AI in banking as chatbots to execute transactions that do not require human interaction and to update clients about services and prospects. Virtual AI assistants are used to simplify and reduce the cost of complying with banking rules. Banking organizations utilize AI to improve loan decision-making, set credit limits, and identify investment opportunities (Malali and Gopalakrishnan, 2020).

History of Artificial Intelligence

Philosophers and mathematicians pioneered the inquiry of mechanical or "formal" reasoning through antiquity. The understanding of logic directly led to Alan Turing's theory of computing, sometimes known as the Church-Turing thesis, which proposed that a machine could replicate both mathematical deduction and formal reasoning by randomly rearranging symbols as basic as "0" and "1". Researchers began to think about the idea of creating an "electronic brain" as a result of this and contemporaneous new findings in cybernetics and information theory. McCullouch and Pitts' idea for Turing-complete "artificial neurons" was published as the first work that came to be known as "AI" in 1943. At a workshop held at Dartmouth College in 1956, the discipline of AI investigations was established. In the 1960s, the participants rose to prominence as pioneers in AI research. They created programs with their pupils that the media dubbed "astonishing": computers were proving logical theorems, learning checkers tactics, solving algebraic word problems, and speaking English (Goksel and Bozkurt, 2019). Since the middle of the 1960s, laboratories had been created all over the world and the Department of Defense had significantly increased funding for research in the United States. In twenty years, machines will be able to perform every task that a man can, according to Herbert Simon. Marvin Minsky stated in his work that "the problem of creating 'artificial intelligence' will be substantially solved within a generation" (Nasif et al., 2021). They had, however, exaggerated the difficulty of the issue. Both the US and British governments discontinued sponsoring exploratory research in response to criticism of Sir James Lighthill and persistent pressure from the US Congress to fund more useful activities. It was thought that the book Perceptrons by Minsky and Papert demonstrated the impossibility of using artificial neural networks to solve problems in the actual world, thereby invalidating the entire methodology. The "AI winter" that followed saw financing for AI initiatives become challenging (Pilling and Coulton, 2019).

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In the early 1980s, the commercial achievement of expert systems, a form of AI software that emulated the knowledge and analytical abilities of human experts, gave AI research fresh life. By 1985, the AI market had topped $1 billion. At the same time, the U.S. and British governments decided to reinstate financing for university investigation in response to Japan's fifth generation computer effort. But once the market for Lisp Machines crashed in 1987, AI once more came under fire, and a second, longer-lasting winter started. Many academics started to have doubts about the ability of present methods to replicate all aspects of human cognition, including vision, robotics, learning, and pattern recognition. Scholars started investigating "sub-symbolic" strategies (Abdel-Khalek et al., 2019).

Researchers in robotics, like Rodney Brooks, rejected "representation" in general and instead concentrated on creating moving, self-sustaining robots. Methods were created by Judea Pearl, Lofti Zadeh, and others that addressed ambiguous and partial information by relying on educated guesses rather than exact reasoning. However, Geoffrey Hinton and colleagues' resurrection of "connectionism," which includes neural network research, was the most significant breakthrough. The first of many fruitful uses of neural networks was demonstrated by Yann LeCun in 1990, who demonstrated how convolutional neural networks can detect handwritten numbers (Russell, 2010).

In the late 1990s and early 2000s, AI slowly regained its reputation by utilizing formal mathematical techniques and by identifying precise answers to precise issues. Researchers were able to provide demonstrable outcomes and work with experts from other disciplines (including statistics, economics, and mathematics) because to their "narrow" and "formal" emphasis. Even though they were hardly ever referred to as "artificial intelligence" in the 1990s, solutions created by AI researchers were extensively employed by the year 2000. Concerned that AI was no longer following the initial objective of building adaptable, fully intelligent

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computers, some academic experts voiced their concerns. They started the area of artificial general intelligence (often known as "AGI") in 2002, and by the 2010s it had a number of well-funded universities (Russell, 2010).

In 2012, deep learning started to rule industry benchmarks and spread throughout the sector. Many particular goals were abandoned in favor of other approaches. The development of faster computers, graphics processing units, and cloud computing, in addition to the availability of a wealth of data (including curated datasets like ImageNet), were key factors in the success of deep learning (Lu, 2017). Due to deep learning's effectiveness, interest in and funding for AI have greatly increased. In terms of total publications, machine learning research rose by 50% between 2015 and 2019. According to the World Intellectual Property Organization, AI constituted a particularly prolific new technology in terms of patent applications and granted patents. According to "AI Impacts," over 20% of new US Computer Science PhD graduates had a specialty in "AI," and there were approximately 800,000 "AI"-related employment prospects in the US in 2022. About $50 billion yearly was spent in "AI" around that time in only the US (Chahar, 2023).

The abuse of technology and questions of justice were thrust into the spotlight in 2016, with a dramatic surge in publications, funding opportunities, and scholars refocusing their careers on these topics. The alignment issue developed into a significant area of academic research. Moreover, Large language models, or LLMs, like ChatGPT are on the increase and have the potential to significantly alter AI performance. Deep-learning models may be pre-trained on enormous volumes of raw, unlabeled data using these new generative AI techniques (Christian, 2020).

AI-Enabling Tendencies

Machines that can mimic human cognitive processes like learning and problem-solving are what artificial intelligence refers to. AI and machine learning (ML) are two of the buzzwords that are most often used nowadays. The most recent advancements in AI have been driven by ML, an area of

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AI. The definition of machine learning (ML) is the capacity to use methods that cause machines to learn and advance without being programmed for this. According to Arrieta et al. (2020), AI and ML are expressed by algorithms that can recognize patterns in data and learn to anticipate outcomes. When AI and ML were studied more closely, they also acquired more advanced methods like Natural Language Processing (NLP), which can integrate linguistics and learning and execute intelligent analyses utilizing written languages. Machines are often able to provide results that are more accurate than those provided by people in repetitive tasks thanks to systems built on AI and ML (Dwivedi et al., 2021).

The effective and promising decision tools for businesses, applicable in various industries, are a major driver of the growing interest in adopting AI. A company may quickly implement AI thanks to four fundamental developments. These fundamental developments are exemplified by the affordability of strong and reasonably priced machines for the many activities of today, as well as by improved algorithms, cloud computing, and data accessibility. Rapid technological development, which boosted computing capability while lowering the cost of computing, had an impact on the accessibility of powerful and inexpensive devices. The Moore's Law 2, which states that increased processing power would result in lower computing costs, is thought by observers to be a law that only applies until 2020, although it also predicts the future of technology beyond that year (Lu, 2017).

Processing speed will significantly increase as computer power rises. Technology specialists today have found that processes that used to take a decade to complete now take just minutes. Five years ago, they used to take hours. Due to its increased price, portability, and speed, AI is now readily available for deployment, adaption, and usage by enterprises. The accessibility of better algorithms and usage methods has significantly improved over the previous time period. The large amount of research

devoted to improving and expanding the algorithms underlying artificial intelligence (AI) led to the emergence of a wide range of AI solutions capable of resolving various issues. The developer community is expanding, and they created free-to-use packages as well (Gotthardt et al., 2020).

AI can now evolve on a platform that is more accessible and has more room than hardware and storage alone thanks to cloud computing. Businesses began to switch to cloud-based platforms and conduct operations entirely from the cloud. The application programming interfaces (API) of cloud providers are including AI and ML, which can assist businesses in obtaining specialized solutions for their issues or for clients. Cloud platforms make computational capacity, data storage, and graphic processing units (GPU) scalable, which frees AI and ML algorithms from hardware constraints and improves performance (Andiola et al., 2020).

These days, there is a wider variety of data available, including unstructured data such as text, photos, and video in addition to organized and numerical data. Big Data storage systems have given businesses the option of processing and storing their data on-site or on the cloud. Taking advantage of these developments, AI is now in a position to revolutionize the accounting profession and redefine how accounting specialists operate (Allam and Dhunny, 2019).

Ethical Use of Artificial Intelligence

Despite having proven that AI technologies enable a number of new functions for companies, their use raises ethical considerations since, for whatever reason, an AI system will cement what it has already learned. This can be a problem since machine learning algorithms, the foundation of many of the most cutting-edge artificial intelligence (AI) tools, are only as clever as the data they are given in training. The opportunity of machine learning bias is inevitable and must be continuously addressed since a human chooses which data is utilized to train an AI software (Ameen et al., 2021).

Anyone who wants to integrate machine learning into practical, in-production systems must consider ethics while developing AI training actions and work to eliminate prejudice. This is especially true when it comes to deep learning and generative adversarial network (GAN) applications, which are inherently incomprehensible. Explainability may be a hurdle to AI usage in industries with rigorous regulatory compliance criteria. For instance, financial institutions in the United States are required by rules to provide justifications for their actions about the issuance of credit (Gonog and Zhou, 2019).

However, because the AI algorithms employed to make such decisions work by extracting tiny connections between hundreds of data points, explaining how the outcome was arrived when a credit judgment is made by programming may be difficult. The software is sometimes referred to as black box AI when the decision-making process cannot be described. In conclusion, AI's ethical problems include the following: bias brought on by poorly trained algorithms and human bias; misuse brought on by deepfakes and phishing; legal issues, such as AI libel and copyright issues; the elimination of jobs; and data privacy issues, particularly in the banking, healthcare, and legal sectors (Rai, 2020).

AI Application in the Accounting Industry

Chukwudi et al. (2018) goal is to evaluate how artificial intelligence affects the efficiency of accounting processes in accounting businesses in South East Nigeria. At the study, conducted among 185 accountants and managers at accounting businesses in the states of Anambra and Enugu, a descriptive research methodology was used. To gather the data required for the investigation, a structured questionnaire was employed. Tables with the acquired data were displayed. At a significance level of 5%, linear regression was employed to evaluate the inquiry hypotheses. The study's findings demonstated that expert systems and intelligent agents have a

substantial influence on how well accounting functions execute in accounting firms in South East Nigeria. It was found that the efficiency of accounting procedures is increased by the application of artificial intelligence.

Gusai (2019) objective is to investigate how artificial intelligence affects the efficiency of accounting and auditing procedures. As a result, descriptive and expressive research is used in this study. Utilizing auxiliary data or data sources. The information was gathered from a variety of sources, including research papers, books, accounting websites, essays from newspapers, magazines, and journals, as well as pieces from websites that deal directly or indirectly with artificial intelligence. The choice of descriptive study was made in order to gain a deeper understanding. AI makes it possible to conduct accounting and auditing in a better and more welcoming environment, and developments in this field may surely greatly aid human efforts.

In the shadow of Corona pandemic, Rashwan and Alhelou (2020) seeks to determine the effect that artificial intelligence use will have on the accounting and auditing sector. Using a descriptive and analytical approach, the study's problem and the theoretical framework for the examination were both identified. A statistical application called SPSS was also used to evaluate and address study hypotheses. The study sample consisted of 170 questionnaires mailed to accountants and auditors who operated accounting and auditing businesses in the Gaza Strip; 155 questions were collected. The questionnaire was utilized as a tool by the researchers throughout their field inquiry. The study's findings indicate that, in light of the Corona pandemic, using artificial intelligence has a significant impact on improving accountants' and auditors' professional performance, increasing their ability to manage difficult accounting and auditing tasks, increasing the effectiveness of their cadres, and developing new accounting and auditing systems.

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The purpose of Lee and Tajudeen (2020) is to look into the adoption and effects of accounting software powered by artificial intelligence (AI) in Malaysian enterprises. A face-to-face interview is conducted with representatives from nine firms who use AI-based accounting software. The data gathered is analyzed using a constant comparative approach. The outcomes show different accounting software built with AI being used by enterprises. These are mostly used as a tool to deposit picture files for documents, automatically record information for invoices, keep track of invoice approvals, manage risks, and also monitor user activity. The usage of AI-based accounting software has increased productivity, streamlined operations, improved customer service, supported a flexible work environment, improved process governance, and conserved personnel.

Berdiyeva et al. (2021) examined the use of AI in accounting and finance. We have performed a meta-analysis in order to continue to guarantee a transparent and repeatable procedure. 150 research publications were examined throughout the database search, which covered the years 1989 through 2020. The majority of studies demonstrate a beneficial effect of AI systems on the accounting and finance process, according to the findings of a meta-analysis.

The primary goal of Mardini and Alkurdi (2021) is to thoroughly evaluate the different literature concerning AI and how it affects accounting. Additionally, this inquiry helps to critically recognize the research issues in accounting that aid investigators in addressing these gaps in the near future. The panel systematic dimensions approach is the methodology used, and it tries to answer research issues by critically reviewing and integrating the outcomes of pertinent earlier studies. The study was effective in carrying out a complete and organized evaluation. It also discovered overlaps and discrepancies in the literature on AI and accounting, which it utilized to recommend new topics for investigation.

Bakarich and O'Brien (2021) looked at how public accountants employed artificial intelligence (AI), specifically robotic process automation (RPA) and machine learning (ML). Additionally, it tries to determine how they perceive the impact and openness to using this technology. This study surveys public accounting professionals to determine how much artificial intelligence (AI), especially robotic process automation (RPA) and machine learning (ML), is presently being used, as well as their opinions of the effect and openness to this technology. 90 participants, representing different businesses, service lines, and positions, provided quantitative and qualitative responses. The findings indicate that RPA and ML are not yet commonly employed by public accountants or their customers, and that businesses offer modest but not significant training on these technologies. According to the responses, firms are only giving a limited amount of RPA and ML training, and neither public accountants nor their clients are yet making considerable use of these technologies. Public accountants are generally accepting of these changes, and respondents strongly predicted that in five years AI will have a significant influence on their routine activities. It also finds that differences in responses appear to be most strongly influenced by firm size. These findings imply that although AI has not yet been extensively applied in public accounting, major changes are about to come.

The aim of Oberoi et al. (2021) is to acknowledge and validate the many influences on artificial intelligence (AI) systems and how they affect the efficiency of accounting firms. To evaluate the literature-driven conceptual models, 176 accountants who work in accounting businesses in Delhi-NCR were selected as a sample. Using convenience sample and a self-administered questionnaire with a 5-point Likert scale, the study's results were gathered. Factor analysis and structural equation modelling were used to evaluate hypotheses. In addition, the Cronbach alpha, KMO, and Bartlett tests were used to gauge internal consistency and assess the suitability of the sample. According to the report, AI will help accountants operate more

productively and intelligently. It will also help them produce better-quality accounting work by reducing errors and fraud.

Emetaram and Uchime (2021) aimed to investigate how artificial intelligence was affecting the accounting industry. To accomplish this goal, relevant literature was reviewed, research questions were posed, and hypotheses were developed. A well-structured questionnaire using a Likert 5-point scale was given to the chosen organizations involved in finance and accounting to gather the data needed for this study. Records from the Corporate Affairs Commission (CAC) made accessible to the researchers showed that Onitsha and Nnewi are home to a combined total of (176) organizations. The researcher will turn to a sample study because of the high population size, along with time, money, and other restraints. The sample size will be determined using the Yaro Yamane sample-size determination function, which will yield a result of 122. Using the t-test, the presented hypothesis was evaluated. The findings indicated that AI had a positive impact on the accounting industry. It was established that rather than fearing that AI would replace their jobs, the accounting industry must embrace AI and incorporate it into improving professional performance if it hopes to remain relevant in the near future.

The association between AI and accountants' approaches to accounting tasks was examined by Akinadewo (2021). A structured questionnaire was employed in the study as the research design approach. The sample size was 205 and the target demographic consisted of accountants with expertise using systems for accounting and other financial transaction operations. The respondents were chosen using a purposive sampling approach. The findings concerning the logit regression analysis showed that the use of artificial intelligence by accountants had a considerable beneficial influence. This suggests that when AI is introduced, accountants' approaches to practical tasks would alter dramatically.

Stancu and Duțescu (2021) examines how artificial intelligence tools have affected accounting. It has employed the qualitative examination of the scientific and business literature linked to the influence of AI on accounting activities to conduct this analysis on the available data. The following databases were used to locate secondary data for this subject in the scientific field: From Taylor, Elsevier, and Emerald, 22 publications about artificial intelligence in accounting were chosen. This study was effective in demonstrating the possible changes that artificial intelligence (AI) might bring about in the accounting field as well as the preparations that must be taken for roles that will be more common in the future.

Das (2021) goal is to determine how AI is affecting the efficiency of accounting procedures. The inquiry is descriptive in form and is based on a range of AI-related literatures and their effects. For increasing knowledge depth, descriptive research has been favored. As a result, this study only uses secondary data gathering techniques and includes a wide range of secondary sources, including literature reviews, empirical studies, websites, books, journals, reports, etc. The work is divided into sections and intended for a broad audience in order to make the topic clear. Various parts are serially numbered from 1 to 14 in addition to additional talks. The study emphasizes how well the employment of artificial intelligence influences accounting function performance.

Damerji and Salimi's (2021) goal was to find out if perceived utility (PU) and perceived ease of use (PEOU) influence the link between accounting students' level of technological readiness and their decision to utilize AI. The investigation includes looking at how each student perceived their preparation for and uptake of technology. Students who participated were given access to a 31-item online questionnaire that sought demographic data as well as their opinions on technological readiness, adoption, PEOU, and PU. The target group consisted of all 824 accounting students from two American colleges. The study's conclusions showed that adoption of new

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technologies is significantly influenced by technological preparedness. However, a hierarchical regression mediation study revealed that both PEOU and PU had an impact on the link between technological preparedness and Artificial Intelligence adoption.

Siau et al. (2022) investigated the role of AI on accounting. A qualitative research approach called Value-Focused Thinking (VFT) may be used to determine the goals that must be reached in order to make the most of the potential of AI concerning accounting sector. This method enables the identification of goals and values, which in turn may give practitioners direction and serve as a framework for further AI investigations in the accounting field. "The population consisted of accounting experts who were knowledgeable about AI in the accounting sector. The Value-Focused Thinking (VFT) technique, a qualitative research methodology that aids in determining the goals to attain the value of AI in the accounting business, was employed in this study. The findings gave accountants recommendations on actions they should take to fully utilize AI's potential. Additionally, it gave a framework for future accounting-related AI research.

Chan et al. (2022) investigated the development and use of artificial intelligence for accounting services. Intelligent systems, robotic process automation, machine learning, and fuzzy neural networks are just a few of the key AI technologies that have been introduced. Some of the main fields of application are general accounting, accounts payable, accounts receivable, purchasing, payment processing, billing, invoicing, collecting debts, reporting on finances, auditing, fraud detection, and financial risk management. Deloitte and Intuit are the subjects of two case studies. It was discovered how AI is used by accounting companies to assist in the detection of irregularities in auditing operations. Auditing is often a time-consuming, difficult process that takes humans a very long time to do.

Banța et al. (2022) investigates how accounting professionals view the most significant returns and difficulties of utilizing AI-based technology and

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examines if AI is viewed as a threat that could harm employability. It employed a questionnaire to get the data that was analyzed because this sort of methodology is excellent for gathering high-quality information in social science research since it enables researchers to seize fresh viewpoints on the topic under study by gathering the data in a standardized manner. Since these MNCs are the ones using AI technology, the questionnaire was intended for professional accountants working for such organizations. As a result, the data from their responses is pertinent to our research.   The respondents were professionals with at least one year of experience in the accounting area, and the information were gathered between June and August 2021. There were 116 participants in all, but 13 were disqualified because their replies were not comprehensive. The findings show that practitioners understand the primary benefits and obstacles of integrating artificial intelligence (AI)-based approaches in accounting operations. Although AI is not seen as a threat to employment, practitioners are aware of the need to adjust their skill sets and are prepared to do so. Employers, professional bodies, and academics can address the primary concerns and continue to assist accounting practitioners in adjusting their abilities by offering a brief summary of the basic reasons pushing accounting practitioners to adopt AI applications.

Nwosu et al. (2022) looked at how accountants see the biggest applications and obstacles of employing AI-based technology and explores if AI is seen as a danger that might hurt employability. The systematic literature review (SLR) research methodology was adopted for this investigation. Using online indexing databases including ScienceDirect, SpringerLink, Taylor & Francis, and Emerald, this study searched the literature. The search took two weeks to complete. A total of 106 publications were found, of which 87 were about finance and business and 18 were research papers and one book chapter connected to AI in accounting. The findings demonstrate that, despite the fact that accountants currently utilize technology in their day-to-

day job to speed up procedures and generate better outcomes, artificial intelligence is anticipated to limit their career prospects since they lack knowledge and skill in the subject.

Abdulameer et al. (2022) sought to comprehend AI and its applications to the accounting and auditing sector, as well as to examine its effects on the growth of the industry based on the available literature. This study also attempted to investigate if AI should be viewed as a threat or an opportunity. The outcomes demonstrated that the perceived usefulness and effectiveness of AI solutions are greatly influenced by the ethical questions of autonomy, accountability, and trust. The study comes to the conclusion that managerial accounting's various ethical problems can be resolved by AI solutions. However, AI technologies might generate additional ethical issues unique to managerial accounting and business ethics through the design and implementation of their solutions. So, despite all the obstacles and professionals' hesitation, management accounting will be significantly impacted by AI in the years to come.

Living at a time of global and accounting-related digital revolution and expansion. However, the body of material that already exists that links these two ideas still appears insufficient, particularly when it comes to Accounting and Artificial Intelligence, both theoretically and practically. Therefore, the purpose of Silva et al. (2022) is to investigate, through a literature review, any potential connections between the practice of accounting and artificial intelligence. The findings demonstrate that methods for automating accounting duties have already been put into place, but accountants are still hesitant to accept this kind of technology.

Mohamad (2022) aimed to investigate how AI could lead to enhance accounting professions. The accounting staff involved in management accounting, financial accounting, tax accounting, and auditing will get a survey of closed-ended questionnaires in order to meet the goal. Because they are simple to explain, comprehend, and generate results that accurately

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represent the population at a cheaper cost, survey questionnaires were chosen for this study. As a result, the sample size will be between 40 and 300. The maximum sample size for this study is 300, which is its goal. Every state in Malaysia will serve as the sample location. Although it is getting greater attention, it is unknown how artificial intelligence may impact the professionalism of accounting. Many fields, including engineering, medicine, law, and nursing, have shown how artificial intelligence may enhance the effectiveness and quality of work. The accounting system is still in the early phases of digitization, in contrast to other industries.

Meryem and EL-Mezouari (2022) examined the use of AI in five accounting sub-fields: financial accounting, management accounting, tax accounting, auditing, and government accounting. The investigation conducted a bibliometric analysis of 931 articles published between 1990 and 2022 in order to determine research trends and the most popular issues and themes addressed in the literature. This study adds to the corpus of accounting literature by assessing the current common theme in the available research by visualizing and mapping the presence and co-occurrence of authors' keywords across 931 articles that discuss this issue using the VOS viewer software. This will allow researchers to draw awareness to certain under-researched topics of inquiry, which will then be examined further by researchers. The findings demostated that financial accounting is the accounting subject that has received the most research. The subject that is discussed the most is how to identify financial statement fraud. There hasn't been much written on how artificial intelligence will affect tax accounting and government accounting.

Lehner et al. (2022) explains its findings using Rest's four-component model concerning antecedents for ethical decision-making in order to highlight ethical problems associated with adopting AI-based accounting systems regarding decision-making. This research has its origins in the hermeneutic

school of interpretative accounting, which engages in a dialogue between the speaker and the texts. To support this discourse, the authors undertook a narrative (semi-systematic), theoretically informed literature review for the years 2015–2020, total of 138 articles from 43 journals. The events that are presented create the narrative of this review, which uses instances of the accounting and auditing practices referenced in certain publications rather than their study methodology. The authors find five primary ethical issues with AI-based decision-making in accounting in the theme coding of the chosen papers: objectivity, privacy, openness, accountability, and trustworthiness. The researchers employ Rest's component model of antecedents for ethical decision-making as an effective basis for the structure. They then critically examine the challenges and their implications for future human-machine collaboration with varying degrees of agency between humans and AI.

Over the course of 15 years, Khan et al. (2023) was examined the significance of artificial intelligence regading accounting and company management. The statistical-historical analysis of artificial intelligence in the commercial and accounting fields is done using a scient metric method. The crucial and well-known data base "Scopus" is where the information is sourced. A study sample consists of 1608 papers that span the topics of accounting and business management. There were 440,652 secondary documents including the keyword "Artificial Intelligence". The data demonstrate the outcomes of the top nations that have invested in artificial intelligence research. With 88,679 publications, the USA holds the top spot in scientific work worldwide. The top five most well-known and economically suffering nations that have worked on the term "artificial intelligence" are, in that order, the United States, China, the United Kingdom, India, and Germany.

Singh et al. (2023) major goal is to learn how artificial intelligence is used and used in the accounting and finance industries. The examination's

intriguing premise is supported by statistics and supplemental material. The essential required data have been collected from various websites, journals, publications, and news sources. The final argument in the section is that AI machines ensure useful capabilities while limiting rewards. As computerization permeates every aspect of industry, the financial organization will also embrace the high-level shift brought about by the technology improvements. The accounting and finance industries that adopted AI will be positioned in the future of technological transformations; accounting benefits from artificial intelligence in a variety of ways.

The goal of Aljaaidi et al. (2023) was to find out how employing AI apps affects the efficiency of accountants and auditing organizations. 38 audit companies make up the final sample for this study. In the context of Saudi Arabia, this investigation used a survey-based technique. Participants in this study were external auditors in Saudi Arabia who possessed certifications from the Saudi Organization for Chartered and Professional Accountants (SOCPA). A link was created for responders to view the surveys that were delivered to them using Google Forms. Using artificial intelligence apps, audit companies regard them as helpful tools that improve the performance of accountants and audit businesses, according to the findings of the multiple regression analysis. The outcomes of the multiple regression analysis show that audit firms who use AI technologies view them as beneficial tools for boosting the effectiveness of accountants and audit firms.

Kureljusic and Karger (2023) attempts to compile existing research on the usage of AI in financial accounting forecasting. Artificial intelligence research for cancer diagnosis has expanded significantly in recent years. This investigation undertook a bibliometric evaluation of the prior literature pertaining to the use of artificial intelligence in cancer diagnosis. It looked at 6450 pieces of writing on the subject that were printed between 1986 and 2022. In doing so, it was possible to provide a summary of this study field,

including its important subjects, pertinent sources, organizations, and publications. The authors offered details on the accuracy and AI approaches used, and they specified three application areas. The findings showed that there is still a dearth of generalizable sociotechnical data.

Nóbrega et al. (2023) examines how artificial intelligence can improve small and medium-sized business accounting. The study examines the uses and advantages of artificial intelligence in SMEs' accounting. The study of 20 interviews followed a qualitative methodology. Recent market introductions of artificial intelligence technologies have forced professionals to engage with data management and adapt new paradigms in the accounting services and profession. It was determined that because SMEs have less financial capability, they lack the ability to integrate AI technologies into their accounting departments.

3. **METHODOLOGY**

Based on the research objectives, the research relied on the qualitative approach, where primary data is used as well as secondary data. First, the research uses secondary data through the use of systematic literature study, where the study used 54 articles on artificial intelligence and its history as well as its impact on the accounting field, where 8 articles were used to deliver an impression of artificial intelligence. Moreover, 9 articles evaluating the history of artificial intelligence were used. In addition to 6 articles on the enabling tendencies of artificial intelligence. Also, 3 articles dealing with the ethical use of artificial intelligence were used. Finally, 28 articles regarding the impact of applying artificial intelligence within accounting field were included. Based on the analysis of systematic literature, it was concluded that it is essential to hold interviews with experts in the accounting field to provide more accurate results to suit the research objectives. Accordingly, 20 interviews were held with experts and managers in the accounting sector in Egypt about their opinion on the acceptance of

artificial intelligence and its impact on accounting performance. These interviews are analyzed using thematic analysis using NVivo software.

4. **RESULTS AND FINDINGS**

The current investigation aims to identify the influence of AI adoption on accounting performance. Accordingly, interviews questions are developed and interviews are done with 20 managers and experts working in the accounting sector. Eight questions are developed, which can be shown as follows;

1. Did you hear about the concept of AI based accounting? How?
2. Is AI technology adopted in your company in the accounting sector?
3. Do you see AI as an opportunity to enhance the accounting operations?
4. In your point of view, did the acceptance of AI in accounting affects the performance of the company?
5. In your point of view, to what extent will the acceptance of AI in accounting will affect the manpower?
6. What are the challenges related to AI adoption in accounting?
7. In your opinion, what are the most significant requirement of AI adoption?
8. Did the adoption of AI in accounting face resistance from the employees?

To assess the interviews, a qualitative analysis with a theme analysis is used. Thematic analysis is an adaptable method for analyzing qualitative evidence that may be used in a variety of paradigmatic or epistemological contexts. Thematic analysis is an appropriate way of analysis for attempting to comprehend experiences, thoughts, or behaviors throughout a data set. Themes, as opposed to mere summaries or categorizations of codes, are intentionally formed patterns (or meanings) derived from a data group that report an investigated issue. Themes can be generated in either an inductive or deductive manner (Kiger and Varpio, 2020).

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Thematic analysis is performed in six phases, according to Maguire and Delahunt (2017): become familiar with data, produce initial codes, seek for themes, analyze themes, define themes, and write up.

Step 1: Become familiar with the data

Reading and rereading the transcripts is the initial stage in any qualitative study. Before continuing, the researcher should be quite comfortable with the complete body of data, also known as your data corpus, which includes all of the interviews and any other data the researcher might be using. It is helpful to write notes and record initial impressions at this point. Figure 1 shows the first step of thematic analysis, and explains the process of defining data on the NVivo program by exporting the interviews on it.
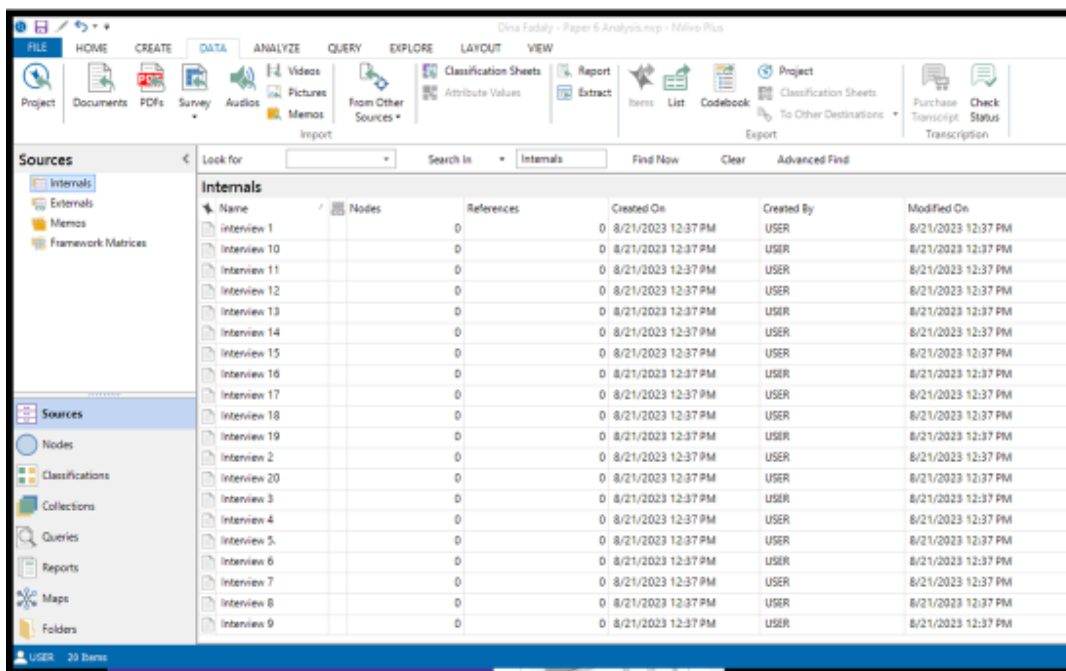

Figure 1: Files Imported Into NVivo

Step 2: Generate initial codes

Concerning this stage, the investigator begin to meaningfully and methodically organize our data. Coding breaks down large amounts of data into manageable meaning units. There are various coding techniques, and the one the researcher choose will depend on the researcher viewpoint and study objectives. This step is presented in NVivo as in the following figure.
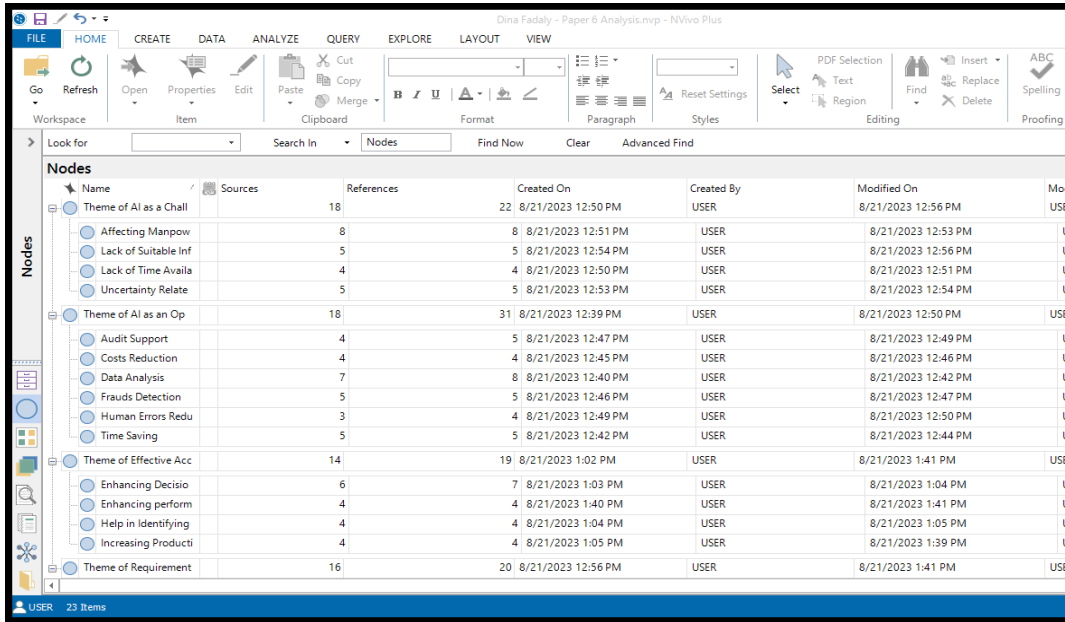

Figure 2: Theme and Codes Generation in NVivo

Step 3: Search for themes

The definition of a theme is open to interpretation. The theme is characterized by its consequence. The investigator looked at the codes, and some of them were obviously part of a theme. The codes had been arranged at the conclusion of this stage into more general themes that appeared to have anything to say specifically about this research subject. The extracted word cloud is shown in the following figure.

Figure 3: Word Cloud

Step 4: Review themes

In this stage, the first themes that we found in Step 3 are reviewed, modified, and developed. At this point, it is beneficial to compile all the information pertinent to each theme. By simply clipping the transcripts, the 'cut and paste' capability in any word editing product (NVIVO) may be used to accomplish this. The researcher reviews the data connected with each topic and considers if the data supports it. The next step is to consider if the themes make sense in the context of the complete data set. Through this step, the researcher generated four themes;

1. Theme of AI as an Opportunity
2. Theme of AI as a Challenge
3. Theme of Requirements of AI Adoption

4. Theme of Effective Accounting

Step 5: Define themes

This is the last round of the themes, and the goal is to pinpoint the "essence" of what each topic is all about. What message does the theme convey? If there are subthemes, how do they relate to the main theme and interact with it? How are the themes connected to one another?

Through this step the researcher succeeded in developing the essential themes and the sub-themes (codes). This is demonstrated in the following table;

Table 1: Defining and Naming Themes

Major Themes	Sub-themes	Reference
Theme of AI as an Opportunity	Data Analysis	8
	Time Saving	5
	Costs Reduction	4
	Frauds Detection	5
	Audit Support	5
	Human Errors Reduction	4
Theme of AI as a Challenge	Lack of Time Availability to Make Decisions	4
	Affecting Manpower	8
	Uncertainty Related to AI	5
	Lack of Suitable Infrastructure	5
Theme of Requirements of AI Adoption	Availability of Experts	5
	Training Courses	4
	Big Data Base	4
	Adding True and Compliant Data	4
	Adding Relevant Data	3
Theme of Effective Accounting	Enhancing Decision-Making Process	7
	Help in Identifying Potential Opportunities and Risks	4

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Major Themes	Sub-themes	Reference
	Increasing Productivity	4
	Enhancing performance	4

Step 6: Writing-up

Typically, the ultimate result of investigation is a report. This process is illustrated in the following subsections;

Theme of AI as an Opportunity

This is the first theme developed from the interviews, where it is consisted of six sub-themes; Data Analysis, Time Saving, Costs Reduction, Frauds Detection, Audit Support and Human Errors Reduction. The codes of AI as an Opportunity theme are shown in the following figure.
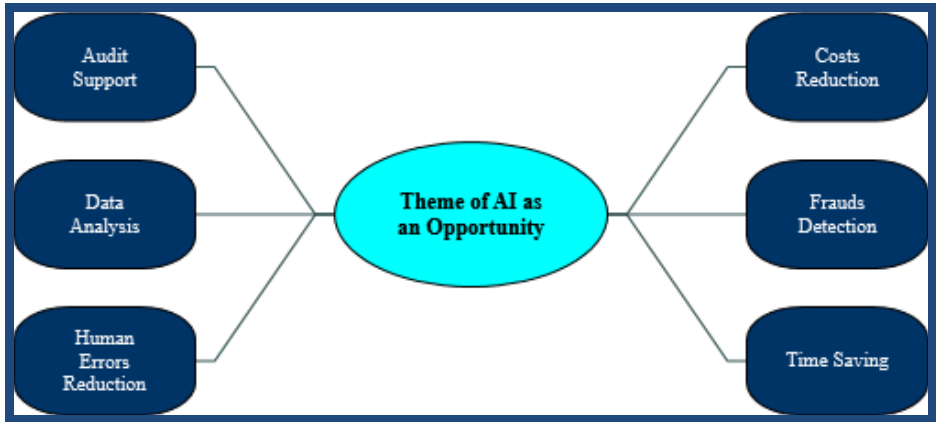
Figure 4: Theme of AI as an Opportunity Mind Map

Data Analysis: AI in the accounting sector has the ability to enhance many of its procedures. One of these procedures is the data analysis. Data analysis process represents a very important and significant task to the accounting sector. Accountants must focus while processing the data analysis as the results of this analysis is the base of taking different decisions. AI will help in this process and guarantee producing an effective data analysis, which by that assure taking the right decisions. The evidence concerning this issue is demonstrated as follows:

"AI in accounting can help in financial reporting, audit and compliance, fraud detection, and data analysis".

"AI is a great opportunity as it helps in the data entry, analysis, and report generation".

"The usage of AI in accounting is growing, and going forward. AI has the ability to identify patterns in large data sets where human cannot, it also allows auditors to analyze large data sets, plays a significant role in tax research and helps in many other operations".

"At the enterprise level, AI may decrease human bias and inaccuracy in data analysis, enhance processes, release workers from monotonous activities, and more".

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"Data and automation are the two main focuses of AI in accounting. Machine learning, an AI-powered technology, can lead to new and better methods for data analytics in accounting".

"AI based accounting represents a software of AI that helps in data entry, real-time data processing, intelligent data analysis, enhance security and compliance, be a financial and accounting guidance, and enhance cost efficiency".

"Processing vast amounts of structured and unstructured data from many sources, including annual reports, financial statements, contracts, mails, social media, etc., allows AI to improve data analysis".

"All I know about AI is that it is a specialized software that aims to replicate the cognitive processes of the human brain in order to solve issues and accomplish objectives, by that it can help in the process of storing data and data analysis".

Time Saving: AI save the long time spent in performing the manual and routine tasks as it can finish all these tasks automatically. It also helps the accountants in finding the information they want easily and save the required time needed to look for the information through the huge data in the system. Moreover, the time saved give the accountants the chance to focus more on the critical and complicated tasks and by that increase their efficiency, these points are shown in the following quotes;

"In the field of accounting, AI was successful in creating a revolution. Accountants no longer have to spend hours searching and sifting through columns of data; instead, they can access the data they require instantly. This not only saves a ton of time, but it also produces data that is more precisely targeted".

"The fields of finance and accounting have been significantly impacted by artificial intelligence. In fact, because they save time and offer in-depth insights, AI-enabled finance and accounting systems are the means for

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businesses to remain strong competitors in a market that is becoming more and more competitive. Thus, I see AI as a great opportunity".
"AI will help in reducing the time spent on routine work, which will make the work accomplished faster and in a more accurate way".
"Intelligent automation made possible by AI frees accountants from time-consuming manual tasks so they can concentrate on higher-value work".
"Automation of labor-intensive or time-consuming processes by AI can boost productivity. This can cut down on manual interventions, delays, and human errors".

Costs Reduction: through automating many of regular and routine tasks, such as data input, invoice processing, tax preparation, payroll, and auditing, AI helps in reducing costs. These evidence are assured through interviews as follows;

"AI also helps the accounting department in saving the time and money by automating regular operations, freeing up employees to focus on important initiatives, and enabling businesses to enhance productivity and profits while decreasing costs".
"Data input, invoice processing, tax preparation, payroll, and auditing are a few examples of repetitive, boring, or human error-prone processes that AI can automate. Accordingly, accountants can focus on additional value-added tasks because of the time and money saved by adopting AI technology".
"Accounting software with AI capabilities can complete jobs quicker and more effectively than people, increasing the productivity of the accounting department as a whole, which will assist the company in lowering costs and enhancing their bottom line".

Another point is pointed out in the interviews, which is the adoption of AI will reduce the required manpower, which will reduce the salaries paid for the employees.

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"AI will help the company to reduce the number of required employees in which helps in reducing costs".

Frauds Detection: one of the most important opportunities provided by AI is frauds detection, it is a very important feature that helps in avoiding many risks that may affect the system and the performance of the accounting. Evidence are shown as follows;

"Both accountants and their clients profit when jobs are completed more accurately and efficiently due to using AI. Additionally, given the time savings possible with AI technologies, accountants could be able to increase the number of clients they serve. Finally, AI can be utilized to notice fraud in the accounting industry".

"For accountants and their clients, AI may also apply cutting-edge techniques like analytic forecasting, evaluation of sentiment, anomaly identification, fraud detection, risk evaluation, etc. to offer deeper insights and suggestions".

"Businesses can use AI to spot irregularities in financial data that might point to fraud, but human skill is still needed to go into and corroborate these suspicions. Fraud analysts utilize their expertise in investigation methods and accounting principles to spot probable fraud and create plans to stop it".

"Machine learning algorithms, for example, may spot trends, abnormalities, and fraud in economic data, strengthening risk management and fraud detection in accounting, strengthening data analysis skills, and enhancing decision-making processes".

"Massive amounts of financial information can be evaluated by AI algorithms, which can also spot irregularities that could be signs of fraud, in which can lessen financial losses and assist in preventing fraud".

Audit Support: another important feature is that AI helps in the auditing procedures, through helping auditors in access the financial data as well as it helps in other auditing features. Evidence below shows this point as follows:

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"AI's influence goes beyond data management to improve audit and accounting procedures".

"AI can assist with document management, making it simple for auditors to find and access pertinent financial records and data. This can greatly simplify the audit procedure and cut down on the time and resources needed to finish the audit".

"AI helps in processing and reconciliation of the invoices, detecting frauds, making financial predictive analysis, preparing tax reports, entering large amount of data and supporting audit".

"AI in accounting uses data automation to modify processes and produce better results. Data input, invoice processing, reconciliation, tax preparation, auditing, and compliance are a few examples of everyday jobs that AI can automate".

"AI-powered audit assistance technologies can help accountants and auditors check financial reports to make sure they are correct and up to date according to accountancy standards".

Human Errors Reduction: the automation helps in performing many tasks automatically, by that the errors and mistakes done manually by the human will be reduced. ChatGPT is given as an example of AI technology that help in providing free-error information. The evidence are shown as follows;

"AI can enhance financial and auditing procedures. Data collecting and analysis operations are also aided by AI. It can save a ton of time and reduce the possibility of human error through using tech-based tools to arrange information".

"AI can increase accuracy by minimizing biases and errors made by humans. AI can also spot data discrepancies and flaws, flagging them for review or correction. As a result, accounting information and services start to be with higher quality and more reliable".

"AI-powered technologies that precisely organize information can be used to save a significant amount of time while also efficiently reducing the dangers associated with human errors".

"ChatGPT has the ability to automate many accounting processes (data entry, reconciliations, and report generation), which helps accountants in saving time and reducing the risk of human errors".

Theme of AI as a Challenge

This is the second theme developed from the interviews, where it is consisted of four sub-themes; Lack of Time Availability to Make Decisions, Affecting Manpower, Uncertainty Related to AI and Lack of Suitable Infrastructure. The codes of AI as a Challenge theme are shown in the following figure.
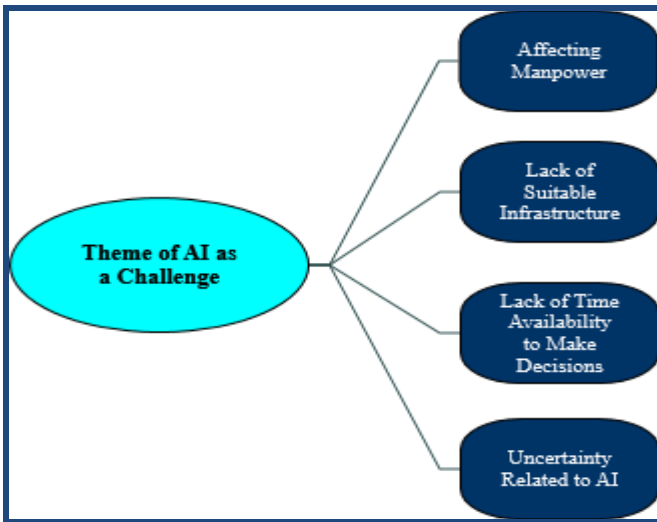

Figure 5: Theme of AI as a Challenge Mind Map

Lack of Time Availability to Make Decisions: one of the important challenges that faces the AI adoption is that the system sometimes do not

allow enough time to the accountants to take the proper decision. This challenge is provided through the interviews in the following quotes;

"There are some decisions related to AI are needed to be taken immediately, which can affect the efficiency of the employee in taking the right decision".

"There are many challenges related to the adoption of AI, which are; lack of time availability to think about the right decision, uncertainty related to AI and the requirement of strong advanced infrastructure".

"The biggest challenge that we face while dealing with AI is that sometimes the system did not provide enough time to take the decisions".

"A serious challenge that causes confusion to the employees is the short time available to take some decision on the system".

Affecting Manpower: respondents assured that manpower is affected negatively as a result of AI adoption, as AI helps in performing many tasks, which reduces the required tasks and by that reduce the need of large number of employees. The evidence is shown as follows;

"Also AI has many advantages and benefits, there is a serious challenge related to manpower, according to recent researches AI will lead to the disappearance of some job title, which will affect the quantity of the required workforce in the future".

"The amount of manpower needed would be reduced as a result of the role of automation process provided by AI, which have the ability to handle and analyze great amount of the transactional data".

"Till now the manpower is not affect by the company's AI adoption but I expect to be affected in the future".

"It is expected that any new technology affect the manpower and reduce the number of needed employees".

"According to research, the adoption of AI affects the manpower, as it leads to the loss of some jobs, but on the same time new jobs will appear".

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"From the industrial revolution till now, any new technology affects the manpower, through reducing the number of required employees and replace them with machines, and for me AI is the same idea".

On the other hand, other respondents see the opposite, as they assure that AI would not affect the manpower negatively, but it will support it. Evidence are shown as follows;

"I see that AI represents a technology that augments the accountants skills and expertise and don't replace it, therefore, AI from my point of view didn't affect the manpower".

"Most of accountants think that AI will affect the manpower and replace them, but in fact accounting professionals who understand how to use AI software may eventually replace those who don't".

Uncertainty Related to AI: many uncertainties related to AI is identified through the interviews, these uncertainties make the interviewees think of AI as a serious challenge. The evidence related to this point is shown as follows;

"What I mean from uncertainty are the problems related to security and privacy. As AI systems handle confidential financial data, security and privacy issues surface, necessitating strong cybersecurity measures to safeguard data from attacks and illegal access".

"Some challenges have been noticed through dealing with AI, which is AI struggles in adjusting with new or uncertain circumstances, it also struggles in understanding semantics from text and understanding complex language, such as that used in legal papers. Moreover, sometimes it fails in giving direction and counsel that is concise and appropriate".

"One of the biggest challenges related to AI is the uncertainty. It can be difficult to comprehend and justify the reasoning behind AI-generated results, because some AI algorithms lack the ability to be interpreted. This create an atmosphere of uncertainty".

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"For accountants and clients to have a successful partnership, ethics and trust are crucial. The use of AI in accounting, however, may bring up some uncertainty issues, including those with reliability, oversights, transparency, security, confidentiality and honesty".

"In my point of view, the uncertainty related to any new technology represents the most significant challenge of adopting AI in the accounting sector".

Lack of Suitable Infrastructure: the unavailability of suitable infrastructure represents a challenge that did not allow the suitable adoption of AI. The following quotation shows this point as following;

"We are facing a challenge related to the advanced infrastructure required for adopting AI technology. This advanced infrastructure is needed in order to adopt AI efficiently".

"The lack of suitable infrastructure is another main challenge that faces most of the companies in Egypt".

"In Egypt the most important challenge is that AI required a very advanced infrastructure and technology in order to be adopted efficiently".

"The poor infrastructure represents a serious challenge that we are working on solving it as soon as possible".

"Different challenges can be identified related to lack of professional experts, lack of suitable infrastructure, uncertainty related to AI, problems of privacy and security, etc.".

Theme of Requirements of AI Adoption

This is the third theme developed from the interviews, where it is consisted of five sub-themes; Availability of Experts, Training Courses, Big Data Base, Adding True and Compliant Data and Adding Relevant Data. The codes of Requirements of AI Adoption theme are shown in the following figure.
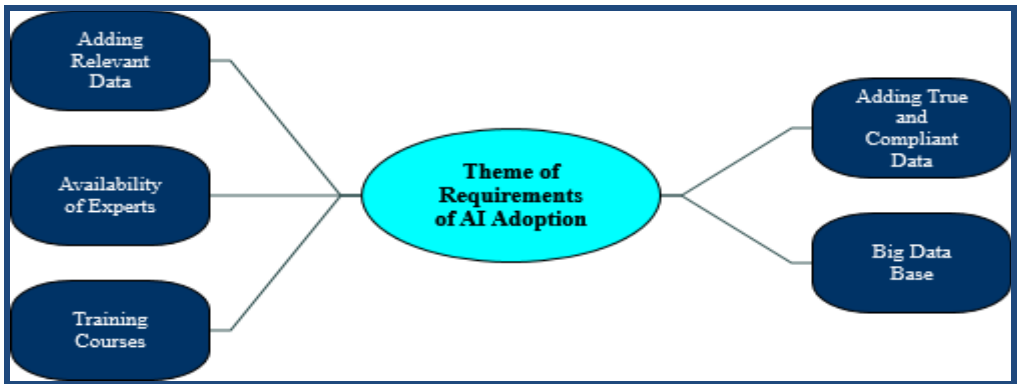
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Figure 6: Theme of Requirements of AI Adoption Mind Map

Availability of Experts: the availability of professional expert that know how to deal with AI software represents a main condition for the successful adoption of AI. Therefore, experts' availability represent the first main requirement of AI adoption. The quotes presents this point as follows;

"The first initial requirement is having experts that are completely aware of AI and how it can be adopted as well as have the ability to train the employees on how to deal with AI technology".

"Second important requirement is the existence of professional experts that can deal with these data and with the whole system in order to make the system work effectively".

"There are various technologies of AI in accounting; machine learning, natural language processing, and robotic process automation. Each technology has its job, therefore the company needs experts who can identify the suitable technology that is needed to be adopted to fit within the company needs and budget".

"Different requirements are needed, which are related to professional experts, simulations and courses, suitable infrastructure, choosing the suitable technology, and many other things".

"The availability of experts that understand will how to adopt and deal with AI system represents for me the most important requirement".

Training Courses: AI is an advanced technology that requires intensive and continuous trainings in order to make employees able to use it. Without these trainings no one can use AI soft wares, which make it useless. The evidence is shown as follows;

"Our company are working during this period on providing training courses and seminars that help employees to know more and more about AI, its importance and how it can benefit the accounting".

"We understand quiet well that our employees need intensive trainings to be able to deal with AI advanced software. Moreover, we are working on developing exams that will be distributed among the employees at the end of each training course to make sure that employees have understand the course and all information provided in it".

"We face resistance from the employees at the beginning of the adoption, especially from old age employees, from this resistance we understand quiet well that we need to provide intensive trainings to the employee to make them familiar with AI and how to deal with it".

"A professional training courses are need to be provided on regular bases to make all the employees updated with the continuous updates that enter the system".

Big Data Base: entering a huge amount of data to the AI system is a most important requirement that allows the system to work. Interviewees have assured this point as following;

"Beside the challenge related to manpower, there is another serious challenge related to the data structure, as the adoption of AI requires an availability of big data base in the financial services, where the company do not have the ability to provide this procedure yet".

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"The most important requirement and challenge at the same time is providing a huge data base. This data base is a must in order to make AI system works efficiently".

"A big data base is needed to be provided to the system before it work. This data base supports the system and enables it to perform significantly".

"A very large data base is required and I see that only big corporates can provide these data base as their possibilities will allow them to do so".

Adding True and Compliant Data: the entered data should be precise and compliant with the intention of makeing the system work appropriately without producing any wrong analysis or results. The importance of having true and compliant data is assured in the interviews as the following;

"AI is a system fueled by data, thus this data must be true and compliant to assure the efficiency of the system".

"Data collection represents the initial step of any AI plan, accordingly the system requires collecting high-quality and compliant data that prevent any deviation or error in the system".

"The availability of true, accurate and compliant data is the most important requirement as this represents the base that allow the system to work properly".

"If you make the error of feeding inaccurate and incorrect data to AI, your system will not make wise decisions, because the data does not match up well with what you want the system to display. Therefore, one of the most important requirement of the system is true and reliable data. The foundation of AI is machine learning, which relies on large volumes of reliable data to learn from".

Adding Relevant Data: respondents also referred to the importance of offering relevant data. Data must be relevant through identifying to the system that different data are relates to each other. This helps the system to work efficiently, also helps it to apply more advanced tasks. The following quotations show this point as follows:

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"There is an important requirement that not all the employees consider it while entering data to the system, which is linking the data to each other. Employees must be able to integrate disparate data sources and make the AI software identify when these data could be relevant to each other".

"Integrating pertinent data is a crucial first step in integrating AI effectively. Businesses are missing out on enormous chances if they don't connect important data sources and relevant sources together. By that AI system lose its efficiency".

"Any AI application must have high-quality data to succeed. Accurate results or suggestions can be produced using high-quality data. Because of this, it's critical to make sure the information used to train and evaluate AI models is comprehensive, consistent, relevant, correct, and current".

Theme of Effective Accounting

This is the fourth theme developed from the interviews, where it is consisted of four sub-themes; Enhancing Decision-Making Process, Help in Identifying Potential Opportunities and Risks, Increasing Productivity and Enhancing performance. The codes of Effective Accounting theme are shown in the following figure.
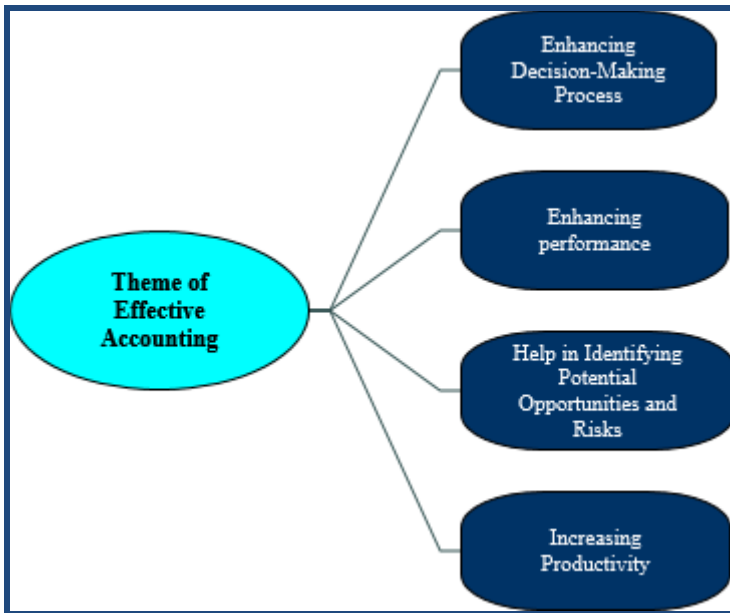
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Figure 7: Theme of Effective Accounting Mind Map

Enhancing Decision-Making Process: the advanced tasks provided by AI make the tasks more accurate, which assures making the right decisions. Moreover the AI system has the ability to provide some suggestions and recommendations to accountants that helps them in the decision making process. Evidence that present these points are shown as follows;

"The adoption of AI technology helps our company in increasing the precision and efficiency of the accounting operations, and provides useful insights and predictions for decision-making, which by that enhance the performance of our company".

"AI in accounting represents an automated system that helps in implementing the repetitive tasks, identifying patterns in financial data, and suggesting different insights that help in taking the better decisions".

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"Artificial intelligence regarding accounting is used to improve the effectiveness of fundamental and core processes and procedures, which eventually results in better business decisions".

"Expert systems provided by AI enable storing and interpreting human experience and employ it in offering advice and suggestions to management accountants and by that assisst them in reaching the most appropriate decisions".

"By delivering data-driven conclusions and recommendations, AI can improve decision-making. AI can also assist accountants and their clients in exploring possible outcomes and scenarios depending on numerous variables and hypotheses. They can use this information to make well-informed decisions".

"AI can assist firms in creating accurate and trustworthy financial forecasts that may be used to enhance strategic decision-making by analyzing financial data".

"AI systems employ this data to enhance accounting procedures by simulating human cognitive abilities including learning, reasoning, and decision-making".

Help in Identifying Potential Opportunities and Risks: another important feature provided by AI is that it has the ability to identify the future opportunities and risks as well as alerts the accountants with them in order to act in a proper way. The following quotes show this point clearly.

"Real-time insights into the company's financial performance can be provided by AI, which enables companies to spot potential risks and opportunities earlier and by that take the right steps that assure the effectiveness of accounting procedures".

"AI helps in identifying the potential risks, which improves the accounting performance, which will reflect back on the company performance".

"The determination of prospective risks, help us to put preventative plans that push these risks away from our company".

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"AI let us know about the current and future opportunities and risks that faces the accounting procedures, in which protect us from many problems occurs in the system as well as make us ready to seize the opportunities in the best way we can" .

Increasing Productivity: regarding this code, respondents had talked about refining the productivity of the employees, the accounting sector and the company as a result of depending on AI system. The evidence regarding this issue is demonstrated as follows:

"The adoption of AI helps in enhancing the employees productivity as it helps them to save a lot of time and to analyze massive amount of data, thus as the productivity of the employees increase the productivity and the performance of the company increases".

"AI will enhance the operations of accounting and by that increasing the company productivity".

"The automated tasks provided by AI help in reducing human error, by that we can have more reliable and accurate financial reporting and analysis. Accordingly to that, the productivity of the accounting sector will be enhanced".

"The advanced features provided by AI accounting enhance the productivity of the accounting sector and guarantee more accurate results".

Enhancing performance: in this point, respondents had also assured that AI will enhance the performance of the accounting sector as well as the performance of the company. Moreover, one of the interviews had mentioned that there are different tools of AI (Xero, Sage, QuickBooks, KPMG Clara, and Deloitte TrueVoice) where each of them can support the system in a different way as each of them has its own functions.

"As operations become more efficient and fast, the performance of the accounting procedure will increase, which will reflect back on the company and its performance".

"Accounting chores that are repetitive are made easier by AI, freeing up time for more significant work. As a result, employees are more effective and productive since they can concentrate on what they do best, in which enhance their performance and reflects positively on the accounting sector".

"If our company adopted it efficiently and succeeded in solve all the issues that faces this adoption, I strongly believe that AI will have the skill to expand the performance of the accounting sector, moreover, the performance of the company itself".

"There are many types of AI accounting solutions and tool, such as; Xero, Sage, QuickBooks, KPMG Clara, and Deloitte TrueVoice, each of these tool has its own functions that helps in enhancing the performance of accounting".

5. **DISCUSSION**

From the analysis, a deeper insight of AI in accounting is gained. Following thematic examination of 20 interviews with accounting managers in Egypt, three themes emerged:

1. Theme of AI as an Opportunity
2. Theme of AI as a Challenge
3. Theme of Requirements of AI Adoption
4. Theme of Effective Accounting

Theme of AI as an Opportunity refers to the opportunities gained from adoption of AI, which consists of six codes (Data Analysis, Time Saving, Costs Reduction, Frauds Detection, Audit Support and Human Errors Reduction). Second theme is AI as a Challenge refers to the challenges that AI can create that represent a barrier of AI adoption, which consists of four codes (Lack of Time Availability to Make Decisions, Affecting Manpower, Uncertainty Related to AI and Lack of Suitable Infrastructure). Third theme is Requirements of AI Adoption refers to the needs of adopting of AI system in accounting, which consists of five codes (Availability of Experts,

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Training Courses, Big Data Base, Adding True and Compliant Data and Adding Relevant Data). Finally, the fourth themes is Effective Accounting that mentioned the benefits gains from AI adoption to the accounting system, which consists of four codes (Enhancing Decision-Making Process, Help in Identifying Potential Opportunities and Risks, Increasing Productivity and Enhancing performance).

Finally, an outline is created that highlights the interview topics and codes. The mind map is depicted in the figure below:
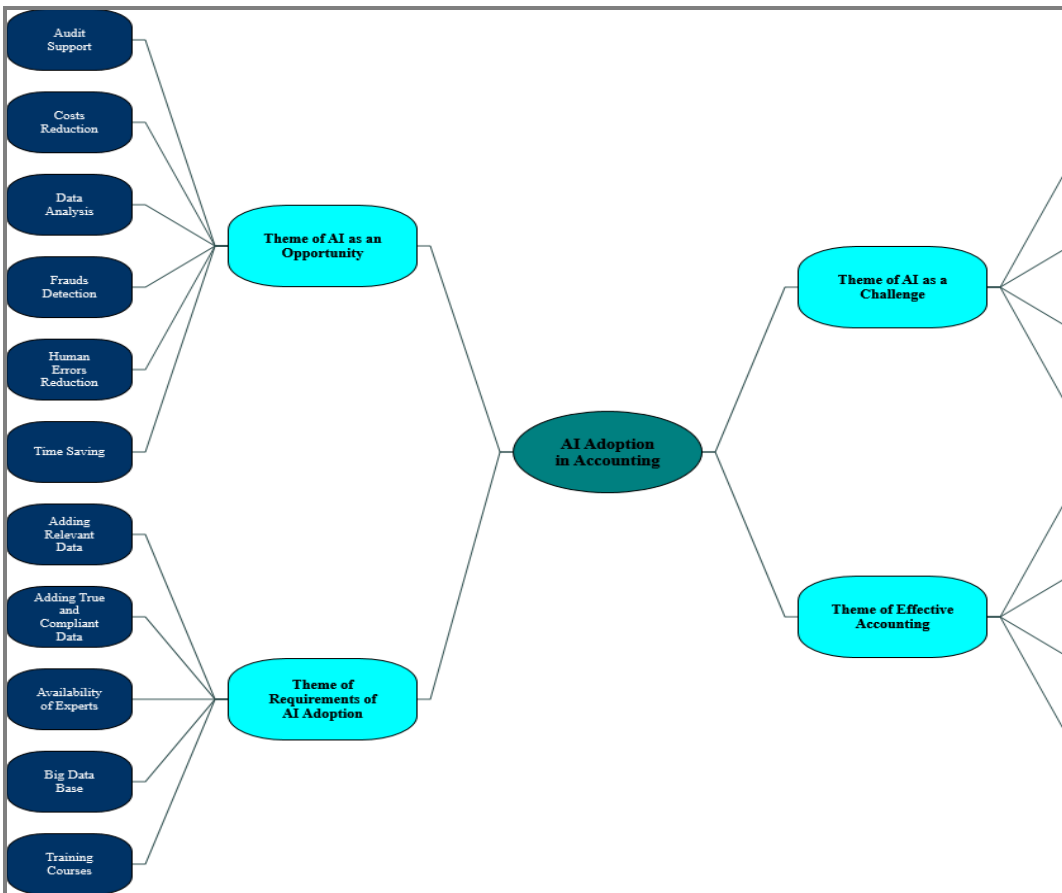
Figure 8: Research Summarization Mind Map

6. **CONCLUSION**

According to the previous results, it was determined that accounting chores that are repetitious are made easier by AI, freeing up time for more significant work. As a result, employees are more effective and productive since they can concentrate on what they do best. This AI generates questions that accountants may change or email to customers, saving them time and effort from having to retype everything. The efficiency and accuracy of

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financial operations might be greatly increased by the use of automated activities in accounting and finance. Automating repetitive and normal tasks reduces the possibility of human mistake, which eventually produces more accurate financial data and reporting. You may save time by creating email drafts with ChatGPT. My group and I are now using AI for customer assistance. In fact, our team at Future Firm employs ChatGPT to enhance customer support by using AI to enable quicker response times and provide more individualized care.

AI algorithms are able to analyze data quickly. As a result, AI is a useful tool for forecasting and spotting patterns. By examining transactions, cash flow, budget, and accounting data to find trends, mistakes, and opportunities for improvement, AI assists people and organizations in managing financial data effectively. One of the advantages of AI is that it may assist you in producing content that will help you build your brand and attract more leads. For demonstration reasons, ChatGPT not only authored full portions of this blog post but also offered ideas, saving time and assuring high-quality material with human involvement. By automating repetitive operations, freeing up employees to concentrate on important projects, and helping organizations to enhance productivity and profitability while reducing costs, AI's process automation may save accounting firms time and money.

The creation and implementation of AI systems, cloud-based systems, or AI-powered tools is one of the most significant ways that AI is generating new job possibilities. The accounting business is learning how various accounting software may speed up the monotonous activities for accountants as AI technology develops. Given that AI still requires human supervision and maintenance, this may open up new employment prospects and opportunity for learning about accounting procedures and business processes. The quality of life can be improved by accounting software and a few other apps since these financial duties are automated, and artificial

intelligence (AI) can make data management, accounts payable, expense reports, or internal accounting procedures less complicated. AI can increase people's professional fulfillment and overall work happiness.

7. **RECOMMENDATIONS**

This paper works on presenting the influence of the adoption of AI technology on the accounting sector. Through making a systematic analysis, a clear insight of AI and its benefits on accounting is identified. Moreover, this systematic analysis helps in preparing the questions used in the interviews done with managers and experts in accounting. After the analysis of the interviews is performed, some recommendations provided to decision makers are presented in this section.

First recommendation is related to choosing the suitable tools to be adopted. As one of the interviewees has mentioned that AI has different tools that can be adopted, such as; Xero, Sage, QuickBooks, KPMG Clara, and Deloitte TrueVoice, the companies must employ professional experts that have the ability to identify the suitable tool to the company in order to adopt it and gain the most benefit from it.

It is also recommended that those experts must provide training courses to the employees that make them know more about AI and its importance to the accounting sector and to the company as a whole as well as develop seminars that make employees have a clearer understanding of AI and all of each features and how to deal with it in the real life.

From this point another recommendation could be developed, which is related to manpower. Once employees are afraid of AI as they see it as a danger that reduces the manpower. Experts must make the employees aware of AI and its role in enhancing their work, performing the routine tasks automatically and helps them to get more accurate and effective work results.

Fourth recommendation is providing to companies that did not adopt AI yet in their system especially in the accounting sector. It is suggested for them

to get more information about AI, its benefits and its ability to increase the performance of the accounting sector and of the company itself. These information could be get from reading research papers, academic articles and it can also be noted from asking experts of AI.

Fifth recommendation is related to infrastructure, a well-established advanced infrastructure is a must in order to make AI work probably. Therefore, companies must work on enhancing their infrastructure and to make updates to any new features needed to be added to the system.

Final recommendation is related to the collected data, through the interviews it is clearly identified how important is to have a true, compliant and relative data in order to make the system work in the right bath and to produce accurate results. Thus, it is simply recommended to put a great attention on this point.

After presenting recommendations to the decision makers, some recommendations are provided to present and future research. First recommendation, it is important to search for different variables that could affect the acceptance of AI in the accounting sector.

Second recommendation is linked to the data type, the current study collected qualitative data, whether from systematic literature or from the interviews, so the researcher suggests collecting quantitative data that will support the results of the qualitative data.

Another recommendation is related to the timing, the researcher suggest making more studies that includes longer period of time, as timing represents a barrier that prevent the enlargement of the study sample.

Last recommendation is regarding the case study, Egypt is taken as a case study so the investigator suggests making additional investigations in other countries in addition to making comparative studies between developing and developed countries.

8. LIMITATIONS AND FUTURE RESEARCHER SUGGESTIONS

However, there were some limitations to this research. For example, a case study in another country that uses artificial intelligence in accounting will provide the best framework to assist decision-makers in the accounting sector in Egypt in applying artificial intelligence, so this study's first limitation was that it could only be a case study in Egypt and not a comparative study of other countries. Time is the second restriction. Due to scheduling constraints, the research's sample was insufficient to produce more solid results. As a result, I think that future study should look at the same factors but with a bigger sample size. The third limitation is that the research relies on qualitative data only, so future researchers can adopt some quantitative data, which will provide more accurate results on the levels of influence of applying artificial intelligence on accounting performance.

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