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ENHANCING ACCOUNTING RESEARCH: HOW ARTIFICIAL INTELLIGENCE CHANGES THE GAME?

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Abstract
This study explores artificial intelligence technology in the scientific research environment, as the researcher seeks to demonstrate the impact of artificial intelligence technology on the quality of scientific research within the framework of accounting sciences in the context of multiple countries represented by (Iraq, Egypt, Saudi Arabia, Jordan, Spain, Australia, Malaysia). The questionnaire tool was used to obtain an answer to a set of paragraphs related to the research variables represented by the dimensions of artificial intelligence and the quality of scientific research. 863 answers were obtained from the countries under study, and these data were subjected to statistical analysis using the SPSS-25 program. The conclusion was reached that artificial intelligence negatively affects the quality of scientific research within the framework of accounting sciences. The partial effects between the research variables and factors can be viewed in the results that were explored in the study. A set of detailed results related to the practices of using artificial intelligence in countries were reached, as we concluded that researchers tend to use artificial intelligence at a low level and may reach a moderate level, which gives an impression about the trend of current practices towards introducing innovative technologies in preparing scientific research in the field of accounting, as technology is used to enhance efficiency and improve results without full reliance on it. However, there is still a general reluctance to fully rely on artificial intelligence in the field of accounting sciences. Despite the potential benefits of the technology, such as increased efficiency and big data analysis, concerns about accuracy, deep understanding, and ethics hinder the general acceptance of full adoption; our study found that Saudi Arabia and Australia have a high level of practices of using artificial intelligence in a large part of the research preparation process. While in countries such as Iraq and Egypt, our results recorded the lowest use of this technology in the field of scientific research in accounting sciences.

Keywords: Artificial Intelligence, Accounting Research, Research Quality, Technology Adoption, Ethical Frameworks

1. Introduction

In the past few years, the business world has witnessed major changes characterized by speed and complexity. These changes are not limited to specific fields but have extended to methods of preparing scientific research. In this context, artificial intelligence technology is one of the most important discoveries that has helped many researchers transform their method of conducting accounting research from a purely intellectual effort to a self-employed electronic effort. Artificial intelligence is a set of advanced tools for analyzing data, interpreting results, and predicting future trends based on algorithms.

In the field of using artificial intelligence in preparing scientific research, many researchers have argued positively about the possibility of using artificial intelligence

tools in preparing research in the field of accounting. This modern tool carries a large set of advantages related to the speed of interaction with research, analyzing its problem, and presenting results and recommendations. In addition, using artificial intelligence enables users to gain comprehensive and deep insights, thus ensuring that the value of their studies is enhanced and made more applicable in practical scenarios.

More precisely, integrating artificial intelligence into the field of accounting does not only enhance accuracy but also enhances the importance and reliability of research results. Researchers who formulate their research with the help of AI can extract important insights from large data sets that traditional methods may struggle to manage effectively. Real-world examples and practical experiments illustrate how AI can lead to more accurate and impactful research results. What makes this tool acceptable in the research field is the modernity of this technology, as researchers hope to maintain a competitive advantage in a rapidly changing work environment, thus securing a distinguished academic position.

All of the above is related to the viewpoint of the team supporting AI technology. On the other hand, another group opposes the idea of using AI in preparing scientific research. They argue that full and/or partial reliance on AI will lead to reducing critical thinking among researchers and making them heavily dependent on the results provided by AI without verifying them. This will weaken the integrity and accuracy of academic work. Additionally, there may be complexity in interpreting research models, as artificial intelligence can be so complex that it becomes difficult to understand how the model reaches certain results, limiting research transparency. This complexity aligns with the concept of the "black box."

In this study, we will discuss artificial intelligence technology and how it changes the rules of the game in enhancing and accelerating scientific research. The transition from self-intellectual effort to artificial technical effort, with human intervention in preparing integrated accounting research, involves reformulating the problem, developing the appropriate methodology, designing models, collecting and interpreting big data, and presenting results and recommendations. The purpose of our research is to explore how the rules of the game will change with the use of artificial intelligence in preparing accounting research. The "rules of the game" here refer to the standards or foundations that determine how something is done, and in the context of artificial intelligence, it means radical changes in the way accounting research is conducted.

Over time and at an accelerated pace, artificial intelligence (AI) has become a widely discussed topic in various fields. AI is a powerful tool for improving efficiency and data accuracy, and its impact on the quality of scientific research has become a topic that needs further exploration. Recently, many researchers have begun to rely on artificial intelligence in formulating their scientific research. However, there are no accurate statistics that reveal the percentage of practitioners of this activity, the specific fields in which AI is used, how it affects research, and what elements of research quality it influences. Therefore, the problem of our study lies in answering these points in the field of accounting research. By addressing this problem, the study can provide valuable insights that contribute to improving the quality of accounting research and enhancing the optimal use of artificial intelligence techniques in this field while maintaining the integrity and quality of scientific research.

2. Theoretical Background

2.1 Artificial Intelligence

Programming that enables computers to function in ways that make people appear intelligent is called artificial intelligence systems. The British mathematician Alan Turing (1950) was one of the founders of modern computer science and artificial intelligence. He defined intelligent behavior in a computer as the ability to achieve human-level performance in cognitive tasks (Holmes, Sacchi & Bellazzi, 2004:334). Therefore, artificial intelligence may be considered part of computer science. It is also part of psychology and cognitive science, as it deals with phenomena that occur when computers perform tasks that, if performed by humans, would be considered to require intelligent thinking (Simon, 1995: 95).

Artificial intelligence (AI) is a branch of computer science whose purpose is to imitate intellectual processes, learning abilities, and knowledge management. It has been increasingly applied in experimental and clinical medicine. In recent decades, there has been a rapid expansion of AI applications in medicine and biomedical sciences. AI's potential in medical diagnosis, risk prediction, and support for therapeutic technologies is growing rapidly. The use of AI in medical, radiological, and cardiac diagnostics has led to measurable clinical benefits. Additionally, AI has been instrumental in the search for new drugs. Its development has also provided new opportunities for research in other scientific disciplines (Sak & Suchodolska, 2021: 2).

The emergence of AI as a scientific field marked the beginning of significant progress. Over the years, many scientists and researchers have focused on automated reasoning, applying AI to prove mathematical theorems and solve algebraic problems. A well-known example is the Logic Theorist, a computer program created by Allen Newell, Herbert A. Simon, and Cliff Shaw. This program successfully proved 38 of the 52 theorems in the Principia Mathematica and even provided more elegant proofs for some of them. These early successes fostered optimism among AI pioneers, reinforcing the belief that fully intelligent machines could soon be created. However, they soon realized that achieving human-equivalent intelligence in machines was still a long way off.

AI has been described as a revolutionary tool for science and is expected to play a crucial role in future scientific research (Krenn et al., 2022: 761). Scientists face various research constraints, including limited time, fixed budgets, and cognitive limitations. AI tools are seen as solutions to these barriers, enabling scientists to be more productive in generating scientific work and more objective by reducing bias and subjectivity. AI advancements over the past decade are generally categorized into two broad types: predictive AI tools, which analyze patterns in training datasets to predict new data, and generative AI tools, which generate new data and text based on patterns observed in training datasets (Messeri, 2024: 49-50).

One potential future application of AI is the automatic generation of figures, tables, and other visual elements in scientific manuscripts, helping to summarize data efficiently. These elements are crucial for the clarity and comprehension of research papers but are often time-consuming to create. However, human guidance and supervision remain necessary to ensure the accuracy, coherence, and credibility of scientific writing before submission for publication. While chatbots and AI tools can assist in scientific writing, they require meaningful input from researchers. Insufficient input can lead to inadequate results. Therefore, AI should not replace human expertise, judgment, and responsibility. However, AI has a distinct advantage in quickly processing vast amounts of information and identifying connections between separate pieces of data, surpassing human

capabilities in comprehending extensive bodies of literature (Salvagno, Taccone & Gerli, 2023:2).

Since its inception, the orientation of artificial intelligence has been three-dimensional. One of its primary goals has been to develop computer programs that display intelligence, thereby contributing to the theory of intelligent systems. Originally referred to as "complex information processing" by Carnegie and Rand, the field later adopted the term "artificial intelligence." A second goal has been to create programs (e.g., GPS) that demonstrate intelligence using cognitive processes similar to those used by humans in the same tasks. This objective aims to develop a theoretical understanding of human intelligence. The third goal has been to build intelligent programs, such as Tong's assembly-line balancing program, which optimize efficiency in industrial settings (Simon, 1995: 96).

In the context of scientific research, measurable research outputs—such as research papers, patents, and innovations—have experienced high and sustained growth over the past century. However, recent empirical evidence suggests that research productivity is declining, and new ideas are becoming increasingly difficult to generate (Gordon, 2016; Bloom et al., 2020). A common explanation for this decline is the "knowledge burden," where the exponential growth of data and information has made research increasingly complex and difficult to navigate. The expansion of knowledge and the rising complexity of research come at a high cost.

Recent developments in artificial intelligence, particularly the advancements in predictive capabilities achieved by multi-layer neural networks, have generated optimism that these techniques could accelerate scientific discovery. As AI continues to evolve, it is expected to play an increasingly vital role in addressing research challenges, enhancing productivity, and facilitating breakthroughs across various scientific fields (Bianchini, Müller & Pelletier, 2022: 1).

2.2 Accounting Research Quality

The quality of research in accounting sciences depends on accuracy and reliability. Research must include rigorous methodologies and in-depth analysis, with a focus on innovation and meeting the needs of the labor market. In addition, modern methods such as artificial intelligence can contribute to improving the quality of research by analyzing data more effectively and providing new insights. Researchers also seek to provide applicable results that support decision-making and improve accounting practices, which enhances the value of research and contributes to the development of knowledge.

Interest in the quality of research in science and technology has increased in recent years. Everyone agrees on the importance of quality over mere quantity in all links of the research chain (Lawani, 1986:13). Relying on artificial intelligence and data analysis techniques is an inevitable necessity for developing the scientific research system and keeping pace with rapid developments at the global level. Artificial intelligence technology improves the efficiency and quality of scientific research and enhances the accuracy of future predictions (Alaa El-Din, 2023: 14).

The use of artificial intelligence techniques in scientific research represents a qualitative shift in traditional scientific research methodologies. It enhances researchers' ability to use and analyze huge amounts of data quickly and accurately, meeting the needs of researchers in collecting and understanding big data (Hussein, 2024: 258). Therefore, there is a great desire to use artificial intelligence applications in scientific research because of the tools they provide that facilitate the work of the scientific researcher.

However, this does not mean relying entirely on artificial intelligence programs. Researchers must remain critical during their research and writing. Artificial intelligence can be useful as a tool, but it should not replace human judgment (Al-Rashidi & Al-Farani, 2024: 18). AI can be used in various stages of research processes effectively and efficiently, starting from collecting and analyzing data to creating content, conducting experiments, simulations, and stimulating innovation (Ghasham, 2023:231).

Taha (2024) believes that artificial intelligence can be used to improve the quality of scientific research, starting from defining the research title to writing scientific references. It also helps improve the learning experience and contributes to enhancing the performance of academic researchers by providing a more effective and efficient research environment. However, it is important that these technologies be used responsibly, within a legal and ethical framework, and in accordance with approved academic and research standards (Taha, 2024:9).

2.3 Research Hypotheses

The researcher assumes that artificial intelligence and the intelligent algorithms this technology carries can positively affect the quality of scientific research in the field of accounting, and the hypothesis is described in the following formula:

H1: Artificial intelligence has a statistically significant effect at a 5% significance level on the quality of scientific research in the field of accounting. The following sub-hypotheses fall under this hypothesis:

1) H1a: Artificial intelligence in its dimensions (AI accuracy, AI transparency, repeatability, reliance on reliable data, analytical methods, legal and ethical frameworks) has a statistically significant effect at a 5% significance level on the accuracy of scientific research
2) H1b: Artificial intelligence in its dimensions (AI accuracy, AI transparency, repeatability, reliance on reliable data, analytical methods, legal and ethical frameworks) has a statistically significant effect at a 5% significance level on the ability to access scientific research data.
3) H1c: Artificial intelligence in its dimensions (AI accuracy, AI transparency, repeatability, reliance on reliable data, analytical methods, legal and ethical frameworks) has a statistically significant effect at a 5% significance level on the researcher's experience.
4) H1d: AI in its dimensions (AI accuracy, AI transparency, repeatability, reliance on reliable data, analytical methods, legal and ethical frameworks) has a statistically significant effect at a 5% significance level on the reliability of scientific research. H1e: AI in its dimensions (AI accuracy, AI transparency, repeatability, reliance on reliable data, analytical methods, legal and ethical frameworks) has a statistically significant effect at a 5% significance level on the validity of scientific research.

2.4 Mathematical Model

Considering the rapid developments in the field of business intelligence, the integration of artificial intelligence has become pivotal in enhancing the quality of scientific research. In this section, we explore, according to the model below, the impact of the different dimensions of artificial intelligence - specifically AI accuracy, AI transparency, replicability, reliance on reliable data, analytical methods, legal and ethical frameworks; on the main research quality indicators represented by scientific research accuracy, accessibility to data, researcher experience, reliability, and validity. By

examining these relationships, the model aims to provide insights into how AI can improve accounting research processes and outcomes. Understanding these dynamics is essential for researchers and practitioners seeking to leverage AI to improve decision-making and enhance research integrity. The model can be formulated as follows:

2.4.1 Impact of AI on Research Quality

$$Q = \alpha AI + \beta$$

Where:

- Q is the **Quality of Scientific Research** (dependent variable).
- AI is the **Artificial Intelligence** (independent variable).
- α is the coefficient representing the effect of artificial intelligence on the quality of scientific research.
- β is the constant (intercept), representing the quality of research when there is no impact from AI (i.e., when $AI = 0$).

2.4.2 Sub-Models: Impact of AI Dimensions on Each Research Quality Dimension

1. Research Accuracy Model:

$$RA = \beta_0 + \beta_1 AI_{\text{Acc}} + \beta_2 AI_{\text{Transp}} + \beta_3 AI_{\text{Rep}} + \beta_4 AI_{\text{RelData}} + \beta_5 AI_{\text{AnalMeth}} + \beta_6 AI_{\text{LegEth}} + \epsilon$$

2. Data Access Model:

$$DA = \beta_0 + \beta_1 AI_{\text{Acc}} + \beta_2 AI_{\text{Transp}} + \beta_3 AI_{\text{Rep}} + \beta_4 AI_{\text{RelData}} + \beta_5 AI_{\text{AnalMeth}} + \beta_6 AI_{\text{LegEth}} + \epsilon$$

3. Researcher Experience Model:

$$RE = \beta_0 + \beta_1 AI_{\text{Acc}} + \beta_2 AI_{\text{Transp}} + \beta_3 AI_{\text{Rep}} + \beta_4 AI_{\text{RelData}} + \beta_5 AI_{\text{AnalMeth}} + \beta_6 AI_{\text{LegEth}} + \epsilon$$

4. Research Reliability Model:

$$RR = \beta_0 + \beta_1 AI_{\text{Acc}} + \beta_2 AI_{\text{Transp}} + \beta_3 AI_{\text{Rep}} + \beta_4 AI_{\text{RelData}} + \beta_5 AI_{\downarrow\ \text{Meth}} + \beta_6 AI_{\text{LegEth}} + \epsilon$$

5. Research Validity Model:

$$RV = \beta_0 + \beta_1 AI_{\text{Acc}} + \beta_2 AI_{\text{Transp}} + \beta_3 AI_{\text{Rep}} + \beta_4 AI_{\text{RelData}} + \beta_5 AI_{\text{AnalMeth}} + \beta_6 AI_{\text{LegEth}} + \epsilon$$

- Dependent Variables (Research Quality Factors):
  - RA : Research Accuracy
  - DA : Data Access
  - RE : Researcher Experience
  - RR : Research Reliability
  - RV : Research Validity

- **Independent Variables (AI Factors):**
  - AI_{Acc} : AI Accuracy
  - AI_{Transp} : AI Transparency
  - AI_{Rep} : AI Reproducibility
  - AI_{RelData} : AI Reliance on Reliable Data
  - AI_{AnalMeth} : AI Analytical Methods
  - AI_{LegEth} : AI Legal and Ethical Framework
- **Other Symbols:**
  - β_0 : Intercept (constant term)
  - $\beta_1, \beta_2, \ldots, \beta_6$: Coefficients representing the effect of each independent variable
  - ϵ : Error term or residuals

3. Methods

The descriptive analytical approach was used in this study and in line with its objectives to describe and analyze the problem as it exists, and a questionnaire was designed as the main tool for collecting data. To evaluate the impact of artificial intelligence (AI) on the quality of accounting research, the questionnaire was divided according to the factors of artificial intelligence (AI technology, AI transparency, replicability, reliance on reliable data, sound analytical methods, legal and ethical frameworks) and the quality of scientific research (accuracy of scientific research, accessibility to data, researcher experience, reliability, validity)

4. Results and Discussion

4.1 Descriptive analysis of research variables

This study collected data from researchers specializing in the field of accounting sciences. The number of respondents was 863 researchers from different countries. An electronic questionnaire was used, as it was distributed on various social media platforms, as well as communicating with the researchers via personal emails. Table (1) provides descriptive statistics for independent and dependent research variables. The descriptive statistical data based on a sample of 863 observations provides an analysis of several main variables, including accuracy, transparency, replicability, reliance on reliable data, sound analytical methods, legal and ethical frameworks, accessibility to data, researcher experience, reliability, validity, and artificial intelligence techniques.

Participants' opinions vary regarding accuracy (average 2.37) and transparency (average 2.49), while replicability is considered the least preferred (average 2.14). The data reflects reliance on reliable data with less variation (average 2.79), while sound analytical methods received a negative evaluation (average 1.57). Legal and ethical frameworks are rated positively (mean 3.87), while data accessibility is limited (mean 2.06). Researcher experience and reliability of results show limited variance (mean 2.55 and 2.45 respectively). Variance in the assessment of validity (mean 2.31) and AI techniques (mean 2.51) reflects the diversity of opinions. Overall, the results indicate a clear variance in opinions, and the analysis shows that most variables fall within the

average category, with some notable differences in the assessment of sound analytical methods and reproducibility, which requires further research to explore the reasons behind these opinions. See table 1

Table 1. Descriptive Statistics

	N	Minimum	Maximum	Mean	Std. Deviation
AI Accuracy	863	1.00	4.50	2.3656	.97170
AI Transparency	863	1.50	4.00	2.4902	.75639
Repeatability	863	1.00	3.50	2.1419	.86022
Reliance on Reliable Data	863	2.00	3.50	2.7949	.47890
Sound Analytical Methods	863	1.00	5.00	1.5689	1.07257
Legal and Ethical Frameworks	863	2.50	5.00	3.8679	.65599
Data Access	863	1.00	3.00	2.0585	.78026
Researcher Experience	863	1.50	3.50	2.5527	.42384
Reliability	863	1.50	3.00	2.4525	.41930
Veracity	863	1.00	3.50	2.3134	.55494
Research Accuracy	863	1.50	4.50	2.5081	.74773
Valid N (listwise)	863				

Reference: Prepared by the researcher.

To find out the percentage of accounting researchers' reliance on artificial intelligence in preparing their scientific research, we asked a relative question ranging from (10%) to (100%) on the target sample, and we concluded from the data that there is a noticeable difference in the percentage of using artificial intelligence among researchers, as the percentage (10% and 20%) falls between these percentages by more than half of the participants, as the results showed that 26.3% of the target sample use artificial intelligence at a rate of 10% in preparing research in the field of accounting, while 32.6% of the sample admitted that 20% of their research preparation depends on artificial intelligence. This indicates that many of the researchers whose opinions were taken rely on artificial intelligence moderately, and we conclude from this that there is an increasing awareness of the importance of this technology without relying on it completely. While the range (30% and 40%), the results showed a decrease in the level of use of this technology within this range of percentages, as the results showed that 11% of the targeted researchers used artificial intelligence at a rate of 30% in preparing their accounting research, while 13.8% of researchers admitted to using 40% of their research that relied on artificial intelligence. In these results, it becomes clear to us that there are several researchers who have begun to integrate artificial intelligence tools into their work, relying on advanced analysis techniques. While the percentage (50% and above) was considered high usage rates for respondents, it appears to us that the researchers who responded acknowledged very low rates of their reliance on artificial intelligence in preparing their research, as the results showed that 50% of researchers acknowledged the use of artificial intelligence at a rate of (7.3%) in preparing their research, and 60% of researchers admitted to using artificial intelligence at a rate of (3%) in preparing their research, and 70% and 90% of researchers proved that the percentage of their use of artificial intelligence is 3% in preparing their research, in these results it was proven to us

that heavy reliance on artificial intelligence is still not common. This result indicates the caution of the targeted researchers about potential risks or lack of confidence in the results of artificial intelligence, or the possibility of a lack of knowledge or culture of using these technologies. In general, this data shows that researchers tend to use artificial intelligence moderately or low, reflecting current trends in the field of scientific research, where technology is used to enhance efficiency and improve results without relying on it completely. See table 2

Table 2. What is the percentage of artificial intelligence intervention in preparing your scientific research (10, 20, 30, 40, ... 100%)?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	10%	227	26.3	26.3	26.3
	20%	281	32.6	32.6	58.9
	30%	95	11.0	11.0	69.9
	40%	119	13.8	13.8	83.7
	50%	63	7.3	7.3	91.0
	60%	26	3.0	3.0	94.0
	70%	26	3.0	3.0	97.0
	90%	26	3.0	3.0	100.0
	Total	863	100.0	100.0	

Reference: Prepared by the researcher.

Regarding reliance on artificial intelligence in preparing scientific research in the field of accounting sciences, the data extracted from the participants' answers indicate that a percentage of (80.6%) admitted that they were not prepared to use artificial intelligence in preparing their scientific research in the field of accounting. This percentage reflects a general caution and a lack of adoption by a large percentage of researchers on artificial intelligence in preparing research for fear of the potential risks associated with complete reliance on technology. The reasons may be due to a lack of confidence in the results, as researchers believe that artificial intelligence cannot accurately analyze or provide a logical explanation for accounting information; in addition, it may be due to the complexity of the topics, as accounting sciences is a complex field that requires a deep understanding of accounting standards and principles, laws and instructions governing financial and accounting practices. While we concluded that a percentage of (19.4%) of the participants expressed their readiness to conduct their research by relying entirely on artificial intelligence technology. This category of researchers may be more open to using modern technology represented by artificial intelligence technologies, but they represent a minority in the research community. This may be attributed to their advanced understanding of technology and a high level of familiarity with AI tools and how to use them effectively. By analyzing this data, it can be said that there is still a general reluctance to fully adopt AI in the field of accounting sciences. Despite the potential benefits of technology, such as increased efficiency and big data analysis, concerns about accuracy, deep understanding, and ethics hinder the general acceptance of full adoption. Therefore, AI is likely to remain an assisting tool rather than a complete replacement for researchers in this field. See Table 3

Table 3. Can artificial intelligence be fully relied upon in preparing scientific research in the field of accounting sciences?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	NO	696	80.6	80.6	80.6
	YES	167	19.4	19.4	100.0
	Total	863	100.0	100.0	

Reference: Prepared by the researcher.

4.2 Results of the level of reliance on artificial intelligence in preparing accounting research

In this section, we will discuss the results that were reached, and at the beginning of this section, we will first address a detailed presentation to answer the three central questions, which are (Do you use artificial intelligence in preparing scientific research? Can artificial intelligence be fully relied upon in preparing scientific research? What is the percentage of artificial intelligence intervention in preparing your scientific research "10%, 20%, 30…...100%" and the results were presented according to the countries that were involved in this research. See Table 4

Table 4. Level of reliance on artificial intelligence in preparing accounting research

Country	Do you use artificial intelligence in preparing scientific research (No)	Do you use artificial intelligence in preparing scientific research)Yes(	Can artificial intelligence be fully relied upon in preparing scientific research (No)	Can artificial intelligence be fully relied upon in preparing scientific research)Yes(	What is the percentage of artificial intelligence intervention in preparing scientific research (10, 20, 30, 40, ... 100%)?							
					10 % AI Use	20 % AI Use	30 % AI Use	40 % AI Use	50 % AI Use	60 % AI Use	70 % AI Use	90 % AI Use
Iraq	63	36	80	19	26	32	11	13	7	4	3	3
Jordan	69	52	102	19	32	35	13	18	9	4	5	5
Egypt	61	46	77	30	26	31	15	18	9	4	2	2
Saudi Arabia	106	60	142	24	46	62	14	18	10	4	6	6
Malaysia	84	58	124	18	44	46	12	17	10	3	5	5
Australia	86	70	119	37	35	57	20	24	11	3	3	3
Spain	46	26	52	20	18	18	10	11	7	4	2	2
Total	515	348	696	167	227	281	95	119	63	26	26	26

Reference: Prepared by the researcher.

From the data presented in Table 4, it can be noted that there is a noticeable variation in the use of artificial intelligence in preparing scientific research in the field of accounting between the selected countries. The use of artificial intelligence is distributed over several percentages from 10% to 90% (see Chart 1), and it appears that there is a variation between countries in the extent of reliance on this technology

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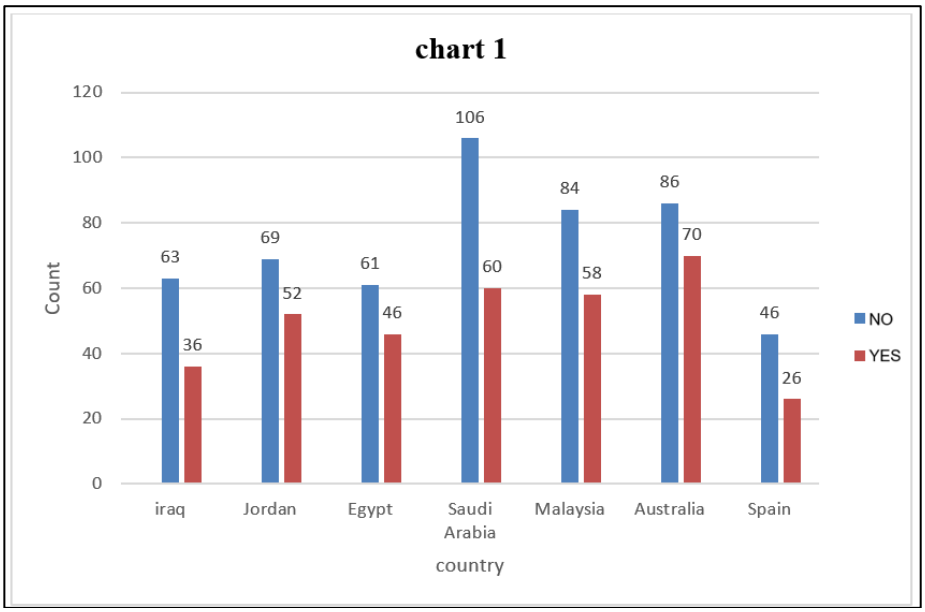

Figure 1. Variation between countries in the extent of reliance on this technology
Reference: Prepared by the researcher.

First, when looking at the answer to the question "Do you use AI in preparing scientific research?", we notice that Saudi Arabia recorded the highest percentage of "yes" answers with 60% (i.e. 106 people out of 166), followed by Australia with 70% (i.e. 70 out of 156), indicating that researchers in these two countries rely more on AI than other countries. On the other hand, we notice that countries such as Iraq and Egypt show a lower percentage of people who use AI in preparing their research, as the percentage of "yes" was only 36% in Iraq and 46% in Egypt. When moving to the question "Can AI be fully relied upon in preparing scientific research in the field of accounting sciences?", it appears that full reliance on AI is still limited (see chart 2). Saudi Arabia also recorded the highest percentage of "yes" with 24 people out of 166, while Egypt recorded 30 people out of 107, which reflects reservations about using AI fully.

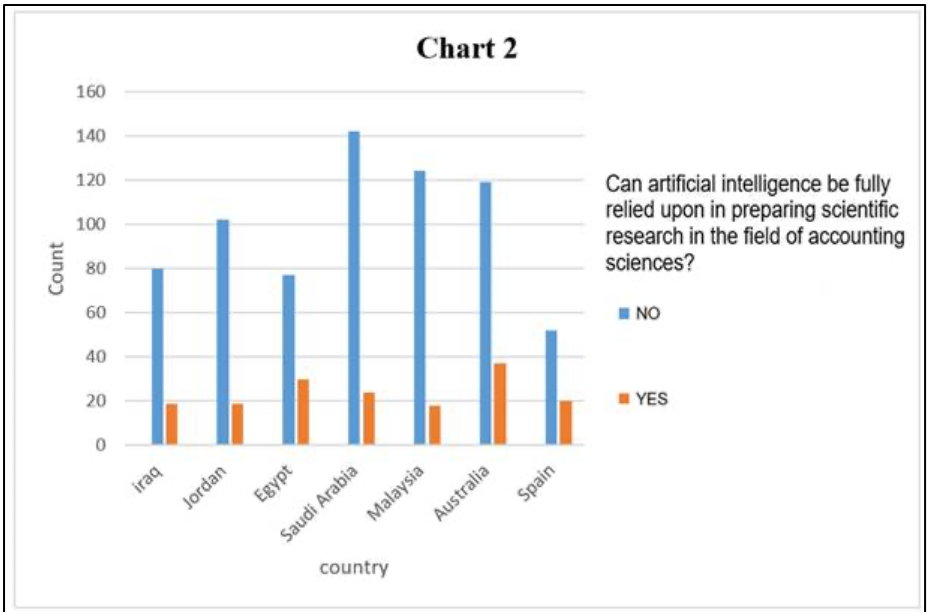

Figure 2. Reflects reservations about using AI fully
Reference: Prepared by the researcher.

Overall, many participants still believe that AI may not be fully sufficient to conduct independent scientific research, with the answer "no" being the most common in most countries.

Regarding the percentage of AI intervention in scientific research preparation, we note that there is a significant variation in the distribution (see Chart 3). In Saudi Arabia and Australia, the largest percentage of answers were in the 40% and 50% range, reflecting the use of AI in a large part of the research preparation process. While in countries such as Iraq and Egypt, the answers were more concentrated in the lower percentages such as 10% and 20%. This indicates that researchers in some countries still use AI to a limited extent or only in certain aspects of scientific research preparation.

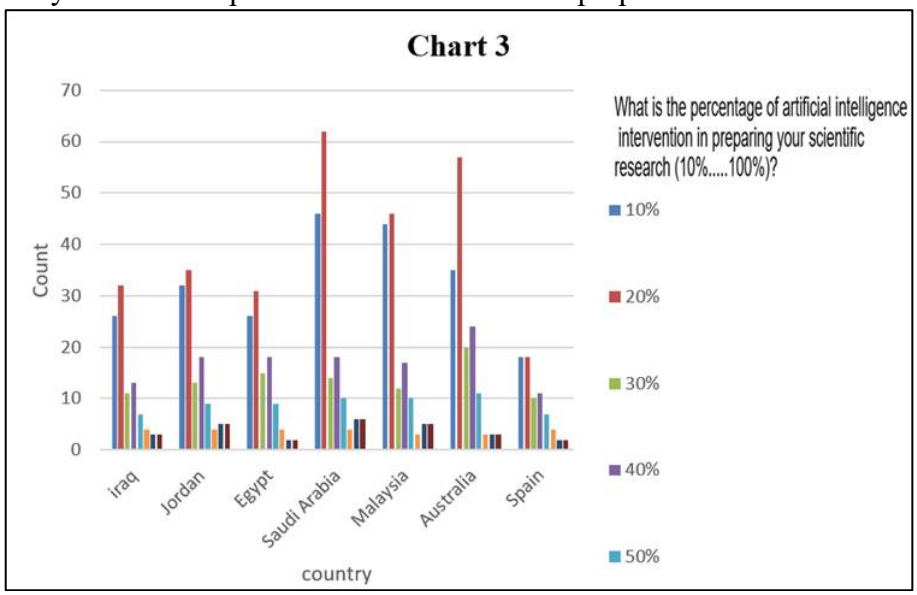

Figure 3. Regarding the percentage of AI intervention in scientific research preparation
Reference: Prepared by the researcher.

Through these analyses, we find that there is a general trend towards increasing reliance on artificial intelligence in scientific research, especially in developed countries such as Australia and Saudi Arabia. However, there is still reservation about the total reliance on artificial intelligence in preparing scientific research, which reflects the need for further development and review of the tools and algorithms used in the field of artificial intelligence.

8.3. Linear Correlation Test

Table 5 shows the linear correlation analysis between a set of basic variables in this study, the important relationships that affect the quality of research. The table indicates that there are strong and positive correlations between some variables, such as the accuracy and transparency of artificial intelligence ($r = 0.237$) and legal and ethical frameworks ($r = 0.379$), indicating that improving the level of accuracy in data is associated with increased transparency and the presence of strong legal frameworks.

On the other hand, replicability shows a strong negative relationship with reliance on reliable data ($r = -0.503$), meaning that low replicability is associated with increased reliance on unreliable data. Sound analytical methods also show a negative relationship with reliance on reliable data ($r = -0.534$) and legal frameworks ($r = -0.471$), indicating that using incorrect analytical methods can reduce reliance on reliable data.

Table 5. Linear Correlation Test

	AI accuracy	AI transparency	Repeatability	Reliance on reliable data	Analytical methods	Legal and ethical frameworks	Accuracy of scientific research	Access to data	Research experience	Reliability	Validity
AI accuracy	1										
	863										
AI transparency	.237**	1									
	0.000										
	863	863									
Repeatability	.119**	0.037	1								
	0.000	0.279									
	863	863	863								
Reliance On Reliable Data	-.133-**	-0.030	-.503-**	1							
	0.000	0.385	0.000								
	863	863	863	863							
Analytical Methods	-0.045	.098**	.417**	-.534-**	1						
	0.191	0.004	0.000	0.000							
	863	863	863	863	863						
Legal And Ethical Frameworks	.379**	.128**	-.261-**	.468**	-.471-**	1					
	0.000	0.000	0.000	0.000	0.000						
	863	863	863	863	863	863					
Accuracy Of Scientific Research	.284**	0.027	-.402-**	0.013	-0.062	.436**	1				
	0.000	0.432	0.000	0.708	0.068	0.000					
	863	863	863	863	863	863	863				
Access To Data	0.023	-.067-*	-.862-**	.607**	-.562-**	.484**	.429**	1			
	0.493	0.048	0.000	0.000	0.000	0.000	0.000				
	863	863	863	863	863	863	863	863			
Research Experience	0.036	.308**	-.233-**	.253**	0.002	-.322-**	0.002	.122**	1		
	0.297	0.000	0.000	0.000	0.963	0.000	0.946	0.000			
	863	863	863	863	863	863	863	863	863		

Reliability	.377**	0.031	.192**	-.306-**	-.107-**	.361**	.250**	0.027	-.392-**	1	
	0.000	0.370	0.000	0.000	0.002	0.000	0.000	0.426	0.000		
	863	863	863	863	863	863	863	863	863	863	
Validity	.228**	-.151-**	-.207-**	-0.045	-.374-**	.119**	-0.031	.126**	0.006	.358**	1
	0.000	0.000	0.000	0.188	0.000	0.000	0.358	0.000	0.858	0.000	
	863	863	863	863	863	863	863	863	863	863	863

Reference: Prepared by the researcher. (Notes: *** p<0.01, ** p<0.05, * p<0.1.)

Accuracy shows a positive correlation with legal frameworks (r = 0.436) but a negative correlation with replicability (r = -0.402), indicating that accuracy may be beneficial within legal frameworks but may not contribute to improving replicability.

Also, data accessibility plays an important role, showing a strong negative correlation with replicability (r = -0.862), meaning that restrictions in data access negatively impact the replicability of results. In contrast, accessibility is positively correlated with reliance on reliable data (r = 0.607).

In addition, researcher experience reflects a positive correlation with transparency (r = 0.308) and a negative correlation with reliance on reliable data (r = -0.233), indicating that experience can enhance transparency but may sometimes lead to reliance on less reliable data. Finally, reliability shows a positive correlation with validity (r = 0.358), emphasizing the importance of reliability in enhancing the validity of results. This complex analysis reflects the interactions between variables, pointing to the need to focus on legal frameworks, enhance transparency, and ensure access to data to improve the quality of research.

8.4. Experimental Results

8.4.1 Regression Results

Table 6 shows the results of estimating the regression equations for the first model related to estimating the impact of artificial intelligence elements on the element of scientific research quality (accuracy).

Table 6. Estimating the regression equations for the first model

Coefficients[a]						
Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	2.563	.206		12.453	.000
	AI accuracy	.095	.023	.124	4.197	.000
	AI transparency	-.085-	.025	-.086-	-3.351-	.001
	Repeatability	-.491-	.025	-.565-	-19.279-	.000
	Reliance on Reliable Data	-.603-	.054	-.386-	-11.261-	.000
	Analytical Methods	.166	.022	.238	7.546	.000
	Legal and Ethical Frameworks	.623	.038	.546	16.208	.000
a. Dependent Variable: AI accuracy						

Reference: Prepared by the researcher.

We note from the apparent results that the variable "AI accuracy" has a positive effect on the accuracy of scientific research by 0.095, indicating that increasing this variable leads to an increase in accuracy. The probability value (Sig.) for this variable is 0.000, which means that this effect is highly statistically significant, and therefore the hypothesis that AI accuracy positively affects accuracy can be accepted. On the other hand, the variables "AI transparency", "repeatability", and "reliance on reliable data" have negative effects. For example, "AI transparency" negatively affects accuracy by -0.085, "repeatability" by -0.491, and "reliance on reliable data" by -0.603. All these variables have a statistical significance (Sig.) less than 0.05, which reinforces the idea that these variables negatively affect accuracy. As for the variables "sound analytical methods" and "legal and ethical frameworks", they have a positive effect, as their coefficients reached 0.166 and 0.623, respectively, with strong statistical significance. This means that they can be considered factors that contribute to improving accuracy.

Based on these results, a decision can be made to accept the hypothesis that indicates that the independent variables affect accuracy. However, caution must be taken when interpreting the negative effects of some variables and working to improve them to enhance the level of accuracy in artificial intelligence-based systems.

Table 7 shows the results of estimating the regression equations for the second model related to estimating the impact of artificial intelligence elements on the element of scientific research quality (access to data).

Table 7. Estimating the regression equations for the second model

Coefficients[a]						
Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	2.322	.119		19.557	.000
	AI accuracy	.055	.013	.068	4.182	.000
	AI transparency	-.067-	.015	-.065-	-4.551-	.000
	Repeatability	-.653-	.015	-.720-	-44.473-	.000
	Reliance on Reliable Data	.179	.031	.110	5.802	.000
	Analytical Methods	-.082-	.013	-.112-	-6.443-	.000
	Legal and Ethical Frameworks	.207	.022	.174	9.340	.000
a. Dependent Variable: access to data						

Reference: Prepared by the researcher.

The analysis results show that there are significant effects of the independent variables on “data accessibility.”

The effect of “AI accuracy,” with a value of 0.055, indicates that improving the accuracy of smart models contributes to increasing data accessibility. This effect has a strong statistical significance (0.000), reflecting the reliability of this result.

In contrast, we find that “AI transparency” shows a negative effect of -0.067, which means that a lack of transparency can hinder users’ ability to access data effectively, which highlights the importance of enhancing transparency in smart systems.

The most negatively impacting variable is “replicability,” which records -0.653, with a statistical significance of 0.000 as well. This result indicates that the inability to replicate results is a major obstacle to data accessibility, which requires improving the methods related to it.

As for "Reliance on reliable data," it records a positive effect of 0.179, indicating that the use of reliable data enhances access to information. "Legal and ethical frameworks" also shows a positive effect of 0.207, indicating that the presence of a clear legal framework enhances individuals' ability to access data, considering challenges related to privacy and security. Based on these results, we can accept the hypothesis that the independent variables significantly affect data accessibility. The results highlight the need to focus on improving accuracy, increasing transparency, enhancing reproducibility, and relying on reliable data, to improve the experience of accessing information in systems based on artificial intelligence in preparing scientific research.

Table 8 shows the results of estimating the regression equations for the third model related to estimating the effect of artificial intelligence elements on the element of scientific research quality (researcher experience).

Table 8. Estimating the regression equations for the third model

Coefficients[a]						
Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	2.522	.102		24.650	.000
	AI accuracy	.166	.011	.381	14.734	.000
	AI transparency	.198	.013	.354	15.664	.000
	Repeatability	-.101-	.013	-.205-	-7.975-	.000
	Reliance on Reliable Data	.537	.027	.607	20.178	.000
	Analytical Methods	-.004-	.011	-.009-	-.338-	.736
	Legal and Ethical Frameworks	-.552-	.019	-.854-	-28.900-	.000
a. Dependent Variable: research experience						

Reference: Prepared by the researcher.

The analysis results show the impact of several independent variables on the "researcher experience", which is the dependent variable.

First, the Constant coefficient shows a value of 2.522, indicating the starting point or baseline value of the researcher experience in the absence of any independent variables.

AI accuracy shows a strong positive effect with a value of 0.166, with a statistical significance (Sig.) of 0.000. This means that increasing AI accuracy is associated with improving researcher experience, highlighting the importance of improving the accuracy of smart models.

AI transparency also shows a positive effect, with a value of 0.198, with a statistical significance of 0.000. This indicates that increasing transparency in systems enhances the researcher's experience, highlighting the need to provide clear and transparent information to users.

On the negative side, we find that replicability records a negative effect of -0.101, with a statistical significance of 0.000. This indicates that poor reproducibility is a major barrier to the researcher's experience, which means that accurate replication of results is an important element.

As for relying on reliable data, it records a strong positive effect of 0.537, with a statistical significance of 0.000. This result shows that relying on reliable data significantly improves the researcher's experience, reflecting the importance of the quality of the data used.

While sound analytical methods show an insignificant effect (value -0.004) with a statistical significance of 0.736, which means that this variable has no significant effect on the researcher's experience.

Finally, legal and ethical frameworks record a significant negative effect of -0.552, with a statistical significance of 0.000. This indicates that the lack of legal and ethical frameworks can negatively impact the researcher's experience, highlighting the importance of having clear policies to ensure ethical and legal compliance.

Based on these results, it can be said that the accuracy and transparency of AI, in addition to relying on reliable data, are important factors in improving the researcher's experience. On the other hand, replicability and the absence of legal and ethical frameworks represent challenges that must be addressed to ensure a positive experience in research, and thus the hypothesis related to the transparency of artificial intelligence can be partially accepted.

Table 9 shows the results of estimating the regression equations for the fourth model related to estimating the effect of artificial intelligence elements on the element of scientific research quality (reliability).

Table 9. Estimating the regression equations for the fourth model

Coefficients[a]						
Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	2.603	.117		22.152	.000
	AI accuracy	.032	.013	.075	2.510	.012
	AI transparency	-.033-	.015	-.060-	-2.301-	.022
	Repeatability	.052	.015	.107	3.601	.000
	Reliance on Reliable Data	-.540-	.031	-.617-	-17.667-	.000
	Analytical Methods	-.082-	.013	-.209-	-6.501-	.000
	Legal and Ethical Frameworks	.357	.022	.559	16.286	.000
a. Dependent Variable: reliability						

Reference: Prepared by the researcher.

The results of the analysis show the effect of a set of independent variables on "reliability", which is the dependent variable. The results indicate that the constant coefficient, with a value of 2.603, reflects the basic level of reliability in the absence of the effect of any of the studied variables. The results of the regression coefficient indicate that the accuracy of artificial intelligence is characterized by a significant positive effect, as its value reached 0.032 with a probability value of 0.012, which is less than the significance level of 0.005. This result indicates that improving the accuracy of artificial intelligence algorithms contributes to raising the level of reliability of scientific research in the field of accounting. In the other direction, we concluded that the variable "transparency of artificial intelligence" has a negative effect of -0.033, and this effect is statistically significant at 0.022, which is less than 0.005. This indicates that the lack of transparency in artificial intelligence systems can lead to a decrease in trust and reliability, which explains the importance of providing clear information about how artificial intelligence technology works.

While the variable "repeatability," we found a positive effect of 0.052, with a statistical significance of 0.000, which is less than 0.005, which means that the ability to repeat

results enhances the reliability of scientific research results. This result explains the importance of verifying the validity of results in scientific research, as the ability to repeat and conclude the same results with the same technique reflects the reliability of the prepared scientific research.

While we concluded that the variable “reliance on reliable data” has a negative effect of -0.540, with a statistical significance of 0.000, which is less than the significance level of 0.005. This result shows that relying on unreliable data can negatively and the significant effect on the reliability of scientific research, which reflects the importance of using accurate and reliable data that can be fed into artificial intelligence technology.

With the same result, we found that the variable "sound analytical methods" has a negative effect of -0.082, with a statistical significance of 0.000, which is less than the significance level of 0.005, which means that not choosing the most appropriate method in analysis leads to a reduction in the level of reliability of scientific research, as there are multiple options and many methods in artificial intelligence technology, so the choice factor will have a significant effect on the reliability of scientific research in the field of accounting sciences.

Finally, "legal and ethical frameworks" records a strong positive effect with a value of 0.357, with a statistical significance of 0.000, indicating that the presence of clear and specific frameworks enhances reliability and encourages adherence to good practices.

Based on these results, it can be concluded that the accuracy of artificial intelligence, reproducibility, and legal and ethical frameworks are essential factors for enhancing reliability. In contrast, the negative effects of transparency and reliance on unreliable data indicate the need to improve these aspects to ensure the improvement of the overall performance of artificial intelligence-based systems in preparing scientific research, and thus the hypothesis is accepted)

Table 10 shows the results of estimating the regression equations for the fifth model related to estimating the effect of artificial intelligence elements on the element of scientific research quality (Scientific research validity).

Table 10. Estimating the regression equations for the fifth model

Coefficientsa						
Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	4.336	.175		24.720	.000
	AI accuracy	.146	.019	.255	7.540	.000
	AI transparency	-.115-	.022	-.156-	-5.291-	.000
	Repeatability	-.148-	.022	-.229-	-6.807-	.000
	Reliance on Reliable Data	-.402-	.046	-.347-	-8.808-	.000
	Analytical Methods	-.245-	.019	-.474-	-13.074-	.000
	Legal and Ethical Frameworks	-.066-	.033	-.079-	-2.031-	.043
a. Dependent Variable: validity						

Reference: Prepared by the researcher.

The results of the analysis show multiple effects of the independent variables on the "Scientific research validity", which is the dependent variable studied. The constant coefficient indicates a value of 4.336, which reflects the level of quality of the basic research when all independent variables are at zero. We found that the accuracy of

artificial intelligence has a positive effect with a value of 0.146, with a statistical significance of 0.000, which is less than the statistical significance level of 0.005. This result indicates that improving the accuracy of artificial intelligence affects the level of Scientific research validity, which explains the importance of relying on accurate models to achieve correct results in scientific research. In contrast, we found that the transparency of artificial intelligence has a negative effect of -0.115, with a statistical significance of 0.000. This result indicates that the lack of transparency in artificial intelligence systems can negatively affect the Scientific research validity, which necessitates the need to enhance transparency to enhance the validity of practical research results. The replicability variable also records a negative effect with a value of -0.148, with a statistical significance of 0.000, which is a significant and significant effect at a statistical significance level of 0.005. We conclude from this that the lack of replicability is considered an obstacle to the validity of scientific research, which explains the need to accurately repeat the results to confirm their validity.

In the same way, we concluded that relying on reliable data has a significant negative impact with a value of -0.402, with a statistical significance of 0.000, which is less than the significance level of 0.005. This result indicates that the use of unreliable data leads to a significant reduction in the validity of research in the accounting field, which reflects the importance of using accurate and confirmed data in accounting studies. As for the variable of sound analytical methods, we found that it has a negative impact, as it records a value of -0.245 with a statistical significance of 0.000, which is less than the significance level of 0.005, which means that the lack of these methods or the misuse of the inappropriate method in scientific research reduces the validity of scientific research.

The same applies to the variable of legal and ethical frameworks, as it recorded a negative impact of -0.066, with a statistical significance of 0.043. This means that the absence of legal and ethical frameworks can negatively affect the validity of scientific research, which reflects the importance of having strong legal and ethical regulations to ensure adherence to good practices that maintain the validity of scientific research procedures. Based on these results, a decision can be made to accept the hypothesis that independent variables significantly affect the "quality of scientific research". The negative effects shown by variables such as transparency, reproducibility, and reliance on reliable data indicate the need to focus on improving these aspects to enhance the quality of research. In contrast, the positive effect of the accuracy of artificial intelligence shows the importance of improving the accuracy of the models used. Therefore, it can be concluded that there is a clear relationship between the studied variables and the quality of scientific research, which enhances the importance of these results in developing effective strategies to improve the quality of research in the future.

8.4.2. Robustness tests

Table 11 relates to the bootstrap test for the parameter measurements in the statistical model. From the results of this test, it can be noted that the estimated values of both the constant and the artificial intelligence coefficient are accurate and stable. For the constant, we note that the estimate is 2.892, with a bias close to zero (-3.553E-15), which means that this estimate is not significantly affected by the random sample. The standard error of this value is 1.834E-15, which reflects the accuracy of the estimate. The value of the two-tailed test (Sig. (2-tailed)) is 0.001, which is less than the usual significance level (0.05), indicating that the estimate is strongly statistically significant. For the 95% confidence interval, which ranges between 2.892 and 2.892, it indicates that the estimate

of the constant is stable and not affected by sample fluctuations. As for the coefficient of artificial intelligence, we find that the estimate is -0.149-, with a very small bias (about -1.388E-16), indicating that there is no significant bias in the estimate. The standard error is 2.314E-16, which also reflects the accuracy of the estimate. The two-tailed test for this value gives the same result, where the value is 0.001, which means that this coefficient is strongly statistically significant and clearly affects the model. As for the 95% confidence interval, which ranges between -0.149 and -0.149, it confirms that the estimate for this coefficient is stable and accurate. In general, the results of the bootstrap test indicate that both the constant and the coefficient of artificial intelligence have accurate and stable estimates, and there are no noticeable effects of bias or large errors. Both the constant and the coefficient are also strongly statistically significant, which means that the effect of artificial intelligence is negative but significant in the model.

Bootstrap for Coefficients							
Model		B	Bootstrap[a]				
			Bias	Std. Error	Sig. (2-tailed)	95% Confidence Interval	
						Lower	Upper
1	(Constant)	2.892	-3.553E-15	1.834E-15	.001	2.892	2.892
	AI	-.149-	-1.388E-16	2.314E-16	.001	-.149-	-.149-

Bootstrap Specifications	
Sampling Method	Stratified
Number of Samples	863
Confidence Interval Level	95.0%
Confidence Interval Type	Percentile
Strata Variables	AI, quality of research

a. Unless otherwise noted, bootstrap results are based on 863 stratified bootstrap samples

Reference: Prepared by the researcher.

5. Conclusion

The study examines how artificial intelligence (AI) has transformed accounting research, highlighting its potential to enhance research quality and provide deeper insights. However, previous studies have not explored AI's success or failure in this field. This research surveys AI's role in accounting research across seven countries (Iraq, Egypt, Saudi Arabia, Jordan, Spain, Malaysia, Australia) using a structured questionnaire.

Key findings indicate that while over half of respondents use AI, reliance remains low due to concerns about accuracy and critical analysis. Notably, 80.6% of researchers prefer not to fully depend on AI, citing the complexity of accounting regulations and standards.

The study also reveals a negative correlation between increased AI use and research quality, suggesting a need to refine AI applications in research. However, strong legal and ethical frameworks positively impact data accuracy and researcher confidence. AI elements such as accuracy, transparency, reproducibility, and reliable data significantly affect research reliability and validity.

In conclusion, AI is a valuable tool but cannot replace human expertise. Future advancements should focus on integrating AI with human judgment to enhance research quality and effectiveness in accounting.

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