



The Impact of AI Techniques on Improving the Process of Proactive Accounting Reporting- An Analytical Study of the Opinions of a Sample of Academics and Professionals in the City of Erbil

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Abstract

The study aimed to show the impact of AI techniques in improving the process of proactive accounting reporting for companies, and for the purpose of reaching the goal of the study and testing its hypotheses, the questionnaire form was organized and distributed to a sample from academics and professionals in the city of Erbil through social networking sites and then analyzing the responses of the respondents through the use of the statistical program (SPSS), and the study reached a series of conclusions, the most important of which is that AI techniques contribute to improving the accounting reporting process Proactive companies sample At the end of the study, based on the conclusions reached by the study, the researcher recommends companies to apply AI techniques due to their role in improving the process of proactive accounting reporting.

Key words : AI Techniques, proactive accounting reporting, Expert Systems

أثر تقنيات الذكاء الاصطناعي في تحسين عملية إعداد التقارير المحاسبية الاستباقية- دراسة تحليلية لأراء عينة من الأكاديميين والمهنيين في مدينة أربيل

المستخلص

هدفت الدراسة الى بيان اثر تقنيات الذكاء الاصطناعي في تحسين عملية الابلاغ المحاسبي الاستباقي لدى الشركات ولغرض الوصول الى هدف الدراسة واختبار فرضياتها تم تنظيم استمارة الاستبيان وتوزيعها على عينة من الاكاديميين و المهنيين في مدينة أربيل وذلك من خلال مواقع التواصل الاجتماعي ومن ثم تحليل ردود المستجيبين وذلك من خلال استخدام برنامج الاحصائي (SPSS)، وقد توصلت الدراسة الى سلسلة من الاستنتاجات من أهمها ان تقنيات الذكاء الاصطناعي يساهم في تحسين



عملية الإبلاغ المحاسبي الاستباقي لدى الشركات عينة الدراسة وفي نهاية وبالاعتماد على الاستنتاجات التي توصل إليها الدراسة يوصي الباحث الشركات بتطبيق تقنيات الذكاء الاصطناعي نظراً لدورها في تحسين عملية الإبلاغ المحاسبي الاستباقي .

الكلمات المفتاحية : تقنيات الذكاء الاصطناعي، التقارير المحاسبية الاستباقية، النظم الخبيرة.

1.Introduction

The technological and industrial revolution in the world is accelerating through the wide application of information and communication technologies of the new generation such as AI, the Internet of Things and blockchain technology, and AI has been able to attract the attention of governments, industries, companies and academia significantly and has opened horizons for them to use them and benefit from the technologies they contain to solve complex cognitive problems associated with human intelligence, where in 1950 the emergence of AI began and in 1956 the features of modern science of AI began to appear clearly When the first conference was held at Dartmouth College, (Venkatasubramanian, 2019: 466) and the most prominent American scientists in the field of AI attended the conference, and then academic and professional work took a balanced and medium direction in the innovation of Jeddah methods and techniques in the following twenty years, and research at the beginning of the eighties of the twentieth century witnessed new attention to the success enjoyed by expert systems that simulate skills and rely on the analytical knowledge of one or more human experts, and soon the world began to witness The increase of computational electronic technologies (computational power) and large storage spaces to show new forms of algorithmic techniques that are revolutionizing today on the widest scale, including deep machine learning, which has become beyond human capabilities at the present time (Gamoura et al., 2018: 7), and given the



importance of the subject of AI in our time, we will try through this research to the extent to which AI techniques are used to improve the process of proactive accounting reporting.

1.1 Research Problem

Companies always strive to achieve the mission that is the purpose of its establishment and work to follow different strategies, tactics and policies in order to achieve that mission, which requires the availability of a set of inputs represented in machinery, equipment, information and human resources to keep pace with developments and achieve their goals and move towards success and excellence, but the majority of companies may not be able to respond to these developments and changes unless there is a qualitative leap in the human cadre in terms of training, development and access to levels Advanced performance, with the need to choose advanced and advanced methods and programs in performance, so the shift towards AI has become an imperative necessity for all developed and developing countries alike in order to improve the process of proactive accounting reporting, and therefore the research problem can be posed through the following questions:

- A. Is there a statistically significant impact on the application of expert systems techniques and on improving the process of proactive accounting reporting?
- B. Is there a statistically significant impact on the application of natural language processing and on Improving Proactive Accounting reporting?
- C. Is there a statistically significant impact between the application of machine learning techniques and the improvement of proactive accounting reporting?



D. Is there a statistically significant impact between the application of AI techniques and the improvement of proactive accounting reporting?

1.2 Research Hypothesis

Based on the definition of the framework of the research problem and the research questions related to it, the following hypotheses can be developed:

A. There is no statistically significant impact on the application of expert systems techniques and on improving the process of proactive accounting reporting.

B. There is no statistically significant effect on the application of natural language processing and on improving the process of proactive accounting reporting.

C. There is no statistically significant effect between the application of machine learning techniques and the improvement of proactive accounting reporting.

D. There is no statistically significant effect between the application of AI techniques and the improvement of proactive accounting reporting.

1.3 Research Importance

The importance of the research stems from the fact that it deals with one of the vital topics, which is AI, which is of great importance to many companies, as it helps to enhance business capabilities in all fields, and gives companies the ability to show all their potential, and raise them to the highest levels, as it increases business efficiency and speed of implementation, and this has a role in companies in the process of improving their proactive reporting.

1.4 Research Objective The research aims to achieve a set of objectives, the most important of which are:



A. Explain the concept, importance and techniques of AI that companies can apply.

B. Statement of the concept, importance and requirements of proactive accounting reporting with companies.

C. Demonstrate the impact of AI techniques in improving the process of proactive accounting reporting in companies.

1.5 Research Methodology

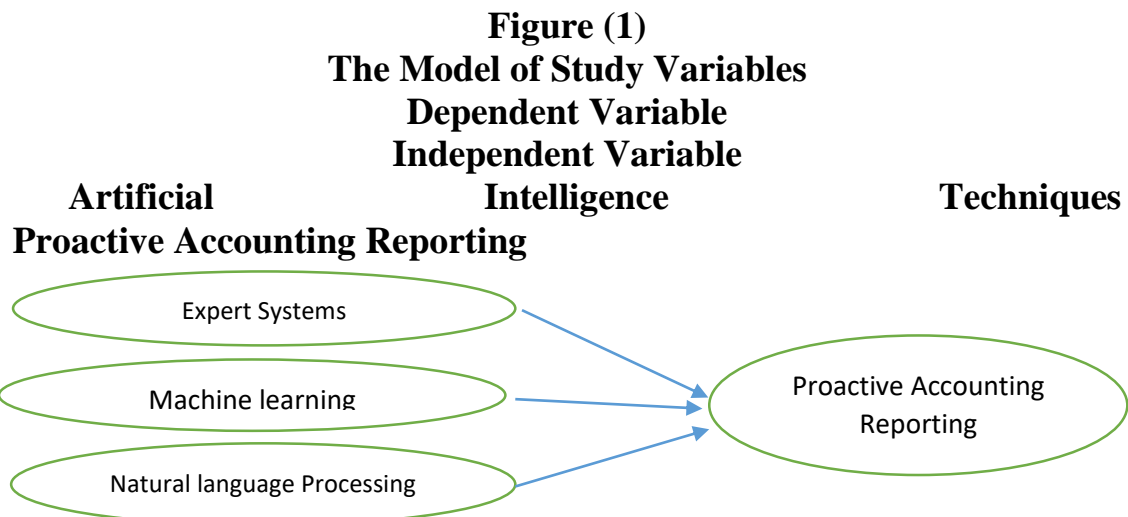
The researcher relied on the descriptive approach in formulating the theoretical side of the research, and at the same time the deductive approach was adopted in the practical side of it.

1.6 Research Model

Figure (1) shows the research model, which consists of two variables as follows:

AI: A system that correctly interprets data and information, learns from that data, and uses it to achieve specific goals and tasks through flexible adaptation.

Proactive Accounting Reporting: It is a combined combination of financial reports and internal management reports concerned with financial statements planned for a specific accounting period.





Source: Prepared by the researcher

2.Literature Review

2.1 The Concept of AI

The term 'AI' was first coined in the 1950s. In 1950, Alan Turing presented what is known as the 'supply test', which evaluates the intelligence of a computer and classifies it as 'intelligent' if it can simulate the human mind. In 1956, at a conference at Dartmouth University, the term 'AI' was officially introduced, and that moment was considered the first step in studying a new topic: how machines simulate human intelligence (Zhang and Lu, 2021: 1). after that, the first program using AI was created by Christopher Strache, who was the head of programming research at the University of Oxford. as this person was able to play chess: via the computer and develop it, then Anthony Oettinger from the University of Cambridge designed a simulation experiment through the computer for the marketing process carried out by the human person in more than one store, which aimed to measure the computer's ability to learn, and this was the first successful experience for the what is known as machine learning (Shraideh and Al-Samarrai, 2021: 160). There are many definitions and concepts mentioned in a large part of the literature on AI, and here the researcher will present some of these definitions. AI is defined as "a general-purpose technology that has the potential to improve people's prosperity and well-being. Contribute to positive sustainable global economic activity, increase innovation and productivity, and help address key global challenges and is used in areas including production, finance, healthcare, and others" (Hussein, 2023: 120). It was also defined as "an experimental branch of computer science whose mission is to seek to create intelligent devices that can perform



complex and varied tasks depending on their intelligence" (Al-Jaber, 2020: 17).

AI is defined as "the ability of a system to correctly interpret external data, learn from that data, and use that knowledge to achieve specific goals and tasks through flexible adaptation" (Haenlein and Kaplan, 2019,1).

Accordingly, the researcher can define AI as a branch of computer science, which includes a set of technologies through which various and complex tasks can be performed and benefited from in multiple fields.

2.2 The Importance of AI

AI provides invaluable possibilities to improve human life in a range of areas including healthcare, education, employment, entertainment, and transportation (Berente, et al, 2021: 1433). The importance of AI stems from its ability to perform tasks continuously without fatigue, regardless of the surrounding circumstances, and to carry out routine tasks that are repetitive or dangerous to humans. In addition, AI possesses self-learning capabilities and awareness of errors that can occur. Furthermore, AI systems are not affected by emotions. They work according to logical programming methods, enabling them to quickly analyze big data from different sources and make accurate decisions (Ibrahim et al., 2023: 2). The importance of AI stems from its ability to perform tasks continuously without fatigue, regardless of the surrounding circumstances, and to carry out routine tasks that are repetitive or dangerous to humans. In addition, AI possesses self-learning capabilities and awareness of errors that can occur. Furthermore, AI systems are not affected by emotions. They work according to logical programming methods, enabling them to quickly



analyze big data from different sources and make accurate decisions (Ibrahim et al., 2023: 2).

a. AI helps in changing the quality of life and developing social and organizational systems and frameworks, as it enhances progress in all areas of life and also greatly assists in innovation.

B. Storing information and associated knowledge so the company can protect its information from leakage and loss.

C. Create a mechanism that is not subject to human emotions such as anxiety or fatigue and fatigue, especially when it comes to stressful work that represents a serious, physical, or mental danger.

D. Generating and finding solutions to complex problems as these problems are solved and addressed in a timely and short time.

E. AI systems use human knowledge, which is stored in the form of facts and theories in a virtual electronic container called the knowledge base in addition to the stored knowledge facts and also contains the rules that the system will use to make decisions.

F. Promotes well-being in all areas of the social sector as it leads to prosperity and economic prosperity through the creation of new markets and more efficient logistics services while improving the quality of services and goods provided.

G. Helps achieve and optimize vision-based automated command and support systems through new ways to control manufacturing processes and work schedules that lead to a new industrial revolution, including the quality of engineering life of the product, increasing production capabilities by predicting demand more reliably and increasing flexibility in supply and demand processes.



2.3 AI Techniques

AI has several technologies, including expert systems, natural language processing, machine learning, deep learning, voice systems recognition, knowledge representation and knowledge database, and logical thinking. Probabilistic thinking can be used to solve complex cognitive problems associated with human intelligence (Goralski and Tan, 2020: 1), and below we will explain the most important of these techniques that can be used in the field of accounting and auditing: (Ibrahim, 2022: 173) and (Siddiqui, 2022: 20)

A. Expert systems: It is an information system that works based on experience, based on knowledge, where its knowledge is used through special applications that help humans in the process of thinking and solving problems and can be used in the field of accounting and auditing based on a knowledge base that includes the expertise and experiences of accountants and auditors, and can integrate the skill of one or more experts to help improve audit services in various processes such as planning, evaluation of the internal control system and definition of audit risks to judge internal control.

B. Machine learning: This technology is a subset of AI, which focuses on creating systems that teach or improve performance based on the data they consume, machine learning and AI are often discussed together, and the two terms are sometimes used interchangeably, but they do not represent the same and here it should be noted that despite all machine learning techniques after AI, not every AI represents machine learning.

C. Natural language processing: It is a sub-science of AI science, which in turn is a branch of informatics, and overlaps significantly with linguistics that provides the required linguistic description of the



computer, and through this technology, we can manufacture software that can analyze and simulate the understanding of natural languages and one of its most manifestations is voice recognition.

2.4 Definition of Proactive Accounting Reporting

When looking at the literature that dealt with the subject of proactive reporting, we notice that limited definitions are received, as proactive reporting is defined as "the obligation of companies to periodically publish some amount of information that defines their activities, practices, financial statements, senior employees, their roles, plans and results of those plans automatically and without submitting requests by the public" (Tawfiq, 2022: 1291).

He also defined it (Al-Jajawi and Majeed, 2014: 39) as "a combination of financial and internal management reports concerned with the planned financial statements for a specific accounting period through which useful financial information is provided to the company's direct stakeholders and investors to help them make their economic decisions."

Therefore, the researcher can define proactive reporting as the company's presentation of its various reports for a certain accounting period to the general public in advance in order to help them make decisions about the company.

Proactive reporting plays a pivotal role in achieving greater transparency and openness to users of financial reports, as it ensures immediate access to information and avoids the costs of obtaining it, as well as engaging in administrative procedures, and most companies proactively publish information using multiple means such as publications, official newspapers, reports, periodicals, bulletin boards, radio and television, and websites, and according to statistics, many of these countries proactively



report certain types of information stipulated by Law These include Chile, Estonia, Iceland, Israel, Turkey, Mexico, Italy (Barbarians, 2016: 145)

2.5 The Importance of Proactive Accounting Reporting

The importance of proactive financial reports lies in the fact that they embody the property of timing in accounting information. Accounting information is useful to decision-makers whenever available promptly. The most important objective of proactive reporting is to enhance the timeliness of accounting information. Additionally, proactive reporting aims to provide shareholders and other users of financial statements with an additional understanding of the company's operations. Therefore, the importance of proactive reporting through financial reports lies in its significance (Haidar et al., 2022: 310-311).

A. Addressing deficiencies related to traditional accounting reporting that relate to the timing of reporting financial information so that it is reported immediately before or at the end of the financial year so that the financial information does not lose its value and ability to meet the needs of users of financial statements.

B. Provide appropriate accounting information to rationalize investment and credit decisions taken by current and prospective investors, credit grantors and creditors promptly and throughout the fiscal year.

C. The accounting information contained in the proactive financial reports helps the users of these reports in estimating the volume and timing of the expected cash flows and the degree of certainty related to them, as the net cash flows are an indicator of the company's ability to meet its external obligations, and these flows reflect the company's ability to finance its operational needs leading to profits and thus the increase in the prices of its shares traded in the stock market.



D. Proactive financial reports provide information on the evaluation of the Company's performance and earning capacity during the period for which the proactive financial reports are prepared and to assist investors in estimating the future expectations of the Company's performance.

E. Provide accounting information regarding the company's resources, liabilities, equity, and changes during the period and other useful information that helps determine the degree of liquidity and the likelihood of facing financial distress during the specified period.

2.6 Proactive Accounting Reporting Requirements

When conducting proactive reporting, the company is required to:
(Quoted in Tamimi and Nafi'i, 2022: 164)

A. Apply the same accounting policies in its proactive financial report as applied in its annual financial statements to facilitate the comparison process.

B. Statement of the actual information period and the expected period of its lists within the report to be reliable and to improve the ability of investors, creditors, and other parties to realize the company's ability to achieve (profits, cash flows).

C. The report shall be submitted at the end of the financial period, otherwise it may lose its importance in terms of time.

D. Announce to stakeholders alike and communicate the date of reporting the proactive financial report to all either through the company's website, in the stock market bulletin or through the economically approved media in a brief manner.

E. The report should provide new and non-duplicate information with what has been mentioned in previous reports, taking into account the issue of cost and benefit.



F. Any component of the proactive financial report contains the word (expected) to give an indication to the recipient that not all the information contained in the report is actual, but contains information planned within the management plan, for example (expected income statement, expected cash flow statement, expected balance sheet as in 31/12 and others).

G. The report should include important explanatory explanations related to the financial year on the basis of which the report was prepared and mention the changes that occurred in the basis of accounting measurement, if any, in order not to affect the decisions of the company's direct stakeholders.

H. If a proactive financial report is issued for the previous year, state its results with the current proactive report for comparison.

I. The Company's management should disclose anticipated contingencies that are expected to have a direct material impact on the Company's financial statements.

J. The responsibility for the information contained in the proactive financial report lies on the company's management and this responsibility does not amount to criminal, but through useful information, the company's management gains a good reputation and the confidence of all parties who have a direct relationship with the company, such as investors, shareholders, and others.

2.7 AI Techniques and Improving Proactive Accounting Reporting

The primary objective of financial reporting is to provide sufficient financial information to rationalize credit, investment and other decisions, and the appropriateness of this information is reflected in the time value of that information by providing proactive capacity, based on the



predictive potential of future cash flows and thus providing proactive and effective information about the company's ability to meet its obligations and achieve its objectives efficiently and effectively, along with the time value information should be predictive value that is embodied in the extent of the role of those Information in providing proactive ability and perception to users, in other words, the concept of proactivity depends on timeliness and reducing the expectation gap among users of the information reported in proactive financial reports (Mhawesh, et al, 2023: 445), and the role of each of the AI technologies in improving proactive reporting can be shown through the following:

A. Expert Systems: It is a smart program that uses the rules taken from human experience in the form of conditions and results in a particular field and the use of derivation and inference methods to extract and conclude the reasoned results resulting from the conformity of these conditions or results with a condition or result of a specific problem to be solved, where the group of experts in the specific field required to obtain the experience system in which to give all the experience they have gathered in the smallest details to the knowledge engineer, who undertakes In turn, the experience is developed in the form of rules for conditional inclusion including the conditions and results of these conditions as well as the application of various techniques.

Expert systems contribute to improving proactive reporting in terms of saving time, and saving time is one of the benefits that companies achieve from using expert systems, because time is an important source in achieving proactive leadership, and on the other hand, since expert systems require specialized knowledge and high skill, so they contribute to the performance of accounting functions by improving the presentation



in the financial statements, developing the disclosure of notes complementary to financial reports, and providing accounting reasoning through indicative guides, predictive models and indicators. Financial reports in a way that simulates human thinking and surpasses it, which improves this in proactive accounting reporting with the company applying expert systems.

B. Machine learning: It is a technique through which machines are taught to do tasks themselves without the need to program them every time to perform a specific task. Rather, they are programmed in a way that they can learn to perform many different tasks. Machine learning revolves around the use of algorithms to guide predictions, and the goal is to create a model based on one or more algorithms (Captain, 2023: 137). Due to the huge amount of work and repetitive data patterns, there is a great opportunity for companies to benefit from machine learning technology. This technology can be applied to a range of operations, including settling bank statements, classifying transactions, recording accounting data in short formats, tracking changes in expenses, and other operations. For example, manually classifying each transaction as revenue or expenses by the company's accountants may take a lot of time and effort. However, by relying on technology, machine learning enables transactions to be classified with minimal effort, enabling the company to improve proactive accounting reporting through this technology.

C. Natural language processing: It is one of the AI techniques, that allow computers to process and understand human language. Medical language processing covers a wide range of technologies such as voice recognition, human language translation, and understanding written texts. Through this technology, the device is taught to understand written or spoken



words without specific commands or phrases, with the possibility of responding to humans in the same way, such as Siri, and Alexa, which rely on understanding the natural language of human-machine communication (Mass et al., 2021: 2).

When companies use natural language processing technology, they can obtain insights, inferences, and methodologies to enhance their knowledge and prevent potential risks. It also helps companies to automate accounting tasks such as data entry and processing financial reports, documents, and receipts with the least possible time and effort. This will contribute to Improving Proactive Accounting reporting.

3.Results and Dissection:

3.1 Description of the Research Variables:

The researcher coded the research variables, which include the research axes related to "AI techniques", and this axis was coded with the symbol (X). This axis was measured through three dimensions, and the three dimensions were coded sequentially as follows: (X1.1-X1.7), (X2.1-X2.7), and (X3.1-X3.7). For reference, each of the three dimensions was measured using seven statements. The second theme, "Improving Proactive Accounting reporting", is coded with the symbol Y. Statements related to this axis were coded from (Y1) to (Y6), which means that they were measured through six statements or questions. To collect primary data about the participants, their opinions, and answers about the themes and dimensions of the above-mentioned study, the researcher used a five-point Likert scale. The values of this scale range from one (1) score, which means "strongly disagree," to a score of five (5), which means "strongly agree." The questionnaire was distributed randomly to a sample of the research community, including academics and professionals



concerned with the subject of the study, through the (Google Forms) platform, where (122) participants filled out the questionnaire form. Subsequently, the statistics program (SPSS) was used to analyze opinions and answers, as well as to achieve research objectives and test hypotheses.

1. Description of Personality Variables:

Through Table (1), which includes the distribution of respondents according to the personal information of the members of the research sample of academics and professionals in the city of Erbil through the use of frequencies and percentages, it was clear as follows:

A. It was found that the majority contributing to the research was from the academic category, where their percentage was (%51.61), while the remaining percentage was from the professional category (%48.39) of the research sample. In general, it was found that the two percentages of participation in the research from the two categories were relatively close, with a difference of four cases in favor of respondents from the academic category.

B. When distributing the respondents according to the academic qualification attribute, it was found that the majority of the participants in the research were from the two categories that obtained a master's degree and a bachelor's degree, where their contribution rate was (%35.48) for each of the two categories. Participants with a PhD came in second place in terms of participation, with (%25.81). Finally, participation by participants with an auditor diploma degree was very low, with only four cases, and their contribution rate (%3.23).

C. According to the table, it is clear that the majority had more than sixteen years of experience, as their contribution to the study was



(%41.94), and they ranked first in terms of participation. Next comes the group with experience between eleven and fifteen years, with a contribution rate of (%25.81). In third place came the participants from the category with experience between six and ten years, with a contribution rate (%22.58). Finally, participation by the group with only five years of experience was minimal, with a contribution rate (%9.68).

D. Finally, based on the distribution of research participants according to their knowledge and familiarity with the subject of AI, which is one of the research axes. It was found that the majority of respondents were knowledgeable about the aforementioned topic, reaching (%58.06), while the remaining percentage of the group who are not familiar with the subject of AI (%41.94).

Table (1)			
Describe the Distribution of the Members of the Research Sample According to Personal Information			
Variable	Categories Variable	Frequency	Percentage
Job Qualification	Academy	64	%51.61
	Professional	60	%48.39
	Total	124	%100
Qualification	Doctor	32	%25.81
	Master	44	%35.48
	Auditor Diploma	4	%3.23
	Bachelor	44	%35.48
	Total	124	%100
Years of Experience	From 1 to 5 years	12	%9.68
	From 6 to 10 years	28	%22.58
	From 11 to 15 years	32	%25.81
	16 years and above	52	%41.94
	Total	124	%100
Do you have a knowledge of the subject of AI?	Yes	72	%58.06
	No	52	%41.94
	Total	124	%100

Source: Prepared by the Researcher Based on the Results of Statistical Analysis



2. Description of the Axes (Variables) of the Study:

The variables of the study were described, which include opinions and answers about questions and paragraphs, which were collected by members of the research sample, where descriptive statistics were used, including frequency distribution, percentages, arithmetic means, standard deviations and agreement ratios, in order to describe the opinions and answers of the respondents or participants in the study concerned, and we must note here that the direction of opinions is determined in terms of levels of approval, based on the arithmetic average (weighted or weighted) of questions or phrases, where the levels of opinions were distributed To three levels of low, medium and high, if the weighted arithmetic values range between (1 and 2.59) the levels of approval for opinions are considered low, i.e. tending towards disagreement, and if they fall between the values of (2.60 and 3.39) the levels of approval are considered medium, i.e. opinions tend towards neutrality, and finally, if they occur between (3.40 and 5) then the levels of opinions are considered high for approval, meaning that opinions tend towards approval, according to the size used for the purpose of describing opinions, try to interlocutor and dimensions of the research.

For the purpose of testing the levels of opinions in terms of approval or vice versa, as well as in terms of neutrality towards opinions and to reach this goal, the statistics of the test (T) were used to test the hypothesis of nothingness, which provides for the neutrality of opinions and answers for each phrase, whether for the dimension or axis against the alternative hypothesis, which is the approval of opinions or not, where we can accept the hypothesis of nothingness or reject it, i.e. accept the alternative hypothesis, based on the value of the level of significance of the test, if



the value of the level of significance is less Or equal to the value of the level of significance assumed by the current field study of (0.05) in this case we can reject the nihilistic hypothesis and accept the alternative hypothesis, in other words, either opinions tend towards acceptance or non-acceptance and we can infer between the two cases through the reference to the value of the statistics, if the value of its signal is positive, it indicates acceptance and vice versa.

3.2: Description of the Axis "AI Technologies":

3.2.1: Description of the Dimension (Expert Systems Technology):

Table (2), represents the descriptive statistics of the paragraphs after "expert systems technology", as well as Table (3), which represents the test of the levels of approval of the phrases of the dimension concerned, which was represented by (7) paragraphs. The following is shown: For Table (2), it is clear as follows:

A. As for the dimension as a whole, it was found that it tends to agree, by (%78.34) compared to (1.84%) of those who do not agree on the aforementioned axis, and it also turned out that the percentage of neutrals on what was included in the dimension in question amounted to (%19.82) In other words, the answers and opinions tend towards approval and at good levels, and the percentage of agreement for the phrases combined was (%78.43), meaning that the opinions are moving towards a contribution to the technology of expert systems, which is one of the AI techniques in Improving Proactive Accounting reporting, according to the opinions of respondents and confirms This is the value of the arithmetic mean (3.92), which was within the extent of acceptance, which came from the Likert five-point scale adopted in the research.



B. For the statements of the mentioned dimension individually, it was found that the statements (X1.1) represented by (saving time to carry out proactive accounting reporting) then the opinions are more agreed, meaning that the degree of agreement at the said statement was high, based on the value of the arithmetic mean of (4.19) and the percentage of agreement (%83.87). As for the statement (X1.5), which is (impartiality when carrying out the accounting reporting process), the opinions were in agreement, but to a lesser extent, meaning that the opinions and answers were less in agreement compared to the rest of the statements, but the degree of approval is also high, based on the value of the arithmetic mean and the percentage of agreement, which is (3.71) and (%74.19), respectively.

C. Concerning the values of the standard deviation, where its value indicates the homogeneity and divergence of opinions from each other for phrases or paragraphs. It turns out that the statement (X1.1) represented by (saving time to do proactive accounting reporting) has the lowest value of (0.47) and therefore the opinions and answers when the said statement were homogeneous. While the statement (X1.7) represented “low cost as a result of simplifying procedures and paper transactions,” the answers to the individuals of the research sample were less homogeneous, meaning more divergent than each other, and had the largest value of the standard deviation of (0.76). This suggests that one cannot fully rely on the opinions of the respondents, as they were less homogeneous, indicating a significant difference in opinions relative to each other.



Table (2): Description of the Dimension (Expert Systems Technology)

Phrases	#	I strongly disagree	I don't agree	Neutral	I agree	I strongly agree	Arithmetic mean	Standard deviation	Agreement Ratio
		1	2	3	4	5			
X1.1	Frequency	0	0	4	92	28	4.19	0.47	%83.87
	%	%0.00	%0.00	%3.23	%74.19	%22.58			
X1.2	Frequency	0	0	16	92	16	4	0.51	%80.00
	%	%0.00	%0.00	%12.90	%74.19	%12.90			
X1.3	Frequency	0	4	24	84	12	3.84	0.63	%76.77
	%	%0.00	%3.23	%19.35	%67.74	%9.68			
X1.4	Frequency	0	4	28	76	16	3.84	0.63	%76.77
	%	%0.00	%3.23	%22.58	%61.29	%12.90			
X1.5	Frequency	0	4	44	60	16	3.71	0.73	%74.19
	%	%0.00	%3.23	%35.48	%48.39	%12.90			
X1.6	Frequency	0	0	28	76	20	3.94	0.62	%78.71
	%	%0.00	%0.00	%22.58	%61.29	%16.13			
X1.7	Frequency	0	4	28	64	28	3.94	0.76	%78.71
	%	%0.00	%3.23	%22.58	%51.61	%22.58			
Weighted rate	Frequency	0	16	172	544	136	3.92	0.4	%78.43
	%	%0.00	%1.84	%19.82	%62.67	%15.67			
		%1.84			%78.34				

Source: Prepared by researcher based on the (SPSS) program



Table (3) represents the results of the test (T) and shows through the results that all the phrases indicate acceptance in terms of opinions and answers of the respondents, based on the level of statistical significance of the test for all phrases. Additionally, through the positive reference to the value of the test statistics used. In other words, the opinions of the respondents tend towards approval of what was included in the phrases of the mentioned dimension. In general, the opinions agree that the expert systems technology contributes to Improving Proactive Accounting reporting, according to the opinions of a sample research from academics and professionals in the city of Erbil.

Table (3) : Test Results of Statistics (T) for all Statements after (Expert Systems Technology _ one of the AI Techniques

Icon	Phrases	Arithmetic mean	Agreement Ratio	Statistic value (T)	The difference between the average of the statement and the hypothetical	Phrase order	Level of statistical significance	Result
X1.1	Provide time to do proactive accounting reporting.	4.19	%83.87	28.18	1.19	1	0.00	Acceptance of the phrase
X1.2	Improve the quality of proactive accounting reporting.	4	%80.00	21.83	1.00	2	0.00	Acceptance of the phrase



X1.6	It has more experience than human experience in carrying out the reporting process.	3.94	%78.71	16.77	0.94	3	0.00	Acceptance of the phrase
X1.7	Reducing the cost as a result of simplifying procedures and paper transactions.	3.94	%78.71	13.66	0.94	4	0.00	Acceptance of the phrase
X1.3	Dealing with the large database.	3.84	%76.77	14.83	0.84	5	0.00	Acceptance of the phrase
X1.4	Ability to retain data for an unlimited period.	3.84	%76.77	13.75	0.84	6	0.00	Acceptance of the phrase
X1.5	Impartiality when carrying out the accounting reporting process.	3.71	%74.19	10.83	0.71	7	0.00	Acceptance of the phrase

Source: Prepared by Researcher Based on the (SPSS) program

3.2.2: Description of the Dimension (Natural Language Processing Technology)

Table (4), represents the descriptive statistics of the paragraphs after "natural language processing technology", as well as Table (5), which represents the test of the levels of approval for the phrases of the



dimension concerned, where it was represented by (7) paragraphs. The following is shown: For Table (4), it is clear as follows:

1. For the dimension as a whole, it was found that it tends to agree by (%77.88) compared to (%6.45) of those who do not agree on the aforementioned dimension, and it also turned out that the percentage of neutrals on what was included in the dimension in question amounted to (%15.67) In other words, the answers and opinions tend towards approval and good levels, and the percentage of agreement for the phrases combined (%77.70), meaning that the opinions are moving towards a contribution to natural language processing technology in Improving Proactive Accounting reporting, according to the opinions of respondents, and this is confirmed by the value of the arithmetic mean (3.88) Which was within the extent of acceptance, which came from the Likert five-point scale adopted in the research.

2. About the statements of the mentioned dimension individually, it was found that the statements (X2.1) represented by (human language processing, understanding, and use) then the opinions are more agreed, meaning that the degree of agreement at the said statement was high, based on the value of the arithmetic mean of (4.19) and the percentage of agreement (%83.87). As for the statement (X2.5), represented by (this technology contributes to modifying the required reporting format), the opinions were in agreement, but to a lesser extent, meaning that the opinions and answers were less in agreement compared to the rest of the statements, but the degree of approval is also considered high, based on the value of the arithmetic mean and the percentage of agreement, which is (3.68) and (%73.55) respectively.



3. About the standard deviation values, it was found that the statement (X2.1) represented by (human language processing, understanding and use) has the lowest value of (0.65), and therefore the opinions and answers when the said statement was homogeneous. While the statement (X2.7) represented by (this technique contributes to the issuance of reports in the main languages) the answers to the individuals of the research sample were less homogeneous, meaning more distant from each other and had the largest value of the standard deviation of (1.02) and the opinions of the respondents cannot be taken somewhat because they were less homogeneous, i.e. there is a difference in opinions relatively.

Table (4)

Description of the Dimension (Contribution of Natural Language Processing Technology)

Phrases	#	I strongly disagree	I don't agree	Neutral	I agree	I strongly agree	Arithmetic mean	Standard deviation	Agreement Ratio
		1	2	3	4	5			
X2.1	Frequency	0	0	16	68	40	4.19	0.65	%83.87
	%	%0.00	%0.00	%12.90	%54.84	%32.26			
X2.2	Frequency	4	4	12	80	24	3.94	0.84	%78.71
	%	%3.23	%3.23	%9.68	%64.52	%19.35			
X2.3	Frequency	4	0	28	68	24	3.87	0.84	%77.42
	%	%3.23	%0.00	%22.58	%54.84	%19.35			
X2.4	Frequency	0	8	4	88	24	4.03	0.7	%80.65
	%	%0.00	%6.45	%3.23	%70.97	%19.35			
X2.5	Frequency	0	12	32	64	16	3.68	0.82	%73.55



	%	%0.00	%9.68	%25.81	%51.61	%12.90			
X2.6	Frequency	4	4	32	64	20	3.74	0.88	%74.84
	%	%3.23	%3.23	%25.81	%51.61	%16.13			
X2.7	Frequency	8	8	12	76	20	3.74	1.02	%74.84
	%	%6.45	%6.45	%9.68	%61.29	%16.13			
Weighted rate	Frequency	20	36	136	508	168	3.88	0.52	%77.70
	%	%2.30	%4.15	%15.67	%58.53	%19.35			
		%6.45			%77.88				

Source: Prepared by researcher based on the (SPSS) program

As for Table (5), whose results are the test (T), found through the results that all phrases indicate acceptance in terms of opinions and answers to the respondents, based on the level of the statistical significance of the test for all phrases. Additionally, through the signal of the value of his statistics used. In other words, the opinions of the researchers are heading towards approval, while the phrases included in the aforementioned dimension, in general, that opinions agree that the technique of treating natural language contributes to Improving Proactive Accounting reporting, according to the opinions of the research sample of academics and professionals in the city of Erbil.

Table (5): Test Results of Statistics (T) for all Statements After (Natural Language Processing Technology) _ one of the AI Techniques

Icon	Phrases	Arithmetic mean	Agreement Ratio	Statistic value (T)	The difference between the average of the statement and the	Phrase order	Level of statistical significance	Result



					hypothetical			
X2.1	Human language processing, understanding and use.	4.19	%83.87	20.57	1.19	1	0	Acceptance of the phrase
X2.4	Processing, understanding and use of human language .Assist in the preparation of the quality of the required reports in a timely manner.	4.03	%80.65	16.48	1.03	2	0	Acceptance of the phrase
X2.2	Assist company officials who do not have computer literacy in issuing reports.	3.94	%78.71	12.35	0.94	3	0	Acceptance of the phrase
X2.3	Ask the computer for the type of reports required.	3.87	%77.42	11.6	0.87	4	0	Acceptance of the phrase
X2.6	Through this technology , company managers can achieve proactive reporting in the required place..	3.74	%74.84	9.36	0.74	5	0	Acceptance of the phrase



X2.7	This technology contributes to the production of reports in major languages.	3.74	%74.84	8.11	0.74	6	0	Acceptance of the phrase
X2.5	This technology contributes to modifying the required reporting format.	3.68	%73.55	9.18	0.68	7	0	Acceptance of the phrase

Source: Prepared by researcher based on the (SPSS) program

3.2.3 : Description of the Dimension (Machine Learning Technology):

Table (6), represents the descriptive statistics of the paragraphs after "machine learning technology", as well as Table (7), which represents the test of the levels of approval for the phrases of the dimension concerned, which was represented by (7) paragraphs. Shows the following:

1. For the dimension as a whole, it turns out that it tends to agree, by (%76.96) compared to (%2.76) of those who do not agree on the mentioned dimension, and it also turned out that the percentage of neutrals on what was included in the dimension in question amounted to (%20.28) In other words, the answers and opinions tend towards approval and good levels, and the percentage of agreement for the phrases combined (%78.53), meaning that the opinions are moving towards a contribution to machine learning technology in Improving Proactive Accounting reporting, according to the opinions of respondents, and this is confirmed by the value of the arithmetic mean (3.93), which It fell



within the range of acceptance, which came from the Likert five-point scale adopted in the research.

2. About the statements of the mentioned dimension individually, it was found that the statements (X3.5), represented by 'processing complex cases that cannot be addressed without resorting to machine learning,' garnered more agreement. This indicates a high degree of agreement with the statement, as reflected in the arithmetic mean value of 4.13 and a percentage agreement of 82.58%.

As for the statement (X3.2), represented by 'understanding the trends and patterns of data that are reported,' the opinions were in agreement, but to a lesser extent. This means that the opinions and answers were less in agreement compared to the rest of the statements, but the degree of approval is also considered high based on the value of the arithmetic mean and the percentage of agreement, which is 3.68 and 73.55%, respectively.

3. About the standard deviation values, it turned out that the statement (X3.7) represented by (processing big data as a result of the many operations carried out by the company) has the lowest value of (0.51) and therefore the opinions and answers when the said statement was homogeneous.

While statement X3.2 represented (understanding the trends and patterns of data that are reported), the answers to the individuals of the research sample were less homogeneous, meaning more distant from each other, and had the largest value of the standard deviation (0.90). The opinions of the respondents cannot be taken somewhat because they were less homogeneous, i.e. there is a difference in opinions relatively.

Table (6): Description of the Dimension (the Contribution of Machine Learning Technology)



Phrases	#	I strongly disagree	I don't agree	Neutral	I agree	I strongly agree	Arithmetic mean	Standard deviation	Agreement Ratio
		1	2	3	4	5			
X3.1	Frequency	0	4	20	84	16	3.9	0.64	%78.06
	%	%0.00	%3.23	%16.13	%67.74	%12.90			
X3.2	Frequency	4	8	28	68	16	3.68	0.9	%73.55
	%	%3.23	%6.45	%22.58	%54.84	%12.90			
X3.3	Frequency	0	0	28	76	20	3.94	0.62	%78.71
	%	%0.00	%0.00	%22.58	%61.29	%16.13			
X3.4	Frequency	0	4	36	60	24	3.84	0.77	%76.77
	%	%0.00	%3.23	%29.03	%48.39	%19.35			
X3.5	Frequency	0	0	24	60	40	4.13	0.71	%82.58
	%	%0.00	%0.00	%19.35	%48.39	%32.26			
X3.6	Frequency	0	4	28	64	28	3.94	0.76	78.71%
	%	%0.00	%3.23	%22.58	%51.61	%22.58			
X3.7	Frequency	0	0	12	92	20	4.06	0.51	81.29%
	%	%0.00	%0.00	%9.68	%74.19	%16.13			
Weighted rate	Frequency	4	20	176	504	164	3.93	0.44	%78.53
	%	%0.46	%2.30	%20.28	%58.06	%18.89			
		%2.76			%76.96				

Source: Prepared by researcher based on the (SPSS) program

Table 7 represents the results of the test (T) and shows, through the results, that all the phrases indicate acceptance in terms of opinions and answers of the respondents, based on the level of statistical significance of the test for all phrases, as well as through the positive reference to the



value of the test statistics used. In other words, the opinions of the respondents tend towards approval of what was included in the phrases of the mentioned dimension, and in general, the opinions agree that machine learning technology contributes to Improving Proactive Accounting reporting, according to the opinions of sample research from academics and professionals in the city of Erbil.

Table (7) : Test Results of Statistics (T) for all Statements After (Machine Learning Technology) _ one of the AI Techniques

Icon	Phrases	Arithmetic mean	Agreement Ratio	Statistic value (T)	The difference between the average of the statement and the hypothetical	Phrase order	Level of statistical significance	Result
X3.5	Addressing complex cases that cannot be addressed without resorting to machine learning.	4.13	%82.58	17.72	1.13	1	0	Acceptance of the phrase
X3.7	Processing big data as a result of the many operations carried out by the company.	4.06	%81.29	23.43	1.06	2	0	Acceptance of the phrase
X3.3	Correctly determine what is required of the	3.94	%78.71	16.77	0.94	3	0	Acceptance of the phrase



	machine.							
X3.6	Save time in preparing financial reports.	3.94	%78.71	13.66	0.94	4	0	Acceptance of the phrase
X3.1	Adapting behavior to its environment without human intervention or partial intervention.	3.9	%78.06	15.64	0.9	5	0	Acceptance of the phrase
X3.4	Delete some unnecessary actions when reporting is being reported.	3.84	%76.77	12.14	0.84	6	0	Acceptance of the phrase
X3.2	Understand the trends and patterns of reported data.	3.68	%73.55	8.4	0.68	7	0	Acceptance of the phrase

Source: Prepared by Researcher Based on the (SPSS) Program

3.2.4: Description of the Dimension (Improving Proactive Accounting Reporting):

Table (8), represents the descriptive statistics of the paragraphs of the axis "Improving Proactive Accounting reporting", as well as Table (9),



represents the test of approval levels for the phrases of the concerned axis, where it was represented by (6) paragraphs. Shows the following:

1. The overall trend for the axis indicates a leaning towards agreement, with 82.26% of respondents in agreement compared to only 1.61% who disagree. It also turned out that the percentage of neutrals amounted to 16.13%. In other words, the answers and opinions are moving towards approval and good levels, and the percentage of agreement for the phrases combined was 80.00%, meaning that the opinions are moving towards the existence of levels of improvement in proactive accounting reporting, according to the opinions of the respondents. This was confirmed by the value of the arithmetic mean (4.00), which was located within the extent of acceptance, which came from the Likert pentameter adopted in the research.

2. About the phrases mentioned separately, it was found that the statements (Y6) represented by (the reduction of time by companies when preparing reports) then the opinions are more agreed, meaning that the degree of agreement at the said statement was high, based on the value of the arithmetic mean of (4.10) and the percentage of agreement (%81.94). Regarding statement (Y1), which posits that significant advancements in technology contribute to enhancing proactive accounting reporting, there was a consensus among opinions, albeit to a lesser degree than with other statements. However, the level of approval remains notably high, evidenced by the arithmetic mean value of 3.87 and a percentage agreement of 77.42%.

3. About the standard deviation values, it turned out that the statement (Y5) represented by (that the AI programming mechanism will contribute to Improving Proactive Accounting reporting) has the lowest value of



(0.54), and therefore the opinions and answers when the said statement was homogeneous. The statement (Y2), represented by the presence of high scientific qualifications among the company's employees, elicited less homogeneity in responses from individuals within the research sample, as indicated by the larger standard deviation value of 0.85. Consequently, it's challenging to draw firm conclusions from respondents' opinions due to their relative lack of uniformity.

Table (8)

Description of the Dimension (Improving Proactive Accounting Reporting)

Phrases	#	I strongly disagree	I don't agree	Neutral	I agree	I strongly agree	Arithmetic mean	Standard deviation	Agreement Ratio
		1	2	3	4	5			
Y1	Frequency	0	0	32	76	16	3.87	0.61	%77.42
	%	%0.00	%0.00	%25.81	%61.29	%12.90			
Y2	Frequency	4	0	20	68	32	4	0.85	%80.00
	%	3.23%	%0.00	%16.13	%54.84	%25.81			
Y3	Frequency	0	0	32	56	36	4.03	0.74	%80.65
	%	%0.00	%0.00	%25.81	%45.16	%29.03			
Y4	Frequency	0	4	12	92	16	3.97	0.6	%79.35
	%	%0.00	3.23%	%9.68	%74.19	%12.90			
Y5	Frequency	0	0	16	88	20	4.03	0.54	%80.65
	%	%0.00	%0.00	%12.90	%70.97	%16.13			
Y6	Frequency	0	4	8	84	28	4.1	0.64	%81.94
	%	%0.00	%3.23	%6.45	%67.74	%22.58			



Weighted rate	Frequency	4	8	120	464	148	4	0.39	%80.00
	%	0.54%	%1.08	%16.13	%62.37	%19.89			
		%1.61			%82.26				

Source: Prepared by researcher based on the (SPSS) program

Table (9) represents the results of the test (T) and demonstrates that all the phrases indicate acceptance in terms of opinions and answers from the respondents. This is supported by the level of statistical significance of the test for all phrases, as well as the positive reference to the value of the test statistics used. In other words, the opinions of the respondents tend toward approval of the content included in the phrases of the mentioned dimension. Additionally, it can be inferred that the opinions generally concur on the existence of levels of improvement in proactive accounting reporting, based on the opinions of the research sample consisting of academics and professionals in the city of Erbil.

Table (9)

Test Results of Statistics (T) for all Axis Statements (Improving Proactive Accounting Reporting)

Icon	Phrases	Arithmetic mean	Agreement Ratio	Statistic value (T)	The difference between the average of the statement and the hypothetical	Phrase order	Level of statistical significance	Result
------	---------	-----------------	-----------------	---------------------	--	--------------	-----------------------------------	--------



Y6	The reduction of time by companies when preparing reports	4.1	%81.94	19	1.1	1	0	Acceptance of the phrase
Y3	Open courses to increase the efficiency of accountants who prepare financial reports.	4.03	%80.65	15.47	1.03	2	0	Acceptance of the phrase
Y5	The mechanism of programming mechanism will contribute to Improving Proactive Accounting reporting ..	4.03	%80.65	21.29	1.03	3	0	Acceptance of the phrase
Y2	The presence of high educational qualifications among the company's	4	%80.00	13.17	1	4	0	Acceptance of the phrase



	employees							
Y4	Updating their reports will improve proactive accounting reporting.	3.97	%79.35	18.04	0.97	5	0	Acceptance of the phrase
Y1	The tremendous development in the world of technology has a role in Improving Proactive Accounting reporting.	3.87	%77.42	15.87	0.87	6	0	Acceptance of the phrase

Source: Prepared by researcher based on the (SPSS) program

3.3 Testing Research Hypotheses:

1. The First Hypothesis:

To test the first hypothesis, derived from the current field study, which posits a statistically significant effect of AI techniques on Improving Proactive Accounting reporting, Table (10) was utilized. The analysis within the table demonstrates a statistically significant effect, as evidenced by the test statistic (F) value in the regression model test. Specifically, the value of (67.881) exceeded the tabular value of the test (3.91) at degrees of freedom (1,122), considering the level of statistical



significance utilized in the study (0.05). Moreover, the significance level of the test (0.000) was lower than the assumed significance level, further confirming the acceptance of the first hypothesis derived from the current study.

On the other hand, we also find that the values of the estimated regression parameters of the regression constant (B0) and slope (B1) were also statistically significant, based on the level of statistical significance of the two model parameters. Their values were respectively (0.000) for each of the two parameters, less than the level of statistical significance assumed in the current study of (0.05). In other words, when AI techniques are absent, the levels of improvement of proactive accounting reporting are present in a fixed amount of (1.408), as well as when the levels of intelligence techniques change. By one unit, the levels of improvement of proactive accounting reporting change by (0.663) and in the same direction.

Finally, it was found that the independent variable represented by (AI techniques) explains the changes that occurred in the dependent variable, represented by (Improving Proactive Accounting reporting) by (%35.75), while the remaining percentage of (%64.25) is due to other variables that affect the variable of Improving Proactive Accounting reporting that are not included in the model.

Table (10): The Impact of AI Techniques on Improving Proactive Accounting Reporting

Dependent Variable	Improving Proactive Accounting Reporting		
	Hard (B0)	Borderline slope (B1)	F



Independent Variable				
AI Technologies	1.408	0.663	67.881	%35.75
	t(4.459)	t(8.239)	sig.(0.000)	
	sig.(0.000)	sig.(0.000)		

:**High morale when $\text{sig} \geq (0.01)$

$F(0.05,1,122)=3.91$

Source: Prepared by researcher based on the (SPSS) program

2. The Second Hypothesis:

To test the second hypothesis, which came from the current field study, stating that there is a statistically significant effect of the expert systems technology variable (considered one of the AI techniques) on the variable Improving Proactive Accounting reporting, we refer to Table (11). Through this table, the analysis of the impact relationship between the two variables mentioned shows that this effect was statistically significant. This conclusion is based on the test value of the statistics (F) used in the regression model test, where its value was (55.607), greater than the tabular value of the test of (3.91) at the degrees of freedom (1,122), and the level of statistical significance used in the current study of (0.05). Alternatively, we can base it on the value of the level of significance for the test of (0.000), where its value was less than the value of the assumed significance level mentioned above. Thus, we accept the second hypothesis that emerged from the current study.

On the other hand, we also find that the values of the estimated regression parameters – the regression constant (B0) and inclination (B1) – were statistically significant. The level of statistical significance for both parameters was (0.000), which is below the assumed level of significance in the current study (0.05). In other words, when expert systems technology is absent, proactive accounting reporting improves by a fixed amount of (1.826), regardless of changes in systems technology levels.



By one unit, the levels of improvement of proactive accounting reporting change by (0.554) and in the same direction.

Finally, it was found that the independent variable represented by (expert systems technology) explains the changes that occurred in the dependent variable, represented by (Improving Proactive Accounting reporting) by (%31.31), while the remaining percentage of (%68.69) is due to other variables that affect the variable of Improving Proactive Accounting reporting that are not included in the model.

Table (11)

The impact of expert systems technology on Improving Proactive Accounting reporting

Independent variable	Dependent variable Improving Proactive Accounting reporting			
	Hard (B0)	Borderline slope (B1)	F	R2
Expert Systems Technology	1.826	0.554	55.607	%31.31
	t(6.230)	t(7.457)	sig.(0.000)	
	sig.(0.000)	sig.(0.000)		

:**High morale when sig \geq (0.01)

F(0.05,1,122)=3.91

Source: Prepared by researcher based on the (SPSS) program

3. The Third Hypothesis:

To test the third hypothesis, which arose from the current field study, it is stated that there is a statistically significant effect of the natural language processing technology variable, considered one of the AI techniques, on the variable 'Improving Proactive Accounting reporting.' Through Table (12), the analysis of the impact relationship between the two variables mentioned shows that this effect was statistically significant. Based on the test value of the statistics (F) used in the regression model test, its value of (11.117) is greater than the tabular value of the test (3.91) at the



degrees of freedom (1,122) and the level of statistical significance used in the current study (0.05), or based on the value of the significance level of the test (0.000) where its value was less than the value of the assumed significance level mentioned above. Thus, accepting the third hypothesis that emerged from the current study.

On the other hand, we also find that the values of the estimated regression parameters of the regression constant (B0) and inclination (B1) were also statistically significant, based on the level of statistical significance of the two model parameters, where their values were respectively (0.000) for each of the two parameters less than the level of statistical significance assumed in the current study of (0.05) In other words when there is no natural language processing technology, the levels of improvement of proactive accounting reporting are present in a fixed amount of (3.153) as well as when the levels of technology change. Natural language processing by one unit, the levels of improvement of proactive accounting reporting change by (0.218) and in the same direction.

Finally, it was found that the independent variable represented by (natural language processing technology) explains the changes that occurred in the dependent variable, represented by (Improving Proactive Accounting reporting) by (%8.35), while the remaining percentage of (%91.65) is due to other variables that affect the variable of Improving Proactive Accounting reporting that are not included in the model.

Table (12)

The Impact of Natural Language Processing Technology on Improving Proactive Accounting Reporting

Dependent Variable	Improving Proactive Accounting Reporting			
	Hard	Borderline	F	R2



Independent Variable	slope			
	(B0)	(B1)		
Natural Language Processing Technology	3.153	0.218	11.117	% 8.35
	t(12.309)	t(3.334)	sig.(0.001)	
	sig.(0.000)	sig.(0.000)		

: **High morale when $\text{sig} \geq (0.01)$

F(0.05,1,122)=3.91

Source: Prepared by researcher based on the (SPSS) program

4. The Fourth Hypothesis:

To test the fourth hypothesis, which was derived from the current field study, it was stated that there is a statistically significant effect of machine learning technology on Improving Proactive Accounting reporting. This technology is considered one of the AI techniques. Through Table (13), the analysis of the impact relationship between the two variables mentioned shows that this effect was statistically significant. This was based on the test value of the statistics (F) used in the regression model test, where its value was (69.108), which is greater than the tabular value of the test of (3.91) at the degrees of freedom (1,122) and the level of statistical significance used in the current study of (0.05). Alternatively, it was based on the value of the significance level of the test of (0.000), where its value was less than the value of the assumed significance level mentioned above. Thus, the fourth hypothesis that came out of the current study is accepted.

On the other hand, we also find that the values of the regression parameters estimated from the parameters of the regression constant (B0) and inclination (B1) were also statistically significant, based on the level of statistical significance of the two model parameters. Their values were respectively (0.000) for each of the two parameters, less than the level of statistical significance assumed in the current study of (0.05). In other



words, when there is no machine learning technology, the levels of improvement of proactive accounting reporting are present in a fixed amount of (1.883), as well as when the levels of learning technology change. By one unit, the levels of improvement of proactive accounting reporting change by (0.539) and in the same direction.

Finally, it was found that the independent variable represented by (machine learning technology) explains the changes that occurred in the dependent variable, represented by (Improving Proactive Accounting reporting) by (%36.16), while the remaining percentage of (%63.84) is due to other variables that affect the variable of Improving Proactive Accounting reporting that are not included in the model.

Table (13)

The Impact of Machine Learning Technology on Improving Proactive Accounting Reporting

Independent Variable	Dependent Variable Improving Proactive Accounting Reporting			
	Hard (B0)	Borderline Slope (B1)	F	R2
Machine Learning Technology	1.883	0.539	69.108	%36.16
	t(7.347)	t(83.13)	sig.(0.000)	
	sig.(0.000)	sig.(0.000)		

$\geq (0.01)$ High morale when sig: ** $F(0.05,1,122)=3.91$

Source: Prepared by researcher based on the (SPSS) program

Conclusions and Recommendations

First: Conclusions

The study reaches a set of conclusions, including:

1. AI offers invaluable possibilities to improve human lives in a range of areas including healthcare, education, employment, entertainment, transportation, and others.



2. AI has several technologies, the most important of which are expert systems, natural language processing, machine learning and deep learning, and voice system recognition.
3. Proactive reporting ensures immediate access to information and avoids the costs of obtaining it as well as engaging in administrative procedures,
4. Proactive accounting reporting contributes to addressing deficiencies related to traditional accounting reporting related to the timing of reporting financial information.
5. AI techniques contribute to improving the process of proactive accounting reporting, as expert systems contribute to the performance of accounting functions by improving the presentation in the financial statements, developing the disclosure of explanations complementary to financial reports, and providing accounting reasoning through guides, predictive models and financial indicators in financial reports in a way that simulates human thinking.

Second: Recommendations

Based on the conclusions reached by the study, the researcher recommends the following:

1. Companies carry out proactive accounting reporting because it embodies the timeliness of accounting information, which is one of the characteristics of the quality of accounting information.
2. The application of AI techniques by companies due to their contribution to improving the proactive accounting reporting process.
3. The need for the competent academic authorities represented in universities and institutes operating in the Kurdistan Region to add new topics within their curricula, including AI techniques, to graduate new



competencies aware of this technology and benefit from it in the field of accounting.

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