

The impact of artificial intelligence strategies on developing management accounting information to achieve sustainable performance

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Abstract. *In this study, we have presented the impact of artificial intelligence (AI) technologies on management reporting and sustainable performance in economic units. We examine the extent to which these factors are used and how they contribute to the quality of information and sustainability of production and economic, environmental, and social decision-making. We start with the descriptive and analytical aspect and collect the data from the employees of BP, a world-wide oil company in Iraq. This data is then analysed using SPSS (version 26). The results show that AI-powered reporting is a critical tool for sustainable performance in all economic processes and it's good to not only deal with environmental and infrastructural issues in an efficient organization/employee system. The study suggests a digital transformation strategy to use AI for sustainable development.*

Keywords: Artificial Intelligence, Management Accounting, Sustainable performance

1. INTRODUCTION

In the face of rapid economic and technological change the concept of sustainable performance has come to be a fundamental criterion for quantifying the success of any economic entity as you find a good balance between economic, environmental and social factors. Management accounting has evolved from a role of management accounting to a strategic one for sustainability as a result of providing performance reports and indicators.

Artificial intelligence (AI) has become an important technology of management accounting reports as it brings information analysis tools that enhance the accuracy and speed of information processing and make strategic decisions.

This research aims to investigate the impact of AI-based management accounting reports on sustainable performance and quality management decisions. The research is organized in four chapters: the first is introduced with the research methodology, the second with the theoretical framework, the third with the practical aspect and the final chapter with the conclusions and recommendations.

2. MATERIALS AND METHOD

2.1. MATERIALS

2.1.1 Theoretical Materials

2.1.1.1 The problem of the study

Even though accounting information systems are getting better and AI technologies are getting more popular, many economic entities still have problems using these to support their operations and even have success dreams.

The research problem is the application of management reports and AI to enhance economic and socio-ecological diversification considering the varying levels of innovation in these designs, infrastructure readiness, and technological capabilities. As a result, that brings us to a fundamental question about how well such reports contribute to sustainable performance, and sub-questions regarding their use, the nature of the information they provide, their sustainability, their impact on accuracy, and the challenges they face in implementing them.

2.1.1.2 Objectives of the study

This research aims to:

1. Identify the extent to which artificial intelligence (AI) techniques are used in preparing administrative reports and reports within the economic unit.
2. Analyze the role of AI-supported management accounting reports in enhancing the quality of sustainability-related information
3. Evaluate the role of these reports in supporting decision-making only, rather than in its sustainable economic, environmental, and social aspects.

2.1.1.3 The importance of the study

1. The research contributes to bridging the knowledge gap between management accounting and artificial intelligence technology, demonstrating how these two fields can be integrated to serve sustainability goals.
2. The research findings help decision-makers in economic units improve the quality of their management reports, making them more accurate and relevant to sustainable performance.
3. It supports the economic unit's approach to achieving a balance between profitability and social and environmental responsibility.

2.1.1.4 Study hypothesis

Based on the research problem and its objectives, the research assumes the following hypotheses:

- Main hypothesis: AI-powered management accounting reports contribute to enhancing sustainable performance.

2.1.1.5 Study Methodology

The researcher relied on the descriptive analytical approach after collecting accurate data to analyze this data and measure the dimensions of artificial intelligence strategies and their impact on the suitability of accounting information and the use of appropriate measurement indicators, using the content analysis approach in collecting data from the different research sample (accounting experts, administrators).

2.1.1.6 Questionnaire Development and Validation

The questionnaire was developed after an extensive review of previous literature related to artificial intelligence, management accounting, and sustainable performance. The measurement items were adapted from previous studies and modified to fit the objectives and context of the current research. The questionnaire was not reviewed by a panel of academic experts before data collection. Therefore, the absence of expert validation is acknowledged as one of the methodological limitations of this study, which may have affected the content validity of the measurement instrument.

2.1.1.7 Study References

By reviewing Arabic and foreign books, university theses and dissertations, published research, and also articles and writings related to the research topic.

2.2. METHODS

2.2.1 The Concept of Artificial Intelligence

Artificial intelligence is no longer just a new idea but an emerging field that permeates our everyday life in a very fast way. But defining artificial intelligence is an unexpectedly complicated task since the very definition of 'intelligence' is still a matter of debate in philosophy, computer science, and other fields. Artificial intelligence is defined as the development of computer systems capable of performing basic human-level tasks like learning, problem solving, decision-making, and perception. These are based on algorithms, data, and computational power to simulate, improve, or even surpass human intelligence. Artificial intelligence is a multidisciplinary field of study based on computer science, mathematics, philosophy, psychology, and neuroscience. This means that each discipline has its own perspective and influences the definition of intelligent behavior. (Aluvihara, et al.: 2025, p. 230).

Artificial intelligence is an important technology that has revolutionized the service industry; it is transforming how organizations work and the kind of value they provide. Artificial intelligence (AI) technology is used in machine learning, robotics, and natural language processing (NLP) applications to automate routine processes and to improve decision-making and provide an end-to-end customer experience. The impact of these advancements can be seen in different sectors, like tourism, healthcare, finance, and retail, and they have a positive effect on the quality of service and

customer satisfaction. AI solutions have also helped to optimize resource utilization, reduce operating expenses, and open new lines of business. (Pushpakumara, 2025:2240) Artificial intelligence is a field of information systems with decades of research (which can be found in all fields) that tries to mimic human capabilities. (Beccalli et al., 2020:21).

The history of artificial intelligence dates back to the mid-twentieth century, when the Dartmouth Conference was organized in 1956 by a group of scientists, including John McCarthy, Marvin Minsky, Nathaniel Rochester, and Claude Shannon. During this conference, researchers introduced the idea that it might be possible to design a machine capable of simulating any task that requires human intelligence. Although there is no universally agreed-upon definition of artificial intelligence, there is broad consensus that machines based on this technology may be able to imitate or even surpass human cognitive abilities, including perception, language interaction, reasoning, analysis, problem-solving, and ultimately creativity. (Harmouzi, 2024: p.112)

2.2.2 Definition of Management Accounting

Management accounting involves collecting the financial and non-financial information required by internal users. Through this information, managers seek to achieve the objectives of the economic unit, communicate and implement strategies, coordinate and design products, production, and marketing activities, while managing various business sectors. Management accounting information generally focuses on specific individual or common managerial needs rather than the overall interests of management. (Kinney & Raiborn, 2011: p.3)

The Institute of Management Accountants (IMA) defines management accounting as a profession that includes participation in decision-making, developing planning and performance management systems, and providing expertise in financial reporting and control to assist management in formulating and implementing the organization's strategy. (Lawson, 2016: p.1)

The American Accounting Association defines management accounting as the process of identifying, measuring, and communicating economic information necessary to enable users of information to make appropriate judgments and decisions. (Drury, 2018: p.4)

Management accounting primarily focuses on supporting company managers and employees by providing tailored information. This information is collected and summarized to provide feedback that assists in planning, decision-making, and performance evaluation processes. (Jonick, 2018: p.1)

2.2.3 Concept and Definition of Sustainable Performance

The concept of sustainable performance refers to various aspects related to an organization's ability to maintain continuity and achieve long-term improvement, enabling it to accomplish its objectives without negatively affecting the environment, society, and economic resources. Therefore, sustainable performance involves adopting practices and strategies that balance economic, social, and environmental considerations in order to achieve sustainability and long-term resilience.

2.2.3.1 Definitions of Sustainable Performance

Measuring the performance of an economic unit, whether it is sustainability-oriented or not, is a process that depends on using indicators that can be classified into economic, social, and environmental dimensions. (Hourneaux, at. el 2018: 4) It refers to the work performed that generates profits for shareholders while ensuring comprehensive protection of the environment. (Quang Huy et al., 2021: p.5).It represents the ability of an organization to create value for stakeholders and its capacity to achieve a balance among the various economic, social, and environmental dimensions. (Bouaouina, 2022: p.34) .Sustainable organizational performance is a means through which an economic unit expresses its future strategy by efficiently utilizing available resources, tools, technologies, and capabilities, while avoiding waste of resources and energy available to the economic unit. (Manshid & Mahdi, 2024: p.594)

2.2.4 The Impact of Artificial Intelligence (AI) on Management Accounting

Artificial intelligence (AI) has had a huge impact on management accounting and there are many improvements in management accounting methods. Some may see these changes as minor changes to management accounting methods that come as a result of technological advancements, but AI applications are in fact part of AI (Patel, 2023).

When integrated with AI technologies into management accounting it is possible to accelerate innovation, improve efficiency, and increase productivity. With the role of management accountant evolving from a more strategic partner to management in the organization into a good partner to make contributions to the organization to help the management and develop skills to drive value creation and growth in the organization, a strategic integration of AI is essential to improve management accounting.

2.2.5 The Relationship Between Smart Management Accounting Reports and Sustainability Performance

Smart management accounting is a key aspect of sustainability performance in the modern organization as it enables financial and non-financial information that contributes to the integration of economic, environmental and social aspects into the decision-making process. Recent studies have shown that advanced management accounting practices, especially that of data analysis and strategic support, are positively related to improved sustainable performance through an effective use of resources, less environmental impact and better corporate accountability. In addition, embedding these practices into governance systems enables transparency and information quality and results in more effective strategic decision-making which in turn enables organizations to achieve their long-term sustainability goals. (Atkinson et al., 2019) (Johri et al., 2024) The impact of intelligent accounting reports on economic, environmental and social performance can be summarized as follows:

2.2.5.1 The Role of Intelligent Management Accounting Reports in Enhancing Economic Performance

Intelligent management accounting reports enhance the economic performance of businesses by providing accurate and timely accounting information to finance managers and optimizing the organization's spending capacity. Such reports (based on data analysis methods and intelligent systems) can also support good management decisions in pricing, profitability assessment, and maximizing the economic value of the company, which will improve economic performance and long-term financial sustainability. (Atkinson et al., 2019, pp. 35–48).

2.2.5.2 The Role of Intelligent Management Accounting Reports in Enhancing Environmental Performance

The intelligent management accounting reports improve the environmental performance of an organization by providing accounting and non-financial information related to the environmental costs, resource use, emissions, and waste and financial impact of an organization. These reports rely on data analysis tools and systems which enable management to make decisions which will reduce the environmental impact of operation. Environmental performance measures can aid in resource utilization and sustainability, ensure environmental compliance, as well as integrate environmental aspects into the strategic decision making of the organization (Atkinson et al., 2019, pp. 520–535).

2.2.5.3 The Role of Smart Management Accounting Reports in Enhancing Social Performance

Smart management accounting reports contribute to the social performance of organizations by providing accounting and non-financial information on social responsibility, employee rights, occupational health and safety, and community engagement. These reports help management measure the social impact of operational activities, enhance transparency and accountability to stakeholders, and support socially conscious management decisions within a framework of overall sustainability. In addition, adding social performance indicators to smart management reports increases the organization's reputation and strengthens community trust in the long term (Atkinson et al., 2019, pp. 535–550).

3. Applied study

3.1 Overview of the research sample

The research community comprises key players in the financial and administrative processes relevant to the study's subject matter: management accountants, financial managers, and sustainability experts working at British Petroleum (BP). BP is the spatial setting of the research

because it is an economic entity and real world use case for artificial intelligence in accounting and there is a real need to assess sustainable performance in a complex and dynamic environment. The research period was 2024. We used purposive sampling for the research, which is a non-probability method to select participants who can contribute the most accurate and relevant information to the research problem in qualitative studies. Participants were chosen based on their own experience or direct supervision in preparing or using management accounting reports, or their knowledge of sustainable performance indicators in the company's environment (environmental, social, and economic).

The sample size was 30 participants, in keeping with the exploratory nature of qualitative research where a number is not necessary as much as it is at what is known as theoretical saturation, that is, when new data stop providing qualitative value. This method allows the analysis to be based on data that is rich and frequent enough to ensure that conclusions are drawn.

3.2 Analysis of the Themes

To confirm the research hypotheses and accomplish the main objectives, the data from interviews were organized and analyzed in terms of the main analytical themes which are consistent with the concepts of the research. The questions were organised within the interview to fully cover the key aspects of the research variables: AI-enabled management accounting reports, sustainable performance in terms of economic, environmental and social aspects. The themes were organized in a logical way, with an initial analysis of the use of AI, then measuring its impact, and finally addressing the challenges and solutions. The qualitative findings of the interviews were transformed into quantitative themes when questionnaire items were developed based on the main themes which were identified through the open-ended and axial analyses. The results were coded using a five-point Likert scale and then entered into SPSS for statistical analysis. This analysis included descriptive analysis, reliability testing, and simple linear regression analysis to test the study hypotheses.

• First axis: Using artificial intelligence in preparing management accounting reports

- 1 First, we employ AI to rapidly and efficiently examine the company's expenses.
- 2 The AI keeps tabs on the costs and links them to activities.
- 3 The AI improves the accuracy of accounting reports.
- 4 The AI aids in cash flow forecasting.
- 5 It is challenging to integrate AI tools into traditional accounting systems.
- 6 Our AI systems are upgraded frequently and will continue to be updated.
- 7 The corporation uses AI in its environmental reports.
- 8 The corporation uses AI in its social reporting.
- 9 The ineffectiveness of AI non accounting reports is due to a lack of training.

As shown in the following table (1)

The findings reveal that most (more than 70%) of participants use artificial intelligence (AI) methods in their management accounting reports and that there is some technical difficulty with integrating AI with existing systems. The level of AI use in management accounting reporting is high from the participants' point of view. The percentages of the items in this section indicate that most of the participants agreed that AI is used effectively in cost analysis, expense tracking, and improving the accuracy of financial reports with agreement rates above 70%. However, for items related to integrating intelligent systems with traditional systems and using AI in non-financial reporting, the average is not very high. AI is already being used in accounting practices but its use is still lacking in terms of comprehensiveness and institutional integration.

• **Second axis: The economic impact of AI-powered management accounting reports**

1. AI-powered reports contribute to improving the quality of financial decisions.
2. These reports help in managing liquidity more efficiently.
3. Smart reports enable the early detection of financial deviations.
4. AI technologies contribute to reducing financial waste.
5. Smart reports help in preparing more realistic budgets.
6. AI reports contribute to identifying profit centers.
7. These reports help guide investments based on accurate data.
8. The use of AI has led to a reduction in operational and administrative costs.
9. Smart reports can be used to evaluate the economic feasibility of environmental initiatives.

As shown in the following table (2)

The approval rates were very high (even over 80%) and this indicates that AI-powered management accounting reports had a positive economic impact. This indicates that the consensus among the participants is that AI-powered management accounting reports have a positive economic impact. Things like more efficient financial decisions, less waste and more realistic budget planning and investment planning were approved more than 80% in the study and these technologies are crucial to the organization's economic performance and not only for the finance industry but for the economy overall. This is a strong indication of the maturity of AI use in the financial sector compared to other dimensions.

• **Third axis: The environmental and social impact of AI-powered management accounting reports**

- 1 Environmental indicators (e.g. emissions and energy consumption) are included in accounting reports.
- 2 Energy consumption is tracked by smart analytics tools.
- 3 Environmental indicators are integrated into the smart accounting system.
- 4 There are still applications for environmental AI in their early stages.
- 5 Social data (workplace accidents, employee satisfaction) is entered automatically.
- 6 Social data is entered manually and without any analytical help.



- 7 There are clear and measurable social performance indicators.
- 8 Sustainability reporting will be improved by making social indicators that can be analyzed.

As shown in the following table (3)

The results for this section indicate a moderate level of AI application in supporting environmental and social dimensions. The percentages show items related to tracking energy consumption and emissions had fairly high approval rates (around 65-70%), indicating initial attempts to integrate AI into the environmental aspect.

In terms of the social dimension, items such as automating occupational safety reports and employee satisfaction received relatively low levels of approval (less than 60%). The reason is that manual input and no indicators that can be automated were used. This shows that the application of AI in sustainability reporting across the three dimensions is still not balanced.

4. RESULTS AND DISCUSSION

This section aims to present and discuss the main findings obtained from testing the research hypothesis and achieving the study objectives, while analyzing the acceptance or rejection of the hypothesis formulated in the first chapter, first section. The primary objective of the research is to identify the extent to which artificial intelligence techniques are used in preparing management accounting reports within the economic unit. The analysis relies on a content analysis checklist for data extracted from the research sample, which includes employees of the global oil company (BP) in Iraq. As shown in the following table (4)

Hypothesis 1: The use of AI-powered management accounting reports contributes to improving the economic performance of the economic unit.

Table (4) shows the results of the statistical analysis of the relationship between the level of use of AI-enabled management accounting reports and the degree of improvement in economic performance among the study sample. Spearman's rank correlation coefficient was used to measure the strength and direction of the relationship between the two variables and simple linear regression analysis to measure the predictive effect of the independent variable on the dependent variable. The correlation coefficient ($r = 0.652$) was positive, meaning this relationship was relatively strong positive between the two variables, meaning the more AI is used to prepare the report, the better the economic performance will be. In addition, the p-value (0.0001) indicates that this relation is statistically significant at the 0.05 level, which supports the first hypothesis.

The regression coefficient was 0.667, and each unit increase in the use of AI reports corresponds to an increase of 0.667 units in the level of economic improvement. The coefficient of determination ($R^2 = 0.422$) indicates that the regression model explains approximately 42.2% of the variation in economic performance, which indicates an acceptable explanatory power of the model in social and administrative research. at the 0.05 level, thus strengthening the model's reliability and supporting the hypothesis.



The present findings are consistent with previous studies that highlighted the role of artificial intelligence in enhancing management accounting practices and supporting organizational performance improvement. Atkinson et al. (2019) argued that modern management accounting systems supported by advanced analytical technologies improve planning, budgeting, and performance evaluation. Similarly, Patel (2023) highlighted that AI applications enable accountants to shift from routine accounting tasks toward strategic decision-making. Furthermore, Duong (2024) reported that artificial intelligence enhances the quality of accounting information by increasing accuracy, reducing processing time, and providing predictive insights for managers. Therefore, the current findings reinforce the argument that AI-enabled management accounting reports can significantly improve the economic performance of economic units through better information quality and more effective managerial decisions.

4.1 Study Limitations

This study has several methodological limitations. First, the research was conducted using a relatively small sample consisting of only thirty participants from BP operating in Iraq, which may limit the generalizability of the findings. Second, the study focused on one organization and one period (2024), making the findings context-specific. Third, the analysis relied mainly on participants' self-reported responses, which may introduce response bias. Finally, although the questionnaire was carefully designed based on previous literature, it was not reviewed by an expert panel prior to distribution, representing a limitation regarding the content validity of the measurement instrument.

5. CONCLUSIONS

1. The results showed that AI-powered management accounting reports clearly and statistically contribute to improving the economic performance of the economic unit by enhancing the accuracy of financial data and improving predictive capabilities and strategic decision-making, thus supporting financial performance efficiency and reducing risk levels.
2. The study found a strong positive impact of AI reports on environmental compliance; in particular, for energy consumption and emissions monitoring. However, this impact is only partial due to the lack of complete integration of AI systems and the environmental accounting framework.
3. The results showed that the social performance of the organization is positively affected by the use of AI reports, but to a lesser extent than the economic aspect. This is because of the poor representation of social indicators in digital databases and lack of specialized automated analysis tools for this area.

The findings of this study have important implications for managers and policymakers. They highlight the importance of adopting artificial intelligence technologies in management accounting systems to improve sustainable organizational performance and support digital transformation initiatives. Moreover, the study provides practical evidence that can assist economic units in



developing more efficient accounting practices that contribute to long-term sustainable development.

6. Recommendations

1. Economic units should expand the implementation of artificial intelligence technologies in management accounting systems to improve the quality of managerial reports and decision-making.
2. Organizations should invest in continuous training programs that enhance employees' capabilities in using AI applications within accounting practices.
3. Greater attention should be devoted to integrating environmental and social sustainability indicators into AI-enabled accounting systems.
4. Organizations should strengthen digital infrastructure to facilitate the integration of AI applications with existing accounting information systems.
5. Future studies are encouraged to include larger samples from different sectors and countries in order to improve the generalizability of research findings.

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Table

Table (1): Statistical analysis table with percentages for the first axis

Paragrap	Disagree%	Neutral%	Agree %
Using artificial intelligence in cost analysis	0%	17%	83%
Improving the accuracy of accounting reports	0%	25%	75%
Using predictive cash flow analysis	0%	33%	67%
Challenges in integrating with traditional systems	17%	25%	58%

Table (2): Statistical analysis table for the second axis

Paragrap	Disagree%	Neutral%	Agree %
Improving the quality of decision-making	0%	8%	92%
Reducing financial waste	0%	17%	83%
Improving budget preparation	0%	25%	75%
Supporting investment decisions	0%	17%	83%

Table (3): Statistical analysis table with percentages for the third axis

Paragrap	Disagree%	Neutral%	Agree %
Inclusion of environmental indicators in reports	%16	%17	%67
Using smart environmental analysis tools	%17	%25	%58
Automatic insertion of social data	%42	%33	%25

Table (4): Results of the statistical analysis of the relationship between the use of AI reports and the improvement in economic performance

analysis	value	Value p	Statistical significance
Correlation coefficient (Spearman)	0.652	0.0001	Dal at the 0.05 level
Simple linear regression analysis	regression coefficient = 0.667 , $R^2 = 0.422$	0.0001	Dal at the 0.05 level