Multi-Disciplinary Publishing Institute Pakistan **Vol.** 03, **Issue.** 01

Submitted: 23 DEC 2024 Accepted: 25 DEC 2024 Published: 31 DEC 2024

Original Article

Adoption of Artificial Intelligence in Accounting and its Impact on Business Performance: Oil and Gas Perspective

Qaisar Aman (Ph.D.)
Associate Professor
Accounting Department, College of Business
King Abdulaziz University Jeddah, Rabigh Campus, Saudi Arabia
Email: kamanallah@kau.edu.sa

Citation

Aman, Q. (2024). Adoption of artificial intelligence in accounting and its impact on business performance: Oil and Gas perspective. *Open Access Organization and Management Review*, 3(1), 66-73.

WEBSITE: www.mdpip.com
PUBLISHER: MDPIP
ISSN: Print: 2959-6211
ISSN: Online: 2959-622X

Abstract

The primary aim of the present study is to determine the use of AI's applications in accounting, its effect on business performance, and the adoption problems faced by the oil and gas industry. For the said purpose, a structured questionnaire was administered among Six hundred respondents of which 500 returned were used in analysis. The study found that the adoption of AI in accounting is emerging in the oil and gas industry and has a positive impact on business performance with the improvement of key performance indicators (KPIs). The study also measured the challenges faced by the said sector. It is observed that lack of expertise, increase of initial cost, and integration of AI in the existing system are the main hurdles. AI-driven explanations, comprising automation of routine tasks, predictive analytics, and enhanced information accuracy. AI in accounting has led to significant perfections in cost reduction, activities efficiency, and better decision-making processes. The current study highlighted the benefits of AI adoption in accounting, such as real-time financial reporting, risk mitigation, and compliance with regulatory standards. It also highlights the challenges faced by organizations, such as resistance to technological change, cybercrime concerns, and the need to educate the workforce and upgrade their capacity. A comprehensive analysis study determines that AI adoption in accounting not only rationalizes financial and non-financial management but also contributes to the strategic aspect of the oil and gas industry.

Keywords: Artificial Intelligence (AI), Machine Learning (ML), Data Analytics (DA), Robotic Process Automation (RPA), Business Performance.

Introduction

Rapid development of technology is shaping the world businesses. Use of modern technology become indispensable for business. Effective accounting, financial management and internal control of a company are integrated with technology. Businesses are highly dependent on technology. Technology is creating value added in a business and generating sufficient revenues, profits and enhancing the overall goodwill. Every business/company are looking for sustainability. Brynjolfsson and McAfee (2017) highlighted the importance and role of AI with respect to current business. The determined AI as a powerful tool that accelerates productivity and innovation, offering businesses the ability to adapt to market changes and optimize strategies in real-time. So, it is important to use the artificial intelligence and link all three components of the sustainability such as, economic, social and environment aspects. Fin-tech is crucial for the long-term success and sustainability of organizations. Accounting software recording, storing, and generating flexible financial information required for wise decision-making, wisely use of financial and non-financial resource, better resource allocation, and performance controlling expenses assessment. Accounting artificial intelligence also manage the assets activity efficiencies, future cash needs, financing, debt/equity utilization. It also highlights the cost benefit analysis of each activity of an organization. Due to the complexity of the business environment, efficient, effective, reliable artificial intelligence mandatory for survival and growth.

In addition to offering a vibrant financial image, accounting also improves answerability and transparency, both are critical in investment and preserving stakeholder interest and trust (Horngren *et al*. 2012). Moreover, research by Drury (2013) highlights how business drivers can make better decisions on long term investments, strategic planning, and resource allocation with the use of financial information and reports produced by accounting. In addition, accounting policies and procedures lower the risk of financial fraud, information risk and legal non-compliance by assisting firms in adhering to regulatory standards (Schroeder *et al*., 2016).

Two of the most natural resources in this planet i.e. oil and gas, which influence the energy landscape and are vigorous to the worldwide economy. Their importance can be observed from several perspectives, such as sustainability, industrial development, economic expansion, energy supply and so on. Worldwide, gas and oil are the key energy sources, providing a significant portion of the fuels used in transportation, industry, and the production of power. They supply the energy needed to run automobiles, heat houses, and power businesses. Almost 1/2 of the world's primary energy consumption has come from the natural gas and oil. For many nations, particularly those with abundant natural oil resources like Saudi Arabia, Russia, and the United States. That is why the Saudi Arabia main source of revenues is coming the export of oil. These countries' GDP and fiscal budgets are heavily reliant on the revenue from the exploitation and sale of these resources.

Substantial investments are drawn to the oil and gas industry, which supports the growth of communication and transportation networks, refineries and pipelines. In addition to the oil and gas sector, this infrastructure is critical for overall economic growth. Artificial intelligence in accounting is essential for several oil and gas industry stakeholders and investors. The aim of such study is to explore the critical role of artificial intelligence in accounting as a tool for better commercialization and financial management by analyzing its contribution to managerial, cost control, and financial stability, with a focus on its strategic importance in organizational success. It is observed and noticed that complain audit, transparency, proper resource management, and better business decision-making all depend on accounting in the corporate sector. Due to the emerging challenges to the business environment, the companies shifted to artificial intelligence in accounting. It serves as the foundation for both long-term strategic objectives and daily operations, ensuring financial stability and expansions and sustainability.

Problem Statement and Research Gap

To improve data accuracy, repetitive operations, and to facilitate the corporate business in decision-making, the application of artificial intelligence (AI) in accounting indispensable. Overall business decisions depend upon accurate and in time information. Notwithstanding its substantial impact, many businesses find it difficult to fully embrace AI technologies because of reservations about implementation difficulty, data safety, and the lack of expertise. Current study pursues to address the gap in understanding in what way AI adoption in accounting directly impacts business

performance. To measure and identify benefits and challenges in terms of decision-making, cost reduction, risk mitigation, and overall financial performance of the business.

Literature Review

The application of artificial intelligence in accounting (AIA) has grown up considerably since it has become a troublemaking issue in many other industries. AIA refers to the computerization, optimization, and upgrading of financial management policies and procedures via machine learning (ML), data analytics, natural language processing (NLP) application and other AI technologies. AI could change conventional accounting procedures and enhance financial performance in the oil and gas industry.

The use of AI in accounting is transforming the businesses to handle risks, conduct audits, and examine financial data. In the earlier days, accounting responsibilities were time-consuming and involved human efforts for budgeting, transactions, financial statements and reporting. However, by rapidly and reliably evaluating massive datasets, AI technologies can improve decision-making abilities and automate repetitive operations (Huang & Vasarhelyi, 2019). Machine learning models can increase estimation accuracy by using historical financial data to predict future ups and down (Davenport & Ronanki, 2018). Additionally, by identifying patterns that differ from typical behavior, AI can identify irregularities or fraudulent transactions, improving an organization's internal controls (Kokina & Davenport, 2017).

AI in accounting also enables more efficient and accurate reporting by utilizing NLP to process unstructured data, such as invoices or financial statements and big data. It reduces human error, speeds up financial operations, and enhance output. The use of AI tools for financial planning and analysis allows for real-time insights, which can support better strategic decision-making and taking (Kokina & Davenport, 2017). The oil and gas industry are highly capital-intensive, and its financial operations are complex due to the nature of exploration, production, refining, distribution and using hedging approach. AI has found various applications in this sector, including predictive maintenance, supply chain optimization, and cost control, price fluctuations, optimal production estimation, forecast demand and supply (Brudermüller, 2020).

One key application of AI in the oil and gas industry's accounting function is in management accounting. Oil and gas companies often face cost overruns due to price fluctuation, regulatory laws, operational inefficiencies, inventory management and so on. AI applications can examine vast amounts of operational data to identify inefficiencies or areas where cost reduction is possible, helping companies optimize their financial outputs. Machine learning algorithms can also be employed for budgeting, ensuring that the predictions are more precise and aligned with market requirements (Sullivan, 2021).

Hedley & Goff, (2018) examined the AI in accounting and observed the ability to process large datasets is particularly useful in managing the financial complexities of oil and gas reserves, which involve multiple variables such as production, investigation costs, and market trends about prices. AI-powered predictive models can help companies optimize asset management, monitor the financial health of projects, and forecast future cash flows This sector resource extraction is capital-intensive, and revenues are uncertain due to global price fluctuations. The dynamics of the global market, regulatory requirements and operating cost/expenses, all have a major impact on the financial performance of oil and gas companies. By increasing productivity, boosting decision-making, and cutting costs, artificial intelligence's incorporation into accounting procedures is altering the financial performance environment.

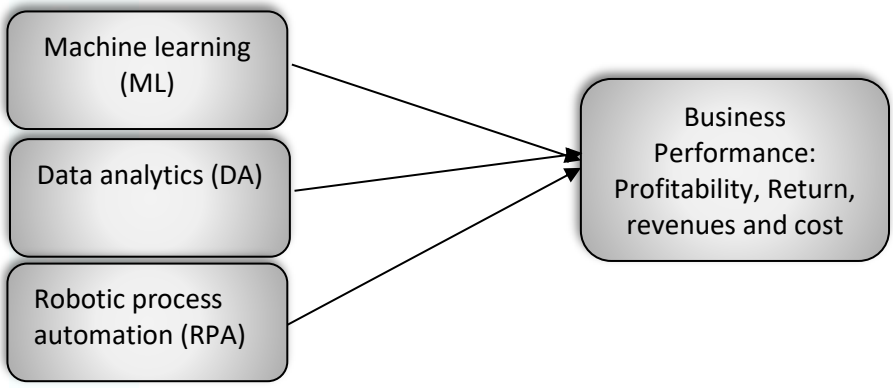
Liu *et al*. (2017) explained that faster and accurate financial reporting is now possible by AI-driven automation in accounting systems. This is particularly important in the oil and gas sector, where responding to changes in the market, in regulations, and in internal control management requires in-time and accurate financial input. AI technologies can save the time needed to create financial statements and black and white picture to senior management about strategic choices rather than data collection and validation.

Moreover, Berman & Pavone (2021), AI in accounting help financial managers in the oil and gas industry evaluate profitability, by using cross sectional data from various sources such as production, transportation, prices and revenues. In this way it improves decision-making/taking about long term and short-term investment and expansion opportunities. AI's has the capabilities to examine past data patterns/trends and predict future outcomes further enhances the reliability of financial projections, aiding in the creation of more robust long-term strategies and planning.

No doubt, many advantages to use AI in accounting in the oil and gas. Such advantages directly affect financial outcomes. Artificial Intelligence (AI) gives oil and gas companies the tools they need to run more effectively and keep a competitive edge in a turbulent market by improving financial reporting, reducing expenses, improving risk management, and identifying fraud. AI will probably continue to be a significant factor in determining the financial strategies and operational efficiencies of businesses in the industry as the technology emerges. To fully acquire AI's potential to change accounting policies and procedures, though, issues with cyber security, data protection, and implementation must also be determined.

Figure 1

Conceptual Framework: AI application



The oil and gas sector are known for its capital-intensive industry. Their financial transactions and data about inventory management, policy and procedures, management cost, production schedules are in huge quantity. Artificial Intelligence in accounting provides revolutionary ways to enhance and automate these policies and procedures. AI in accounting tools increase financial operations, decision-making/taking, and overall profitability. The main aim of present study is to explore the role of AI in accounting within the oil and gas sector and assess its effect on business performance.

Research Design and Method

The current research study used a quantitative methods approach. The current research design permit for a complete inspection of AI's impact on financial performance in the oil and gas industry. Quantitative data has been used to analyze the oil and gas industry with respect to adoption of AI in accounting. A structure questionnaire is developed and disseminated among the executives, accounting professionals and financial managers of oil and gas industry of Saudi Arabia. The structured questionnaire consisted of three sections such as what extent of AI adoption in accounting; use of AI in accounting impact on business performance; what challenges faced by business to implement AI. The survey questionnaire focused on the perception understanding the extent to which AI technologies are implemented in accounting tasks such as financial reporting, auditing, estimation, financial planning, revenues generation and strategic perspective. Questions explored how AI in accounting technologies influence key performance indicators (KPIs), like minimize financial risk, business risk, business return, operating profit, cost reduction strategies. Respondents be asked to rate their perception and experience about the outcomes using a Likert scale to quantify the perceived impact of AI on their business outcomes.

A survey (questionnaire) comprising questions intended to gauge the degree of Artificial Intelligence (AI) use in accounting operations, its impact on business financial performance. The current study disseminated 600 questionnaires among the relevant respondents and 500 questionnaires returned and found complete in all respect for analysis. A Likert scale analysis of the findings is presented below, with one (1) representing "strongly disagree" and five (5) represents "strongly agree."

Results and Analysis

Respondents' response entered SPSS and then organized the data for further analysis. Precise summary of the results presented in the form of tables for better understanding. The table results included strongly disagree to strongly agree, mean scores and standard deviations of each question.

What is the Extent of AI Adoption in Accounting

This section assesses how AI is being implemented in various accounting processes.

Table 1
The Extent of Adoption of AI in Accounting

Question	Strongly Disagree (1)	Disagree (2)	Neutral (3)	Agree (4)	Strongly Agree (5)	Mean Score	Standard Deviation
Use AI for automating financial reporting.	10% (50)	12% (60)	15% (75)	35% (175)	28% (140)	3.64	1.18
AI is used to assist in long term investment and making budgets.	14% (70)	16% (80)	22% (110)	30% (150)	18% (90)	3.42	1.17
Accounting team uses AI for fraud detection, corruption and risk mitigation.	11% (55)	13% (65)	20% (100)	34% (170)	22% (110)	3.54	1.16

Business Performance Effected by AI

The following table assesses the impact of AI on business performance in areas of financial and non-financial reporting accuracy, cost decline, profitability, and decision-making.

Table 2
Business Performance Effected by AI

Question	Strongly Disagree (1)	Disagree (2)	Neutral (3)	Agree (4)	Strongly Agree (5)	Mean Score	Standard Deviation
AI has improved the accuracy of our financial reporting.	5% (25)	8% (40)	15% (75)	40% (200)	32% (160)	4.01	0.98
AI helped to minimize operational costs.	6% (30)	10% (50)	18% (90)	39% (195)	27% (135)	3.91	1.04
AI has improved decision-making in financial management	4% (20)	9% (45)	17% (85)	42% (210)	28% (140)	4.03	0.95
AI has positively affected the profitability	8% (40)	13% (65)	23% (115)	35% (175)	21% (105)	3.76	1.12

Challenges Confronted in Implementing AI

This table measures the challenges facing by the in adopting AI in accounting.

Table 3
Challenges Confronted in Implementing AI

Question	Strongly Disagree (1)	Disagree (2)	Neutral (3)	Agree (4)	Strongly Agree (5)	Mean Score	Standard Deviation
Face challenges in integrating AI with existing systems.	4% (20)	6% (30)	22% (110)	41% (205)	27% (135)	3.85	1.02
Lack of expertise within the company to implement AI.	7% (35)	10% (50)	25% (125)	35% (175)	23% (115)	3.69	1.10
Cost of AI implementation is high.	5% (25)	8% (40)	21% (105)	39% (195)	27% (135)	3.91	1.06

Tabl4 4
Statistical Summary of the Results

Questionnaire section	Mean	Standard Deviation
What extent of AI adoption in accounting	3.55	1.16
Impact on business performance	3.94	1.00
Challenges faced in implementing AI	3.81	1.05
Impact of AI overall	3.76	1.07

Interpretation of Results

The use of AI in accounting is normally average. The common use of AI is in financial reporting automation and reporting (mean score 3.64). The use of AI is also adopted in risk mitigation and fraud exposure (mean score 3.54). The usage of AI application for budgeting and forecasting is slightly lower (mean score 3.42.) Whereas the impact of AI on business performance considerably positive. The value of mean score is high (4.03), while profitability mean value (mean 3.76) shows a quite lower perceived impact. Its effect on direct profitability is still developing or influenced by external factors. In addition, use of AI and impact on business performance, the integration with prevailing systems and the dearth of capability are identified as the main challenges. The integration difficulty man value (mean score 3.85) is significant, but the lack of expertise mean value (mean score 3.69) is a prominent barrier as well. The initial cost result shows that (mean score 3.91) it is also a significant challenge.

Discussion and Conclusion

The implementation of artificial intelligence (AI) in accounting has shown a significant impact on business performance. It provides both noticeable and strategic advantages for growth and current output. Business operational efficiency has increased dramatically because of AI's capacity to automate standard accounting processes including transaction processing, data entry, and financial reporting. The same results concluded by Brynjolfsson & McAfee, (2017). The study confirmed that AI's predictive analytics improved the decision making and enhanced the profitability. Another study conducted by Berman & Pavone (2021) in the same industry (oil and gas) and found that AI in accounting demonstrated positive effect on business performance and improved the efficiency. Similarly, Kokina & Davenport, (2017) research study results are aligned with the current study. The study highlighted due to capital-intensive industry. More revenue generating brand and considered as a basic source of energy. AI in accounting policies and procedures increased the operational efficacy and enhanced the profitability. Based on the above analysis

findings, the study concludes that the oil and gas business is progressively applying AI in accounting. In addition to its efficiency and beneficial effects, there are several issues that businesses must appropriately handle and to be addressed. The biggest obstacles to using AI in the oil and gas sector are rising costs, a lack of experience, and system integration. In summary, aside from these challenges, artificial intelligence is a key factor enhancing business performance, particularly when it comes to increasing the accuracy of financial reporting and decision-making processes. The study results strength AI integration by increasing more funding for AI integration and training/learning, which would eventually result in even higher returns, operational effectiveness, risk mitigation, reduce fraud, corruption and more profitability.

Limitations and Future Directions

The current study only considered the AI in accounting and ignored the other areas of the business. Second limitation is that the study analyzed the data of oil and gas industry, so careful while generalizing the results. It is highly recommended and has a potential to conduct the research to find or demonstrate the role of AI technologies in the education sector or other service sectors.

Acknowledgements

I acknowledge the support of the head and faculty members of the Accounting Department, College of Business, King Abdulaziz University Jeddah Rabigh Campus.

Deceleration of Interest

The results and explanations offered in the study could not have been impacted by any conflicts of interest.

References

Berman, S., & Pavone, G. (2021). AI in oil and gas: Financial performance improvements through machine learning. *Energy Economics Review*, 34(2), 112-126.

Brudermuller, M. (2020). Leveraging AI in the oil and gas sector. *Journal of Strategic Management*, 48(4), 623-634.

Brynjolfsson, E., & McAfee, A. (2017). *The Second Machine Age: Work, Progress, and Prosperity in a Time of Brilliant Technologies*. W.W. Norton & Company

Davenport, T. H., & Ronanki, R. (2018). Artificial intelligence for the real world. *Harvard Business Review*, 96(1), 108-116.

Drury, C. (2013). *Management and Cost Accounting*. Cengage Learning.

Hedley, D., & Goff, P. (2018). AI in accounting and its financial impact on the oil and gas sector. *Journal of Financial Analysis*, 30(3), 95-112.

Horngren, C.T., Sundem, G.L., & Elliott, J.A. (2012). *Introduction to Financial Accounting*. Pearson Education.

Huang, H., & Vasarhelyi, M. A. (2019). Artificial intelligence in accounting: Current state and future directions. *Accounting Horizons*, 33(3), 53-77.

Kokina, J., & Davenport, T. H. (2017). The emergence of artificial intelligence: How automation and AI will transform finance. *Journal of Accountancy*, 223(3), 56-63.

Liu, J., Zhang, Z., & Lin, B. (2020). Cost optimization in the oil and gas sector through AI applications. *Petroleum Economics*, 28(4), 98-113.

Schroeder, R.G., Clark, M.W., & Cathey, J.M. (2016). *Financial Accounting: Theory and Analysis*. Wiley.

Sullivan, D. (2021). *AI in financial forecasting: Applications in the oil and gas industry*. Energy Finance Journal, 12(1), 44-56.

Note: **Open Access Organization and Management Review** is under the process of recognition by the Higher Education Commission Pakistan in the Y category.

Disclaimer/ Publisher's Note: The statements, opinions, and data contained in all publications in this journal are solely those of the individual author(s) and not of the MDPIP and/ or the editor(s). MDPIP and editor(s) disclaim responsibility for any injury to the people or property resulting from any ideas, methods, instructions, or products referred to in the content.