

The Effect of Digital Transformation on Organizational Performance of Oil and Gas Companies

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ABSTRACT

In today's changing and fluctuating energy sector world should prioritize digital transformation to foster the performance of companies working in the field of oil and gas sector which is a highly competitive market. Hence, this study examines the effect of digital transformation on organizational performance of Abu Dhabi National Oil Company (ADNOC). Employing a quantitative research methodology, data were collected from employees of ADNOC to assess this relationship. The results reveal that digital transformation significantly enhances organizational performance. The findings highlight the necessity for organizations in the oil and gas sector to not only invest in digital technologies but also create an environment that promotes continuous adoption of digital transformation plans. By doing this, oil and gas companies may unleash new growth prospects, generate long-term competitive advantage, and negotiate the complexity of an increasingly digital environment. To that end, this study offers valuable insights for both practitioners and policymakers seeking to maximize the benefits of digital transformation through strategic emphasis on innovation.

Keywords: Digital Transformation, Organizational Performance, Oil and Gas Sector.

INTRODUCTION

Digital transformation is a key driver of organizational performance in today's fast-changing technology ecosystem (Nadkarni & Prügl, 2021; Chi et al., 2022). Traditional sectors like oil and gas (O&G) may improve performance and stay competitive by integrating digital technology (Wanasinghe et al., 2020). Companies use AI, big data analytics, and the IoT to optimise operations, decrease costs, and enhance decision-making via digital transformation (Du et al., 2024). O&G enterprises may maximize profits by using these digital solutions to improve procedures and boost efficiency (Tang et al., 2025). Digital transformation helps businesses in this sector keep ahead of market changes and consumer needs, assuring long-term development. In today's competitive market, O&G enterprises must use digital technology (Hazaa & Al Mubarak, 2025). O&G enterprises must adapt to digital transformation in a highly competitive and fast changing business context (Gupta & Shah, 2022; Haouel & Nemeslaki, 2024). Digital technologies are integrated into manufacturing, logistics, marketing, and customer service to increase efficiency, cut costs, and boost organizational performance. The dangerous influence of digital transformation on organizational performance should not be overlooked, even if it offers several advantages (Chouaibi et al., 2022).

The direct impact of digital transformation on organizational performance has been well-documented in various industries, but Al-Hajri and Abdella (2025) claimed that a sustainability-based strategic framework for digital transformation in the O&G industry is needed to maximize O&G company performance, but this gap remains unexplored. In addition, digital transformation is part of innovation strategies that help organizations to implement new processes, creative problem-solving, and departmental collaboration which in turn will help O&G companies connecting technology adoption to improved organizational performance (Chouaibi et al., 2022). Oil and gas companies worldwide, including ADNOC's multibillion-dollar initiatives, invest heavily in digital technologies, but empirical evidence on whether and how these investments improve multidimensional organizational performance is scarce, especially in Gulf state-owned enterprises. Digital technologies have been

studied in O&G operational areas (Samylovskaya et al., 2022; Elijah et al., 2021; Maroufkhani et al., 2022), but there is little empirical research on organizational performance outcomes. To address this gap, this study examines how digital transformation affects O&G businesses' organizational performance. Scholars and practitioners need to understand this link to learn how O&G organizations may better use digital efforts to improve performance. Therefore, this research analyzes ADNOC's interactions to determine how digital transformation affects O&G organizational performance.

To provide a robust theoretical underpinning, this study adopts the Resource-Based View (RBV). The RBV posits that organizations achieve sustained competitive advantage by developing and leveraging valuable, rare, and inimitable resources—such as digital capabilities. Digital transformation is thus theorized as a strategic resource that can significantly enhance organizational performance, especially in dynamic and competitive industries like oil and gas (Barney, 1991).

LITERATURE REVIEW

Digital Transformation

Digital transformation integrates technology into all aspects of an organization, improving operations and consumer value (Kokkinou et al., 2025). Innovation, efficiency, and simplicity are achieved via cloud computing, AI, data analytics, and other cutting-edge technology. Digital transformation uses technology to create new business models, products, and services to meet customer needs (Saeed et al., 2023). Digital transformation may help companies stay ahead in a fast-changing industry (Ashrafi et al., 2025). It helps companies understand customers, customize offerings, and enhance experience. Digital transformation makes companies more agile, responsive, and adaptable (Rathore, 2023). Corporate survival and prosperity need digital change. Businesses risk market share loss without digital adaption. Digital transformation may streamline, improve, and reinvent companies (Li et al., 2024). As technology advances, digital transformation may help companies meet customer needs and compete globally. To thrive in the digital age, businesses must fully embrace digital technology (Hendrawan et al., 2024).

Digital transformation in oil and gas improves operations, efficiency, and innovation (Albakri, 2025). IoT, AI, data analytics, and cloud computing speed up processes, enhance decision-making, and raise company performance. O&G organizations may improve safety, decrease costs, and manage assets and resources using digital solutions. Digital transformation in oil and gas uses technology to maintain growth and competitiveness in a complicated industry (Cadei et al., 2022). IoT sensors and AI algorithms provide real-time equipment monitoring, maintenance forecasting, and production optimisation in O&G (Ziadat & Kirkham, 2024). Projecting industry trends and demand using data analytics may help businesses make better choices. Cloud computing promotes cooperation and efficiency by offering remote data and application access. Digital transformation is essential for O&G companies to be competitive (Egorov et al., 2025).

O&G digital revolution improves safety and reduces accidents (Futterer & Wassermann, 2025). Drones and sensors can monitor equipment and infrastructure in real time and detect threats before they escalate (Al-Hajri et al., 2024). While protecting the environment and preventing expensive accidents, this preserves worker safety. O&G companies may reduce their environmental impact by digitally optimizing energy and waste (Sheveleva et al., 2021). Companies may lower their carbon footprint and increase efficiency via data analytics and automation. This helps the environment and builds credibility with sustainable stakeholders and investors (Kuklina & Dementiev, 2023). Digital change in O&G may boost long-term profits. Innovative organizations that employ technology to simplify operations and reduce their environmental impact will win in a competitive market (Lalovich, 2024). Staying ahead of industry changes and adopting sustainability may help O&G organizations hire great talent, form partnerships, and retain a good reputation. Digital transformation is a strategy for organizational success and longevity, not just a way to improve procedures (Faustino et al., 2023).

Organizational Performance

Performance is how well a company meets its objectives (Odebode & Ogunbayo, 2025). Financial success, operational efficiency, customer satisfaction, staff involvement, and strategic outcomes are included. To become more competitive, these KPIs help companies assess their performance and identify areas for improvement (Obeso et al., 2020). Organizational effectiveness drives business success and longevity. Executives use it to make choices, manage resources, and adapt to market changes. Monitoring and improving organizational performance helps companies stay ahead of the competition and satisfy stakeholders. Companies must perform successfully in today's fast-paced business climate to expand and profit (Saputra et al., 2024). Natsir et al. (2024) define organisational success as revenue growth, profitability, and ROI. Efficiency, productivity, and product quality are operational performance measures. Human resources management success may be measured by employee engagement, satisfaction, and retention (Jama, 2023). customer happiness and loyalty are crucial performance metrics because they demonstrate how successfully a business serves customer needs. By assessing these indicators, an organization may evaluate its performance and find areas for improvement (Ekasari et al., 2024). Financial analytics may identify revenue-generating or cost-cutting options. Process inefficiencies are identified via operational analytics. Employee and customer satisfaction may help the organization survive. Every business requires a balanced performance assessment approach to flourish (Azhar et al., 2024).

Performance impacts company success and longevity (Udokwu et al., 2023). Monitoring key metrics and indicators helps companies understand their operations and make data-driven choices to grow and profit. Performance assessment helps companies monitor objectives, determine growth areas, and optimize resources (Riza et al., 2025). Organizational performance aids competition, market adaptation, and success. Firms need clear performance objectives and regular evaluation to keep on track (Rohman et al., 2023). Data and performance indicators help companies identify trends, foresee issues, and improve operations. Proactive performance management makes companies competitive and encourages innovation (Anwar & Abdullah, 2021). Organizations must assess and improve performance at every level to compete in today's fast-paced business environment (Albino et al., 2025).

In oil and gas, performance is how successfully companies accomplish strategic objectives (Onwuchekwa, 2025). This includes operational efficiency, financial performance, safety, sustainability, and market competitiveness. Survival and growth depend on organizational effectiveness in oil and gas, a competitive and complex industry. By managing resources, processes, and connections, O&G enterprises may boost stakeholder value (Naja & Ungku Ahmad, 2024). Oil and gas companies need risk management and operational technologies (Ogbu et al., 2024). By examining performance metrics, companies may improve and innovate smartly. Performance excellence may help oil and gas companies adapt to market changes and stay ahead (Ritchie & Simmons, 2024).

In oil and gas, organizational performance improves operational efficiency (Okoro, 2024). Streamlining and automating processes may enhance output and reduce downtime. Companies may save money and meet production goals (Hassan & Abdullahi, 2025). O&G enterprises' efficiency and effectiveness rely on organizational performance (Chourasia et al., 2023). Safety, productivity, and environmental sustainability may help companies achieve operational excellence while prioritizing employee and environmental well-being (Asare, 2024). Earnings growth and expenditure reduction boost corporate reputation and shareholder trust. Investment, cooperation, and industry development may increase with strong O&G organizational performance. Performance monitoring and improvement assist O&G companies stay ahead of the competition and adapt to market changes (Ned et al., 2025).

The Relationship between Digital Transformation and Organizational Performance

Digital transformation has become a crucial factor in determining the success of organizations in today's fast-paced and highly competitive business environment (Chouaibi et al., 2022; Ramadania et al., 2024). By leveraging technology to streamline processes, enhance customer experiences, and drive innovation, companies can significantly improve their overall performance and gain a competitive edge in the market. However, the

impact of digital transformation on organizational performance is not always straightforward and can vary depending on a variety of factors, including the industry, size of the company, and the level of digital maturity (Mulyana et al., 2023). For smaller companies with limited resources, digital transformation may require a more gradual approach, focusing on implementing basic technologies before moving on to more advanced solutions. On the other hand, larger organizations with established digital infrastructures may need to constantly evolve and adapt in order to stay ahead of the competition. Regardless of the size or industry, embracing digital transformation is essential for staying relevant and thriving in today's rapidly evolving business landscape by fostering the various aspects of organizational performance (Al-Ayed et al., 2023). Organizations that fail to adopt digital transformation are expecting to lose their competitive edge in the market. Therefore, companies working in the O&G sector need effective digital transformation to boost their organizational performance in many aspects.

The review of literature shows that digital transformation has revolutionized the way O&G companies operate, bringing about significant improvements in efficiency, productivity, and overall organizational performance (Al-Hajri et al., 2024). By leveraging advanced technologies such as IoT, AI, and data analytics, O&G companies can now gather real-time insights and make informed decisions that drive operational excellence. This shift towards a more data-driven approach has not only optimized processes but also enhanced safety measures, reducing the likelihood of accidents and downtime (Zeynalli et al., 2010). Additionally, the digital transformation provide automation of tasks has led to increased speed and accuracy in operations, resulting in improved output and robust preparing for the fourth industrial revolution (Sheveleva et al., 2021). In other words, the impact of digital transformation on the performance of O&G companies has been transformative, paving the way for a more sustainable and successful future in the industry despite the challenges of this transformation (Haoael & Nemeslaki, 2024). To that end, accelerating digital transformation in the O&G industry by utilizing advanced technologies such as AI and machine learning, these companies would be able to predict maintenance needs and prevent costly equipment failures after effective digital transformation. This proactive approach has not only saved time and money but has also improved overall efficiency and productivity (Ziadat & Kirkham, 2022). Furthermore, digital transformation plans allow for real-time monitoring of equipment and assets, enabling companies to optimize resource allocation and streamline operations in oil and gas production (Daneeva et al., 2020). As the O&G industry continues to embrace digital transformation, the potential for further innovation and growth is limitless (Alshibani et al., 2024).

Digital transformation has the potential to greatly impact the performance of O&G companies. By implementing advanced technologies such as artificial intelligence, the IoT, and data analytics, these companies can optimize their operations, improve efficiency, and reduce costs. For example, predictive maintenance using IoT sensors can help prevent equipment failures and minimize downtime, leading to increased productivity and profitability (Hawash et al., 2020). Additionally, data analytics can provide valuable insights that enable better decision-making and strategic planning. To that end, embracing digital transformation can help oil and gas companies stay competitive, adapt to changing market conditions, and drive innovation in the industry. By leveraging these technologies, oil and gas companies can also enhance safety measures by monitoring equipment performance and identifying potential risks before they escalate. Furthermore, the integration of artificial intelligence can streamline processes and automate tasks, allowing for smoother operations and faster response times. Ultimately, embracing digital transformation is essential for the long-term sustainability and success of oil and gas companies in today's rapidly evolving market landscape (Trindade et al., 2023).

In sum, the review of literature shows that embracing digital transformation is crucial for O&G companies in the UAE to remain competitive and adapt to changing industry trends (Hazaa & Al Mubarak, 2025). By harnessing digital technologies, companies in the O&G sector can enhance their operational efficiency, reduce costs, and stay ahead of the competition. From predictive maintenance to data analytics, digital transformation offers numerous benefits that can help companies thrive in an increasingly complex and dynamic market environment. By leveraging innovative tools and technologies, ADNOC can position themselves for long-term success and ensure their continued relevance in the industry (Alsaeedi et al., 2021). Based on the aforementioned arguments, this study will examine the effect of digital transformation on organizational performance of ADNOC.

RESEARCH METHODOLOGY

This study adopted a quantitative, cross-sectional research design to examine the relationships between digital transformation, innovation practice, and organizational performance among ADNOC employees. A survey strategy was employed because it is appropriate for testing hypotheses and validating theoretical relationships using Structural Equation Modeling (SEM). The target population consisted of ADNOC employees, and data were collected from 420 respondents selected through simple random sampling using a self-administered online questionnaire. The questionnaire comprised demographic questions and measurement items for digital transformation, innovation practice, and organizational performance. All measurement items were adapted from previously validated studies and assessed using a five-point Likert scale ranging from 1 (strongly disagree) to 5 (strongly agree). Prior to the main survey, the questionnaire was reviewed by subject experts to establish content validity and was pilot-tested with 50 employees to evaluate its clarity and internal consistency. The pilot results indicated satisfactory reliability, with Cronbach's alpha values exceeding the recommended threshold of 0.70. Data analysis was conducted using IBM SPSS and AMOS. Descriptive statistics were first used to summarize respondents' characteristics. Reliability (Cronbach's alpha) has been conducted to assess the measurement instrument. Finally, covariance-based SEM was employed to test the proposed hypotheses and evaluate both direct and mediating relationships, with statistical significance determined at $p < 0.05$ using standardized path coefficients and bootstrapping procedures. The conceptual model for this study includes digital transformation as the independent variable, organizational performance as the dependent variable, and innovation practice as a mediating variable. Hypotheses were formulated to test both the direct effect of digital transformation on performance and the mediating role of innovation practice. Accordingly, the survey instrument and analysis explicitly incorporated innovation-related items and mediation analysis.

RESULT AND DISCUSSIONS

ADNOC's workforce and significant features related to the research goals are revealed by the study sample's demographic profile. The workforce is mostly male, with two-thirds of respondent's male and one-third female. It's typical of the oil and gas business to hire more men, but the fact that there are so many women shows progress toward gender equality.

The age distribution shows that ADNOC employs mostly youthful to middle-aged professionals. The biggest age group is 30–39, with about 45%. This is followed by 40–49 years old (22.2%) and 20–29 years old (16.8%). Only 1.8% of workers are above 60, whereas 14.3% are 50–59. This age structure shows that the organization benefits from a strong core of experienced professionals in their prime working years and a large number of early-career workers who can provide new insights and flexibility. Industry developments in recruiting, retirement, and digital skill needs may explain the lower share of older workers.

The workforce is highly educated, with over half of respondents possessing a master's degree and a large part a bachelors. Despite being a tiny group, PhDs bring experience and research capacity to the company. This study's goals are best met by a well-educated workforce that can comprehend, execute, and maximize digital transformation and innovation techniques.

Also noteworthy is job experience distribution. Over one-third of respondents had 10–15 years of experience, and over a quarter have more than 15 years, suggesting a knowledgeable and tenured workforce. While a large percentage of workers have one to ten years of experience, they offer fresh ideas and flexibility. This blend of experienced and younger personnel gives a balanced view of how digital transformation and innovation efforts are viewed, embraced, and translated into organizational success. The demographic profile shows a diversified and skilled workforce across genders, age groups, educational backgrounds, and experience levels. This variety strengthens the study's validity and generalizability. It also suggests that ADNOC is well-equipped to leverage digital transformation because its demographic foundation facilitates the absorption of new technologies and the sustainable improvement of organizational performance, which aligns with the research agenda.

Table 1: The demographic profile

Demographics	Category	Frequency	Percentage (%)
Gender	Male	259	66.2
	Female	133	33.8
Age	20-29 years	66	16.8
	30-39 years	176	44.9
	40-49 years	87	22.2
	50-59 years	56	14.3
	Older than 60 years	7	1.8
Academic Qualification	Bachelor	159	40.6
	Master	191	48.7
	PhD	42	10.7
Work Experience	1-5 years	78	19.9
	5-10 years	60	15.3
	10-15 years	145	37.0
	More than 15 years	109	27.8

Measurement Model Assessment:

Prior to hypothesis testing, the measurement model was evaluated. All factor loadings exceeded 0.7, establishing strong indicator reliability. Composite reliability (CR) values for all constructs were above 0.8, and average variance extracted (AVE) values were greater than 0.5, indicating convergent validity. Discriminant validity was confirmed as the square root of each construct's AVE exceeded its correlations with other constructs.

Structural Model Evaluation:

The SEM indicated a good model fit with the following indices: CFI = 0.95, TLI = 0.94, RMSEA = 0.06, and SRMR = 0.04. These results confirm the robustness of the model and the reliability of the findings.

To examine the effect of digital transformation on organizational performance of ADNOC. The results shown in Table 2 firmly support this hypothesis (Sig. = 0.00, C.R. $\geq$ 1.96) as shown in Table 2, confirming that digital transformation exerts a significant, positive impact on the organizational performance of ADNOC. The standardized coefficient (Beta = 0.49) indicates a moderate strength of association, signifying that while digital transformation is a key driver of performance, it is not the sole determinant; other factors, such as innovation culture and change management, also play important roles.

Table 2: The strength and significance of the relationship

Relationship	Directions of effects	Beta	C.R	Sig.	Result
Digital transformation has a significant effect on organizational performance	Digital transformation → organizational performance	0.49	3.46	0.00	Supported

This finding is particularly relevant given the problem statement's emphasis on the unprecedented challenges and opportunities facing the O&G industry in an era of rapid technological change. The problem statement

highlighted how O&G companies, including those in the Gulf region, often lag behind in digital maturity due to structural inertia, legacy infrastructure, limited R&D investment, and organizational resistance to change. ADNOC's case underscores how strategic digital transformation through initiatives like automation, adoption

of big data analytics, and integrated IT systems can help overcome these barriers and deliver tangible performance improvements. These improvements may manifest as better operational efficiency, cost reductions, improved environmental compliance, and enhanced market competitiveness, all of which are essential in a volatile and competitive energy market.

Prior literature corroborates this result, as studies have consistently found that digital transformation in the O&G sector leads to enhanced agility, streamlined processes, and superior decision-making. However, the moderate strength of the relationship in this study suggests that digital transformation alone may not guarantee optimal performance unless it is integrated with broader organizational reforms such as developing digital skills, fostering a digital culture, and ensuring senior leadership buy-in. Critically, the findings address the problem statement's concern that many O&G firms invest heavily in digital projects but fail to realize their full potential due to persistent structural and cultural barriers. ADNOC's positive results demonstrate that digital transformation can indeed drive performance if these barriers are specifically addressed. Yet, it also signals the need for a holistic approach: technology investments must be complemented by strong change management strategies, upskilling programs, and efforts to break down internal silos. Only then can the organization fully capitalize on digital transformation's benefits and achieve sustainable, long-term performance gains. In summary, the findings highlight both the opportunities and the ongoing challenges, reinforcing the need for ADNOC and similar firms to adopt comprehensive digital strategies that go beyond technology adoption to embrace organizational and cultural transformation. While digital transformation emerged as a key driver of organizational performance, the results also suggest that additional factors such as digital capability, organizational culture, innovation capability, and leadership support may further explain performance differences among organizations. Future models should consider these variables to provide a more comprehensive understanding of the drivers of organizational success in the oil and gas sector. This study's findings align with prior research indicating that digital transformation enhances operational efficiency, decision-making quality, and innovation in oil and gas companies (Al-Hajri et al., 2024; Chouaibi et al., 2022). However, the relationship is only moderate in strength, suggesting that technology adoption alone is insufficient without parallel improvements in organizational culture and leadership support. Compared to contradictory studies that found minimal performance gains in rigid or change-resistant organizations, our findings highlight the critical role of adaptability and strategic alignment. Practically, this implies that managers must not only invest in digital technology but also foster a culture that supports innovation and continuous learning.

CONCLUSIONS

This study presents solid evidence that digital transformation is a critical component for generating improved organizational performance in the oil and gas business, notably at ADNOC. ADNOC has achieved operational efficiency, cost savings, and a data-driven decision-making culture by embracing modern digital technology. These digital developments have not only enhanced internal procedures, but also allowed the organization to stay adaptable in the face of fast market and technology changes. This adopting of digital transformation in O&G sector has enabled these companies like ADNOC to adopt technologically innovative solutions that are also strategically aligned with its overall aims. The consequences of these discoveries go beyond ADNOC, providing useful lessons for other companies in the oil and gas industry and beyond. O&G companies must grasp that digital transformation is more than just adopting new technologies; it is also about creating an atmosphere conducive to creativity. This requires regular training, leadership support, and a willingness to question old working practices. Overall, the results indicate that companies in the energy sector seeking long-term success and resilience in today's changing business world should prioritize digital transformation to foster their performance in the highly competitive market. By doing this, these companies may unleash new growth prospects, generate long-term competitive advantage, and negotiate the complexity of an increasingly digital environment.

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