The International Journal of Business Management and Technology, Volume 9 Issue 3 March 2025
ISSN: 2581-3889

Research Article Open Access

Effect of Technology Adoption on the Performance of Oil Marketing Firms in Kenya

[1],Faith Jepchirchir Kiprop, [2]Dr. Jeptepkeny Bowen, [3]Prof. Simon Kipchumba
[1]*Postgraduate Student, Kabarak University*
[2,3]*Kabarak University*

Abstract: The oil marketing industry in Kenya faces stiff competition and fluctuating profitability, prompting firms to explore innovative strategies to enhance performance. This study aimed to determine the effect of technology adoption on the performance of oil marketing firms in Kenya. Anchored on the resource-based view and dynamic capabilities theories, the research employed a descriptive research design, targeting 64 heads of strategy in all oil marketing firms in Kenya. Data was collected using structured questionnaires and analyzed using correlation and multiple linear regression models. The results indicated that technology adoption significantly improves organizational performance, explaining 90.5% of the variance in performance. Firms that strategically adopt new technologies experience enhanced operational efficiency, innovation, and competitiveness. The findings underscore the critical role of technology adoption in driving firm performance, making it a key strategic priority for industry players. The study recommends that oil marketing firms invest in emerging technologies and foster a culture of continuous innovation to remain competitive in the dynamic energy sector. The insights from this study offer valuable contributions to industry players seeking sustainable and innovative strategies to enhance performance, making it a relevant topic for the conference's focus on innovation and partnerships.

Keywords: *Performance, technology adoption, operational efficiency, innovation, and competitiveness*

I. Introduction

The performance of oil marketing firms in Kenya is critical to the country's energy sector, which underpins various industries and day-to-day activities. As the demand for energy continues to grow, these firms face mounting pressure to enhance operational efficiency and maintain competitiveness in a rapidly evolving market. Technology adoption has emerged as a key strategy in this context, offering firms the opportunity to streamline their processes, improve decision-making, and boost overall performance. Technology, particularly digital tools like enterprise resource planning (ERP) systems and customer relationship management (CRM) software, has become integral to managing complex supply chains, reducing operational costs, and ensuring timely delivery of petroleum products (Awolusi & Atiku, 2019). As such, technology adoption plays a pivotal role in helping oil marketing firms navigate the challenges of globalization and competition.

In recent years, oil marketing firms globally have embraced technology as a means to enhance their operational capacity. In China, for example, companies are leveraging artificial intelligence and automation to optimize supply chains and streamline operations (Shahul et al., 2022). Similarly, in South Africa, organizations are using technology to reduce operational costs, improve efficiency, and maintain competitive advantage in the energy sector (Kunene, 2021). The ability to quickly integrate advanced technologies into their business processes has become a crucial factor in the success of firms in the energy industry. For oil marketing firms in Kenya, adopting such technologies is not only necessary to improve internal processes but also to meet regulatory standards and respond to market demands more effectively (Kamau, Rotich, & Ogollah, 2022).

Kenyan oil marketing firms operate in a competitive landscape characterized by fluctuating oil prices and regulatory constraints. The Energy and Petroleum Regulatory Authority (EPRA) governs this sector, ensuring that companies comply with national standards while promoting fair competition (Mairim, 2022). As the sector grows, technology adoption becomes an even more critical tool for maintaining operational efficiency and driving business success. Firms

that fail to integrate advanced technologies may struggle to compete with those that streamline their operations through innovations such as automated inventory systems, digital customer engagement platforms, and data analytics for decision-making (Njuguna & Wanjohi, 2021).

In Kenya, the adoption of technology by oil marketing firms is gaining momentum as these organizations recognize the benefits of digital transformation. However, challenges such as inadequate ICT infrastructure and resistance to change continue to impede full-scale adoption (Kipkorir et al., 2023). Despite these barriers, there is a growing recognition that technology will be central to the future success of oil marketing firms in Kenya. As businesses seek to remain agile and competitive, the strategic integration of technology will not only enhance operational efficiency but also drive long-term growth and sustainability in the energy sector (Ongeri, Magutu, & Litondo, 2020).

II. Statement of the Problem

Oil marketing firms in Kenya face the daunting challenge of navigating a rapidly shifting business environment shaped by increasing globalization and the effects of internationalization (Mairim, 2022). The oil industry is under immense pressure, pushing companies to develop strategies that respond to both perceived and actual changes in the competitive landscape (Matinde & Atikiya, 2023). Recent data highlights intensifying competition within the Kenyan oil market, accompanied by a worrying decline in profitability for oil marketing firms. For example, Njuguna and Namusonge (2023) noted a 2% drop in overall industry profitability between 2020 and 2022, driven by factors such as market saturation, aggressive pricing, and evolving consumer preferences (Omai, Njeru & Memba, 2018). This decline poses a significant challenge to the long-term sustainability of these firms, necessitating a strategic reassessment.

In response to this fierce competition and falling profitability, oil marketing firms are under pressure to reevaluate their operational strategies (Majimbo & Namusonge, 2020). Achieving and maintaining a competitive advantage has become increasingly critical, with firms considering technology adoption as a potential solution. Technology adoption offers an opportunity to streamline processes, improve operational efficiency, and increase competitiveness. Despite its recognized benefits, it remains unclear to what extent oil marketing firms in Kenya have embraced and implemented technological advancements. As these companies face challenging market conditions, there is a need to investigate the relationship between technology adoption and their performance to understand its impact on their competitiveness and sustainability.

Existing literature offers valuable insights into the potential benefits of technology adoption for improving organizational performance. Studies in various industries, such as those by Arise and Adegbie (2021), Awolusi and Atiku (2019), and Zondo (2021), have shown that integrating advanced technologies can lead to enhanced efficiency and operational effectiveness. However, research specifically focusing on the oil marketing sector in Kenya remains limited. This presents a significant research gap, as the unique characteristics and market dynamics of oil marketing firms in Kenya may influence how technology adoption is executed and how it affects firm performance. This study aimed to address this gap by exploring the effects of technology adoption on the performance of oil marketing firms in Kenya.

III. Objective of the Study

The objective of this research was to determine the effect of technology adoption on performance of oil marketing firms in Kenya.

Literature Review

Park and Shintaku (2022) aimed to investigate the effects of technology adoption on the performance of automotive firms in Japan. The primary objective was to assess whether adopting new technologies positively influenced key performance indicators such as production efficiency, product innovation, and overall organizational competitiveness. The research employed a mixed-methods approach, combining quantitative analysis of production data and qualitative case studies. Surveys were administered to assess the perceived impact of technology adoption on innovation, while operational metrics were analyzed to evaluate efficiency improvements resulting from the adoption of new technologies. The study revealed a positive correlation between technology adoption and firm performance in the Japanese automotive industry. Companies that strategically adopted new technologies experienced improvements in production efficiency and product innovation, contributing to enhanced overall organizational competitiveness.

Diener and Špaček (2021) aimed to explore the impact of technology adoption on employee perceptions and how these perceptions influenced organizational performance in the banking sector in Germany. aimed to explore the impact of technology adoption on employee perceptions and how these perceptions influenced organizational performance in the banking sector in Germany. The study revealed that employee perceptions during technology adoption played a crucial

role in subsequent performance outcomes in the German banking sector. Positive perceptions, such as ease of use and perceived improvements in work efficiency, were associated with better employee morale and, consequently, improved organizational performance.

Perera (2021) sought to synthesize findings from multiple studies to provide a comprehensive understanding of the impact of technology adoption on firm performance in the retail industry in Sri Lanka. The study aggregated data from various empirical studies on technology adoption in Sri Lanka retail industry, encompassing diverse retail segments. Effect sizes were calculated to determine the overall impact on performance metrics, including customer satisfaction, operational efficiency, and financial performance. The meta-analysis revealed a positive overall association between technology adoption and firm performance in Sri Lanka retail industry. Retail companies that strategically adopted new technologies experienced improvements in customer satisfaction, operational efficiency, and overall financial performance.

Okoro (2021) aimed to explore the relationship between strategic technology adoption and firm innovation, assessing whether technology adoption initiatives contributed to increased innovation within telecommunication firms in Kenya. A cross-sectional survey design was employed, gathering data from a diverse sample of technology firms in Kenya representing various subsectors. The study assessed the level of technology adoption, measured by specific strategic initiatives, and correlated these with innovation outcomes, including product development and market differentiation. The research found a positive association between strategic technology adoption and firm innovation in the Kenyan Telecommunication sector. Companies that strategically adopted new technologies, particularly by investing in research and development and fostering a culture of innovation, demonstrated higher levels of creativity and adaptability.

IV. Theoretical Framework

This study was anchored on four key theories: the resource-based view (RBV) theory, change management theory, organizational learning theory, and dynamic capabilities theory. The resource-based view (RBV) theory posits that organizations can achieve a competitive advantage by leveraging internal resources that are valuable, rare, inimitable, and non-substitutable. In the context of this study, technology adoption is viewed as a strategic resource that oil marketing firms can harness to enhance operational efficiency and overall performance. By integrating advanced technologies into their operations, firms can optimize resource use, streamline processes, and improve decision-making, thereby strengthening their competitive position in the marketplace.

Change management theory is relevant to this study as it addresses the processes and strategies required to manage organizational transformation, particularly when introducing new technologies. The successful adoption of technology necessitates effective change management practices, such as clear communication, employee involvement, and leadership support, to minimize resistance and ensure smooth implementation. Organizational learning theory supports this by emphasizing the need for continuous learning and knowledge sharing within firms, enabling employees to adapt to new technologies and improve performance. Lastly, dynamic capabilities theory focuses on the ability of firms to integrate, build, and reconfigure internal and external competencies to address rapidly changing environments. In this study, dynamic capabilities are essential as oil marketing firms must continuously adapt to technological advancements and evolving market conditions to maintain long-term success.

V. Conceptual Framework

This study was guided by the following conceptual framework that shows diagrammatized representation of the relationship between the variables. This is shown in Figure 1.

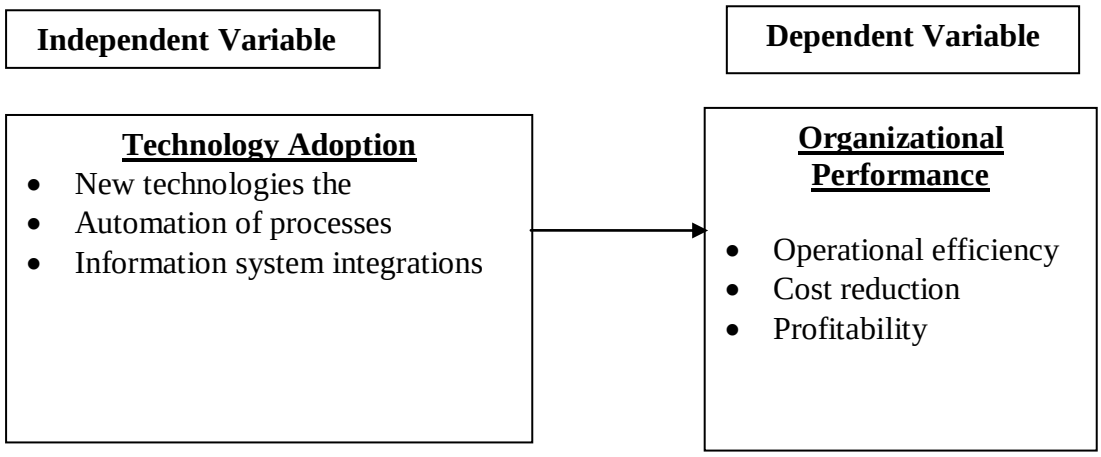

Figure 1: Conceptual Framework
Source: Author

Research Methodology

This study employed a descriptive research design to investigate the effect of technology adoption on the performance of oil marketing firms in Kenya. The target population consisted of all 64 oil marketing firms operating in the country, with the heads of strategy development or their equivalents serving as the respondents. A census approach was used, ensuring that all 64 firms were included in the study. Primary data was collected through structured questionnaires administered via Google Forms, with the questions focusing on key variables such as organizational restructuring, process redesign, employee training, and technology adoption. Data analysis was conducted using the Statistical Package for Social Sciences (SPSS), where correlation and multiple linear regression models were applied to examine the relationships between the independent variables and organizational performance. The following empirical model was adopted.

$$\mathbf{Y=\beta_0 + \beta_1 X_1 + \varepsilon}$$

Where:

Y = Organizational performance

β_0 = Constant term

β_i = Beta coefficient of variable i measuring change Y to change in i

X_1 = Technology adoption

VI. Results of the Study

Descriptive Statistics

The descriptive results on technology adoption reveal that oil marketing firms in Kenya have varied levels of commitment to technology integration across different areas. The highest-rated statement, with a mean of 4.83, was the existence of a structured process for evaluating and selecting technology solutions that align with business needs, indicating that firms prioritize a systematic approach to technology adoption. Additionally, feedback from employees regarding the usability of new technologies is actively sought, also rated highly with a mean of 4.83. Firms demonstrated strong alignment of technology initiatives with overall strategic objectives (mean = 4.00) and active monitoring of industry trends (mean = 4.33), reflecting a proactive approach to staying current with technological advancements. The leadership teams are also committed to maintaining competitiveness through technology (mean = 4.23).

However, some areas showed room for improvement, particularly in the training and support provided to employees during technology implementation, which scored a relatively low mean of 2.33. Similarly, firms scored lower on investing in tools and resources for employees to effectively use technologies (mean = 3.67) and cybersecurity strategies to protect against risks (mean = 2.33). The overall mean score for technology adoption was 3.80, with a standard deviation of 0.58, suggesting a generally positive attitude toward technology adoption across the firms but with significant variability in how different aspects of technology are managed and integrated into their operations.

Table 1: Descriptive Statistics on Technology Adoption

Statements	N	Mean	Std. Dev
Our company regularly invests in adopting new technologies to enhance operational efficiency.	48	3.17	0.37
There is a structured process for evaluating and selecting technology solutions that align with business needs.	48	4.83	0.37
Employees receive adequate training and support during the implementation of new technologies.	48	2.33	0.75
The organization actively monitors industry trends to stay informed about emerging technologies.	48	4.33	0.47
Technology adoption initiatives are aligned with the organization's overall strategic objectives.	48	4.00	0.62
The leadership team emphasizes the importance of technology in maintaining competitiveness.	48	4.23	0.31
The organization has a dedicated IT team responsible for overseeing technology adoption.	48	3.67	0.75
Employees have access to the necessary tools and resources to effectively use new technologies.	48	4.33	0.75
The impact of technology adoption on overall business performance is regularly assessed.	48	3.17	0.37
The organization actively seeks feedback from employees regarding the usability of new technologies.	48	4.83	0.37
The organization has a clear cybersecurity strategy in place to protect against potential risks.	48	2.33	0.75
The technology adoption process is flexible to accommodate changes in the business environment.	48	4.33	0.47
Overall mean Score	**48**	**3.80**	**0.58**

Correlation Analysis

The correlation matrix shows a very strong positive relationship between technology adoption and organizational performance, with a Pearson correlation coefficient of 0.951, significant at the 0.000 level. This indicates that higher levels of technology adoption are closely associated with improved performance in oil marketing firms in Kenya.

Table 2: Correlation Matrix for Technology Adoption and Performance

		Performance
Technology adoption	Pearson Correlation	.951**
	Sig. (2-tailed)	0.000

Regression Analysis

The regression results for technology adoption and organizational performance, as shown in Table 3, indicate an R Square value of 0.905. This means that 90.5% of the variance in organizational performance can be explained by technology adoption.

Table 3: Model Fitness for Technology Adoption and Performance

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.951[a]	.905	.903	.280243

a. Predictors: (Constant), Technology adoption

The ANOVA results in Table 4 demonstrate that the regression model is statistically significant. The model has a sum of squares of 34.304 and a mean square of 34.304, with an F value of 436.793 and a significance level (Sig.) of 0.000. This indicates that the model significantly predicts organizational performance, and that technology adoption is a highly significant predictor.

Table 4: ANOVA Results for Technology Adoption and Performance

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	34.304	1	34.304	436.793	.000[b]
	Residual	3.613	46	.079		
	Total	37.917	47			

a. Dependent Variable: Organizational performance

b. Predictors: (Constant), Technology adoption

The standardized Beta coefficient for technology adoption is 0.951, which is significant at the 0.000 level. This suggests that for every one standard deviation increase in technology adoption, organizational performance increases by 0.951 standard deviations.

Table 5: Regression Coefficients for Technology Adoption and Performance

		Unstandardized Coefficients		Standardized Coefficients		
Model		B	Std. Error	Beta	t	Sig.
1	(Constant)	.197	.177		1.113	.271
	Technology adoption	.914	.044	.951	20.900	.000

a. Dependent Variable: Organizational performance

VII. Summary of Findings

Descriptive statistics indicated that technology adoption was highly rated by respondents, with a mean score of 3.80 and a standard deviation of 0.58, reflecting a generally positive perception and consistent responses. Correlation analysis revealed a very strong positive relationship between technology adoption and organizational performance, with a Pearson correlation coefficient of 0.951 and a significance level of 0.000, indicating that improvements in technology adoption are strongly associated with enhanced organizational performance. The regression analysis provided further evidence of the significant impact of technology adoption on performance. The model summary revealed that technology adoption explained 90.5% of the variance in organizational performance.

VIII. Conclusions

This study concludes that technology adoption is a critical determinant of performance for oil marketing firms in Kenya. Embracing new technologies allows firms to enhance their production efficiency, innovation capabilities, and overall competitiveness. The significant impact of technology adoption highlights its role as a fundamental strategic initiative that firms must prioritize to achieve superior performance and maintain a competitive edge in the industry.

IX. Recommendations

Oil marketing firms should strategically adopt and integrate new technologies to drive performance improvements. This includes staying informed about emerging technologies, investing in those that align with business needs, and

providing adequate training and support for employees during implementation. Firms should actively seek employee feedback on technology usability and ensure a robust cybersecurity strategy is in place to protect against risks. By embracing technological advancements, firms can enhance their operational efficiency, innovation, and overall competitiveness.

References

[1] Arise, O., & Adegbie, F. (2021). Business process reengineering and financial stability of listed oil and gas companies in Nigeria. *International Journal of Science Academic Research*, *2*(5), 1541-1549.

[2] Awolusi, O. D., & Atiku, O. S. (2019). Business Process Re-Engineering and Profitability in the Nigerian Oil and Gas Industry: The Mediating Influence of Operational Performance. *Information Management and Business Review*, *11*(3 (I)), 13-26.

[3] Diener, F., & Špaček, M. (2021). Digital transformation in banking: A managerial perspective on barriers to change. *Sustainability*, *13*(4), 2032.

[4] Kamau, F., Rotich, G., & Ogollah, K. (2022). Business process reengineering and service delivery in Huduma centers in Kenya. *European Journal of Business and Strategic Management*, *7*(1), 49-61.

[5] Kipkorir, J. J., Mutea, F., & Moguche, A. (2023). Business process reengineering effects on financial performance of commercial banks in Meru County, Kenya. *International Journal of Professional Practice*, *11*(4), 1-11.

[6] Kunene, X. S. (2021). *Impact evaluation of Business Process Re-engineering (BPR) in the department of Academic Administration at a University of Technology (UoT) in South Africa* (Doctoral dissertation).

[7] Mairim, M. S. (2022). *Effect of Dynamic Capabilities on Financial Performance of Oil Marketing Firms in Kenya* (Doctoral dissertation, KCA University).

[8] Majimbo, D. O., & Namusonge, M. (2020). Strategic innovation and performance of oil marketing firms in Nairobi City County, Kenya. *International Academic Journal of Human Resource and Business Administration*, *3*(9), 228-245.

[9] Matinde, K. M., & Atikiya, R. (2023). Response strategies on performance of oil marketing firms in Nairobi city county, Kenya. *International Journal of Management and Business Research*, *5*(1), 239-252.

[10] Njuguna, E. N., & Namusonge, E. (2023). Fourth-party logistics and performance of oil and gas marketing companies in Kenya. *International Journal of Social Sciences Management and Entrepreneurship (IJSSME)*, *7*(2).

[11] Njuguna, A. W., & Wanjohi, P. (2021). Effect of business process re-engineering on performance of agro-processing firms in Nairobi City County. *The Strategic Journal of Business & Change Management*, *8*(4), 33-54.

[12] Okoro, S. C. (2021). Factors affecting adoption of modern technology by telecommunication firms in Kenya: A Case Study of 5G Technology. *United States International University*.

[13] Omai, D. M., Njeru, A., & Memba, F. (2018). The effect of commercial debt finance on profitability of petroleum marketing companies in kenya. *International Journal of Economics, Commerce and Management*, *6*(1), 125-138.

[14] Ongeri, R. N., Magutu, P. O., & Litondo, K. (2020). The Business Process Re-Engineering Strategy: It's Impact on the Performance of Companies Manufacturing Food in Kenya. *European Journal of Business and Management Research*, *5*(5);31-39.

[15] Park, Y. W., & Shintaku, J. (2022). Sustainable Human–Machine Collaborations in Digital Transformation Technologies Adoption: A Comparative Case Study of Japan and Germany. *Sustainability*, *14*(17), 10583.

[16] Perera, N. (2021). Impact of digital transformation in measuring business performance of small & medium scale businesses in Sri Lanka. *International Journal of Economics, Business and Management Research*, *5*(7), 1-25.

[17] Shahul Hameed, N. S., Salamzadeh, Y., Abdul Rahim, N. F., & Salamzadeh, A. (2022). The impact of business process reengineering on organizational performance during the coronavirus pandemic: moderating role of strategic thinking. *foresight*, *24*(5), 637-655.

[18] Zondo, R. W. D. (2021). The impact of Business Process Re-engineering (BPR) on labour productivity in the automotive assembly organization in South Africa. *Quality-Access to Success; 22*(183), 111-123