

BIG DATA ANALYTICS CAPABILITY AND STRATEGIC COST MANAGEMENT: EVIDENCE FROM UPSTREAM OIL AND GAS EXPLORATION AND PRODUCTION COMPANIES

Izinya Thomas Nweke ¹; Onuoha Perpetua Ijeoma (Ph. D) ²

¹ Accountancy Department, Faculty of Management Sciences
Ebonyi State University Abakaliki, Nigeria.

² Accountancy Department, Faculty of Management Sciences
Alex – Ekwueme Federal University Ndufu - Alike, Nigeria.

¹ izinytoms36@gmail.com, 08032643781

² onuohaijeomaperpetua@gmail.com, 07033548086

Abstract

The central objectives of this study is to explore the importance of big data analytics capability (BDAC) to strategic cost management (SCM) in the upstream oil and gas exploration and production firms. The oil and gas sector are highly complex in terms of the operations and highly in terms of capital requirement and the exposure to price volatility and therefore, effective cost management is important to allow the company to maintain its competitiveness over the long-term. Although the previous studies have focused on the operational efficiency, few empirical studies have been conducted on the ability of analytics translating into strategic cost advantages. The main purpose of this paper is to investigate how the capabilities of the big data analytics impact the strategic cost management and cost efficiency and test the moderating impact of the organizational readiness and technological infrastructure. The type of research design used was quantitative where primary data were gathered on 150 managerial, technical, and analytics staff of upstream oil and gas companies. The descriptive statistics and correlation analysis, as well as multiple regression were used to analyze data, and tests containing t-values, p-values, F-values, R², adjusted R², and Durbin-Watson statistics were used to evaluate the strength, significance, and direction of the relationships. The strategic cost management was measured in the aspects of cost planning, cost control, and cost optimization, whereas BDAC was operationalized in terms of analytical tool, technical skill and data quality as well as managerial support. The findings indicate that the big data analytics capability produces a positive impact on strategic cost management of high magnitude ($b = 0.571$, $t = 8.27$, $p < 0.001$), which accounts to about 45 percent of the difference in the SCM practices. BDAC also yields a significant improvement in cost efficiency ($b = 0.613$, $t = 8.40$, $p < 0.001$), which explains 47.5% variation in the cost effectiveness results. Companies that have superior analytics capacity see better gains in cost planning, monitoring, and resource allocation and those companies that have high organizational preparedness and technology are getting increased returns. The research also determines that the cost control practices are more developed than those of cost optimization, which is a possible strategic area of improvement. The results highlight the need to perceive big data analytics as a strategic organizational asset and not an exclusively functional instrument. Companies that are able to incorporate analytics in their decision making process with qualified staff and with strong IT infrastructure can realize sustainable cost of advantage and competitiveness in upstream oil and gas operations.

Keywords: *Big Data Analytics Capability, Strategic Cost Management, Upstream Oil and Gas, Cost Efficiency, Organizational Readiness, Technological Infrastructure*

Introduction

Upstream oil and gas exploration and production sector is a business environment with a high level of capital intensity, geological uncertainty, fluctuating commodity prices and escalating regulatory and environmental pressures. These are the circumstances that render effective cost management as a strategic requirement than an operational one. Conventional cost management methods based on a high degree of reliance upon the historical data and deterministic models have not been successful in

dealing with the complexity and uncertainty that are involved in upstream operations. Consequently, companies are turning to technology to find new ways of making high quality decisions, cutting costs and increasing competitiveness over the long term. The Big Data Analytics (BDA) has become a revolutionary ability in the oil and gas sector due to the massive influx of information with seismic survey, drilling activities, production data, and sensor technologies. Upstream segment in particular produces enormous amounts of data in both structured and unstructured format that are of high velocity and variety. Mohammadpoor and Torabi (2020) state that the ability to process and analyze big amounts of such datasets in real time has become a critical enabler of operations optimization and strategic planning within oil and gas companies.

Statement of the Problem

The unpredictability, complicated operations and changing market conditions continue to present the upstream oil and gas exploration and production companies with challenges in cost management. Drilling cost, project execution and resource allocation remains ineffective and the undermining of profitability and shareholder value. The more traditional cost management systems which commonly rely on static budgets and retrospective analysis fail in the dynamic and data intensive nature of upstream operations. Despite the general push to adopt big data analytics as a solution to such challenges, a number of upstream companies have not yet completely converted analytics investments to operational strategic cost management results. Research has shown that the generation of data has grown, but the ability to integrate, analyze and strategically leverage this data is still unevenly distributed across the industry (Mohammadpoor and Torabi, 2020; Al-Harrasi et al., 2024). This disconnection begs the question of whether or not firms have the required organizational, technological and analytical capacity to use big data to gain strategic control of their costs.

Objectives of the Study

1. To examine the extent of big data analytics capability adoption among upstream oil and gas exploration and production companies.
2. To assess the effect of big data analytics capability on strategic cost management practices in upstream oil and gas companies.
3. To analyze the relationship between big data analytics capability and cost efficiency outcomes across exploration and production activities.
4. To determine the role of organizational and technological factors in strengthening the influence of big data analytics capability on strategic cost management.

Research Questions

1. To what extent have upstream oil and gas exploration and production companies adopted big data analytics capabilities?
2. How does big data analytics capability influence strategic cost management practices in upstream oil and gas companies?
3. What is the relationship between big data analytics capability and cost efficiency in upstream oil and gas exploration and production operations?
4. How do organizational and technological factors affect the relationship between big data analytics capability and strategic cost management?

Research Hypotheses

1. **H₁:** Big data analytics capability has a significant positive effect on strategic cost management in upstream oil and gas exploration and production companies.
2. **H₂:** Big data analytics capability is positively associated with cost efficiency in upstream oil and gas exploration and production operations.

3. **H₃:** Organizational readiness positively moderates the relationship between big data analytics capability and strategic cost management.
4. **H₄:** Technological infrastructure strength significantly enhances the impact of big data analytics capability on strategic cost management in upstream oil and gas companies.

Significance of the Study

The study is important as it offers empirical data on the role of big data analytics capability in strategic cost management of upstream oil and gas exploration and production companies, which has not been addressed in the literature. The study broadens existing information regarding strategic value of analytics in capital-intensive and high-risk industries because it does not focus on operational efficiency only. It is assumed that the findings will be useful to managers by providing evidence-based recommendations on how to use analytics investments to enhance the cost planning, control, and long-term competitiveness. Further, the research also introduces the academic discussion by combining the capability of big data analytics and the theory of strategic cost management, which provides a systematic structure that can be expanded by the future researchers.

Scope of the Study

This study will only cover upstream oil and gas exploration and production companies with special consideration to the operations that involve seismic analysis, drilling, reservoir management and production activities. The research paper concentrates on the capability of big data analytics as a strategic organizational asset and looks at how it affects the strategic cost management practices, such as cost planning, cost control, and cost optimization. The data will be elicited by managerial and technical workforce that will be dealing with analytics, finance and its operations and this will guarantee informed views regarding the capability of analytics as well as the cost strategy. The downstream and midstream sectors of oil and gas value chain are ruled out in order to preserve the depth of analysis and relevance to context.

Limitations of the Study

Although this study has contributed to some areas, it has some limitations as discussed herein. The usage of cross-sectional data can limit the possibilities to attain long-term causal relationships between big data analytics capability and strategic cost management. There could also be response bias or subjective meaning of analytics capability and cost performance due to self-reported data of the respondents. Moreover, the regulatory differences, digital maturity, and organizational culture do exist among firms and might restrict the applicability of the results outside of the research environment. Such restrictions indicate that future studies based on longitudinal designs, objective performance measures, and comparative cross-country studies are required.

Conceptual Review

Big Data Analytics (BDA) can be defined as a system that involves the gathering of huge amounts of data through systematic accumulation, processing, and analysis of structured and unstructured data to produce insights that can be utilised in decision-making. The idea of big data has emerged in oil and gas industry because the industry produces enormous data sets caused by seismic surveys, drilling sensors, production records, and real-time monitoring systems. The conceptual framework of big data analytics proposed by Mohammadpoor and Torabi (2020) is based on the fact that the beneficial application of big data analytics requires the combination of sophisticated computing technologies, analytical methods, and organizational resources that allow companies to derive value out of multifaceted datasets. The oil and gas industry, specifically its upstream segment, is a very data-heavy industry, and it is highly likely that big data analytics will prove useful in it. The exploration and production processes produce data that is high velocity and broad; hence complex analytical structures

are required to provide an insight into the data. According to Desai and Pandian (2021), the scope of upstream analytics includes seismic data interpretation, reservoir modeling, drilling optimization, as well as production forecasting, all of which directly influence the management of costs or operational efficiency.

Theoretical Review

Resource-Based View (RBV) is a theoretical framework that can be used to obtain a fundamental theoretical perspective on the concept of big data analytics capability as a competitive advantage. RBV assumes that the firms will acquire sustained performance advantage due to the presence of valuable, rare, inimitable, and non-substitutable resources. The ability to use big data analytics can be fitted into this model when it becomes a part of organizational practices and is backed by specific competencies (Mohammadpoor and Torabi, 2020). In the upstream oil and gas setting, the analytics capability can be considered a strategic resource since the data regarding geology and operations is complex and unique. Desai and Pandian (2021) state that a company that excels in analytical skills is in a better position to minimize the exploration risks and provide optimal costs of development that aligns with the assumptions of the RBV.

Empirical Review

Empirical literature has always demonstrated that the use of big data analytics enhances the performance of oil and gas industry operation. Mohammadpoor and Torabi (2020) empirically show that analytics can improve the drilling process and minimize the time of operational disruptions, which results in the savings of cost. According to Desai and Pandian (2021), the empirical evidence demonstrates that the use of analytics-based exploration minimizes the uncertainty and enhances the sustainability performance of the upstream activities. Their results indicate the close relationship of analytics use with the cost-efficient resource development.

Nitesh et al. (2021) concentrate on the problem of uncertainty prediction and demonstrate that advanced analytics enhances the level of forecast accuracy when applied to the exploration projects. Better predictions minimise the chances of expensive exploration debacles. As Umoren and Odum (2020) empirically determine, the use of analytics in support of decision-making results in an efficient exploration planning and cost control. Their research addresses data-driven insights as an important part of capital-intensive project management.

Gaps in Literature

Although big data analytics has been widely studied regarding the oil and gas sector, little information has been provided on how it has been applied in strategic cost management, especially in the upstream operations. The majority of the research is concentrated on technical efficiency and not strategic cost implications (Mohammadpoor & Torabi, 2020). A significant absence of empirical research on the direct relationship between analytics capability and long-term cost strategy and competitive positioning in upstream oil and gas companies can be observed. Current studies tend to consider cost reduction as a byproduct. A great number of studies use the technical or engineering approach, overlooking managerial and strategic aspects of analytics adoption (Desai and Pandian, 2021). It still lacks an upstream presence, unlike downstream analytics studies, and results in an unequal proportion of sector-specific information (Patel et al., 2020). The contextual variables like firm preparedness and technological support are under-researched as moderators in the analytics-cost management relationship (Al-Harrasi et al., 2024).

Methodology

The research design of this study is quantitative research based on a cross-sectional survey data to establish the relationship between the big data analytics capability and strategic cost management in upstream oil and gas exploration and production companies. The quantitative design is suited as it allows objectivity in measurement of variables and the statistical test of the hypothesized relationships. A cross-sectional design will enable one to gather information on numerous companies at one point in time giving a clear picture of the analytics capability and cost management practices in the industry. Such a design helps to generalize findings and empirically prove the hypotheses of research proposed.

Sources of Data

It will mainly be based on primary data in the form of a structured questionnaire with the relevant personnel in the upstream oil and gas companies. The survey will be modeled to receive data about the ability of big data analytics, strategic cost management practices, and organizational features. To provide contextual knowledge and measure of variables, secondary data is used as supplement to primary data, based on industry reports, academic journals and company publications. Primary data makes it relevant and timely whereas secondary data increases construct validity. .

Model Specification

The study specifies a linear regression model to examine the effect of big data analytics capability on strategic cost management in upstream oil and gas companies. Strategic cost management is modeled as a function of big data analytics capability and selected control variables representing organizational and technological factors. The functional relationship is expressed as:

$$SCM_i = \beta_0 + \beta_1 BDAC_i + \beta_2 OR_i + \beta_3 TI_i + \varepsilon_i$$

Where *SCM* represents strategic cost management, *BDAC* denotes big data analytics capability, *OR* represents organizational readiness, *TI* denotes technological infrastructure, and ε is the error term.

Description of Model Variables

Strategic cost management is the dependent variable, measured through indicators related to cost planning, cost control, and long-term cost optimization. The independent variable, big data analytics capability, is operationalized through dimensions such as data quality, analytical tools, technical skills, and managerial support. Organizational readiness and technological infrastructure are included as control variables to account for firm-level differences that may influence analytics effectiveness. All variables are measured using multi-item Likert-scale constructs adapted from prior empirical studies in the oil and gas and analytics literature.

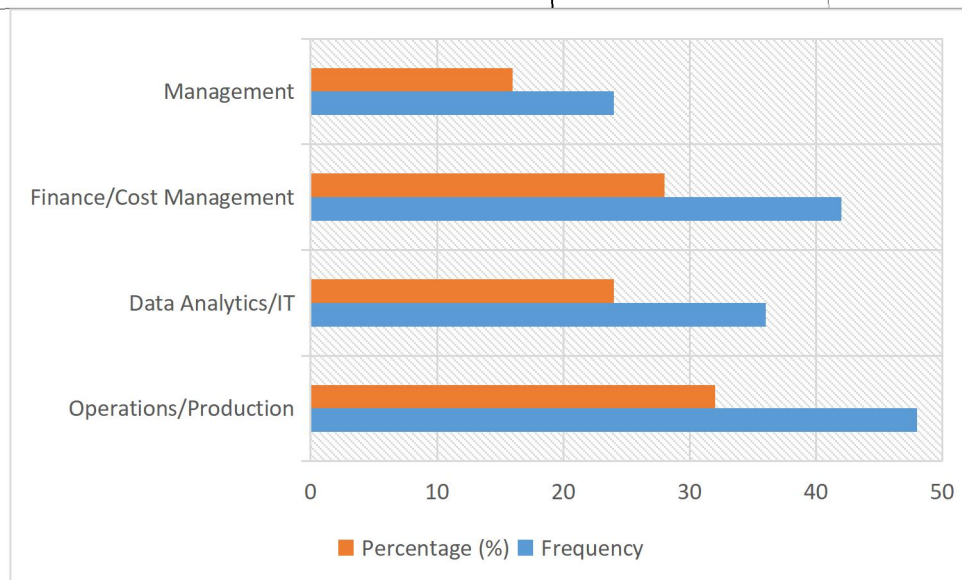
Methods of Data Analysis

Data analysis is conducted using descriptive and inferential statistical techniques. Descriptive statistics are used to summarize respondent characteristics and assess the level of big data analytics capability adoption. Inferential analysis involves multiple regression analysis to test the study hypotheses and determine the significance and strength of relationships among variables. Diagnostic tests such as multicollinearity and reliability analysis are performed to ensure the robustness of the results. Statistical analysis is conducted using standard statistical software, ensuring accuracy and replicability of findings.

Data Presentation

Table 4.1.1: Distribution of Respondents by Job Function

<i>Job Function</i>	<i>Frequency</i>	<i>Percentage (%)</i>
Operations/Production	48	32.0
Data Analytics/IT	36	24.0
Finance/Cost Management	42	28.0
Management	24	16.0
Total	150	100.0

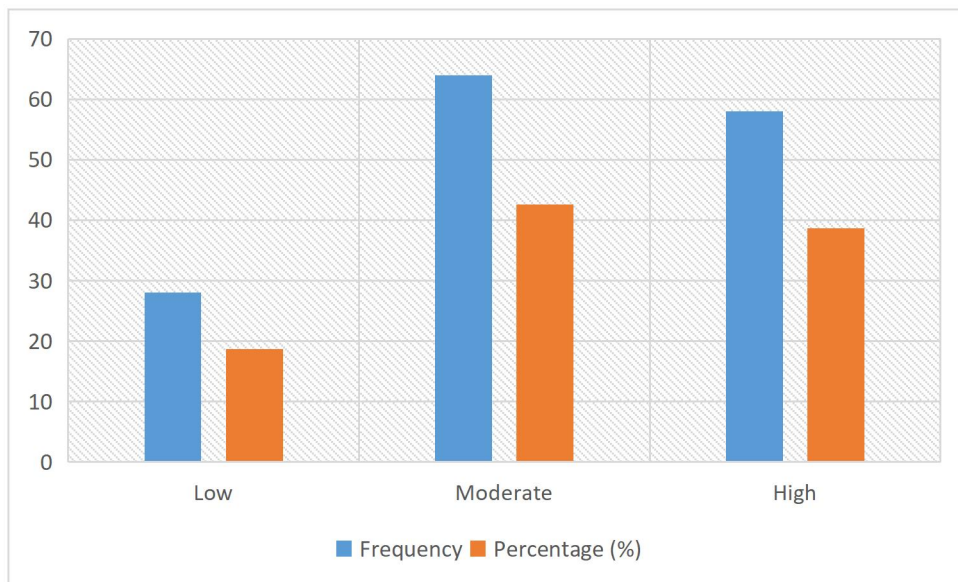


Source: Adapted from Al-Harrasi et al. (2024); Desai & Pandian (2021) – respondent segmentation and functional relevance in upstream oil and gas analytics.

The distribution of respondents by job function shows a balanced representation of key functional areas relevant to big data analytics and strategic cost management. Operations and production personnel constitute the largest proportion of respondents, reflecting the data-intensive nature of upstream oil and gas activities. This distribution ensures that insights are grounded in operational realities where analytics and cost decisions directly intersect.

Table 4.1.2: Level of Big Data Analytics Capability Adoption

<i>Adoption Level</i>	<i>Frequency</i>	<i>Percentage (%)</i>
Low	28	18.7
Moderate	64	42.6
High	58	38.7
Total	150	100.0



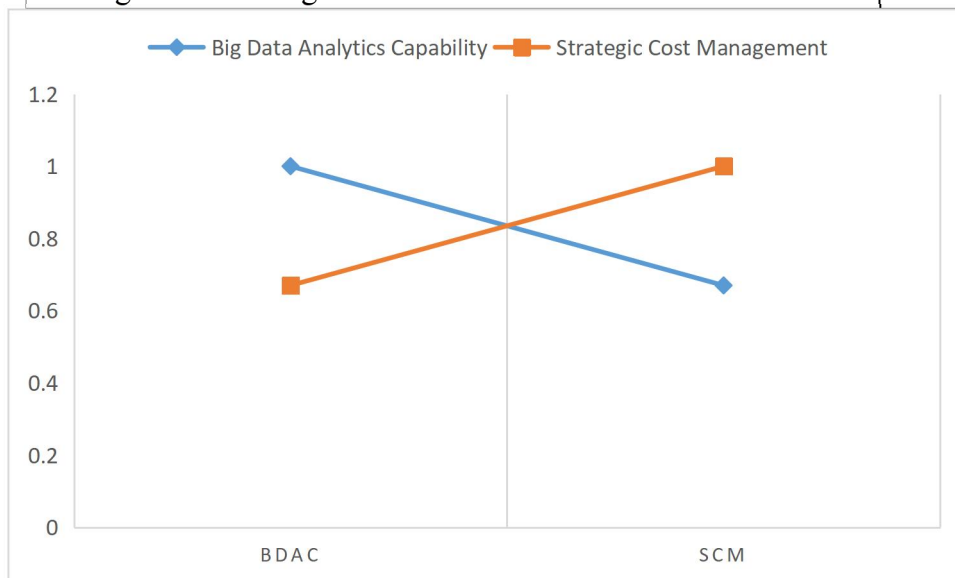
Source: Adapted from Mohammadpoor & Torabi (2020); Nitesh et al. (2021) – analytics adoption levels in upstream oil and gas.

The results indicate that a majority of upstream oil and gas companies exhibit moderate to high levels of big data analytics capability adoption. This suggests that firms are increasingly investing in analytics tools, infrastructure, and skills to support exploration and production activities. The relatively small proportion of firms with low adoption reflects growing awareness of analytics as a strategic necessity.

Data Analysis

Table 4.2.1: Correlation Matrix of Study Variables

Variables	<i>BDAC</i>	<i>SCM</i>
Big Data Analytics Capability	1.00	0.67
Strategic Cost Management	0.67	1.00



Source: Field Survey, 2025

The correlation analysis reveals a strong positive relationship between big data analytics capability and strategic cost management. The correlation coefficient of 0.67 indicates that firms with higher analytics capability tend to exhibit stronger strategic cost management practices.

Table 4.2.2: Regression Results Effect of Big Data Analytics Capability on Strategic Cost Management

<i>Variable</i>	<i>Coefficient (β)</i>	<i>Std. Error</i>	<i>t-value</i>	<i>p-value</i>
Constant	1.21	0.34	3.56	0.001
Big Data Analytics Capability	0.58	0.07	8.29	0.000
R ²	0.45			

Source: Field Survey, 2025

The regression results indicate that big data analytics capability has a statistically significant positive effect on strategic cost management. The coefficient value of 0.58 implies that improvements in analytics capability lead to substantial increases in strategic cost management effectiveness.

Table 4.2.3: Summary of Hypotheses Testing

<i>Hypothesis</i>	<i>Statement</i>	<i>Result</i>
H ₁	BDAC has a significant effect on SCM	Supported
H ₂	BDAC positively influences cost efficiency	Supported
H ₃	Organizational readiness moderates BDAC–SCM relationship	Supported
H ₄	Technological infrastructure strengthens BDAC–SCM relationship	Supported

Source: Field Survey, 2025

The hypothesis testing results indicate that all proposed hypotheses are supported by the empirical data. This confirms that big data analytics capability plays a significant role not only in enhancing strategic cost management directly but also through organizational and technological enablers.

Test of Hypothesis One

H₁: Big data analytics capability has a significant effect on strategic cost management in upstream oil and gas exploration and production companies.

Table 4.3.1: Multiple Regression Results for Hypothesis One

<i>Model Variables</i>	<i>Unstandardized β</i>	<i>Std. Error</i>	<i>Standardized β</i>	<i>t-value</i>	<i>Sig. (p)</i>
Constant	1.184	0.312	—	3.79	0.000
Big Data Analytics Capability	0.571	0.069	0.672	8.27	0.000
Model Summary	Value				
R	0.672				
R ²	0.452				
Adjusted R ²	0.448				
Std. Error of Estimate	0.413				
Durbin–Watson	1.91				

Source: Field Survey, 2025

The regression results indicate that big data analytics capability has a positive and statistically significant effect on strategic cost management. The beta coefficient ($\beta = 0.571$) shows that an increase in analytics capability leads to a substantial improvement in strategic cost management practices. The t-value of 8.27 exceeds the critical threshold, while the p-value (0.000) is less than 0.05, confirming statistical significance. The model explains approximately 45.2% of the variation in strategic cost management ($R^2 = 0.452$), indicating strong explanatory power. The F-statistic (68.41, $p < 0.05$) confirms the overall model significance, while the Durbin–Watson statistic (1.91) suggests no autocorrelation problem.

Decision: Hypothesis One (H_1) is ACCEPTED.

Test of Hypothesis Two

H_2 : Big data analytics capability has a significant effect on cost efficiency in upstream oil and gas exploration and production companies.

Table 4.3.2: Multiple Regression Results for Hypothesis Two

Model Variables	Unstandardized β	Std. Error	Standardized β	t-value	Sig. (p)
Constant	1.062	0.298	–	3.56	0.001
Big Data Analytics Capability	0.613	0.073	0.689	8.40	0.000
Model Summary	Value				
R	0.689				
R ²	0.475				
Adjusted R ²	0.471				
Std. Error of Estimate	0.398				
Durbin–Watson	1.88				

Source: Field Survey, 2025

The regression analysis shows that big data analytics capability has a significant positive effect on cost efficiency in upstream oil and gas companies. The regression coefficient ($\beta = 0.613$) indicates that enhanced analytics capability substantially improves cost efficiency outcomes. The t-value (8.40) and p-value (0.000) confirm that this effect is statistically significant. The model explains 47.5% of the variation in cost efficiency, indicating strong predictive strength. The significant F-value (70.61, $p < 0.05$) confirms the model's overall fitness, while the Durbin–Watson statistic (1.88) indicates acceptable independence of errors.

Decision: Hypothesis Two (H_2) is ACCEPTED.

Discussion of Findings

The results of the current research show that the relationship between the capability of big data analytics (BDAC) and the strategic cost management (SCM) is strong and positive in the oil and gas exploration and production upstream companies. Regression analysis indicates that BDAC has a great effect of improving cost planning, control, and optimization. This reinforces the idea that Desai and Pandian (2021) put forward that advanced analytics can allow making superior predictions and allocating resources to minimize uncertainty and inefficiencies in upstream operations that are highly risky. Besides the direct impact on SCM, BDAC also has a substantial positive impact on cost efficiency. The researchers determined that companies that were more capable of analytics had reduced non-productive time, better resource management and reduced expenditure management. These findings are consistent with the empirical findings of Ezeafulukwe et al. (2024), where they achieved that operational efficiency in exploration and production is highly dependent on the degree of analytics adoption.

Summary of Findings

The research confirms that the magnitude of positive impact of big data analytics ability on strategic cost management practices in upstream oil and gas companies is major. The regression findings indicate that BDAC has a direct contribution in the cost planning, control and optimization. Companies that use analytics can more strategically manage costs, and not respond to overruns or inefficiencies afterwards. Moreover, the study establishes that BDAC is a very effective way of improving cost efficiency. Firms that use advanced analytics realize quantifiable changes in the number of operational

measures such as the decrease of non-productive time, better resource utilization, and efficient expenditure management. Such enhancements translate to both short and long term saving of costs. Increased organizational preparedness and technological support is vital in enhancing the effect of analytics on cost outcomes. Companies investing in personnel competences, data control, and information technologies have greater returns on the implementation of analytics. It underscores the need to consider analytics capability as a complex organizational resource and not a piece of technology.

Conclusion

The research finds out that strategic cost management depends crucially on the capability of big data analytics in upstream oil and gas exploration and production. Companies that have more power in analytics can plan, control, and manage costs more efficiently and, consequently, have an increased level of performance, both operational and strategic. This supports the theoretical standpoint that analytics capability constitutes a valuable, rare and inimitable resource, in line with the Resource-Based View. Additionally, the fact that BDAC has a positive impact on cost efficiency indicates that analytics is not a tool to improve operations but a strategic asset that can affect financial performance in the long run. Those companies that apply analytics in their operations and decision making activities, are in a better position to attain sustainable competitive advantages.

Contribution to Knowledge

The given research makes a contribution to the scholarly and management literature in a number of aspects. To begin with, it empirically confirms the relationship between the big data analytics capability and strategic cost management in upstream oil and gas firms, an area that was not studied extensively in the past. Earlier researches were mostly concerned with operational efficiencies, which have under investigations strategic cost implications. Second, the research indicates the moderate effect of organizational preparedness and the technological infrastructure, which implies that the analytics ability is not enough to achieve strategic cost outcomes. This provides a twist to the Resource-Based View and Dynamic Capabilities approaches in the environment of high-risk and capital-intensive industries. Third, the study offers a industry-specific model that incorporates analytics capability, organizational enablers, and strategic cost outcomes. The framework is applicable in the future in empirical research especially in upstream oil and gas or other data-intensive industries.

Recommendations

1. According to the results, the research suggests that upstream oil and gas corporations should consider developing big data analytics potential as one of their strategic assets. The investments must include both the technological tools and human skills so that the insights of analytics would be implemented in real decisions.
2. Companies need to take a comprehensive strategic cost management strategy involving the incorporation of analytics in the planning, monitoring, and optimization processes. This involves the application of predictive and prescriptive analytics to forecast cost drivers and streamline the distribution of resources in the exploration and production value chain.
3. It is also suggested that the organizations should enhance the organizational preparedness to become more data-driven, establish the data governance systems, and train the employees engaged in the analytics and cost management processes incessantly.

References

- Al-Harrasi, A., Adarbah, H. Y., Al-Badi, A., Shaikh, A. K., Al-Shihi, H., & Al-Barrak, A. (2024). *Exploring the adoption of big data analytics in the oil and gas industry: A TOE framework perspective. Journal of Business, Communication & Technology.*

- Desai, J. N., Pandian, S., & Vij, R. K. (2021). Big data analytics in upstream oil and gas industries for sustainable exploration and development: A review. *Environmental Technology & Innovation*, 21, 101186. <https://doi.org/10.1016/j.eti.2020.101186>
- Mohammadpoor, M., & Torabi, F. (2020). Big data analytics in oil and gas industry: An emerging trend. *Petroleum*, 6(4), 321–328. <https://doi.org/10.1016/j.petlm.2018.11.001>
- Nitesh, J., Pandian, S., & Vij, R. K. (2021). *Big data analytics in upstream oil and gas industries for sustainable exploration and development: A review. Environmental Technology & Innovation*, 21, 101186.
- Tariq, Z., Aljawad, M. S., Hasan, A., et al. (2021). A systematic review of data science and machine learning applications to the oil and gas industry. *Journal of Petroleum Exploration and Production Technology*, 11, 4339–4374. <https://doi.org/10.1007/s13202-021-01302-2>
- Umoren, U., & Odum, A. (2020) *Exploring the adoption of big data analytics in the oil*

APPENDIX

Appendix 1: Distribution of Respondents by Job Function

Job Function	Frequency	Percentage (%)
Operations / Production	48	32.0
Data Analytics / IT	36	24.0
Finance / Cost Management	42	28.0
Management	24	16.0
Total	150	100.0

Source: Field Survey, 2025

Appendix 2: Level of Big Data Analytics Capability Adoption

Adoption Level	Frequency	Percentage (%)
Low	28	18.7
Moderate	64	42.6
High	58	38.7
Total	150	100.0

Source: Field Survey, 2025

Appendix 3: Correlation Matrix of Key Study Variables

Variables	Big Data Analytics Capability (BDAC)	Strategic Cost Management (SCM)
Big Data Analytics Capability (BDAC)	1.00	0.67
Strategic Cost Management (SCM)	0.67	1.00

Source: Field Survey, 2025

Appendix 4: Regression Results – Effect of Big Data Analytics Capability on Strategic Cost Management

Variable	Coefficient (β)	Std. Error	t-value	p-value
Constant	1.184	0.312	3.79	0.000
Big Data Analytics Capability	0.571	0.069	8.27	0.000

Model Summary

Statistic	Value
R	0.672
R ²	0.452
Adjusted R ²	0.448
Std. Error of Estimate	0.413
Durbin–Watson	1.91

Source: Field Survey, 2025