OPEN ACCESS
World Journal of Economics, Business and Management
ISSN: 3049-2181 | Vol. 3, No. 5, May, 2026
Website: https://wasrpublication.com/index.php/wjebm

RISK MANAGEMENT SYSTEM AND PERFORMANCE OF OIL AND GAS PIPELINE PROJECTS IN SOUTH-SOUTH, NIGERIA

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Received: 07/04/2025 | Accepted: 04/05/2026 | Published: 18/05/2026

Abstract: *This study investigated the relationship between risk management system and performance of oil and gas pipeline projects in South-South: Moderating the role of Technology Capability. A sample of 399 respondents were drawn across oil and gas pipeline projects in South-South. The study utilized the cross-sectional research design. The study adopted a survey research design and relied on primary data collected through a closed-ended structured questionnaire administered to employees of oil and gas firms across the region. Using stratified random sampling, the sample size was determined through the Taro Yamane formula, and proportional allocation was applied across the states in the South-South region. Data were analyzed with Structural Equation Model-Partial Least Squares (SEM-PLS) version 4.0 statistical tools to test the hypotheses and establish relationships among the variables. Based on the results and empirical evidence, this research revealed that all the risk management system utilized in the analysis are linked directly with the performance of oil and gas pipeline projects. The research concludes that all four dimensions of risk management system have varying effect and influence on the performance of oil and gas pipeline projects. Their effects are largely small. Given that risk management committees were not significantly associated with cost control, oil and gas firms should complement committee oversight with dedicated cost engineering units that monitor financial variances and introduce proactive cost optimization techniques.*

Keywords: Risk management system, Performance, Technology Capability, Pipeline Projects, South-South, Nigeria.

Introduction

The oil and gas industry remains one of the most critical sectors driving economic development and industrial growth globally, and in Nigeria, it contributes significantly to national revenue and foreign exchange earnings. Within this sector, pipeline infrastructure plays an indispensable role in the transportation of crude oil, natural gas, and refined petroleum products from production sites to processing facilities and end-users (Dal Maso et al., 2024). The South-South region of Nigeria, which hosts the majority of the country's oil and gas activities, is particularly strategic in this regard as it harbors extensive pipeline networks critical for the functioning of the industry. However, pipeline projects in the region have been plagued by a variety of risks including vandalism, oil theft, gas flaring, corrosion, sabotage, and operational inefficiencies, all of which have hindered project performance and caused substantial economic, environmental, and social losses (Adamu et al., 2021; Eze et al., 2022).

1.2 Statement of the Problem

The oil and gas industry in Nigeria, particularly in the South-South region, has historically been both the backbone of the national economy and a major source of persistent challenges due to its operational and infrastructural vulnerabilities (Shah et al., 2025). Despite the vast revenue generation potential of the sector, with petroleum exports accounting for over 80 percent of government revenue, the country continues to grapple with underperformance of oil and gas projects, largely due to ineffective risk management systems (Olawale & Oyegoke, 2022). One of the major issues is pipeline-related risks, which have consistently undermined the performance of oil and gas projects. According to the Nigerian National Petroleum Corporation (NNPC, 2021), Nigeria loses an estimated 200,000 barrels of crude oil daily to pipeline vandalism and oil theft, translating to several billion dollars annually in lost revenue. This revenue loss has significant implications for national development, considering the reliance of the country's budgetary expenditure on oil rents.

Therefore, the central problem addressed in this study is that, despite the acknowledged importance of risk management systems in enhancing project performance, oil and gas pipeline projects in the South-South of Nigeria continue to suffer from delays, cost overruns, substandard quality outcomes, and severe environmental consequences. The ineffective implementation of risk management structures—including weak committee efficacy, poor internal control, limited risk evaluation, and insufficient adherence to ISO 37000 standards—has hindered project resilience and national economic sustainability.

2.1 Theoretical Review

2.1.1 Resource-Based View (RBV) Theory

The Resource-Based View traces its intellectual lineage to Edith T. Penrose (1959) and was given explicit strategic framing by Birger Wernerfelt (1984) and later formalised with the VRIN (valuable,

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rare, inimitable, non-substitutable) logic by Jay Barney (1991). Penrose (1959) emphasised the firm as a bundle of productive resources whose internal heterogeneity explains differing growth trajectories; Wernerfelt (1984) and Barney (1991) made the argument operative for strategy by suggesting that firm-specific resources and capabilities underlie sustained competitive advantage.

2.2.2 Dynamic Capabilities theory

Dynamic Capabilities theory is most closely associated with Teece, Pisano, and Shuen (1997) and further elaborated by Teece (2007)—complements RBV by explaining how firms adapt resource endowments over time. Teece et al. (1997) define dynamic capabilities as the firm's ability to integrate, build, and reconfigure internal and external competences to address rapidly changing environments; the later explication (Teece, 2007) breaks this into sensing, seizing and reconfiguring activities.

2.2.3 Agency Theory

Agency Theory, formally introduced by Jensen and Meckling (1976), addresses principal–agent problems that arise when ownership and managerial control are separated. Jensen and Meckling (1976) argued that divergence of interests and information asymmetry between owners (principals) and managers (agents) create agency costs unless mitigated by monitoring and incentive mechanisms.

2.2.4 Institutional Theory

Institutional Theory—developed in organisational sociology by Meyer and Rowan (1977) and expanded by DiMaggio and Powell (1983)—explains why organisations adopt similar structures and practices because of coercive, mimetic and normative pressures in their environment. Meyer and Rowan (1977) argued that formal structures can be symbolic responses to institutional pressures rather than purely efficiency-driven mechanisms, while DiMaggio and Powell (1983) articulated the isomorphic pressures that make organisations within a field converge. Applied to ISO 31000 adherence and the adoption of formal risk frameworks, institutional theory helps explain why pipeline operators may adopt international standards: coercive pressure from regulators and financiers, mimetic pressure to emulate industry leaders, and normative pressure from professional bodies and consultants all push firms toward formalised risk processes.

2.2 Conceptual Review

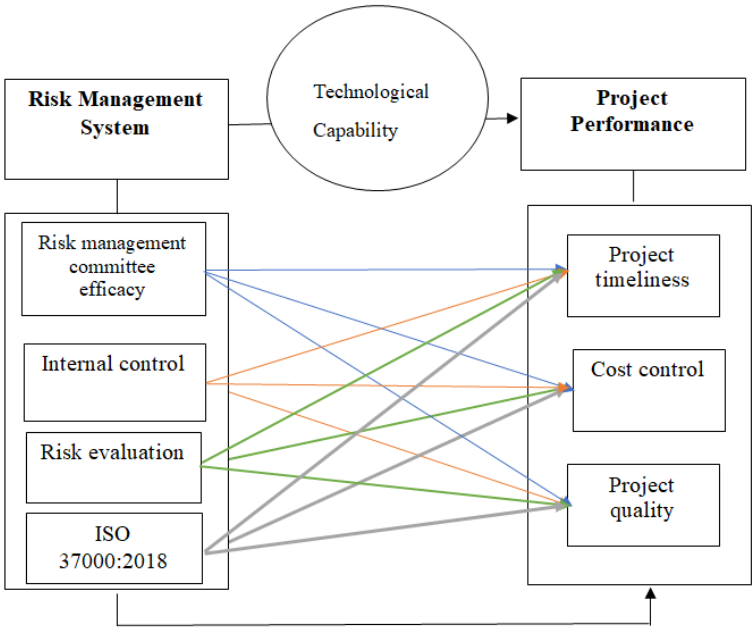

Figure 2.1: Conceptual Framework of Relationship between Risk Management System and Performance Oil and Gas Pipeline Projects in South South.

Source: Conceptualized by Obioma (2025) and adapted from dimensions of **Risk Management System**- Risk management committee efficacy; Internal control; Risk evaluation; ISO 37000:2018(Shah et al., 2025); Zhou and Wu (2010). Measures of **Project Performance** - Simon et al., (2015); Yu and Moon, (2019); Kurniawan et al., 2021 Nugroho, Prijadi & Kusumastuti, (2021). Moderating **Technological Capability** from (Joensuu-Salo, (2021); Matalamaki and Joensuu-Salo; 2022).

2.3 Review of Empirical Literature

Qiu et al. (2025) evaluated risk management on adaptive performance. The study focuses on systems that execute successive missions with random durations. To balance mission completion probability and system failure risk, the study examine two decision problems: when to abort missions and how to select the performance level prior to mission abort. The objective was to maximize the expected revenue through dynamic performance control and mission abort (PCMA) decisions. The study considers condition-based PCMA decisions and formulate the joint optimization problem into a Markov decision process. The study established the monotonicity and concavity of the value function. Based on this insight, the study show that optimizing the mission abort policy requires a series of control limits. In addition, the

study provides conditions under which the performance control policies are monotone. For comparative purposes, the study analytically evaluates the performances of some heuristic policies. Finally, the study present a case study involving unmanned aerial vehicles executing power line inspections. The results indicate the superiority of our proposed risk control policies in enhancing operational performance for safety-critical systems. Dynamic performance adjustment and mission abort decisions provide opportunities to reduce the failure risk and increase operational rewards of safety-critical systems.

Ba Awain et al. (2025) the study evaluates the effect of risk management on product innovation and performance. Furthermore, the study was carried out considering the resource scarcity of these firms, the moderating roles of entrepreneurial networking, and the current pace of change in technology, the moderating effect of technological turbulence has also been added to the research. Quantitative methods have been applied in this research. The data have been collected using adapted questionnaires from prior studies. A purposive sampling technique has been applied to collect the data. A sample of 99 small and medium enterprises was chosen, and their owners and managers were chosen as representatives. The framework has been evaluated using Structural equation modelling with the help of SMART PLS-3. The findings drawn from the analysis of the empirical data confirmed that supply chain risk management holds a significant impact on product innovation performance and sustainability in SMEs. Additionally, entrepreneurial networking and technological turbulence both hold a significant direct impact on product innovation performance and sustainability as well. Moreover, entrepreneurial networking and technological turbulence hold a significant moderating effect on the relationship between supply chain risk management and product innovation performance.

Dal Maso et al. (2024) investigatesd the relationship between environmental performance and market values of firms exposed to environmental risk that manage effectively to reduce it. Using a sample of 8112 US firm-year observations during 2012–2020, we document a positive relationship between firms' environmental performance and market-to-book value. Moreover, we show that this relationship holds primarily when firms are more vulnerable to environmental risk and proactively manage to reduce it. Our paper not only agrees with the previous literature showing that it pays to be good but, most importantly, shows that such an approach is reflected in higher valuation mostly when companies use sound environmental risk-control strategies. Contributions and implications are discussed.

3.1 Research Design

The research design adopted for this study is a cross-sectional survey design, which is most appropriate for investigating the relationship between the effectiveness of risk management systems and the performance of oil and gas pipeline projects in the South-South region of Nigeria. A cross-sectional survey allows data to be collected from a population or sample at a single point in time, providing a snapshot of existing conditions, perceptions, and practices across multiple organizations simultaneously (Creswell & Creswell, 2018).

3.2 Population of Study

The population of this study comprises all registered oil and gas firms operating within the South-South region of Nigeria, particularly those directly linked to pipeline-related projects, including gas distribution, gas gathering, gas transmission, hazardous liquids transportation, and liquefied natural gas (LNG) facilities. The South-South region, which includes Akwa Ibom, Bayelsa, Cross River, Delta, Edo, and Rivers States, is the hub of Nigeria's oil and gas industry and hosts a significant number of multinational and indigenous firms engaged in pipeline construction, maintenance, and operations. These firms are critical stakeholders in the sector, as they oversee pipeline infrastructure and provide services such as engineering, procurement, construction, and pipeline integrity management.

3.3 Sample and Sampling Techniques

The study will employ a stratified random sampling technique to ensure representative coverage of oil and gas firms and their staff across the six states of Nigeria's South-South region. Stratified random sampling is appropriate because the population is naturally partitioned by state (Rivers, Delta, Bayelsa, Akwa Ibom, Edo, Cross River) and because stratification improves precision by ensuring proportional representation from each state-stratum before applying random selection within strata (Cochran, 1977; Saunders, Lewis, & Thornhill, 2019).

The overall sample size is calculated using Yamane's (1967) formula for sample size determination with a chosen precision level, and then allocated to each state in proportion to its share of the total population.

Yamane's formula (1967) is given as:

$n = N / (1 + N * e^2)$

These sum to a total population N = 106,000, which is the basis for determining the required sample. A conventional precision level e = 0.05 (5%) is chosen to balance statistical confidence and feasibility in the field (Yamane, 1967; Krejcie & Morgan, 1970; Saunders et al., 2019).

Applying the formula:

$n = 106,000 / (1 + 106,000 * 0.05^2)$

$n = 106,000 / (1 + 106,000 * 0.0025)$

$n = 106,000 / (1 + 265)$

$n = 106,000 / 266 \approx 398.50 \rightarrow$ rounded to 399 respondents

Table 3.1: Allocated Sample

State	Estimated population (N_i)	Proportion (N_i / N)	Allocated sample n_i (exact)	Allocated sample (rounded)
Rivers	42,500	0.401	159.77	160
Delta	22,500	0.212	84.59	85
Bayelsa	22,500	0.212	84.59	85
Akwa Ibom	7,500	0.071	28.20	28
Edo	7,500	0.071	28.20	28
Cross River	3,500	0.033	13.16	13
Total	**106,000**	**1.00**	**398.50**	**399**

Source: Authors Compilation (2025)

4.1. Presentation of Data

No of Questionnaires	Frequency/Rate
Questionnaires Returned	399
Returned and Useable Questionnaires	399
Returned and Excluded Questionnaires	0
Questionnaires not returned	0
Response Rate	100%
Valid Response Rate	100%

Table 4.2 Gender Distribution of Respondents

Gender	Frequency	Percentage (%)
Male	285	71.4
Female	114	28.6
Total	399	100

Table 4.4 Educational Qualification of Respondents

Educational Qualification	Frequency	Percentage (%)
OND	30	7.5
HND	50	12.5
B.Sc.	160	40.1
M.Sc.	80	20.1
MBA	25	6.3
Ph.D.	14	3.5
Professional Certification (ICAN, PMP, COREN, etc.)	40	10.0
Total	399	100

Table 4.10 Nature of Company of Respondents

Nature of Company	Frequency	Percentage (%)
Multinational Oil & Gas Firm	150	37.6
Indigenous Oil & Gas Firm	110	27.6
Oil Servicing Company	90	22.6
Pipeline Construction Firm	49	12.3
Total	399	100

Table 4.16: Summary of Hypothesis and Finding

H_0:	Path	Hypothesis Statement	Coefficient		Decision
H_{01}:	RCM -> TML	There is no significant relationship between risk management committee efficacy and project timeliness of oil and gas pipeline projects in the South-South.	-0.126	0.017	Supported/ Reject Null
H_{02}:	RCM -> QLT	There is no significant relationship between risk management committee efficacy and cost control of oil and gas pipeline projects in the South-South.	0.033	0.334	Not supported
H_{03}:	RCM -> CNT	There is no significant relationship between risk management committee efficacy and standard quality of project of Oil and gas pipeline projects in the South-South.	-0.127	0.053	Supported
H_{04}:	INC -> TML	There is no significant relationship between internal control and project timeliness of oil and gas pipeline projects in the South-South.	-0.169	0.001	Supported
H_{05}:	INC -> QLT	There is no significant relationship between internal control and cost control of oil and gas pipeline projects in the South-South.	-0.063	0.208	Not supported
H_{06}:	INC -> CNT	There is no significant relationship between internal control and standard quality of project of Oil and gas pipeline projects in the South-South.	-0.19	0.002	Supported
H_{07}:	REV -> TML	There is no significant relationship between risk evaluation and project timeliness of oil and gas pipeline projects in the South-South.	0.097	0.059	Not supported
H_{08}:	REV -> QLT	There is no significant relationship between risk evaluation and cost control of oil and gas pipeline projects in the South-South.	-0.264	0.000	Supported
H_{09}:	REV -> CNT	There is no significant relationship between risk evaluation and standard quality of project of Oil and gas pipeline projects in the South-South.	0.093	0.059	Not supported
H_{010}:	ISO -> TML	There is no significant relationship between ISO 37,000;2018 adherence orientation and project timeliness of oil and gas pipeline projects in the South-South.	-0.138	0.013	Supported
H_{011}:	ISO -> QLT	There is no significant relationship between ISO 37,000;2018 adherence orientation and cost control of oil and gas pipeline projects in the South-South.	-0.201	0.003	Supported
H_{012}:	ISO -> CNT	There is no significant relationship between ISO 37,000;2018 adherence orientation and standard quality of project of Oil and gas pipeline projects in the South-South.	-0.118	0.047	Supported
H_{013}:	THC -> PRF	Moderating influence of technological capability on the relationship between risk management and performance of oil and gas pipeline projects in the South-South	-0.105	0.035	Supported

5.1 Summary

This thesis investigated the relationship between Effectiveness of Risk Management and Performance Oil and Gas Pipeline Projects in South South., Nigeria. The study follows a predominantly deductive approach as it first examined extant theories and assumptions about the relationship between the variables before developing empirical frameworks through which it assessed the manifestations of the variables within the context of oil and gas pipeline projects in the South-South, Nigeria.

i. The results indicate that the efficacy of risk management committees (RCM) has a statistically significant but negative relationship with project timeliness and standard quality, with coefficients of –0.126 (p = 0.017) and –0.127 (p = 0.053) respectively, leading to rejection of the null hypotheses. This suggests that while the existence of risk management committees influences outcomes, inefficiencies or bureaucratic delays in their activities may actually hinder timely delivery and compromise project quality. However, the relationship between risk management committee efficacy and cost control was not significant (coefficient = 0.033, p = 0.334), implying that committee effectiveness does not substantially impact cost-related outcomes in pipeline projects.

ii. For internal control (INC), the findings reveal significant negative relationships with both project timeliness (coefficient = –0.169, p = 0.001) and project quality (coefficient = –0.190, p = 0.002), showing that strong internal control mechanisms can directly influence the performance and compliance of pipeline projects. However, the relationship between internal control and cost control was not statistically significant (coefficient = –0.063, p = 0.208), suggesting that while internal controls safeguard processes and ensure accountability, they may not directly translate to better cost management outcomes.

iii. The findings on risk evaluation (REV) highlight a strong and statistically significant effect on cost control (coefficient = –0.264, p = 0.000), indicating that proactive and structured evaluation of risks improves the ability to manage costs in oil and gas pipeline projects. However, no significant relationship was found between risk evaluation and project timeliness (coefficient = 0.097, p = 0.059) or project quality (coefficient = 0.093, p = 0.059). This means that although risk evaluation helps in cost management, it does not necessarily ensure faster delivery or improved quality outcomes.

iv. Regarding ISO 37000:2018 adherence orientation, the study finds significant negative relationships across all three performance indicators: project timeliness (coefficient = –0.138, p = 0.013), cost control (coefficient = –0.201, p = 0.003), and standard quality (coefficient = –0.118, p = 0.047). This suggests that compliance with global governance standards enhances project management processes and strengthens accountability, thereby improving timeliness, cost efficiency, and quality delivery of oil and gas pipeline projects in the South-South.

Finally, the moderating effect of technological capability (THC) was also found to be significant (coefficient = –0.105, p = 0.035). This finding demonstrates that technological capability strengthens the relationship between risk management practices and overall project performance, underscoring the role of digital tools, modern monitoring systems, and advanced project management technologies in shaping successful outcomes.

5.2 Conclusion

The first conclusion arises from the role of risk management committees (RCM). The results reveal that while the existence of risk management committees is significantly associated with project timeliness and quality, the direction of the relationship is negative. This suggests that although these committees are designed to improve monitoring, coordination, and oversight, their influence often leads to delays in project delivery and inconsistencies in maintaining quality standards. Bureaucratic bottlenecks, prolonged approval processes, and overlapping responsibilities may explain this paradox. Conversely, risk management committees were not significantly associated with cost control, implying that their oversight functions may not extend strongly into the domain of financial efficiency. The conclusion here is that while RCMs are vital governance structures, their operations must be streamlined and reoriented toward efficiency rather than control-heavy procedures if they are to truly add value to project outcomes.

For internal control (INC), the study concludes that robust internal control systems significantly improve both project timeliness and quality. This suggests that when controls such as audit trails, approval systems, and compliance monitoring are effective, projects are more likely to meet deadlines and adhere to specified standards. However, internal control was not found to have a significant impact on cost control, underscoring the reality that while these systems prevent fraud, mismanagement, and inefficiencies, they do not directly translate into lower costs. This finding emphasizes the need for project managers to complement internal controls with cost-engineering practices and budget discipline tools that directly address financial outcomes.

The study also highlights the role of risk evaluation (REV) as a determinant of cost control. The conclusion here is that when risks are systematically identified, analyzed, and mitigated before or during project execution, cost overruns are less likely to occur. However, the absence of significant relationships between risk evaluation and both timeliness and quality suggests that while evaluation strengthens financial prudence, it does not automatically ensure faster delivery or improved technical performance. Thus, risk evaluation should be integrated with proactive scheduling and technical assurance measures if its benefits are to be extended beyond cost savings.

Turning to ISO 37000:2018 adherence orientation, the findings demonstrate consistent significance across all dimensions of project performance—timeliness, cost control, and quality. The conclusion here is clear: adherence to global governance standards strengthens accountability, transparency, and oversight in pipeline projects, leading to improved overall outcomes. By embedding ethical principles, stakeholder inclusivity, and structured decision-making, ISO 37000:2018 serves as a governance compass that enhances efficiency, reduces leakages, and ensures that projects meet both technical and regulatory benchmarks. Its positive influence across all dimensions underscores the centrality of

governance frameworks in transforming the oil and gas sector in Nigeria's South-South.

Finally, the moderating role of technological capability (THC) is concluded to be pivotal in shaping the risk management–performance nexus. The findings indicate that the adoption of modern technologies such as enterprise resource planning (ERP) systems, digital monitoring tools, and automated project management software significantly strengthens the effect of risk management on performance outcomes. This means that without adequate technological integration, even well-designed risk management systems may fall short in delivering desired results. The conclusion here is that technological readiness is not optional but a strategic necessity for oil and gas firms seeking to thrive in complex and volatile project environments.

Taken together, the study concludes that project performance in the South-South oil and gas pipeline sector is shaped by the dynamic interplay of governance structures, risk management practices, and technological capabilities. Risk management committees and internal controls are critical but can be counterproductive when implemented rigidly. Risk evaluation proves effective in cost management but requires integration with operational processes to affect timeliness and quality. ISO 37000:2018 adherence provides the most consistent improvements across all performance dimensions, highlighting the importance of governance frameworks. Finally, technological capability emerges as the key enabler that allows these mechanisms to translate into tangible project performance outcomes.

Based on the observations and empirical evidence, this research observed that all employed of risk management system are linked directly with the performance of oil and gas pipeline projects. The research concludes that all four dimensions of risk management system have varying effect and influence on the performance of oil and gas pipeline projects. Their effects are largely small.

5.3 Recommendations

In view of the findings and the position of this study with regards the relationship between Effectiveness of Risk Management and Performance Oil and Gas Pipeline Projects in South South., Nigeria, this study recommends as follows:

Since the results revealed that the relationship between risk management committee efficacy and project timeliness as well as project quality was significant but negative, it is recommended that the operations of risk management committees should be redesigned to minimize bureaucratic delays and redundant oversight. Committees should be empowered with decision-support technologies and streamlined reporting lines to avoid obstructing timely project delivery. In addition, their roles should be clarified to focus more on strategic guidance and less on micro-level intervention in execution, thereby ensuring that their contribution enhances rather than constrains project performance. Given that risk management committees were not significantly associated with cost control, oil and gas firms should complement committee oversight with dedicated cost engineering units that monitor financial variances and introduce proactive cost optimization techniques.

For internal control systems, the study established significant effects on timeliness and quality, but no effect on cost control. This suggests the need for project managers to sustain and expand internal control systems such as independent auditing, compliance reviews, and performance dashboards, as they contribute to meeting schedules and quality benchmarks. However, since they do not automatically translate into financial savings, organizations should integrate internal controls with cost-management strategies such as value engineering, procurement optimization, and real-time expenditure monitoring to achieve cost efficiency. This dual approach will allow controls to safeguard quality and time objectives while financial systems directly address cost challenges.

Risk evaluation was found to significantly influence cost control but not timeliness or quality, suggesting that firms should place stronger emphasis on embedding risk evaluation at both the planning and execution stages of pipeline projects. This should involve comprehensive scenario planning, probabilistic cost modeling, and the application of risk registers that are updated throughout the project cycle. Since evaluation alone does not improve quality or timeliness, it should be complemented with operational strategies such as critical path analysis, quality assurance systems, and technical reviews, ensuring that identified risks are not only costed but also mitigated with respect to schedule and technical performance.

The adherence to ISO 37000:2018 was consistently significant across timeliness, cost control, and quality, pointing to the need for oil and gas companies in Nigeria to fully integrate governance standards into their operations. It is recommended that firms adopt ISO 37000 frameworks as part of their organizational culture, training senior management and project teams in ethical leadership, stakeholder engagement, and transparent decision-making. Compliance audits should be conducted regularly to ensure that principles of accountability and inclusivity are not only documented but practiced. This will not only improve project outcomes but also boost investor confidence, regulatory compliance, and the long-term sustainability of pipeline projects.

Finally, the moderating role of technological capability underscores the urgent need for greater investments in digital tools and platforms. Oil and gas firms should adopt enterprise resource planning systems, digital project management solutions, and real-time monitoring technologies that automate reporting, enhance risk tracking, and integrate financial, technical, and operational data. By embedding digital technologies into the risk management framework, organizations can significantly improve responsiveness, reduce human errors, and optimize decision-making. The adoption of such technologies is not only a competitive advantage but also a critical requirement for ensuring that risk management mechanisms translate effectively into superior project performance.

5.4 Contributions to Knowledge

The contributions of this study to the body of knowledge on the relationship between Effectiveness of Risk Management and Performance Oil and Gas Pipeline Projects in South South., Nigeria are stated as follows:

i. The findings of the study present a holistic overview and detailed assessment of the relationship between risk management system and performance. Thus, the study approach goes further by not only assessing correlations but affirming the tolerance and variance inflation factor of the variables.

ii. Most studies on risk management system and performance were done using single and primary variables which

lacked depth, in other to avoid regressive nature of secondary data collection, the study was able to qualitative data.

iii. The data derived from the study projects the manifestation of the variables particular to oil and gas pipeline projects in the South-South, Nigeria. The study therefore contributes through its specific focus on the oil and gas pipeline projects, as such findings can serve to enrich decision making and drive knowledge utility with regards to the activities of oil and gas pipeline projects in the study scope.

iv. Finally, the study provides a strong argument for the operational features and interactions between the measures and dimensions of the variables. The evidence from the study, signify substantial interactions between dimensions such as risk management committee efficacy, internal control, risk evaluation and ISO 37,000;2018 adherence, and also shows substantial levels of interaction between measures such as Project timeliness, cost control, and standard quality of project. This validates their roles as components of their corresponding constructs and suggests their replicability in subsequent studies on the same or similar variables.

5.5 Suggestion for Further Studies

Further studies on boosting performance of oil and gas pipeline projects through a revitalization of the elements of risk management system can be carried out in the following areas:

i. Subsequent studies on risk management system and performance of oil and gas pipeline projects can be carried out within other geographical contexts and industries as a way of cross-validating the constructs presented by this study in other sectors such as construction, agriculture and manufacturing.

ii. Studies can be carried out on the relationship between the variables using other constructs which conceptualize and Operationalized the variables using other dimensions and measures not captured within the content of this particular investigation.

iii. Subsequent studies should also assess the roles of moderating/ mediating variables such as organizational climate, organizational size and even organizational culture with regards to identifying their roles and effect on the relationship between risk management system and performance of oil and gas pipeline projects.

iv. Further studies can also utilize and assess the relationship between the variables using other theoretical frameworks outside those captured and examined within the context of this study. These may include theories such as the social learning theory, the systems theory, and also the organizational embeddedness theory. These may include other possible antecedents.

HEURISTIC MODEL

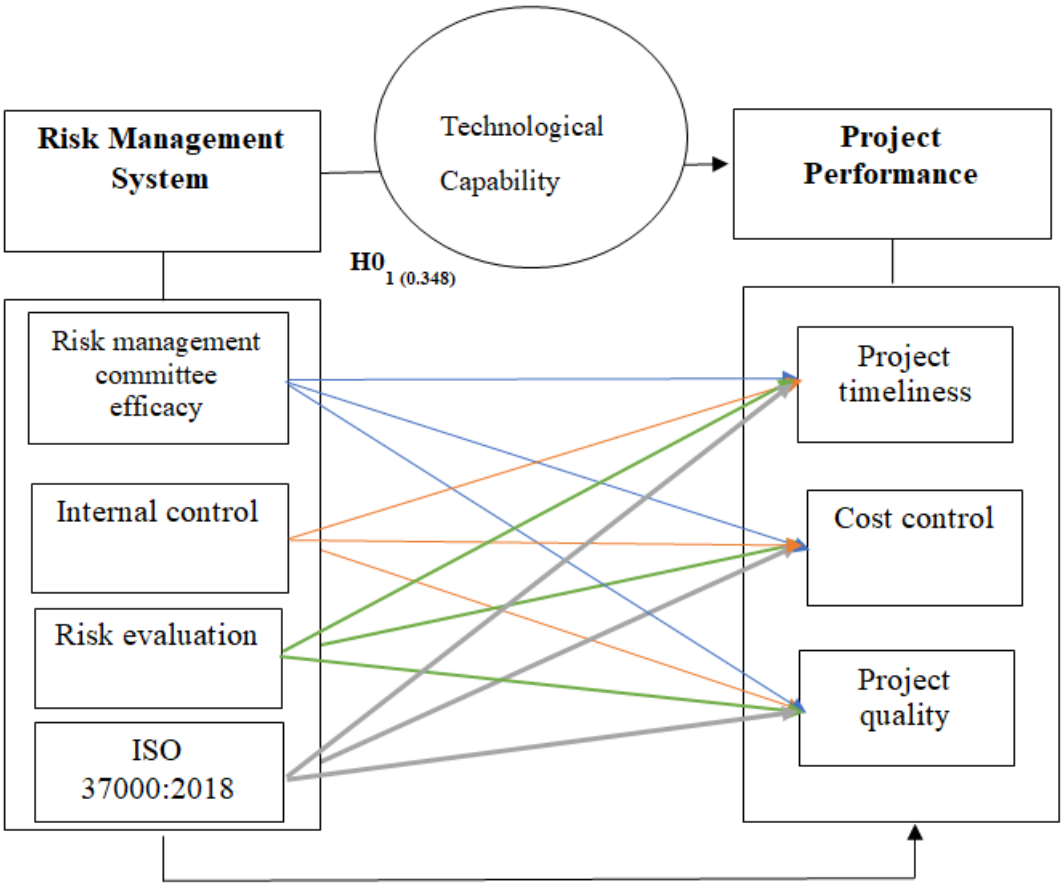

Figure 4.9: A model showing the Outcome of the Study

Keys: Bold lines $(H0_3,\ H0_4, H0_5\ H0_6, H0_7, H0_8\ and\ H0_9)$ represent strong relationships; **slightly bold lines** ($H0_1 and\ H0_2$ **)** represents moderate relationships

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