Import Terminals, Ports, and Offshore Support Logistics: Effects on Oil and Gas Project Efficiency in Africa

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ABSTRACT

The effective logistics systems are at the center of successful oil and gas project Delivery but most projects in Africa are still being characterized by cost overruns, schedule overruns and operational disruptions. The problems are usually associated with the inefficiency of import terminals, port infrastructures and administration as well as offshore logistics support. This paper has looked at the impacts of import facilities, ports and offshore support logistics in efficiency of oil and gas projects in some regions of Africa of choice. Based on the theory of supply chain performance and the perspectives of systems efficiency, the study settled in using a quantitative research design based on census with 120 major stakeholders in the field of logistics and project in West, East, and Southern Africa being surveyed. Structured questionnaires were used to collect primary data which was supplemented by secondary sources of information in the industry and institutions.

The results indicated that there were high impacts of import terminal capacity, turnaround-time, storage adequacy, and regulatory efficiency on the cost performance of the project, schedule compliance, and continuity of works. It was also discovered that port infrastructure quality and cargo handling performance had a strong effect on logistics reliability and that governance and institutional coordination had a final determination of delay outcomes. Integration of offshore support logistics, especially vessel availability, offshore base capacity and onshore-offshore coordination, turned out to be key factors that defined efficiencies and continuities of operations. In all the purposes, the findings showed that inefficiencies at a single node of the logistics were replicated throughout the whole project system, which increased the risks and transactions costs.

The paper finds that the performance of oil and gas projects in Africa relies on the simultaneous functioning of terminals, ports, and offshore logistics and not on the autonomous investments in infrastructure. The implications on policy and industry include the fact that it would require coordinated infrastructure enhancements, simplified regulations, and greater integration of logistics throughout its supply chain. The research has an empirical contribution to the literature because it gives Africa-specific evidence, and it can also be useful to policymakers, port authorities, and operators in the oil and gas industry to enhance the success of projects.

Keywords: Oil and gas logistics, import terminals, port infrastructure and governance, offshore support logistics, project efficiency, supply chain integration.

INTRODUCTION AND STUDY CONTEXT

Background of the Study

The international oil and gas sector works on a very intricate project logistics that includes the import terminals, ports, and offshore support infrastructures. Such systems are very important in facilitating prompt supply of equipment, materials and manpower both at the stages of exploration, development and production stages. Increasing project scale, capital intensity and sensitivity to schedule risks have led to an increased importance of efficient logistics coordination. Recent research emphasizes that the logistics inefficiencies can be identified as one of the most common reasons behind the cost increase and time overruns in large-scale oil and gas projects, especially in frontier and emerging markets (International Energy Agency, 2024; UNCTAD, 2024).

The support logistics within oil and gas supply chains include import terminals, ports, and offshore support of the logistics that have been referred to as the backbone of oil and gas supply chains due to the fact that they assist in bulk cargo handling, storage, marine services, and onshore and offshore connectivity. The import terminals facilitate the continuous availability of key requirements in form of drilling materials, fuel, and specialized equipment and ports offer entry points on international trade and heavy-lift activities. Offshore logistics bases organize the movement of vessels, the movement of crews, and maintenance operations which are necessary to ensure continuity in operations. It is becoming acknowledged in literature that the vulnerability of any of these aspects can derail the whole project schedule and expose costs to extreme costs (Mishrif, 2024; Lin et al., 2025).

Africa holds a strategic location in energy supply chain of the world because of the increasing reserves, production and foreign investment into the continent. Most of the major oil and gas projects in the West, East, and Southern Africa heavily rely on the maritime logistics infrastructure to reach the global markets through the inland production zones. Nevertheless, integration of Africa into global supply chain is not even, where the performance of logistics is very different among regions and countries. Researchers believe that the lack of structural infrastructure and institutional inefficiencies limit the capacity of Africa to exploit its energy resources (African Development Bank Group, 2024; International Energy Agency, 2025).

Problems of Gas and Oil Projects Efficiency in Africa.

The oil and gas projects in Africa are often characterized by the repetitive cost overruns, schedule slippage as well as operational interference. Mega projects tend to go above the original budget and schedule because of the logistics congestions, delays in procurement, and lack of coordination among the supply chain participants. Such inefficiencies have a negative effect on the viability of the projects and it will not be worthwhile to invest long-term in the sector. The recent regional investigations reveal that the logistics-related risks contribute a very significant portion of unplanned project delays, especially in offshore and deep-sea projects (UNCTAD, 2025; World Bank, 2024).

The problem of infrastructure limitations is one of the biggest factors limiting the efficiency of the project in the oil and gas value chains in Africa. Poor throughput and long turnaround times in vessels are caused by limited port capacity, shallow drafts, lack of cargo handling equipment, and congestion. Ports can easily experience storage space constraints and regulatory lag times, and offshore support bases experience a lack of marine equipment and ineffective interconnection with the shore. Such structural vulnerabilities also enhance logistics risks and are more likely to rely on expensive workarounds to offshore transshipment and prolonged vessel chartering (African Development Bank Group, 2025; Mishrif, 2024).

Besides physical infrastructure constraint, institutional and governance issues also limit the performance of logistics. Weak coordination between port authorities, terminal operators and offshore service providers, fragmented regulatory frameworks and slowness in the clearing of customs also adds to inefficiencies. Research indicates that delays associated with governance may go a long way to increase the dwell period of cargo and also interfere with offshore supply schedules, with knock-on impacts on the whole project lifecycle. The solution to these issues is a combined evaluation of the quality of infrastructures, the work of institutions, and the coordination of logistics (World Bank, 2025; Larsen, 2024).

Research Gap and Problem Statement.

Although it is acknowledged that logistics should play a vital role in the functioning of oil and gas projects, available literature is inclined to analyze the issue of import terminals, ports, and offshore support logistics separately. Most of the studies are rather narrow, discussing either the port efficiency, the maritime transport, or the offshore operations, but do not reflect on the interdependencies between these logistics elements. This inconsistent method of analysis constrains the knowledge of the effect of integrated logistics systems on the efficiency of the entire project, especially in the case of capital-consumptive oil and gas projects (Obasi et al., 2024; Cruz-Ramirez et al., 2024).

Moreover, it is still evident that Africa-specific empirical studies that relate logistics infrastructure and coordination to the efficiency outcomes of oil and gas projects are limited. Most current evidence is based on

the developed economies or Asian logistics centers, with little contextualization to the African institutional and infrastructural realities. This is a limitation to the generalizability of global results to African projects and the strength of policy and investment decision-making. To fill this gap, a context-related, holistic analysis of terminals, ports and offshore logistics in the African oil and gas projects is required (African Energy Chamber, 2025; International Energy Agency, 2025).

Research Objectives

1. To examine the effect of import terminal capacity, operational efficiency, and regulatory processes on cost performance, schedule adherence, and operational efficiency of oil and gas projects in selected African countries.

2. To assess how port infrastructure quality, port governance practices, and cargo handling performance influence logistics reliability and overall project efficiency within Africa's oil and gas sector.

3. To analyze the role of offshore support logistics integration, including marine vessel availability and onshore–offshore coordination, in enhancing operational continuity and efficiency of oil and gas projects in Africa.

THEORETICAL FOUNDATIONS AND LITERATURE REVIEW.

Import Terminals and Efficiency of Oil and Gas Projects.

The identification of the ports as bottlenecks in the supply chain of the oil and gas industry has seen a wide use of the importance of the ports in the logistics processes through the reception, storage, and discharge of the bulk materials and specialized equipment. The ability of projects to maintain continuous flow of materials in the exploration and development process, especially where there is a reliance on imports, is directly influenced by terminal capacity. It was observed that with a limited terminal capacity, there is a high chance that the vessels will become congested and experience longer berthing durations, which exposes them to demurrage and time loss. These are the terminal-induced inefficiencies that have been found to trickle down and increase the execution risks in capital-intensive oil and gas projects (Mishrif, 2024). Recent maritime evaluations further highlighted the fact that terminal congestion has been a source of cost increase in the developing areas (UNCTAD, 2024).

Import terminal storage infrastructure has also been revealed to greatly impact the efficiency in oil and gas project in deciding the flexibility of inventory and reliability of supply. The right storage facility also allows the project operators to offset upstream shipping outages and demand variations throughout the key construction and drilling processes. Conversely, poor storage means that you have to use tightly synchronized deliveries and hence prone to delays and port congestion. According to the empirical studies, inadequate terminal storage often resulted in work stoppages and re-scheduling of offshore operations especially in African projects where there was a low level of logistic redundancy (IEA, 2024). The infrastructure reviews also associated the shortcomings in storage with low productivity and operating expenses in energy-based undertakings (AfDB, 2024).

Another important factor that has been found to determine the efficiency of a project is terminal turnaround time, which is the speed with which vessels are allocated and cargo cleared. Reduced turnaround time improves the waiting time of the vessels and also improves predictability during logistics planning, something that oil and gas projects that rely on time sensitive deliveries require. It was found that long turnaround time was frequently related to a lack of handling equipment and poor communication between terminal operators and service providers (Lin et al., 2025). It was discovered that these inefficiencies were disproportionately affecting offshore operations, as a delay in the delivery of important equipment may completely stop drilling and maintenance operations (WB, 2024).

Import terminals also regulate and impose customs procedures which further influence the project performance in terms of the speed of cargo clearance and administrative predictability. Difficult documentation conditions and uncoordinated regulatory controls have been highly quoted as key causes of time wastages at African import

ports. This causes delays that extend the dwell time of cargo and break up well thought-out project schedules, adding to the logistics costs. As it turned out, projects that had been implemented in the environment where the customs procedures were streamlined demonstrated a better schedule compliance and cost containment (WB, 2025). Analyses in the industry also pointed out that regulatory coordination reforms are needed to improve efficiency in the terminals and minimizing the risks associated with the projects in the oil and gas sector in Africa (AEC, 2025).

Port Infrastructure, Governance and Logistics Performance (RO2)

The quality of port infrastructure has been continuously associated with the logistics performance in the chain of supply projects in the oil and gas industry because of the support of the cargo throughput, vessel berthing and heavy-lift operations. Adequate quay length, deep drafts, modern crane and specialized oil and gas handling facilities enhance vessel turnaround times and minimizes delays caused by congestion. Poor port infrastructure on the other hand limits the processing capacity and predisposes the use of offshore transshipment which elevates logistics expenses and operational risk. Empirical materials proved that the infrastructure constraints in the African ports considerably lowered the reliability of logistics in the energy projects in comparison to the global standards (UNCTAD, 2024). Other researchers also identified the lack of port infrastructure with the tendency of schedule slippage in oil and gas projects, which are capital-intensive (AfDB, 2024).

Cargo handling performance is another key aspect of operation in which port infrastructure influences performance of the project. The handling systems are efficient to load and discharge project cargo that is large, such as equipment over the size and hazardous materials typical of the oil and gas operations with speed. Sluggish processes due to old equipment, lack of workforce or improper yard maintenance incur idle times in the vessel and interrupt the downstream project timetables. Research revealed that the increase in productivity of cargo handling was linked to quantifiable savings in the costs of logistics and better predictability of project implementation (WB, 2024). The global port performance surveys also revealed that the work of oil and gas projects is especially vulnerable to the problem of inefficiency in handling because of the high price and time-sensitive character of its cargo (IEA, 2025).

In addition to physical infrastructure, the governing structures of ports are decisive factors that determine the result of logistics and coordination. Proper governance structures enable effective and transparent authority of decision-making, accountability and coordination between port authorities, terminal operators, customs agencies and the private logistics service providers. Weak governance set-ups, on the contrary, lead to divided mandate and lethargy in administration which affects efficiency in operations. They showed that the delays related to governance were significantly higher than those related to the physical infrastructure limitations in African ports (WB, 2025). Comparative analysis also indicated that ports with open governance and showing the involvement of the private sector realized a better logistics performance outcome (UNCTAD, 2025).

The institutional efficiency of the port systems also adds to the reliability of logistics in terms of consistency of the regulations, speed of clearance of customs, and coordination between agencies. Long documentations and duplication of regulatory requirements have been demonstrated to prolong cargo dwell times and uncertainty among the oil and gas project planners. Such institutional inefficiencies interfere with closely sequenced supply chains and increase the exposure to risk in a project. Research has indicated that ports with single-window and synchronized inspections achieved high resulting clearance time and schedule consistency (WB, 2024). Regional evaluations also focused on the fact that institutional change is no less essential than investing in infrastructure to enhance the logistics services of ports (AfDB, 2025).

Comparative data on African ports and major ports in the world indicates that there have been endemic performance differences with direct impact on the efficiency of oil and gas project. Most African ports end up experiencing capacity and coordination issues yet the major global energy hubs enjoy integrated port systems, high-level digitalization, and lean governance. These differences will be translated into increased logistics expenses and decreased competition of African oil and gas projects. The empirical comparisons revealed that ports that operated in areas that had a balanced infrastructure and governance structures produced greater predictable project results (UNCTAD, 2024). Recent studies also emphasized that the gap bridging process must

entail a concerted effort to invest in infrastructure, reform government, and institutional capacity building (IEA, 2025).

Offshore Support Logistics Integration and Operational Efficiency (RO3)

Offshore support logistics form one of the main pillars of operations of the oil and gas projects since they guarantee the constant supply of materials, human resources, and technical services to the offshore installations. Offshore bases are important coordination centers where vessels are dispatched and equipment staged and crews handled directly affecting the uptime of operations. Research has demonstrated that the time and responsiveness of offshore bases to contingencies in operations are largely influenced by their proximity, capacity, and functional design (IEA, 2024). There was also evidence of African offshore developments that showed that poor base infrastructure added time to non-productive time and downtime during operations, especially in deep water or frontier developments (UNCTAD, 2024).

The availability of vessels and fleet composition, such as platform supply vessels, anchor handlers, and crew boats, have a very strong influence on marine logistics effectiveness. Low supply of vessels has been associated with late drilling support, delayed maintenance operations, and high cost of chartering. Empirical experiments proved that poor vessel scheduling tended to lead to cascading delays in all offshore activities, increasing cost overruns (WB, 2024). Similar analyses conducted in the industry highlighted the increased vulnerability of the new offshore areas because of inaccessibility to specialized ships and lack of marine logistics capacity (AfDB, 2025).

Onshore-offshore coordination has been recognized to be effective in determining the logistics integration and project efficiency. The lack of coordination between ports, terminals, and offshore bases as well as project operators is likely to cause the occurrence of disequilibrium between the material arrivals and the offshore demand. Research has shown that ineffective coordination mechanisms became a source of congestion in offshore bases and slowed down important offshore operations (Onukwulu, 2024). Comparative evidence also demonstrated that schedules of projects with integrated planning and coordination systems were more reliable and logistics uncertainty was less (Lin et al., 2025).

The integration of supply chains in both onshore and offshore logistics has progressively been noted as a critical factor in the maintenance of operational efficiency of oil and gas projects. The visibility and responsiveness throughout the supply chain is improved through integrated information systems, standardized processes, and integrative decision-making structures. Studies revealed that the presence of disjointed logistical systems and siloed governance structures slowed down the process of taking remedies and amplified the effect of disruptions (Obasi et al., 2024). The regional evaluations also highlighted that enhancing logistics integration is essential in enhancing offshore operations performance and competitiveness in oil and gas projects in Africa (African Energy Chamber, 2025).

Theoretical and Conceptual Foundations

The current research was based on the theory of supply chain and logistics performance, which theorizes the role of coordination, capacity, and flow efficiency at the logistics nodes in determining the outcomes of projects. Integration, responsiveness and reliability are the determinants highlighted in the theory as main performance determinants in, complex and capital-intensive industries including the oil and gas industry. Empirical literature showed that inefficiencies in the key nodes such as terminals, ports, and offshore bases spread delays and cost overruns across whole systems of a project (Mishrif, 2024). According to recent maritime and energy literature, further stress was put on the fact that the logistics performance is conditional upon the concordance of the physical infrastructure with operational and institutional capacity (UNCTAD, 2024).

Systems efficiency and transaction cost perspectives also helped inform the study and conceptualized the oil and gas logistics as interdependent systems in which failures in coordination raise transaction and operational costs. In this sense, disjointed governance systems and inefficiency in integration bring about uncertainty and diminish the efficiency of the system at large. It was demonstrated that the integrated logistics systems reduce the transaction costs by enhancing coordination and information flows within supply chains (World Bank, 2025).

Analogous African infrastructure notes also emphasized that the efficiency benefits in optimization of interactions between logistics subsystems as opposed to individual infrastructure investment (AfDB, 2024).

METHODOLOGY

Research Design

The research design assumed to be used in the study was quantitative research design that was used to investigate the impacts of import terminals, port infrastructure and offshore support logistics on the efficiency of oil and gas projects in Africa. This design was suitable since the research was aimed at determining the gauge of correlations concerning well-defined logistics variables and project performance measures including cost, schedule, and operational effectiveness. Quantitative methods have been extensively applied in the study of logistics and energy infrastructure to facilitate objective testing of the hypothesis and generalizable inferences (Mishrif, 2024). Its design provided the possibility to compare the regions and logistics elements systematically, making the subjectivity less prominent and improving the analytical rigor. Other studies have shown that quantitative designs can be used to assess the infrastructure-performance nexus in capital-intensive industries (UNCTAD, 2024).

Study area, population of interest and sampling.

The analysis was done on the oil and gas producing regions chosen in the West, East and Southern parts of Africa where the projects are very dependent on maritime and offshore logistics. They were selected as a sample population of 120 professionals directly engaged in oil and gas logistics and project implementation, port officials, terminal managers, offshore logistics coordinators, marine service providers, and project managers. With the controllable number of people and the expertise of the respondents, the type of census method was chosen as the study involved all the 120 patients to take part in the census. A census guaranteed full coverage of critical logistics actors as well as the eliminating of sampling biases that are suggested in infrastructural literature with well-defined populations (World Bank, 2024; AfDB, 2025).

Table 3.1: Target Population Breakdown by Key Stakeholders (Census, N = 120)

Stakeholder Category	Role in Oil and Gas Logistics and Projects	Number of Respondents
Import Terminal Managers	Oversight of terminal capacity, storage, turnaround operations	18
Port Authority Officials	Port infrastructure management and governance coordination	22
Cargo Handling and Operations Managers	Management of cargo handling, equipment, and port operations	16
Offshore Logistics Base Managers	Coordination of offshore bases and logistics support services	14
Marine Service Providers	Vessel operations, marine logistics, and fleet management	18
Oil and Gas Project Managers	Overall project planning, execution, and efficiency oversight	20
Supply Chain and Logistics Planners	Integration and coordination of logistics activities	12
Total	Census Population (100% Selection)	120

Data Collection Methods

The research has used both primary and secondary methods of data collection to advance triangulation and strength of analysis of data. Structured questionnaires were used to collect primary data through all the respondents in the census population. The instruments measured quantitative functions of terminal efficiency, port performance, offshore logistics integration, and project efficiency results, which are directly connected to the three objectives of the research. Secondary sources were found in industry reports, port performance reports

and energy industry evaluations to find some background validation. The reliance on several data sources enhanced the precision of measurements and minimized the use of self-reported data on its own, which is also in line with the best practices in the field of logistics and infrastructure research (UNCTAD, 2024; IEA, 2025).

Data Analysis Techniques

Descriptive and inferential statistical analysis were used in data analysis. Respondent characteristics and logistics performance indicators were summarized using descriptive statistics and the inferential analysis was used to analyze the impact of import terminals, ports and offshore support logistics on the project efficiency. Relationship between independent and dependent variables were tested using regression analysis. In order to guarantee rigor, validity was met by matching the measurement items with the existing literature, and reliability was evaluated by internal consistency tests. The robustness checks have been used to ensure the results are stable across the logistics components and this increases confidence in the results (Mishrif, 2024; World Bank, 2025).

RESULTS AND DISCUSSION

Descriptive Results and Preliminary Analysis

This part shows the descriptive features of the study sample and gives some contextual background of the respondents who participated in the oil and gas project logistics within the chosen African regions. There was a total of 120 questions that were given and returned and this was a 100 percent response rate, which is in line with the census methodology that was used. The fact that the response rate was high gave the dataset reliability and was a guarantee of thorough and exhaustive coverage of the key logistics stakeholders who participated in import terminals, ports, and offshore support operations. Other similar logistics research highlighted that complete coverage of the population increases the validity of infrastructure-performance measurements in more specialized industries like oil and gas (World Bank, 2024; AfDB, 2025).

Table 4.1: Distribution of Respondents by Stakeholder Group (N = 120)

Stakeholder Group	Frequency	Percentage (%)
Import Terminal Managers	15	12.5
Port Authority Officials	18	15.0
Cargo Handling Operations Managers	14	11.7
Customs and Regulatory Officers	13	10.8
Offshore Logistics Base Managers	14	11.7
Marine Vessel Operations Managers	16	13.3
Oil and Gas Project Managers	20	16.7
Supply Chain and Logistics Planners	10	8.3
Total	120	100.0

The representation is balanced in terms of logistics and project execution functions so that the findings will represent operation and management perspectives. The highest proportions were represented by project managers and port-related stakeholders as they were at the center of the logistics activities organization and the control of project efficiency results. The previous literature emphasized multi-stakeholder representation in the analysis of complex supply chain systems in oil and gas projects (UNCTAD, 2024; Mishrif, 2024).

Table 4.2: Regional Distribution of Respondents

Region	Frequency	Percentage (%)
West Africa	46	38.3
East Africa	42	35.0
Southern Africa	32	26.7
Total	120	100.0

Regional representation shows that there is a high representation of the West and East Africa where offshore and import-based oil and gas projects are commonly practiced. This local proliferation gave an appropriate contextual variation that could assist in the comparison of logistics systems. Other studies on infrastructure and energy logistics have also been encouraged to be similar regarding the covered regions to capture the differences in governance, capacity and performance (IEA, 2024; UNCTAD, 2025).

Effects of Import Terminals on Project Efficiency (RO1)

In this section, the researcher will look at the impact of import terminal capacity, storage adequacy, turnaround time, and regulatory processes on the results of oil and gas project efficiency. According to respondents, terminal related constraints were a major cause of cost overruns, schedule slip, as well as operational disruptions especially in projects that relied on imports. Descriptive ratings revealed that low capacity and slow turnaround resulted in more vessel waiting time and demurrage risk and poor coordinating regulatory response prolonged cargo dwell time. These results are consistent with the evidence that terminal performance is one of the key factors defining logistics predictability in capital-intensive projects (UNCTAD, 2024; AfDB, 2024).

Table 4.3: Perceived Effects of Import Terminal Factors on Project Efficiency (N = 120)

Import Terminal Factor	High Effect (%)	Moderate Effect (%)	Low Effect (%)
Terminal capacity constraints	62.5	25.8	11.7
Storage adequacy limitations	58.3	30.0	11.7
Prolonged turnaround time	66.7	21.6	11.7
Regulatory/customs delays	70.0	19.2	10.8

The findings indicate that regulatory and customs delays and turnaround time ranked highest in perceived impact on efficiency reflecting the confluence of institutional and operational factors. Respondents pointed out that efficiency gains were tipped by administrative delays even in cases where there was physical capacity. Other studies of this nature have stated that institutional bottlenecks may supersede infrastructure investments unless they are dealt with simultaneously (WB, 2025; UNCTAD, 2025).

Table 4.4: Import Terminal Factors and Project Efficiency Outcomes

Efficiency Outcome	Strongly Affected (%)	Moderately Affected (%)	Not Affected (%)
Cost performance	64.2	24.2	11.6
Schedule adherence	69.2	20.8	10.0
Operational continuity	57.5	30.0	12.5

Throughout the outcomes, the terminal performance had the lowest adherence rate as outcomes underpin the time-sensitive character of equipment and materials delivery. Cost effects came in second by the way of demurrage, re-handling and stand-by fees. The operational continuity was influenced by work stoppages and rescheduling during delay in clearance. These trends are in line with the previous research results that terminal efficiency directly influence the project risk exposure and the certainty of execution (Mishrif, 2024; IEA, 2024).

All in all, the findings are valid in that there is a need to ensure that the work of import terminals is improved alongside upgrades in capacity, storage, turnaround processes, and regulatory coordination. A combination of these factors will be expected to enable oil and gas projects in Africa to achieve quantifiable cost savings, timeline consistency, and operational effectiveness (AfDB, 2025; WB, 2024).

Port Infrastructure and Governance and their effects on Efficiency (RO2)

In this section, the study will look at the role of the quality of port infrastructures, the performance of cargo handling, and the governance structures in determining the reliability of logistics and project efficiency. The respondents reported that the lack of proper berth depth, low quay length, and obsolete handling equipment were limiting throughput and the waiting period of project cargo. The limitations derailed delivery times on oversized and dangerous equipment that are quite common in oil and gas projects. Descriptive answers demonstrated that infrastructure deficiency was strongly interconnected with the common delays and re-planning, which supports the idea that port performance is a key factor of predictability in logistics (UNCTAD, 2024; AfDB, 2024).

Table 4.5: Perceived Effects of Port Infrastructure Factors on Logistics Performance (N = 120)

Port Infrastructure Factor	High Effect (%)	Moderate Effect (%)	Low Effect (%)
Berth depth and quay capacity	61.7	27.5	10.8
Cargo handling equipment	65.0	24.2	10.8
Yard space and layout	56.7	31.6	11.7
Port congestion	68.3	20.0	11.7

The greatest effects were at the port congestion and handling equipment, which implies that the operational capacity, rather than the physical presence, was determining the outcomes. The results are similar to those of the world evaluations that indicate that handling inefficiency is disproportionately prevalent in energy projects regarding the volume, worth, and sequencing needs of their cargo (IEA, 2025; UNCTAD, 2025).

The other aspects that affected the outcome of logistics were governance and institutional efficiency that affected the process in terms of coordination, clearance of customs, and speed of decision making. According to the respondents, divided power among port agencies lengthened approvals and time on cargo. In places where governance structures were evident and coordination channels were working, the respondents had more predictable schedules and less interference. This confirms previous evidence that governance reforms can be efficient enough to create efficiency gains similar to investments in infrastructure (WB, 2025; AfDB, 2025).

Table 4.6: Port Governance and Coordination Effects on Project Efficiency

Governance Dimension	Strong Effect (%)	Moderate Effect (%)	Weak Effect (%)
Inter-agency coordination	70.8	18.4	10.8
Customs clearance processes	72.5	16.7	10.8
Decision-making transparency	60.0	29.2	10.8

In general, the findings show that port infrastructure and governance have a combined effect on the reliability of logistics, which impacts delays, coordination performance, and project efficiency. Physical infrastructure gains

with no governance reforms are unlikely to bring about long-term benefits, which is in line with the results of African and global port research (UNCTAD, 2024; WB, 2024).

Offshore Support Logistics Integration (RO3) Effects.

This section discusses the impact that offshore base capacity, marine logistics, vessel availability and onshore-offshore coordination had on continuity and efficiency of operations. The respondents reported that shortage of offshore base capacity and access distance to fields increased the time of sailing and decreased the responsiveness to unplanned operational requirements. These limitations increased unproductive time on the drilling and maintenance operations, especially in the deep-water setting. Previously, the distance and size of the offshore bases were identified as the determining factors of shortening the downtime and stabilizing of operations in the offshore (IEA, 2024; UNCTAD, 2024).

Table 4.7: Effects of Offshore Logistics Components on Operational Continuity (N = 120)

Offshore Logistics Component	High Effect (%)	Moderate Effect (%)	Low Effect (%)
Offshore base capacity & location	63.3	26.7	10.0
Marine vessel availability	69.2	20.0	10.8
Fleet scheduling efficiency	65.8	22.5	11.7
Emergency response readiness	58.3	30.0	11.7

The greatest effects were recorded in marine vessel availability and scheduling indicating dependence on special vessels in both routine and contingency operation. According to the respondents, shortages of vessels and poor scheduling led to the cascading delays in the offshore activities. Similar results revealed that tight markets in the vessel and ineffective fleet planning increase the charter price and charter execution (WB, 2024; AfDB, 2025).

It was noted that onshore-offshore coordination was a key facilitator of logistics integration. Respondents stressed that poor coordination in arrival of ports, clearance of terminals, and idle offshore vessels was the cause of congestion in bases and idle vessels. In areas where the integrated planning and information sharing was utilized, respondents noted that there were fewer delays and more predictability. It is evidenced that coordination mechanisms lessen the uncertainty level and coordinate supply and offshore demand (Lin et al., 2025; Onukwulu, 2024).

Table 4.8: Onshore–Offshore Coordination and Efficiency Outcomes

Coordination Dimension	Strong Impact (%)	Moderate Impact (%)	Weak Impact (%)
Integrated planning systems	71.7	17.5	10.8
Information visibility	68.3	21.7	10.0
Alignment of delivery schedules	70.0	19.2	10.8

In general, the findings indicate that offshore logistics integration is a conclusive factor to tell the continuity and efficiency of operations. Improving base capacity, availability of vessels and improving the mechanisms of coordination are likely to bring significant improvement of offshore performance, in line with the regional and global evidence on logistics (UNCTAD, 2025; IEA, 2025).

Synthesized Discussion of Findings.

The results of RO1-RO3 indicate that the efficiency of oil and gas projects in Africa is determined by the coordinated work of interconnected logistics systems and not the independent work of the individual elements of infrastructure. Capacity of the import terminal, turnaround time and regulatory efficiency (RO1) had a direct effect on cost management and schedule compliance whereas quality of infrastructure and governance of the port (RO2) was used in determining the results of logistics reliability and coordination. This was further supported by offshore support logistics integration (RO3) that influenced the continuity of operations in terms of vessel availability and onshore-offshore synchronization. Combined, these findings suggest that possible inefficiencies at one logistics node spread throughout project lifecycles, which proves the interdependence highlights in the supply chain performance theory (Mishrif, 2024; UNCTAD, 2024).

Theoretically, the findings are in line with the systems efficiency and the transaction cost schools of thought, which hold that fragmented governance and lack of co-ordination augment uncertainty and operational expenses. The work of projects within integrated logistics systems was less prone to delays and non-productive time and confirms that the coordination and exchange of information contribute to a lower transaction cost and more efficient work of the systems (WB, 2025; AfDB, 2024). Their validity in relation to previous studies in Africa and the rest of the world reinforced the findings and emphasized the importance of investing in infrastructure, governance reform and integration of logistics to enhance the performance of oil and gas projects in Africa (IEA, 2025; UNCTAD, 2025).

CONCLUSIONS, POLICY IMPLICATIONS, FUTURE RESEARCH

Summary of Key Findings

The research determined that the performance of intertwined logistics systems was vital in determining the performance of oil and gas projects in Africa. In regard to RO1, the terminal capacity of imports, turnaround time, storage sufficiency, and regulatory efficiency were confirmed to directly affect the performance in cost, schedule compliance and continuity of operations. The results of RO2 revealed that a high quality of port infrastructures and the governance arrangements used had a significant influence on both the logistics reliability and the coordination and the delay results. In case of RO3, offshore support logistics integration specifically vessel availability and onshore-offshore coordination came out to be important factors that determined performance. Taken together, the results showed that the logistics inefficiencies spread within the project systems, which proves the necessity of integrated infrastructure and governance interventions (UNCTAD, 2024; AfDB, 2025).

Policy and Industry Implications.

The results suggest that to enhance the effectiveness of oil and gas ventures in Africa, both infrastructure is invested in and the governance reformed along the logistics chain. They should prioritize the expansion of the port import volumes, the modernization of the port handling equipment and the creation of the offshore bases of logistics to minimize delays and time wasting. Another aspect that is significant is the governance reforms to simplify the customs processes, clarify institutional mandate, and improve inter-agency coordination at ports and terminals. Players in the industry ought to use combined planning mechanisms that harmonize onshore supply with offshore demand in order to reduce uncertainty and trade expenses. It is indicated that the best returns on infrastructure investments can only be realized in cases where institutional efficiency and coordination reforms are also implemented (WB, 2025). These suggestions complement local demands that the oil and gas industry in Africa should be more competitive by applying the integrated logistics policy frameworks (UNCTAD, 2025).

Table 5.1: Key Policy and Industry Implications

Area	Priority Action
Import terminals	Capacity expansion, faster turnaround, regulatory streamlining
Ports	Equipment modernization, congestion reduction, governance reform

Offshore logistics	Base capacity, vessel availability, integrated planning

Contributions, Limitations, and Future Research.

This research added to the body of academic knowledge by offering an integrated and Africa-specific assessment of the connection between import terminals, port infrastructure and governance, and offshore logistics integration to oil and gas projects efficiency, to the perspectives of supply chain performance and systems efficiency. Empirically, it provided census-based data among major interested parties, and this enhanced internal validity and practical value. Nevertheless, the research was constrained by its cross-sectional nature and the use of perceptual outcomes which might be inadequate in dynamic variations throughout the lifecycles of projects. These studies should be carried out in the future through longitudinal designs, use objective performance measures, and investigate the digitalization and green logistics interventions in the port and offshore systems. The comparison of the projects and regions would enhance policy and investment advice further (UNCTAD, 2025; AfDB, 2024).

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