Lamu International Port and Facilitation of Regional Trade in East Africa: A Case of Kenya

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Abstract: Trade facilitation failures in Kenya are primarily attributed to congestion, inefficiencies and inadequate infrastructure that hinder timely cargo clearance and increase shipping costs. The Port of Mombasa face significant challenges due to limited capacity and outdated handling equipment, resulting in prolonged dwell times for cargo. The goal of the study was to assess Lamu Port and Facilitation of Regional Trade in East Africa: A case of Kenya 2021-2024. The study determined how transshipment services affect trade facilitation in Kenya. Academic researchers find value in the study's findings. The study used three theories comprising of the Supply chain management theory, Network theory and Operations management theory. The study targeted 401 officials and included government officials, transporters, members of the Lamu business community, non-governmental organizations, and the LAPSETT Board, participated in the study.The findings demonstrate that port transshipment services, transport networking, and warehousing collectively play a critical role in enhancing trade facilitation at Lamu Port. Transshipment services highlight the importance of efficient cargo handling, reduced turnaround time, and competitive operational costs in attracting shipping lines and boosting the port's competitiveness. The transport network results emphasize that intermodal efficiency, strong cargo flow, and adequate infrastructure capacity are essential for seamless connectivity between the port and inland markets, enabling smooth regional trade. Warehousing findings further reveal that optimal space utilization, cost efficiency, and reliable security measures are crucial in supporting cargo storage, minimizing delays, and building trust among port users.

Background to the Study

Lamu Port is a key infrastructure project envisioned as a hub in the larger LAPSSET Corridor project. The project aims to transform the region's economic landscape by providing a gateway to landlocked countries such as South Sudan and Ethiopia and enhancing trade connectivity with East Africa and beyond (De-Soyres, Mulabdic & Ruta, 2020). The Lamu Port, designed to accommodate large vessels and support advanced transshipment activities, is poised to become a strategic hub in the Indian Ocean, capitalizing on its proximity to major maritime routes. With its modern berths, storage yards, and supporting infrastructure, the port is expected to strengthen Kenya's position as a regional logistics hub, expand warehousing capacity, and contribute to the broader development objectives of the East African region (Marchuk, Harmash & Ovdiienko, 2020).

The Mombasa Port had faced several challenges that prompted the establishment of the Lamu Port to alleviate pressure and enhance regional trade. One of the main issues had been congestion due to increased cargo volumes, which strained transshipment efficiency and led to delays in processing and shipping (Allen & Arkolakis, 2022). This congestion was exacerbated by inadequate transportation networks and limited expansion space within the urban environment. Inefficiencies in logistics and cargo handling also contributed to prolonged clearance times, while warehousing constraints added further pressure. The port's location within a densely populated area also poses environmental concerns and restricts expansion, making diversification through Lamu Port critical for improving efficiency and competitiveness (Ratner & Gad, 2019).

The United States' ports, such as the Port of Los Angeles and the Port of New York/New Jersey, play a crucial role in global trade due to their strategic locations and advanced infrastructure. These ports are well-equipped for transshipment, acting as hubs for distributing goods across North America. The extensive transportation networks, including railways and highways, allow efficient inland connectivity and reduce bottlenecks (Pokrovskaya & Fedorenko, 2019). Advanced cargo handling and warehousing technologies, such as automated cranes and computerized systems, enhance efficiency and reduce turnaround times. Despite these strengths, U.S. ports face challenges like congestion, labor disputes, and aging infrastructure, which strain both transshipment capacity and storage facilities.

South Africa's ports, such as Durban and Cape Town, are central to regional trade in Southern Africa. Supported by developed road and rail networks, these ports provide efficient links between transshipment operations and inland distribution centers (Yeo, Deng & Nadiedjoa, 2020). Investments in modern cargo handling equipment and warehouse facilities have improved efficiency. However, aging infrastructure and labor disputes undermine reliability across the logistics chain. Political instability and regulatory changes also disrupt transport and warehousing capacity, necessitating ongoing modernization.

Egypt's ports, including Alexandria and Port Said, leverage the Suez Canal to facilitate transshipment between Europe, Africa, and Asia. Strategic investments in infrastructure have boosted handling efficiency and warehousing capacity (Avetisyan & Hertel, 2021). Nonetheless, congestion, political instability, and security concerns challenge smooth cargo flows across the transport network. Balancing growth with sustainability remains critical, requiring reforms in both transportation systems and warehousing technology.

Tanzania's ports, such as Dar es Salaam and Tanga, are vital for East African trade. These ports support the export of minerals and agricultural goods, but inadequate infrastructure undermines transshipment efficiency (Erkisi & Ceyhan, 2019). Road and rail limitations hinder smooth cargo flows to warehouses and regional destinations. Bureaucratic inefficiencies also delay cargo clearance and increase warehousing costs. Addressing these challenges is essential to boost competitiveness and strengthen regional trade facilitation.

The establishment of Lamu Port was driven by the need to ease congestion at Mombasa Port, which struggled with growing volumes and limited warehousing space (Ochieng, 2020). Envisioned as a deep-water facility for larger vessels, Lamu Port enhances Kenya's transshipment capacity and regional trade reach. However, slow progress on supporting transport networks such as roads and rail has hindered seamless connectivity. Low traffic and inadequate warehousing facilities also restrict the port's operational efficiency. As a result, despite being operational since 2021, Lamu Port remains underutilized, with many vessels still preferring Mombasa due to its established logistics and storage capacity (Stanley, 2022).

Statement of the Research Problem

Trade facilitation failures in Kenya are primarily attributed to congestion, inefficiencies, and inadequate infrastructure that hinder timely cargo clearance and increase shipping costs. The Port of Mombasa faces significant challenges in transshipment due to limited capacity and outdated handling equipment, resulting in prolonged dwell times for cargo (KPA, 2021). The inefficiency of customs processes, compounded by bureaucratic red tape and corruption, further exacerbates delays in cargo clearance, as importers often encounter lengthy documentation and inspection procedures (World Bank, 2020). Inadequate hinterland connectivity, including weak road and rail transportation networks, restricts the port's ability to distribute goods efficiently to inland destinations, raising logistics costs. Additionally, warehousing constraints and insufficient storage facilities contribute to bottlenecks, creating trade barriers for businesses, particularly small and medium-sized enterprises (African Development Bank, 2021).

Lamu Port has struggled to meet the expectations of regional actors in facilitating trade due to underutilization of its facilities, as it has handled far fewer ships and cargo volumes than projected. For example, in its first year of operations, Lamu Port managed only about 6,000 Twenty-foot Equivalent Units (TEUs) of cargo, significantly lower than its transshipment capacity of 1.2 million TEUs annually (Ochieng, 2020). The lack of developed supporting transportation networks, such as road and rail connections to key markets in Kenya, Ethiopia, and South Sudan, has been a major bottleneck, delaying cargo movement and discouraging shippers from using the port expected to serve as a regional hub. Security concerns in the Lamu region, due to proximity to Somalia and persistent terrorist threats, have also undermined investor confidence in the port. Furthermore, inadequate warehousing facilities, limited complementary logistics services, and delays in customs processes have hampered port efficiency (Erkisi & Ceyhan, 2019). These combined challenges have reduced the port's competitiveness compared to the more established Mombasa Port. The study sought to assess the role of Lamu Port in facilitating East African regional trade.

General Objective

To assess Lamu International Port and Facilitation of Regional Trade in East Africa: A case of Kenya.

Specific Objectives
 i.   To assess the role of trans-shipment services on trade facilitation in the Lamu port, Kenya.
 ii. To evaluate the role of transportation network on trade facilitation in Lamu port, Kenya.
 iii. To examine the role of port warehousing on trade facilitation in Lamu port, Kenya.

Theoretical Review

The study was grounded on; Supply chain management theory, Network theory and Operations management theory.

The Supply Chain Management Theory

Keith Oliver, who is credited with creating the term supply chain management and highlighting the significance of coordinating different supply chain phases to increase efficiency and lower costs, made substantial contributions to the theory's development in the 1980s (Fan, Lai & Qi, 2019). In the context of port

transshipment, SCM theory is highly relevant as it underscores the importance of efficient cargo handling, seamless integration with inland transportation, and the coordination between various actors, including shipping lines, port authorities, and logistics providers (Briggs & Sheehan, 2019).

Network Theory

The theory explores the structure and dynamics of networks, focusing on how various nodes and their connections affect overall system behavior. The theory has roots in the work of Leonard Euler in the 18th century, who laid the groundwork for network analysis with his study of the Seven Bridges of Königsberg (Wiener, 2019). In the context of port transportation networks, the theory helps analyze how ports, shipping routes, and inland transport systems are interconnected and how these connections impact overall efficiency and effectiveness (Carayannis, *et.al.*2018).

Operations Management Theory

The theory focuses on the efficient and effective management of processes that produce and deliver goods and services. The roots of operations management can be traced back to the early 20th century, with significant contributions from Frederick Taylor, who is often regarded as the father of scientific management (Sheng & Sheng, 2018). The theory washighly relevant to port warehousing operations as it focuses on optimizing efficiency, productivity, and resource utilization (Hudon & Floricel, 2023). In port warehousing, the principles of operations management such as process design, inventory management, capacity planning, and quality control are applied to ensure that goods are stored and handled efficiently.

Liberalism Institutionalism Theory

Liberal institutionalismtheory emphasizes the capacity of states to cooperate in an anarchic international system through the creation and maintenance of formal institutions. Keohane (2020) argues that institutions enable cooperation by reducing transaction costs, enhancing transparency, monitoring compliance, and extending the "shadow of the future" through repeated interactions.The theory offers a particularly strong explanatory framework for understanding how regional trade facilitation operates. Regional and multilateral agreements, such as the WTO Trade facilitation agreement, exemplify the theory by institutionalizing cooperation through harmonized customs procedures, electronic single-window systems, and coordinated border management (IMF, 2023).

Research Methodology

In this study, an explanatory research design was adopted. This design is particularly suitable for investigations seeking to clarify and explain the causal links between variables and to uncover the underlying mechanisms behind observed phenomena. The research was carried out in Lamu County. Lamu is located near the border with Somalia, making it an ideal location for a port that can serve not only Kenya but also landlocked countries in East Africa, such as South Sudan and Ethiopia (IEBC, 2024). The target population for the study were 401 officials based in Lamu comprising of government officials, transporters, members of the business community in Lamu and non-government agencies and LAPSETT board (Lamu County Directory, 2023). A stratified sampling strategy was employed in the study. A probability sampling method called stratified sampling divides a population into discrete, non-overlapping groupings, or strata, according to shared traits. A questionnaire with both closed-ended and open-ended questions was used to collect primary data for the study. A Likert scale served as the foundation for the study's structured questionnaire since it gives participants a standard response range and makes data collection and analysis easier.

The drop and pick later approach were used in this study. The researcher physically delivered the questionnaires to respondents and allowed them sufficient time to complete the forms at their convenience, and later returns (picks) them up. This approach was appropriate as targeted participants were busy at the time of study.

Data Analysis and Presentation

After being cleaned, coded, edited, summarized, and verified for accuracy, the field data was tabulated and transferred to a computer for SPSS analysis. To assess the association between the independent and dependent variables, the study employed descriptive statistical approaches including mean and standard deviation. The study also made use of inferential statistics, such as regressionanalysis to assess the relationships between dependent and independent variables, allowing researchers to predict outcomes and understand the strength and nature of these relationships.

The multiple regression model is as stated below;

$$Y: \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \varepsilon$$

Where:
$\beta_1, \beta_2, \beta_3$ and β_4 is the regression coefficient of the independent variables
Y = Trade Facilitation
β_0 = Constant
X_1 = Trans-shipment
X_2 = Transport Network
X_3 = Port Warehousing
ε is the error term normally distributed about a mean of zero.

Findings

Response Rate: The findings show that there were 74% (148) respondents who completed the questionnaires and 26% (52) respondents who did not complete the questions. This completion rate suggests a relatively high level of engagement, which is desirable in survey research as it reduces the risk of non-response bias.

Gender Composition: The findings show the frequent distribution of gender as follows,57% male, 40% female, and 3% identifying as other. The findingsindicate a significant male dominance in roles related to international ports and regional trade facilitation at Lamu Port, Kenya.

Age Distribution: The age distribution findings dominated by individuals aged 36–45 years (38%), followed by 26–35 years (25%) and 46–55 years (19%) indicate that the workforce and actors involved in international port operations and regional trade facilitation at Lamu Port are largely within their most economically active and professionally experienced years.

Level of Education: The educational distribution dominated by certificate holders (45%) and diploma holders (32%) reveal that the majority of personnel involved in international port operations and regional trade facilitation at Lamu Port possess vocational or operational roles that typically require mid-level qualifications.

Years of Experience: The results show that 74% of respondents have between 4 and 10 years of experience highlighting study participants that are relatively mature and well-grounded in operational knowledge and trade facilitation practices.

Awareness of LAPSETT project: The findings shows that a noteworthy 74% of respondents indicated awareness of the LAPSSET project in Lamu, compared to 26% who were unfamiliar, suggesting strong penetration of information within the community.

Religion: The results of the findings in figure 4.6 shows that 47% (47% represents how many) of the population is Muslim, 23% is Christian, 1% is Hindu, and 29% identifies as others. This represents the varied but primarily Islamic cultural landscape of Lamu County, which has historically been a Muslim-majority area.

Descriptive Results

Port Transshipment Services on Trade Facilitation

The mean score of 3.44 indicates that respondents generally view the port's transshipment performance as moderate, with notable strengths and ongoing challenges.The correlation results indicate that Lamu Port transshipment services, trade facilitation is strongly associated with both throughput volume ($r=0.533$, $p<0.01$) and turnaround time ($r=0.516$, $p< 0.01$), suggesting that improvements in operational efficiency and the speed of vessel handling directly enhance trade facilitation in East Africa. The strong positive relationship between throughput volume and turnaround time ($r=0.753$, $p<0.01$) implies that higher cargo volumes may extend processing durations unless efficiency measures are applied, highlighting the need for advanced port management systems. Additionally, operational costs show a weaker but significant positive correlation with trade facilitation ($r=0.254$, $p<0.05$), meaning that while cost efficiency plays a role, it is less influential compared to throughput and time factors.

Predictor	Unstandardized B	Std. Error	Standardized Beta	t	Sig.
(Constant)	0.411	0.122	–	3.369	0.001
Throughput Volume	0.260	0.074	0.070	3.514	0.001
Turnaround time	0.359	0.098	0.255	3.663	0.001
Operational costs	0.405	0.077	0.430	5.260	0.001

The regression coefficients indicate that throughput volume, turnaround time, and operational costssignificantly influence trade facilitation. Among them, operational costs have the strongest standardized effect (β=0.430), suggesting that cost efficiency is the most influential factor in enhancing trade facilitation, likely because competitive pricing attracts more shipping lines and increases cargo flow. Turnaround time follows (β=0.255), highlighting the importance of reducing vessel and cargo handling delays to improve port competitiveness in East Africa's transshipment market. Throughput volume, while statistically significant, has the weakest impact (β=0.070), implying that simply increasing cargo handled is less effective without simultaneous improvements in cost and efficiency.

Port Transportation Network on Trade Facilitation
The overall mean score of 3.83 suggests that respondents largely agree that inadequate infrastructure and underdeveloped intermodal networks hinder seamless cargo movement and limit the port's competitiveness. In a related study, Khan and Ahmed (2019) revealed that inadequate infrastructure, poor road conditions, and delays at border crossings were major challenges to trade facilitation. The results show that Lamu Port's transportation network has strong and statistically significant relationships with trade facilitation in East Africa, particularly through cargo flow (r=0.739, p=0.010) and infrastructure capacity (r=0.713, p=0.022), indicating that efficient cargo movement and robust port facilities are critical drivers of regional trade performance. Intermodal efficiencythe seamless integration of road, rail, and maritime transportalso has a substantial positive correlation with trade facilitation (r=0.624, p=0.011), underscoring the importance of connectivity between Lamu Port and inland markets.

The regression coefficients indicate that all three transportation network factors intermodal efficiency, cargo flow, and infrastructure capacity significantly contribute to trade facilitation at Lamu Port. Intermodal efficiency has the highest standardized impact (β=0.470, p=0.027), highlighting the importance of seamless connectivity between maritime, road, and rail systems in accelerating cargo movement. Infrastructure capacity follows closely (β=0.426, p=0.028), emphasizing that adequate port facilities and handling capabilities are crucial for supporting growing trade volumes. Cargo flow, while slightly lower in influence (β=0.355, p=0.034), remains vital for ensuring smooth operational throughput.

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	β	Std. Error	Beta		
(Constant)	.411	.122		3.369	.028
Intermodal efficiency	.560	.182	.470	3.077	.027
Cargo flow	.363	.095	.355	3.821	.034
Infrastructure capacity	.431	.083	.426	5.193	.028

Port Warehousing on Trade Facilitation
With an overall mean score of 3.99, indicating agreement that warehousing facilities are relatively affordable, secure, and compliant with standards. The correlation results indicate that Lamu Port's warehousing operations have a strong influence on trade facilitation in East Africa, with space utilization showing the highest association (r=0.761, p=0.009), underscoring the importance of efficient storage management in ensuring smooth cargo handling and minimizing delays. Cost also demonstrates a strong positive correlation with trade facilitation (r=0.678, p=0.015), suggesting that competitive and predictable warehousing charges can attract more cargo and shipping lines. While security has a weaker but still significant relationship with trade facilitation (r=0.392, p=0.021), its strong correlations with both space utilization (r=0.845) and cost (r=0.804) highlight its indirect role in sustaining efficient and cost-effective operations.

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
Constant	1.080	.321		3.365	.021
Cost	.375	.050	.055	3.68	.017
Space utilization	.390	.076	.078	.4.755	.039
Security	.365	.056	.037	2.25	.043

The regression co-efficients show that all three warehousing factors; cost, space utilization, and securitysignificantly influence trade facilitation at Lamu Port. Space utilization has the highest impact (β=0.078, p=0.039), indicating that maximizing warehouse capacity and optimizing storage layouts are key to improving cargo handling efficiency. Cost follows closely (β=0.055, p=0.017), suggesting that competitive and predictable warehousing charges can enhance port attractiveness to shipping lines and traders. Security, though with the smallest effect (β=0.037, p=0.043), remains essential for safeguarding goods, maintaining trust, and ensuring smooth trade operations.

Trade Facilitation

An overall average mean of 3.54, indicates that respondents generally view the clearance processes and trade-related functions as moderately effective, but with significant room for improvement.Wanjiku and Were (2021) observed that clearance processes at Kenyan ports have improved following the rollout of integrated customs systems, but bottlenecks related to documentation and bureaucratic delays continue to undermine effectiveness. The correlation results indicate that customs effectiveness has the strongest positive relationship with trade facilitation at Lamu Port (r=0.424, p=0.001), suggesting that streamlined customs procedures, faster clearance times, and reduced bureaucratic delays play a pivotal role in enhancing port efficiency. Cost efficiency also shows a notable correlation with trade facilitation (r=0.405, p=0.002), meaning that competitive operational costs help attract more cargo and improve regional trade flows. Logistical connectivity has a moderate but significant relationship with trade facilitation (r=0.361, p=0.007), reflecting the importance of effective integration between port operations and inland transport systems such as rail, road, and regional freight corridors.

	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
(Constant)	.477	.349		1.368	.176
Customs effectiveness	.387	.085	.176	2.199	.012
Cost efficiency	.541	.077	.538	1.006	.009
Logistical connectivity	.325	.108	.586	.5546	.018

The regression coefficients reveal that all three factors; customs effectiveness, cost efficiency, and logistical connectivitysignificantly contribute to trade facilitation at Lamu Port. Cost efficiency has the strongest influence (β=0.538, p=0.009), indicating that competitive and predictable operational costs are key in attracting cargo volumes and boosting port competitiveness. Logistical connectivity follows closely (β=0.586, p=0.018), highlighting the importance of well-integrated transport links between the port and inland markets for smooth cargo movement. Customs effectiveness, though with a smaller effect (β=0.176, p=0.012), remains critical in reducing clearance delays and enhancing operational speed.

Conclusion

The findings demonstrate that port transshipment services, transport networking, and warehousing collectively play a critical role in enhancing trade facilitation at Lamu Port. Transshipment services highlight the importance of efficient cargo handling, reduced turnaround time, and competitive operational costs in attracting shipping lines and boosting the port's competitiveness. The transport network results emphasize that intermodal efficiency, strong cargo flow, and adequate infrastructure capacity are essential for seamless connectivity between the port and inland markets, enabling smooth regional trade. Warehousing findings further reveal that optimal space utilization, cost efficiency, and reliable security measures are crucial in supporting cargo storage, minimizing delays, and building trust among port users.

Recommendations

While respondents acknowledged that clearance processes at the port are relatively efficient, they also highlighted gaps in its impact on regional trade patterns and shipping costs. To address this, the port should

expand its transshipment capacity by investing in modern cargo handling equipment, digital tracking systems, and streamlined customs procedures to attract more shipping lines.

Respondents noted that although connectivity has improved moderately, the impact remains limited due to underdeveloped road and rail infrastructure. To fully integrate Lamu Port into regional trade routes, priority should be given to fast-tracking the construction of the LAPSSET Corridor highways and the planned railway line linking Lamu with Isiolo and onwards to Ethiopia and South Sudan.

The findings suggest that while the port has become an additional option for international trade, its ability to influence trade patterns remains weak, partly because of limited storage and value-added services. Developing large-scale, modern warehouses, bonded storage facilities, and logistics parks within the Lamu Special Economic Zone would enable traders to store, repackage, and redistribute goods more effectively.

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