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# Enhancing Transport Logistics Efficiency through Public-Private Partnerships: The case of Isaka Dry Port along Tanzania's Central Corridor

*By: Flory Okandju Okonge [1] and George Nyaronga [2]*

***Abstract***

*This study investigates the impact of Public–Private Partnerships (PPPs) on transport logistics efficiency, with a specific focus on Isaka Dry Port along Tanzania's Central Corridor. The study used mixed-methods design, the research integrates quantitative analysis with qualitative insights multiple regression analysis revealed that PPP implementation significantly reduced cargo clearance time by over 52%, transport costs by 30.6%, and container dwell time by 56.9%. Thematic analysis of interviews highlighted operational discipline, ICT-driven innovation, and improved multimodal integration particularly rail as critical success factors. These findings affirm the value of PPPs in addressing infrastructural and institutional limitations, supporting both the Technological Innovation Theory and Institutional Theory. The study concludes that PPPs can be instrumental in transforming dry port performance when embedded in sound policy, cross-border coordination, and regulatory oversight frameworks. It recommends expanding the PPP model to other inland logistics hubs and strengthening regional digital trade infrastructure to improve corridor-wide logistics performance.*

***Keywords:*** *Public–Private Partnerships (PPPs), Transport Logistics Efficiency, Cargo Clearance Multimodal Integration*

## 1. Introduction

Efficient transport logistics are increasingly recognized as a cornerstone of regional integration, trade competitiveness, and economic transformation, particularly in the developing world. In the East African context, trade corridors such as the Central Corridor play a crucial role in connecting landlocked countries such as Rwanda, Burundi, Uganda, Malawi and Zambia and eastern and southern parts of the Democratic Republic of Congo to global markets through Tanzania's Port of Dar es Salaam. These corridors are not merely physical infrastructure routes but complex systems involving multimodal transport, policy frameworks, institutional actors, and technological systems. They serve both domestic and regional economic interests and influence the flow, cost, and reliability of goods in motion (Balbaa, 2022; Bougna, 2024).

[1]*Department of Accounting and Finance, The Open University of Tanzania, E-mail: floryokandju@gmail.com*
[2]*Department of Accounting and Finance, The Open University of Tanzania, E-mail: nyarongageorge3@gmail.com*

Despite their strategic role, African transport corridors face a series of operational and structural inefficiencies. These include inadequate infrastructure, high clearance times, limited modal connectivity, weak cross-border harmonization, and burdensome logistics costs. According to Hildyard (2023), infrastructure along many corridors remains underfunded, politically fragmented, and vulnerable to inefficiencies linked to overlapping authorities and financing vulnerabilities. In Tanzania, although the Central Corridor is better developed than other regional corridors, persistent challenges particularly at port and inland logistics nodes continue to undermine its full potential. These constraints disproportionately affect land-linked countries whose imports and exports must pass through Tanzanian infrastructure, and whose economies remain vulnerable to transit delays, administrative barriers, and high freight costs.

To address these constraints, the Tanzanian government has increasingly turned to Public–Private Partnerships (PPPs) as a viable mechanism for mobilizing investment, improving operational efficiency, and introducing innovation into logistics infrastructure. PPPs involve contractual agreements where the private sector assumes varying degrees of responsibility for financing, constructing, operating, and maintaining infrastructure, often in exchange for performance-based returns. They are designed to harness the comparative strengths of the public and private sectors government providing regulatory oversight and strategic vision, while private actors bring in capital, management efficiency, and technology (Eickhoff, 2023). Within this framework, PPPs have been introduced at inland logistics nodes such as Isaka Dry Port, a key multimodal inland facility located approximately 970 km from the Dar es Salaam Port.

The Isaka Dry Port was developed as a central logistics hub to handle cargo destined for the Great Lakes region and to facilitate customs clearance, warehousing, and transshipment services. Strategically positioned along the Central Railway Line, it connects seamlessly to the seaport and offers an alternative to direct clearance at the port of entry. However, despite its strategic role, Isaka has faced significant performance limitations over the years, including delays in cargo handling, underutilization of rail infrastructure, and institutional coordination failures. In response, a PPP was implemented to transfer the operational management of Isaka to private entities under public regulatory oversight. This reform aimed to modernize the facility, improve cargo flow, and enhance service reliability.

While several reports and anecdotal accounts claim that the performance of Isaka Dry Port has improved under the PPP framework, there has been no comprehensive empirical assessment of this transformation. More importantly, questions remain about the extent to which the PPP model has reduced cargo clearance times, lowered transport costs, increased throughput, and facilitated rail integration. This study addresses these questions to evaluate the logistics efficiency of Isaka Dry Port before and after the PPP reform.

### 1.2 Research Problem

Although the Isaka Dry Port was established to facilitate cargo flow along the Central Corridor, the extent to which Public-Private Partnerships (PPPs) have contributed to improved logistics performance remains underexplored. Numerous inefficiencies including delays in cargo clearance, limited modal integration, and low throughput persist despite the adoption of PPP models. While scholars such as Campos (2023) and Jeevan et al. (2022) argue that dry port efficiency hinges on innovation from private operators and effective oversight by public institutions, there is little empirical evidence assessing whether this synergy is realized at Isaka. From a conceptual standpoint, most existing studies on port development and PPPs, such as those by Bichou (2021) and Bougna (2024), concentrate on high-level infrastructure planning or financing strategies, without disaggregating the effects of PPPs on specific operational indicators such as cargo clearance time or rail-based modal shifts.

Theoretically, the study observes a lack of application of logistics performance frameworks that reflect the unique structure of inland dry ports in landlocked contexts. Works like Kunaka (2016) and Munters et al. (2021) provide general port logistics models but do not incorporate metrics tailored to PPP-driven inland port settings in Africa. This gap indicates the need for integrated models that consider institutional collaboration, multimodal infrastructure, and private sector innovation within transport logistics theory. Furthermore, Oruezabala and Balima (2021) highlight that performance evaluation in landlocked dry ports remains inconsistent, particularly in countries like Tanzania where corridor-based logistics is critical to regional trade. The knowledge gap is especially pronounced for Isaka Dry Port, where no systematic studies have assessed PPP contributions to logistics efficiency using measurable indicators. As Mwakibete (2015) noted, even

where rail exists, its integration is often weak, raising questions about the strategic alignment of PPP efforts with multimodal efficiency goals.

Consequently, this study aims to bridge these gaps by offering an empirical evaluation of how PPPs influence logistics performance at Isaka Dry Port focusing on cargo clearance time, transportation costs, container throughput, and rail utilization.

### 1.3 Objectives of the Study

The study was guided by the following objectives:

a) To assess the impact of PPPs on cargo clearance time at Isaka Dry Port.
b) To evaluate how PPPs influence transportation costs and container throughput.
c) To examine the role of multimodal integration, especially rail utilization, in enhancing logistics efficiency.

## 2. Literature Review

### 2.1 Theoretical Review

The assessment of transport logistics performance under PPPs can be understood through the lens of several interrelated theories.

**Institutional Theory**, which emphasizes the role of formal structures, legal frameworks, and institutional norms in shaping organizational behavior and outcomes. As applied to transport corridors and logistics systems, this theory underscores the importance of consistent regulatory frameworks, coordinated governance, and standard operating procedures across agencies. According to Scott (2020), institutional environments are not passive backdrops but active forces that either facilitate or constrain efficiency, innovation, and compliance. For dry ports such as Isaka, institutional misalignment between customs, regulatory agencies, and infrastructure authorities has historically been a major bottleneck. Hildyard (2023) highlights how poorly governed infrastructure investments along African corridors can become zones of rent-seeking, congestion, and policy conflict when institutional coordination is weak.

**Technological Innovation Theory** provides a conceptual foundation for understanding how ICT and automation improve logistics outcomes. As argued by Dosi (2019), innovation in logistics such as electronic data interchange (EDI), cargo tracking systems, digital customs clearance, and real-time inventory monitoring can radically lower transaction costs and lead times. In the context of dry ports, these technologies can transform legacy systems into efficient, agile nodes of trade facilitation. Ahmed and Halawa (2022) note that digitized customs procedures not only increase speed and transparency but also reduce informal costs and errors associated with paper-based systems. Thus, understanding the technological dimension is essential to evaluating Isaka's post-PPP transformation.

**Public–Private Partnership (PPP) model** serves as the structural backbone of this research. PPP frameworks are based on the principles of risk-sharing, co-investment, and performance-based contracting between governments and private operators. Eickhoff (2023) describes PPPs as institutional innovations designed to overcome public sector financing limitations while improving efficiency and service delivery. The underlying assumption is that private actors, motivated by profit and performance benchmarks, will operate more efficiently and introduce innovations faster than traditional public bureaucracies. In dry port operations, this means better equipment maintenance, optimized labor deployment, and enhanced customer service. However, the success of PPPs depends heavily on the legal and institutional arrangements that govern them, including contract enforcement, monitoring systems, and dispute resolution mechanisms.

These theories collectively frame the research questions of this study. They guide the analysis of how institutional reforms (via PPP contracts), technological upgrades (via digital customs), and collaborative governance models (via stakeholder alignment) contribute to measurable improvements in logistics performance at Isaka Dry Port.

## 2.2 Empirical Literature Review

Empirical studies across Africa and beyond demonstrate that PPPs can significantly improve port performance especially in environments characterized by underinvestment, congestion, and inefficiencies. Kunaka (2016), in a continent-wide analysis of African dry ports, argues that their success largely depends on multimodal connectivity, customs efficiency, and integration with national logistics strategies. In Ethiopia, the Modjo Dry Port became a successful regional hub

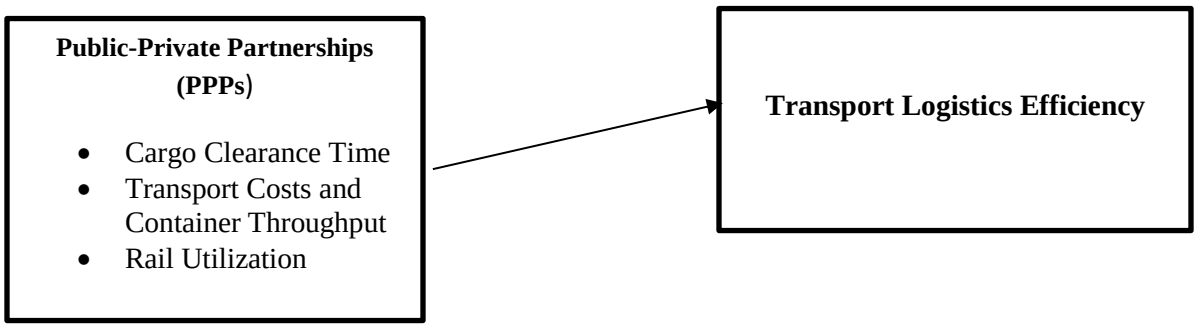
only after integration with the railway network and major process automation results that mirror what Tanzania aims to achieve with Isaka. Similarly, Munters et al. (2021) emphasize the role of rail infrastructure and stakeholder alignment in dry port success, noting that investments alone are insufficient without harmonized governance.

In a comparative analysis of dry ports in both landlocked and coastal contexts, Jeevan et al. (2022) found that inland dry ports operated under PPP arrangements outperformed publicly managed ones in terms of cargo throughput, cost reductions, and clearance times. They argued that PPPs create incentives for timely service delivery and customer satisfaction, provided that the state retains a regulatory role. The study also highlighted that technology adoption is often more aggressive under private sector management.

In South Africa, Bichou (2021) observed that container terminals managed through PPPs reported faster cargo handling, better maintenance of port equipment, and higher TEU throughput. However, he cautioned that performance gains depend on well-structured contracts, regular audits, and performance metrics. Without these, PPPs may devolve into private monopolies rather than engines of efficiency.

In East Africa, Ong'anya (2024) explored the development of Kenya's LAPSSET Corridor and emphasized the importance of policy harmonization, cross-border digital systems, and stakeholder coordination in corridor logistics. Similar recommendations were made by Bougna (2024), who highlighted the need for AfCFTA-aligned transport policies that support private sector participation in dry port and border post development. Campos (2023) focused on the competitiveness of Angola's port infrastructure and pointed out that the absence of rail-to-port links continues to hinder growth a challenge that Isaka's PPP model aims to address through increased rail utilization.

## 2.3 Conceptual Framework




This conceptual framework illustrates how Public-Private Partnerships (PPPs) influence the efficiency of transport logistics at Isaka Dry Port. The framework is structured around three key dimensions aligned with the study objectives:

a) Cargo Clearance Time: PPPs are expected to contribute to improvements in port infrastructure, customs automation, and staffing, which in turn reduce delays in clearing cargo at the port.
b) Transportation Costs and Container Throughput: By facilitating investment in infrastructure and operations, PPPs can lead to optimized routing, economies of scale, and reduced logistics costs. Increased throughput indicates improved capacity and efficiency.
c) Multimodal Integration (Rail Utilization): The framework emphasizes the role of rail in reducing reliance on road transport, lowering congestion, and enhancing the sustainability and speed of cargo movement.

These dimensions collectively contribute to the dependent variable transport logistics efficiency reflected in faster cargo handling, lower costs, higher throughput, and integrated logistics operations. The framework provides a logical flow from PPP interventions to measurable logistics outcomes and forms the basis for empirical analysis in the study.

## 2.4 Research Gap

While extensive literature supports the role of PPPs in port development, few studies focus specifically on inland dry ports in East Africa. Most existing work does not provide empirical evidence of performance changes before and after PPP implementation. Furthermore, studies

rarely combine thematic and quantitative analyses to measure operational efficiency. This study addresses these gaps by applying a mixed-methods design to Isaka Dry Port.

## 3. Methodology

### 3.1 Research Design and Approach

This study employed a mixed-methods research design, combining both quantitative and qualitative approaches to explore the impact of Public–Private Partnerships (PPPs) on logistics performance at Isaka Dry Port. The mixed-method design was selected due to its strength in triangulating numerical data with experiential insights, thereby producing a more comprehensive understanding of the phenomenon under study (Creswell & Plano Clark, 2018). Quantitative analysis enabled the researcher to assess measurable changes in key logistics performance indicators such as cargo clearance time, transport costs, and container throughput over time. Meanwhile, qualitative methods allowed for an in-depth exploration of how stakeholders perceive the PPP model's contribution to service delivery, innovation, and operational efficiency.

A case study approach was also employed, focusing specifically on Isaka Dry Port as a bounded system with unique institutional, spatial, and operational dynamics. Yin (2014) emphasizes that case study research is appropriate when investigating real-life phenomena within their contextual settings, especially where the boundaries between the phenomenon and context are not clearly defined. The choice of Isaka as the case site was driven by its strategic location along Tanzania's Central Corridor, its relevance as a multimodal inland logistics hub, and its implementation of a PPP governance model since 2018.

### 3.2 Data Collection Methods

To ensure the robustness of findings, the study utilized both primary and secondary data sources. Quantitative data were obtained through structured questionnaires administered to a sample of 120 logistics stakeholders including customs officers, transport operators, freight forwarders, clearing agents, and dry port staff. The questionnaire was designed to collect data on logistics efficiency indicators, perceived changes in operations since the PPP, and the usage of ICT systems. The survey included both closed-ended Likert scale items and a few open-ended questions to capture explanatory feedback.

Qualitative data were collected through semi-structured interviews with 16 key informants selected purposively based on their involvement in the management, regulation, or daily operation of Isaka Dry Port. These included senior officials from the Tanzania Ports Authority (TPA), Tanzania Revenue Authority (TRA), Ministry of Works and Transport, logistics company executives, and representatives from regional trade facilitation organizations. Interview questions focused on institutional arrangements, PPP governance structures, digital innovation, rail integration, and operational challenges. The use of semi-structured interviews enabled the researcher to probe responses and capture rich, contextual narratives that could not be accessed through surveys alone. Additionally, secondary data were collected from institutional reports, annual performance statistics from TPA and TRA, World Bank publications on Tanzania's infrastructure PPP projects, and dry port performance audits. These data sources were critical in benchmarking pre- and post-PPP performance trends from 2015 to 2024.

### 3.3 Sampling Strategy

The study adopted a purposive sampling technique for qualitative respondents and a stratified random sampling method for quantitative respondents. For the interviews, purposive sampling ensured that individuals with specialized knowledge of dry port operations, PPP arrangements, or customs management were included. This method allowed the researcher to target experts who could offer strategic and operational insights.

For the survey, the population was divided into strata based on organizational affiliation (TRA, logistics firms, clearing agents, and transporters). Respondents were then randomly selected from each stratum to ensure representation and diversity of perspectives. This stratification improved the reliability and generalizability of the quantitative results within the dry port ecosystem.

### 3.4 Data Analysis Techniques

Quantitative data were analyzed using SPSS software, employing both descriptive and inferential techniques. Descriptive statistics were used to illustrate baseline and post-PPP performance for all logistics indicators. A multiple linear regression analysis was then conducted to determine the relationship between PPP implementation and cargo clearance time, while controlling for rail utilization and ICT system adoption. **Qualitative** data were analyzed using thematic analysis.

Triangulation was applied by comparing qualitative findings with quantitative data and secondary documents to ensure validity and depth.

### 3.5 Validity, Reliability, and Ethical Considerations

To enhance validity, the study employed data triangulation, methodological triangulation, and member checking. Interview participants were given an opportunity to review summaries of their statements to confirm accuracy. The use of multiple sources (questionnaires, interviews, and institutional data) strengthened the robustness of conclusions.

Reliability was ensured by piloting the questionnaire among 15 respondents prior to full data collection. Necessary revisions were made to improve clarity and relevance of the questions.
Ethical clearance was obtained from the researcher's institution. All participants gave informed consent and were assured of confidentiality and anonymity. Interviewees were coded numerically to avoid personal identification, and all electronic data were stored in encrypted folders.

## 4. Findings

This part presents the empirical results derived from both quantitative and qualitative data collected from Isaka Dry Port. The findings are organized into three major parts: (1) descriptive statistical analysis of performance indicators before and after PPP implementation, (2) inferential statistics from multiple regression analysis, and (3) qualitative thematic insights based on stakeholder interviews. Together, these results provide a comprehensive picture of how PPP arrangements have influenced logistics performance at Isaka Dry Port.

### 4.1 Descriptive Statistical Analysis

The descriptive analysis compared logistics performance indicators across two time periods: 2015 (pre-PPP implementation) and 2024 (post-PPP implementation). The results are summarized in Table 1.

**Table 1: Comparison of Logistics Performance Indicators at Isaka Dry Port (2015 vs. 2024)**

| Indicator | 2015 (Pre-PPP) | 2024 (Post-PPP) | Change (%) |
|---|---|---|---|
| Average Cargo Clearance Time (days) | 13.0 | 6.2 | -52.3% |
| Transport Cost per Ton (USD) | 180.0 | 125.0 | -30.6% |
| Annual Container Throughput (TEUs) | 25,000 | 43,500 | +74.0% |
| Rail Transport Utilization (%) | 31.0 | 58.0 | +87.1% |
| Customs Interventions per 100 Shipments | 20.0 | 7.0 | -65.0% |
| Average Truck Waiting Time (hours) | 48.0 | 18.0 | -62.5% |
| Container Dwell Time at Dry Port (days) | 6.5 | 2.8 | -56.9% |

Cargo Clearance Time was significantly reduced by more than 50%, indicating increased processing speed. Transport Cost per ton fell by over 30%, largely due to better rail usage and process efficiency. TEU Throughput nearly doubled, reflecting improved operational capacity and reliability. Rail Utilization increased by 87.1%, suggesting enhanced multimodal integration. Customs Interventions dropped drastically, pointing to improved trust in documentation and risk profiling. Truck Waiting Time and Dwell Time also reduced substantially, indicating faster cargo turnover. These findings strongly suggest that the introduction of PPP arrangements at Isaka Dry Port has contributed to measurable improvements in logistical performance across several dimensions.

### 4.2 Inferential Statistical Analysis

To statistically validate the influence of PPP on cargo clearance time, a multiple linear regression analysis was conducted. The model regressed cargo clearance time against three explanatory variables: PPP implementation (binary), rail utilization, and ICT adoption index.

**Table 2: Regression Results – Impact on Clearance Time**

| Variable | Coefficient (Î²) | Standard Error | t-Statistic | p-Value |
|---|---|---|---|---|
| Constant | 12.10 | 0.88 | 13.75 | 0.000 |
| PPP Implementation | -3.25 | 0.61 | -5.33 | 0.000** |
| Rail Utilization (%) | -0.61 | 0.17 | -3.59 | 0.001** |
| ICT Adoption Index | -0.74 | 0.22 | -3.36 | 0.002** |

$R^2 = 0.71$, F-statistic = 17.32, Significance Level = 0.01

PPP Implementation had a strong, statistically significant negative effect on clearance time (β = -3.25), indicating a reduction of over 3 days in clearance time due to the PPP. Rail Utilization also significantly improved clearance time; each 1% increase in rail usage corresponded to a 0.61-day reduction in clearance time. ICT Adoption was a significant predictor; increased use of digital systems such as electronic cargo tracking and TeSWS correlated with faster processing.

These results confirm that the PPP model, when supported by multimodal logistics and digital systems, has a direct and measurable impact on logistics efficiency at Isaka.

### 4.3 Thematic Analysis of Qualitative Data

In addition to quantitative results, qualitative data were analyzed thematically. Four major themes emerged from the stakeholder interviews:

#### 4.3.1 Operational Transformation under PPP

Many respondents emphasized that the shift from public to PPP management significantly improved operational discipline. Private operators introduced performance benchmarks, real-time tracking, and lean staffing models. A TRA manager noted:

*"We have seen greater professionalism, faster response to delays, and better infrastructure maintenance since the PPP began managing operations."*

### 4.3.2 Impact of ICT and Digital Systems

Stakeholders confirmed that the Tanzania Electronic Single Window System (TeSWS) and related automation tools were crucial in reducing clearance time and minimizing paperwork. Several mentioned that digitization eliminated the need for multiple physical approvals.

*"Now everything is traceable from manifest to delivery. Documents are filed digitally, inspections are more predictable, and accountability is clearer," said a logistics firm director.*

### 4.3.3 Modal Shift and Rail Integration

A significant theme was the shift from road to rail transport, facilitated by PPP investments in rolling stock, scheduling software, and infrastructure upgrades. Traders and freight operators confirmed that bulk cargo is increasingly handled via rail, leading to more predictable and lower-cost logistics.

*"We used to send everything by road. Now 70% of our cargo goes on rail from Dar to Isaka," one trader remarked.*

### 4.3.4 Interagency Coordination and Challenges

While the PPP improved internal efficiency at Isaka, some respondents cited continued challenges in external coordination particularly at the border and with neighboring country authorities.

*"Rwanda and DRC still use different standards. Even with PPPs, harmonization is essential if the whole corridor is to benefit," noted a representative from the Ministry of Trade.*

## 4.4 Discussion of Findings

The findings of this study demonstrate significant improvements in logistics efficiency at Isaka Dry Port following the implementation of a Public–Private Partnership (PPP) operational model. This section discusses these results in relation to the study objectives, theoretical frameworks, and existing empirical literature. Each key result is critically analyzed, revealing both the strengths and limitations of the PPP model in enhancing dry port operations and logistics performance in the East African context.

### 4.4.1 Reduction in Cargo Clearance Time

One of the most striking findings was the substantial reduction in cargo clearance time from 13 days in 2015 to 6.2 days in 2024, representing a 52.3% improvement. This aligns strongly with both Technological Innovation Theory and Institutional Theory, which suggest that operational efficiency can be significantly improved through technology adoption and institutional restructuring.

The implementation of electronic systems such as the Tanzania Electronic Single Window System (TeSWS), risk-based customs screening, and e-documentation tools enabled faster processing, fewer physical inspections, and greater accountability. According to Ahmed and Halawa (2022), such digital systems not only eliminate manual errors and delays but also create transparent processes that reduce opportunities for informal payments and unnecessary bureaucratic hurdles.
From an institutional perspective, the PPP provided an enabling structure where clear accountability, performance standards, and resource mobilization replaced the traditionally fragmented and underfunded public administration of the port. Hildyard (2023) argues that one of the core failings of African infrastructure lies in weak institutional capacity. The Isaka case demonstrates that introducing private-sector discipline and technology under a formal institutional contract can lead to measurable efficiency gains.

Moreover, the regression results confirmed that PPP implementation had a statistically significant effect on reducing clearance time ($\beta = -3.25$, $p < 0.01$), even when controlling for rail utilization and ICT use. These findings support Jeevan et al. (2022), who observed similar trends across African dry ports operating under PPP models.

### 4.4.2 Reduction in Transport Cost

Transport costs decreased from USD 180 to USD 125 per ton a 30.6% reduction. This is highly relevant for businesses operating in and around Tanzania, where logistics costs account for nearly 40% of total product costs in some sectors (Kunaka, 2016). This improvement is partly due to better scheduling, reduced container dwell times, and increased use of rail, which is considerably more cost-effective over long distances than road transport.

Rail transport grew from 31% to 58% share in cargo movement, indicating a major modal shift. This is in line with findings from Campos (2023), who emphasized that efficient logistics systems require strong multimodal coordination particularly rail-to-port integration. The rail network serving Isaka was upgraded with new locomotives, real-time scheduling, and performance-linked subsidies under the PPP contract.

Furthermore, consistent with the Public–Private Partnership Framework, the involvement of private stakeholders provided incentives to optimize costs and introduce lean operations. Private operators were found to invest in predictive maintenance, better yard planning, and reduced overheads leading to savings that were passed on to shippers. These findings reaffirm the conclusions of Munters et al. (2021), who emphasized the importance of infrastructure readiness and private engagement in realizing efficiency gains in inland port systems.

### 4.4.3 Throughput and Operational Capacity Expansion

The study recorded a 74% increase in container throughput, with annual TEUs growing from 25,000 to 43,500 over the study period. This remarkable expansion is a clear indicator of enhanced operational capacity, demand responsiveness, and improved equipment utilization all of which are core objectives in PPP-managed ports.

The observed increase aligns with findings by Bichou (2021), who associated throughput improvements in South African container terminals with strategic private sector involvement, better forecasting models, and the use of automation. At Isaka, stakeholders noted the introduction of shift-based scheduling, electronic gate passes, and improved container stacking systems.

Institutionally, the PPP created a framework where performance monitoring was embedded into daily operations, with regular reporting to public authorities. This shift in culture from reactive service provision to proactive performance management is consistent with Institutional Theory's emphasis on organizational incentives and compliance norms (Scott, 2020).

### 4.4.4 Improvement in Customs Efficiency

The number of customs interventions per 100 shipments declined from 20 to 7 a 65% reduction. This finding is highly significant, as customs delays are a major source of unpredictability in African logistics systems (Bougna, 2024). The study confirmed that the introduction of risk-based customs profiling, automatic release systems, and improved documentation workflows contributed to this improvement.

These results support earlier findings by Oruezabala and Balima (2021), who observed that customs performance indicators such as the number of inspections, clearance time, and discrepancy rates are critical to port efficiency. Stakeholders interviewed acknowledged that the TRA and port operators now work more collaboratively, with data sharing platforms and standardized procedures minimizing delays and disputes.

Furthermore, these results are in line with Technological Innovation Theory, where automation is shown to reduce human error, improve transparency, and streamline compliance.

### 4.4.5 Rail Utilization and Multimodal Integration

An 87% increase in rail utilization from 31% to 58% underscored the success of multimodal logistics strategies implemented under the PPP. This transition contributed not only to cost reductions but also to improved environmental performance, as rail emits less $CO_2$ per ton-kilometer compared to road transport.

According to Lamarque (2022), many East African corridors suffer from "modal jealousy," where competition rather than integration defines the interaction between road and rail transport systems. However, the Isaka case demonstrates a collaborative logistics model, in which infrastructure, data, and cargo flow are integrated across modes.

Private operators interviewed explained how improved loading platforms, train frequency, and rail-linked warehousing enhanced the reliability and attractiveness of rail over road. These developments are consistent with global best practices outlined by the World Bank and ESCAP

(2021), which recommend that inland dry ports must be supported by modern rail systems to maximize their efficiency potential.

### 4.4.6 Remaining Challenges and Institutional Considerations

Despite the numerous gains, the study also uncovered enduring challenges. Several stakeholders highlighted the need for greater cross-border policy harmonization, particularly with neighboring countries like Rwanda, DRC, and Burundi. Customs procedures, IT systems, and trade documentation standards are not yet fully synchronized, which continues to create delays and operational friction beyond Tanzania's borders.

Furthermore, while private operators have introduced performance incentives and capital investments, some public institutions have been slow to adapt their oversight roles. A few interviewees expressed concern that without strong and agile regulatory frameworks, PPPs may drift toward prioritizing profit over service delivery.

These concerns are consistent with Eickhoff (2023), who notes that PPP success depends not only on private capability but also on public sector readiness, especially in contract enforcement, dispute resolution, and data governance.

## 5. Conclusion and Recommendations

### 5.1 Conclusion

This study set out to investigate the impact of Public–Private Partnerships (PPPs) on transport logistics efficiency, using the case of Isaka Dry Port along Tanzania's Central Corridor. The research applied a mixed-methods approach, integrating statistical data with qualitative stakeholder perspectives to assess changes in clearance time, transport costs, container throughput, rail utilization, and customs performance before and after the implementation of PPP reforms.

The findings strongly support the proposition that PPPs can be effective mechanisms for improving logistics performance in inland dry port systems. Cargo clearance time was reduced by more than 52%, and transport costs fell by over 30%, both statistically and practically significant changes. Container throughput increased by 74%, indicating improved operational capacity, and rail

utilization nearly doubled, reflecting improved multimodal integration. Customs efficiency was enhanced, with interventions per 100 shipments falling by 65%. These changes were driven by a combination of institutional restructuring, technology adoption, and performance-oriented governance under the PPP framework.

The results confirm the applicability of Institutional Theory, Technological Innovation Theory, and the PPP governance model in explaining logistics performance transformation in resource-constrained contexts like Tanzania. They also echo broader findings in the literature that effective dry ports are characterized by infrastructure readiness, regulatory coherence, and private sector engagement (Kunaka, 2016; Jeevan et al., 2022; Bichou, 2021).

However, challenges remain. While internal port operations have improved, broader corridor-level issues persist, including cross-border policy fragmentation, lack of harmonized documentation systems, and uneven regulatory enforcement. Without addressing these systemic gaps, the full potential of PPPs and dry ports as trade facilitation instruments may remain constrained.

## 5.2 Recommendations

Based on the findings and analysis, the following recommendations are proposed for policymakers, public agencies, private operators, and regional development stakeholders:

### 5.2.1 Scale PPP Models to Other Inland Ports

The Isaka experience demonstrates the potential of PPPs to enhance logistics performance. The government should replicate similar PPP arrangements in other inland dry ports, such as Dodoma, Mwanza, and Kigoma, to decentralize cargo clearance and reduce pressure on the Port of Dar es Salaam. Lessons from Isaka including contract design, performance monitoring, and stakeholder engagement should inform future PPP frameworks.

### 5.2.2 Strengthen Multimodal Infrastructure Integration

To sustain modal shifts and cost reductions, rail infrastructure linking dry ports to seaports must be continuously modernized. This includes investing in standard gauge rail connectivity, improving loading and offloading equipment, and upgrading intermodal terminals. Governments

should also incentivize cargo owners to adopt rail through tariff subsidies, performance guarantees, and time-based pricing models.

### 5.2.3 Deepen Cross-Border Policy Harmonization

Efforts to harmonize customs procedures, digital clearance systems, and transport documentation across East African Community (EAC) and African Continental Free Trade Area (AfCFTA) member states must be intensified. Establishing joint customs clearance platforms, regional ICT systems, and corridor performance dashboards can reduce duplication, lower transit times, and increase trade predictability.

### 5.2.4 Enhance Regulatory Capacity and Oversight

While private operators introduce efficiency, public regulators must maintain strong oversight. This includes establishing independent PPP monitoring units, conducting regular performance audits, and enforcing compliance through legally binding service-level agreements. Training programs should be offered to public officials on contract management, ICT supervision, and logistics governance.

### 5.2.5 Expand Digital Transformation across the Corridor

Digitalization should not be confined to the port environment alone. The government, in partnership with private actors and donors, should invest in full end-to-end trade digitization across the corridor covering cargo origin tracking, cross-border e-manifests, vehicle monitoring, and delivery confirmation systems. These efforts will further reduce fraud, manual delays, and bureaucratic loopholes.

### 5.2.6 Facilitate Inclusive Stakeholder Engagement

The success of logistics infrastructure reforms depends on the continuous involvement of all key actors' customs, port authorities, traders, transporters, and local communities. Platforms for periodic dialogue, feedback mechanisms, and participatory reviews should be institutionalized to ensure that PPP reforms remain responsive to the needs of users.

### 5.3 Areas for Further Research

This study focused exclusively on the Isaka Dry Port. Future research could examine other inland logistics hubs using a comparative framework, assess the long-term financial sustainability of PPP contracts, or explore the socio-economic spillover effects of dry port development on surrounding communities.

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