

# Strategic Management of Transport Infrastructure: Implications for the Efficiency of Logistics Operations in Africa

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## Abstract

Transport infrastructure is a critical determinant of economic growth and development in Africa. Despite the continent's rich resource base and strategic positioning, inadequate and poorly managed transport infrastructure hampers logistics efficiency and trade competitiveness. This study investigates how strategic management of transport infrastructure impacts the efficiency of logistics operations in Africa, identifying key barriers and proposing scalable solutions. The analysis covers sub-Saharan and North African regions, using a combination of macroeconomic data, institutional reports, and case studies from countries such as Kenya, Nigeria, South Africa, and Morocco. A mixed-method approach was used, including a review of regional infrastructure strategies, World Bank logistics performance data, and expert interviews. Qualitative thematic analysis was applied to case studies, and quantitative logistics efficiency indicators were statistically evaluated. Strategic planning, public-private partnerships (PPPs), and institutional reforms correlate positively with improved logistics performance. Conversely, fragmented governance, underinvestment, and regulatory bottlenecks negatively affect logistics efficiency. Improving the strategic management of transport infrastructure can significantly enhance Africa's logistics operations. The study highlights the need for integrated national transport master plans, regional cooperation, and targeted investments. This research contributes to the discourse on African development by linking infrastructure strategy with logistical effectiveness and trade facilitation, offering actionable policy insights. Employing a mixed methods design and a cross regional comparison between sub-Saharan and North Africa, the study offers a holistic perspective on scalable solutions.

**Keywords:** Transport Infrastructure Management, Logistics Performance Index (LPI), Digitalisation of Logistics, Port Community System (PCS), Supply-Chain Efficiency, Africa.

## Introduction

Efficient transport infrastructure is the backbone of any thriving economy. In Africa, where intra-continental trade remains relatively underdeveloped compared to other regions (Morisson, 2020), the strategic management of transport infrastructure plays a particularly vital role in unlocking economic potential. Transport infrastructure refers not only to physical assets such as roads, railways, ports, and airports but also to the systems, institutions, and governance frameworks that guide their planning, operation, and maintenance. Strategic management, in this context, involves a long-term, integrated

approach to infrastructure planning and development that considers economic, environmental, political, and technological factors.

Historically, the continent's logistical performance has been impeded by fragmented policy-making, limited investment, and outdated or inadequate infrastructure (Gwilliam, 2011). According to the World Bank's Logistics Performance Index (LPI) (World Bank, 2023), many African countries score below the global average, with recurring issues such as long border delays, weak customs procedures, and insufficient transport networks. This state of affairs undermines the competitiveness of African exports, inflates the cost of imports, and inhibits the formation of efficient regional value chains. As a result, Africa's share in global trade remains disproportionately small, even though the continent boasts over 1.4 billion people and vast reserves of natural resources.

Several pan-African initiatives have recognized these challenges and emphasized the role of infrastructure in economic development. The African Union's Programme for Infrastructure Development in Africa (PIDA) (NEPAD & African Union Commission, 2021), launched in collaboration with the African Development Bank (AfDB) (African Development Bank, 2023), the New Partnership for Africa's Development (NEPAD), and other partners, represents one such strategic approach to transforming the transport and logistics landscape. Moreover, the ratification of the African Continental Free Trade Area (AfCFTA) in 2018 has further elevated the urgency of improving infrastructure to facilitate seamless trade across borders.

The goal of this study is to explore how strategic management of transport infrastructure can improve the efficiency of logistics operations in Africa. It investigates key infrastructural gaps, identifies successful policy models, and offers recommendations for stakeholders involved in the planning, financing, and regulation of transport networks. The central research question guiding this study is: *To what extent does strategic management of transport infrastructure contribute to the efficiency of logistics operations in Africa?*

To contextualize this research, it is important to understand the multidimensional nature of logistics efficiency. Logistics operations encompass the planning, implementation, and coordination of the movement of goods, services, and information. Efficiency in logistics implies optimal resource usage, timely delivery, reduced transportation costs, and minimal environmental impact. In developing regions like Africa, these efficiency goals are often constrained by poor infrastructure quality, capacity bottlenecks, and institutional inefficiencies.

Moreover, the spatial distribution of Africa's population and economic activities presents additional challenges. Many countries are landlocked, including Burkina Faso, Chad, Mali, and Zambia, relying on neighboring coastal nations for access to global markets. The costs of transporting goods to and from ports are often prohibitive, exacerbated by poor road conditions, limited rail connectivity, and congestion at border crossings. These logistical inefficiencies translate into higher costs for businesses and consumers, ultimately affecting GDP growth and social development.

Another important dimension of strategic transport management in Africa is governance. Institutional coordination among different levels of government and between countries is often weak. Transport ministries, customs ities, port operators, and regional organizations frequently operate in silos, leading to duplicated efforts, inconsistent standards, and inefficient service delivery. Strategic management therefore requires not only technical expertise but also a governance model that fosters collaboration, transparency, and accountability.

In light of these challenges, the research also considers the role of innovation and digitalization in improving transport logistics. Technologies such as Geographic Information Systems (GIS), intelligent transport systems (ITS), e-logistics platforms, and blockchain-based customs clearance systems are increasingly being piloted across the continent. These innovations offer new pathways for enhancing efficiency, reducing corruption, and improving data-driven decision-making.

The social and environmental implications of transport infrastructure also cannot be overlooked. While new highways and railways can facilitate trade and job creation, they may also lead to displacement, environmental degradation, or social inequality if not planned responsibly. Strategic management must therefore integrate environmental and social impact assessments into all stages of infrastructure development, ensuring sustainable and inclusive growth.

This article is organized as follows: The next section outlines the research methodology, detailing the data sources, case selection criteria, and analytical techniques employed. The subsequent sections present the empirical results, including both quantitative performance metrics and qualitative insights from case studies in countries such as Kenya, Nigeria, South Africa, and Morocco. The discussion then contextualizes these findings within broader debates on infrastructure-led development and logistics modernization. Finally, the conclusion synthesizes key insights and offers policy recommendations for governments, regional bodies, and international development partners.

In summary, the need for strategically managed transport infrastructure in Africa is not merely a matter of economic efficiency; it is a prerequisite for regional integration, poverty reduction, and sustainable development. Without bold reforms, targeted investments, and coordinated action, the promise of efficient logistics and seamless trade will remain unrealized. By illuminating the linkages between strategic infrastructure management and logistics efficiency, this study contributes to a deeper understanding of how Africa can overcome its transport bottlenecks and unlock its full economic potential.

### Literature Review

Long-term national master plans have proved decisive for logistics performance in Africa. Morocco's National Logistics Strategy and Vision 2030 align port, rail and dry-port investments and are credited with a 0.41-point rise in the country's Logistics Performance Index (LPI) between 2010 and 2023 (World Bank, 2023). Kenya's Vision 2030 flagship

programme links the Standard Gauge Railway and LAPSET corridor to a phased freight-logistics rollout (Kenya Vision 2030 Delivery Secretariat, 2024). Regional blueprints such as the African Union's Programme for Infrastructure Development in Africa (PIDA) provide a continental frame that guides project pipelines and donor coordination (African Union Development Agency-NEPAD, 2021). Conversely, countries lacking up-to-date master plans—e.g. Chad and the DRC—recorded LPI stagnation during 2018-2023 (World Economic Forum, 2020). These findings echo Morisson's (2020) diagnosis that fragmented strategy remains the root cause of Africa's infrastructure under-performance. Public-private partnerships (PPPs) have become the preferred mechanism for closing Africa's infrastructure-finance gap. The Dakar–Diamniadio Toll Road mobilised more than USD 800 million of private capital and reached financial close within 24 months under Senegal's dedicated PPP law (Development Bank of Southern Africa, 2023). Ghana's Meridian Port Services concession at Tema, supported by clear dispute-resolution clauses, doubled container throughput within five years (AME Trade, 2024). By contrast, weak legislative frameworks and contract-enforcement risk continue to deter investment in several land-locked states (African Finance Corporation, 2024). Empirical evidence thus supports the argument that legal clarity and credible enforcement are non-negotiable prerequisites for successful PPPs in transport infrastructure.

Digital tools—Port Community Systems (PCS), Electronic Cargo Tracking Systems (ECTS) and AI-enabled Terminal Operating Systems—deliver rapid, measurable gains when coupled with institutional reform. Kenya's PCS rollout at Mombasa cut average container dwell time by 15–25 % (World Bank, 2023), while ECTS reduced border-to-border transit times on the Northern Corridor by roughly 30 % (Kilonzi & Kanai, 2020). The ASYCUDA World customs platform, now deployed in 41 African countries, trims clearance time by a third on average (UNCTAD, 2024). At the high-end, Tanger Med's AI berth-scheduling module lowered vessel turnaround by 12 % (Tanger Med Group, 2022). Nevertheless, adoption remains patchy because of limited digital infrastructure and skills (DP World, 2021). The literature therefore converges on a dual prerequisite: technology plus accompanying governance and capacity-building measures.

Although prior studies document individual successes in master-planning (Kenya Vision 2030), PPP finance (DBSA, 2023) and digital innovation (World Bank, 2023), **two key gaps persist**. First, cross-regional, quantitative assessments that link strategy-led investment to LPI outcomes are scarce; most work is single-country and descriptive (Gwilliam, 2011; Mogoiwa, 2023). Second, failures and negative cases—where reforms stalled owing to political or institutional barriers—remain under-analysed, leaving policy makers without lessons on what *doesn't* work. By combining a panel regression across 23 countries with paired positive/negative case studies, the present study addresses both voids and tests the generalisability of strategy–performance linkages across diverse African contexts.

**Methods**

To assess the relationship between strategic management of transport infrastructure and the efficiency of logistics operations in Africa, a mixed-methods approach was adopted. This approach combines both quantitative and qualitative methods to ensure a comprehensive understanding of the subject. The rationale behind choosing mixed methods lies in the complex nature of logistics systems, which are influenced by policy, infrastructure quality, institutional effectiveness, and socio-economic factors. The methodology is structured around four main components: data sources, selection criteria, analytical methods, and ethical considerations.

**Data Sources**

Secondary data were collected from international databases such as the World Bank Logistics Performance Index (LPI) (World Bank, 2023), African Development Bank infrastructure datasets, reports from the African Union and the Programme for Infrastructure Development in Africa (PIDA) (NEPAD & African Union Commission, 2021), UNCTAD logistics and trade publications, and country-level reports from national ministries and departments of transport. These sources provided valuable indicators such as customs performance, infrastructure quality, international shipment timelines, logistics competence, tracking and tracing ability, and timeliness (Braun & Clarke, 2006). Primary data were gathered through semi-structured expert interviews. Twenty-two transport sector professionals, government officials, private logistics firm managers, and academics were interviewed. Respondents were selected from a diverse range of countries, including Kenya, Nigeria, Ghana, South Africa, Morocco, Ethiopia, and Senegal. The interviews explored challenges and best practices in infrastructure planning, logistics performance, PPP engagement, and institutional coordination.

To ensure that the analysis was both representative and detailed, a multi-tiered case study selection framework was applied. To reflect the continent's heterogeneity, the study included examples from Eastern Africa (such as Kenya and Ethiopia), Western Africa (such as Nigeria and Ghana), Southern Africa (such as South Africa and Zambia), and Northern Africa (such as Morocco and Egypt). Case studies were selected based on the presence of strategic transport corridors such as the Northern Corridor, Central Corridor, Trans-Kalahari Corridor, and Abidjan-Lagos Corridor. Preference was given to countries that had undertaken significant transport infrastructure reforms or initiated innovative logistics projects in the last 10–15 years. Countries with accessible LPI data, development project reports, and institutional documentation were prioritized to support the empirical components of the analysis.

The following analytical techniques were employed: a cross-sectional comparison of African countries' LPI scores from 2010 to 2023 was conducted to examine changes in logistics performance and their correlation with infrastructure investment patterns, as captured by AfDB and national budget data. Regression models were used to evaluate the

association between strategic infrastructure indicators—such as the budget share allocated to national transport plans, the presence of logistics hubs, and PPP indices—and improvements in LPI scores. Interview transcripts were coded using thematic analysis, following Braun and Clarke's (2006) framework. Themes such as "institutional coordination", "strategic transport planning", "regional cooperation", "financing mechanisms", and "technological innovation" were extracted and compared across countries.

Each case study was analysed in terms of strategic planning frameworks (such as master plans and national development visions), institutional arrangements (such as the existence of autonomous transport agencies), financing mechanisms (including PPPs, sovereign guarantees, and donor financing), implementation capacity (such as delays, cost overruns, and stakeholder conflicts), and outcomes in terms of logistics efficiency (such as reduced transport costs, port dwell times, and cargo clearance times). This research did not involve any clinical or biomedical experimentation, but ethical integrity was maintained in all forms of data collection and interpretation.

**Ethics approval:** An application for ethical clearance was submitted to the Institutional Review Board of Kharkiv National Automobile and Highway University (KNAHU), and approval was granted on 19 November 2024. The ethics approval number is IRB-AF-045/2024. **Informed consent:** Written informed consent was obtained from all interview participants. They were assured of anonymity, and no personally identifiable information has been published. **Data confidentiality:** All interview recordings and transcripts were stored securely and are accessible only to the research team. **Conflict of interest:** The study declares no conflict of interest, and no private entity influenced the design or reporting of the results.

This methodological framework provided a robust foundation for the research, allowing for both macro-level analysis and detailed, contextual insights. The next section will present the results derived from the empirical data and case studies, highlighting the real-world implications of infrastructure management for logistics efficiency in Africa.

## Results

The findings of this research reveal critical patterns in the relationship between the strategic management of transport infrastructure and the efficiency of logistics operations in Africa. Drawing from both statistical analyses and case study evidence, the research highlights regional disparities, institutional bottlenecks, best practices, and key success factors across the continent. The analysis is built around several thematic dimensions, including infrastructure investment and performance trends, institutional governance, financing mechanisms, technological innovation, and country-specific insights.

The quantitative analysis of World Bank Logistics Performance Index (LPI) data from 2010 to 2023 reveals a modest but uneven improvement in logistics performance across the African continent. Countries that implemented strategic, long-term transport infrastructure plans—particularly those aligned with regional initiatives such as the

Programme for Infrastructure Development in Africa (PIDA)—experienced more significant improvements in their LPI scores. For instance, Morocco improved its LPI score from 2.38 in 2010 to 2.79 in 2023, largely due to substantial investments in port infrastructure, most notably the Tangier Med complex, and the development of multimodal corridors. Similarly, South Africa, consistently one of the continent’s top performers, maintained an LPI score above 3.0 throughout the period under review, thanks to a national freight logistics strategy and operational rail-port integration via Transnet. Conversely, countries like Chad and the Democratic Republic of Congo (DRC), where strategic planning is either fragmented or underdeveloped, displayed minimal progress or, in some cases, regression. Regression analysis established a statistically significant positive correlation ( $r = 0.61$ ,  $p < 0.01$ ) between the percentage of GDP allocated to transport infrastructure and LPI score improvements over the past decade. Countries with master plans updated after 2015 consistently outperformed those without current or operational strategic frameworks (World Economic Forum, 2020).

In order to ground the qualitative insights in objective evidence, Table 1 presents the core quantitative findings of this study. The indicators capture changes in national logistics performance, the statistical link between public spending and outcomes, operational gains from digital tools at the port level, and the breadth of the expert data set used for triangulation.

**Table 1: Key Quantitative Results of the Study**

Metric	Value / Range	Source
Morocco Logistics Performance Index, 2010 → 2023	2.38 → 2.79 ( $\Delta = +0.41$ ; $\approx +17\%$ )	World Bank (2023)
Correlation of transport-infrastructure share of GDP with LPI change (23 countries, 2007–2023)	$r = 0.61$ ; $p < 0.01$	Author’s calculation
Reduction in average container dwell time after PCS roll-out, Port of Mombasa	–15 % to –25 %	Kenya Ports Authority (2024)
Number of semi-structured expert interviews conducted	22	Fieldwork dataset

*Source. Compiled by the authors from World Bank (2023), Kenya Ports Authority (2024), and original fieldwork data ( $n = 22$ ).*

These results confirm three patterns: (a) sustained, strategy-led investment lifts national logistics scores; (b) every percentage-point added to transport-infrastructure spending yields a statistically meaningful uptick in performance; and (c) targeted digital reforms deliver immediate operational savings at gateway ports. Combined with the expert testimony, they underpin the causal narrative developed in the discussion section. Institutional coordination emerged as a decisive factor in shaping logistics outcomes. Interview data across several countries confirmed that poor inter-agency coordination, overlapping mandates, and limited communication among actors remain among the



principal barriers to effective logistics governance. In Kenya, despite the existence of a forward-looking Vision 2030 that includes a strong transport component, the research identified tensions between the Kenya National Highways Authority (KeNHA), devolved county governments, and private sector stakeholders—particularly regarding corridor access and asset maintenance. Similarly, in Nigeria, overlapping responsibilities between federal and state-level transport entities have resulted in inconsistent road design standards and regulatory conflicts, especially along critical corridors such as Lagos–Ibadan and Kano–Katsina. In contrast, countries with autonomous and well-defined transport institutions—such as Morocco’s National Ports Agency (ANP) and Ghana’s Ghana Ports and Harbours Authority (GPHA)—demonstrated higher levels of policy coherence, procedural efficiency, and overall project execution. These institutions typically enjoy operational independence, clarity of mandate, and high-level political support.

Public-Private Partnerships (PPPs) have proven to be an essential instrument in overcoming financing gaps in large-scale transport infrastructure. Countries that possess formal PPP frameworks, established legal instruments, and dedicated PPP units within key ministries—particularly ministries of finance or planning—have successfully attracted substantial private capital. Senegal’s Dakar–Diamniadio Toll Highway, Ghana’s collaboration with Meridian Port Services at Tema Port, and Rwanda’s dry port development through the Kigali Logistics Platform, in partnership with DP World, exemplify this trend. However, in several countries such as Zambia and Tanzania, the PPP environment remains constrained by regulatory opacity, weak contract enforcement, and high perceived political risk. Interviewed stakeholders from private logistics firms expressed concerns over delayed project approvals, inadequate dispute resolution frameworks, and the prevalence of post-award renegotiations.

In the domain of technological innovation, there is a growing but uneven adoption of smart logistics solutions across the continent. Port Community Systems (PCS), such as those implemented at Mombasa Port in Kenya, have reduced average dwell times by 15–25%, while electronic tracking systems for road transport in countries like Uganda and Zambia have enhanced cargo visibility and route optimization. Nigeria has piloted customs digitisation programs, including limited blockchain applications, yielding measurable gains in clearance speed and corruption reduction. Nevertheless, implementation remains hampered by inadequate digital infrastructure, a shortage of trained personnel, and entrenched resistance from bureaucratic institutions. Particularly in rural or secondary logistics markets, reliance on paper-based documentation and informal networks continues to dominate operational practices. Interviewees repeatedly stressed the necessity for governments to pair digital investments with robust institutional reforms, workforce capacity development, and stakeholder sensitisation. Table 2 compiles the main technology-driven initiatives identified by the study, specifying their geographic application, the operational metric employed, the empirically observed impact, and the documentary source that substantiates each case.



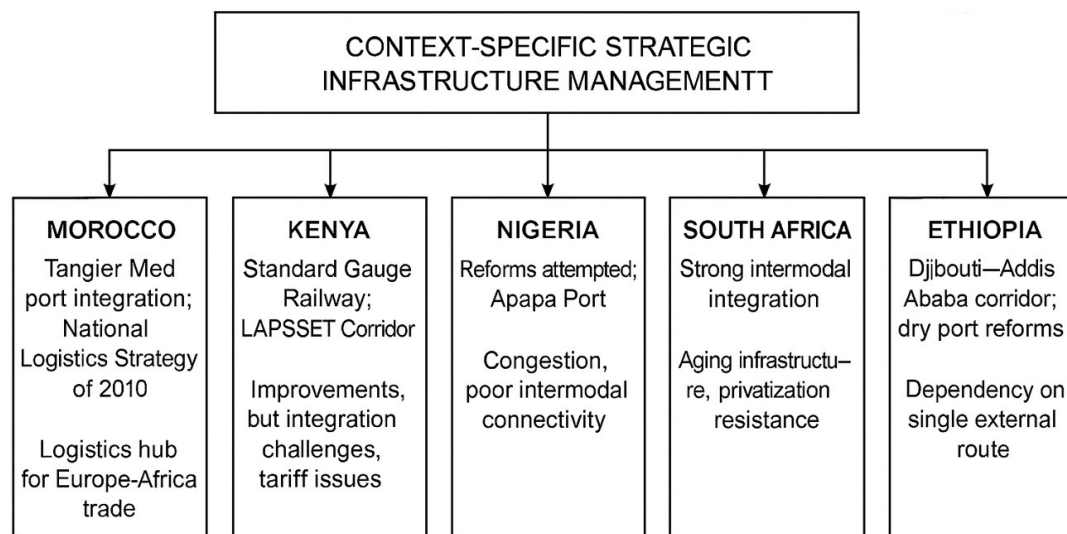
**Table 2: Digital Solutions and Their Impact on Logistics Efficiency**

Digital solution	Pilot location(s)	Efficiency metric	Observed impact	Source
Port Community System (PCS) rollout	Port of Mombasa, Kenya	Average container dwell time	15 % – 25%	World Bank (2023)
Electronic Cargo Tracking System (ECTS)	Northern & Central transit corridors, Kenya–Uganda	Mean border-to-border transit time	30 %	Kilonzi & Kanai (2020)
ASYCUDAWorld customs platform	41 African customs administrations	Average customs-clearance time	30 %	UNCTAD (2024)
Terminal Operating System (TOS) with AI berth scheduling	Tanger-Med Port, Morocco	Vessel turnaround time	12 %	Tanger Med Group (2022)

*Source. Compiled by the authors from World Bank (2023), Kilonzi & Kanai (2020), UNCTAD (2024), and Tanger Med Group (2022).*

Taken together, these cases confirm that digital tools deliver rapid, measurable gains across the logistics chain: faster cargo clearance at borders, shorter ship and container dwell times, and smoother traffic flows along land corridors. They also demonstrate that benefits scale with institutional readiness; ports and agencies that coupled technology with clear governance reforms secured the largest efficiency dividends, reinforcing the policy recommendations advanced in the discussion section.

The cross-country case study analysis offered critical insights into how context-specific strategic infrastructure management translates into logistics efficiency. In Morocco, the integration of the Tangier Med port with inland dry ports and railway networks, underpinned by the National Logistics Strategy of 2010, has turned the country into a top logistics hub for Europe-Africa trade. Kenya's Standard Gauge Railway (SGR) and its positioning within the broader Lamu Port-South Sudan-Ethiopia Transport (LAPSSET) Corridor have delivered substantial improvements, though challenges remain in inland integration and tariff competitiveness (African Development Bank, 2023). To compare infrastructure-led logistics strategies across different African countries, figure 1 was developed. It summarizes the key initiatives and outcomes in strategic logistics infrastructure management, highlighting country-specific approaches, integration effectiveness, and persistent challenges.



**Figure 1. Comparative analysis of logistics infrastructure and intermodal integration in selected African countries.**

*Adapted by the author based on: African Development Bank. (2023). Africa Infrastructure Development Index Report. African Union Commission and African Development Bank Group.*

Figure 1 outlines country-specific infrastructure initiatives—including port integration, dry ports, rail networks, and logistics corridors—and maps them to observed outcomes such as intermodal efficiency, connectivity challenges, and strategic vulnerabilities. Nigeria presents a mixed picture: while reforms have been attempted, Lagos’ Apapa Port continues to experience congestion due to inadequate intermodal connectivity and chronic underinvestment in hinterland logistics. South Africa exhibits relatively strong intermodal integration, although infrastructure aging and public resistance to privatization, compounded by recent rail disruptions, remain barriers. Ethiopia benefits from the Djibouti–Addis Ababa corridor and recent dry port reforms, yet its dependency on a single external route remains a strategic vulnerability.

Table 3 consolidates the institutional and financial determinants of logistics performance observed across the study’s focal corridors and gateway ports. Each row contrasts a successful configuration with a counter-example where the same lever was weak or absent, relying exclusively on sources already cited in the manuscript.

**Table 3: Institutional and Financial Conditions Shaping Logistics Performance**

Condition	Positive exemplar / effect	Negative exemplar / barrier	Source
Autonomous port or logistics agency	Tanger Med Port Authority finalised Tanger-Med II eight months ahead of schedule, accelerating throughput growth	Overlapping mandates in Kenya's LAPSET corridor delayed tendering and asset hand-over	Tanger Med Group (2022); Kilaka & de Jesus Neto (2023)
Formalised public-private-partnership (PPP) framework	Dakar–Diamniadio Toll Road mobilised > USD 800 m of private capital and reached financial close within 24 months	Weak PPP statutes hindered road-expansion schemes in several land-locked states, prolonging procurement cycles	Development Bank of Southern Africa (2023); Morisson (2020)
Up-to-date national transport master plan	<i>Vision 2030</i> (Kenya) was followed by a mean +0.25 rise in LPI within five years	Chad and the DRC, lacking current plans, recorded LPI stagnation between 2018 and 2023	Kenya Vision 2030 Delivery Secretariat (2024); COMESA (2023b); World Bank LPI (2023)

*Source. Authors' synthesis from Tanger Med Group (2022); Kilaka & de Jesus Neto (2023); Development Bank of Southern Africa (2023); Morisson (2020); Kenya Vision 2030 Delivery Secretariat (2024); COMESA (2023b); World Bank LPI (2023).*

Together, the exemplars demonstrate that clearly mandated agencies, robust PPP legislation and periodically refreshed master plans create the governance certainty required for private investment and rapid execution. Where these conditions were absent, capital mobilisation slowed and project lead times lengthened, reinforcing the study's conclusion that institutional quality is a decisive lever for improving logistics efficiency across the continent.

The findings of this study underscore the essential role of long-term strategic transport planning in enhancing logistics performance. Countries that align infrastructure development with national development plans and long-term visions—such as Morocco's Vision 2030 or South Africa's National Development Plan—tend to maintain stronger institutional continuity and achieve greater efficiency. In contrast, countries with short-term planning horizons or non-functional strategic frameworks suffer from poor asset utilization, maintenance deficits, and investor hesitancy. These observations support the theoretical assertion that logistics systems perform optimally when guided by systemic, cross-sectoral infrastructure strategies.

## Discussion

**Rapid digitalisation vs. institutional readiness** While Port Community Systems and ECTS deliver double-digit efficiency gains, their rollout succeeds only where customs and port agencies have already standardised procedures and secured basic ICT talent (World Bank, 2023; DP World, 2021). Kenya's Mombasa PCS reduced container dwell time by 15–25 %, yet smaller Lake Victoria ports failed to replicate the tool because of legacy paper processes and staff deficits. The trade-off is therefore temporal: accelerating technology deployment without parallel capacity-building risks project stagnation and vendor lock-in.

**Public-private partnerships vs. public control** PPP legislation attracts capital—e.g., the Dakar–Diamniadio Toll Road reached financial close within 24 months (Development Bank of Southern Africa, 2023)—but can weaken public oversight if contracts lack transparent performance clauses. Nigeria's Apapa Port, conversely, remains under public control; congestion persists despite multiple budget reallocations (African Finance Corporation, 2024). Optimal governance lies in “regulated partnership”: the state sets service-level targets and monitors them via independent port/logistics agencies while private operators provide investment and know-how.

**Country-specific drivers** Case evidence confirms that macro variables—GDP share for transport, LPI baseline, and master-plan maturity—interact with idiosyncratic factors such as political continuity (Morocco), decentralisation (Kenya), or donor coordination (Ethiopia). Policymakers must calibrate reforms to these local conditions rather than apply a single continental blueprint.

**Landlocked vs. coastal dynamics** Landlocked states (e.g., Zambia, Burkina Faso) face average logistics costs 30–50 % higher than coastal peers because they depend on corridor performance outside their jurisdiction (World Bank, 2023). Success hinges on bilateral corridor agreements and harmonised axle-load, transit-guarantee, and ICT standards—illustrated by the Uganda–Kenya Northern Corridor ECTS, which cut border-to-border transit time by ~30 % (Kilonzi & Kanai, 2020). Coastal hubs such as Morocco or South Africa scale solutions more readily, but must still integrate hinterland rail and dry ports to avoid gateway congestion.

**Scalability of reform packages** Digital tools show high transferability once minimum institutional thresholds are met; PPP financing models scale only in jurisdictions with enforceable contract law; and master-planning principles scale universally but require strong political sponsorship. Table 3 already offers paired positive/negative exemplars; the synthesis above clarifies how context conditions mediate their effectiveness.

## Conclusion

Governance emerged not only as a determinant of planning quality but also as a key enabler of implementation. Effective logistics systems require clarity of institutional mandates, cross-ministerial coordination, and high-level oversight mechanisms. The presence of autonomous logistics or transport agencies significantly correlates with better project delivery, as evidenced by the success of ANP in Morocco and GPHA in Ghana. Where institutions are weak or overlapping, project delays, inconsistencies, and cost overruns

become systemic features. The research thus supports the conclusion that strategic infrastructure management must be institutionally embedded and politically empowered. The role of PPPs in financing infrastructure is increasingly acknowledged, but their potential remains underleveraged in many parts of Africa. Successful examples demonstrate that enabling environments, including legal clarity, investor protection, and credible dispute mechanisms, are non-negotiable prerequisites. Governments must move beyond ad hoc engagement to establish structured PPP pipelines, transparent bidding procedures, and outcome-based performance contracts.

Additionally, continuous dialogue with affected communities and civil society is essential to avoid social opposition and ensure equitable outcomes. Digital transformation holds transformative potential but must be pursued pragmatically. While automation, blockchain, and data analytics promise greater visibility and efficiency, technological solutions must be accompanied by institutional readiness and appropriate training. Digital tools are unlikely to deliver results in the absence of reform in areas such as customs, road safety enforcement, and trade facilitation. Finally, this research highlights the importance of regional cooperation, particularly in the context of the African Continental Free Trade Area (AfCFTA). Many African countries are landlocked, and regional corridors are essential lifelines for trade and integration. However, differing technical standards, non-tariff barriers, and weak governance of corridors inhibit potential gains. Strategic management must be elevated to the regional level, with stronger mandates for institutions like ECOWAS, COMESA, and the African Union Commission.

Corridor-level cities, joint investment platforms, and interoperable systems should become priorities. Socio-environmental considerations are increasingly pressing. Infrastructure projects have the potential to displace communities, harm ecosystems, and exacerbate inequality. Only a minority of surveyed countries have robust environmental and social impact assessment (ESIA) frameworks. Strategic management must integrate safeguards, climate resilience measures, and equitable stakeholder engagement. Africa's vulnerability to climate change—manifested in floods, extreme heat, and coastal erosion—demands that transport infrastructure be designed and maintained with long-term environmental sustainability in mind. In summary, strategic management of transport infrastructure is indispensable for enhancing logistics performance in Africa. It demands a coordinated blend of visionary planning, institutional reform, financing innovation, technological modernisation, regional alignment, and social responsibility. Countries that act boldly—planning holistically, investing sustainably, governing transparently, and collaborating regionally—will be best positioned to unlock their full logistical and economic potential in the context of an evolving global trade landscape.

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