

## The Role of Infrastructure Financing Mechanism in Enhancing Transport Efficiency and Economic Growth

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### ABSTRACT

Sustainable development, regional integration, and economic progress are all fundamentally fueled by effective transportation infrastructure. However, insufficient funding for infrastructure continues to be a major barrier to attaining productivity and efficiency in transportation in many African developing nations. This essay looks at how infrastructure funding might improve transportation effectiveness and spur economic expansion. It investigates the effects of various funding sources on the creation, upkeep, and sustainability of transportation networks, including public-private partnerships (PPPs), sovereign infrastructure funds, concessional loans, and international development aid. The study makes the case that efficient finance enhances connectivity, lowers logistical costs, and promotes industrial growth, trade competitiveness, and job creation based on theoretical debate and available data. The study also highlights the necessity of creative and sustainable finance strategies that are in line with national development objectives and the Sustainable Development Goals, especially SDGs 8 and 9. It comes to the conclusion that increasing private sector involvement, developing institutional capacity, and enhancing policy coherence are crucial for maximizing the results of infrastructure investments and hastening inclusive economic growth.

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### 1.0 INTRODUCTION

It is often acknowledged that one of the key pillars of economic development is transportation infrastructure, which facilitates the flow of people, products, and services while encouraging industrialization, trade expansion, and regional integration. Effective transportation systems boost supply chain performance, lower logistics costs, promote market accessibility, and boost national economies' competitiveness. As a result, governments looking to generate sustained economic growth, draw in private investment,

and raise the standard of living for their inhabitants have made investing in transport infrastructure a strategic priority (Ke et al., 2020; Cigu et al., 2018; Varghese & Pradhan, 2025). According to the World Bank (2024), efficient transportation infrastructure boosts production by cutting down on travel time, enhancing connectivity, and making it easier to access both domestic and foreign markets.

Despite its strategic significance, the creation and upkeep of transportation infrastructure demand significant financial resources, which frequently surpass the financial capabilities of many emerging nations. Inadequate infrastructure funding has led to deteriorated road networks, crowded ports, ineffective rail systems, and underdeveloped interior waterways throughout Africa and other emerging nations, which has limited economic performance and transportation efficiency. As the African Development Bank (2024) estimates, Africa's yearly infrastructure finance gap remains substantial, making it difficult for the continent to develop effective transportation networks that can sustain economic development. As a result, governments, development partners, and private investors now view resolving infrastructure funding issues as a crucial policy problem (Kadyraliev et al., 2022; Tirumala & Tiwari, 2022; Oyegbade et al., 2022).

The mobilization and distribution of funds for the design, development, operation, upkeep, and upgrading of infrastructure assets is referred to as infrastructure financing. Public spending has historically been the main source of funding for transportation projects. However, the implementation of increasingly diverse funding strategies has become necessary due to increased infrastructure demands, rapid urbanization, rising public debt, and increasing fiscal restrictions. Public-Private Partnerships (PPPs), sovereign infrastructure funds, infrastructure bonds, concessional loans, export credit facilities, multilateral development financing, and blended finance mechanisms are some of these. These financing strategies allow governments to disperse investment risks, enhance project delivery, leverage private resources, and guarantee the long-term viability of transport infrastructure (Oyegbade et al., 2022; Tirumala & Tiwari, 2022; Zahirah et al., 2025).

In addition to providing tangible goods, infrastructure funding also improves transportation efficiency. Adequately funded transportation systems enhance multimodal transportation connectivity, modernize ports and airports, build out railway networks, and improve road quality. These improvements improve freight movement, cut down on vehicle running expenses, shorten trip times, improve logistics performance, and boost the dependability of transportation services. By enhancing access to manufacturing facilities and consumer markets, efficient transportation systems also promote both local and international trade, boosting supply chain resilience and lowering operating costs (Yingfei et al., 2022; Wan et al., 2024; Zhang & Cheng, 2023).

Economic growth and transport efficiency are strongly related through a variety of transmission pathways. Increased labor mobility, industrial growth, agricultural commercialization, tourism, foreign direct investment, and job prospects are all facilitated by improved transportation infrastructure. Additionally, it increases productivity by making it possible for companies to transfer completed goods and raw materials more effectively while lowering operating expenses and delays. As a result, nations with well-funded and effective transportation networks typically have higher levels of economic competitiveness, more trade, and better living standards (Ke et al., 2020; Appiah et al., 2023; Varghese & Pradhan, 2025).

Concerns about climate change, environmental sustainability, and resilient infrastructure development have raised awareness of sustainable infrastructure funding in recent years. Financing options that support ecologically friendly transportation systems, such as low-carbon transportation, green infrastructure, electric mobility, and climate-resilient transportation networks, are becoming more and more popular among governments and international development organizations. Green bonds, sustainability-linked loans, climate finance, and blended finance are examples of innovative financing tools that have arisen as practical ways to promote long-term environmental and economic goals while funding sustainable transportation initiatives (Mahmood et al., 2024; Zhao et al., 2022; Ning et al., 2023).

The Sustainable Development Goals (SDGs) of the United Nations specifically acknowledge the significance of infrastructure financing. SDG 9 (Industry, Innovation, and Infrastructure) highlights the necessity of building robust infrastructure, encouraging equitable and sustainable industrialization, and stimulating innovation through higher investments in high-quality infrastructure. In a similar vein, SDG 8 (Decent Work and Economic Growth) promotes long-term, equitable, and sustainable economic growth via increased productivity, job creation, and effective infrastructure. Additionally, by enhancing urban mobility and accessibility, investments in sustainable transport infrastructure assist SDG 11 (Sustainable Cities and Communities) and SDG 13 (Climate Action) by promoting ecologically sustainable transportation networks. Robust funding structures that can mobilize sufficient domestic and foreign resources for infrastructure development are necessary to achieve these aims (Khan et al., 2022; Mahmood et al., 2025; Usman et al., 2024).

While a lot of study has been done on the connection between economic development and transportation infrastructure, most of it focuses on public investment or infrastructure availability. The impact of various infrastructure finance strategies in improving transportation efficiency and their contribution to sustainable economic growth has been the subject of relatively few studies, especially when it comes to emerging nations. Furthermore, little focus has been placed on comprehending how creative funding strategies can simultaneously enhance transportation performance and promote sustainable development goals (Varghese & Pradhan, 2025; Mahmood et al., 2025; Tan et al., 2024).

In light of this, the function of infrastructure funding mechanisms in boosting economic growth and improving transportation efficiency is examined in this study. It specifically examines the ways in which financial tools including concessional finance, public-private partnerships, sovereign infrastructure funds, and international development aid support the growth and sustainability of transportation infrastructure. The implications of efficient infrastructure financing for industrial development, trade competitiveness, efficient logistics, and sustainable economic transformation are also covered in the report. Lastly, it makes policy recommendations to assist resilient transportation networks and the accomplishment of the Sustainable Development Goals by bolstering infrastructure funding frameworks, enhancing institutional capacity, and encouraging smart investments (Mahmood et al., 2025; Oyegbade et al., 2022; Tirumala & Tiwari, 2022).

## 1.2 Statement of the Problem

It is commonly known that transportation infrastructure is a key factor in regional integration, industrial development, trade facilitation, and economic progress. Effective transportation systems boost supply chain performance, lower logistics costs, increase market accessibility, and encourage investment and employment (Ke et al., 2020; Cigu et al., 2018; Zhang & Cheng, 2023). However, because of ongoing financial restrictions, many emerging nations still have inadequate and badly maintained transport networks, despite the acknowledged necessity of transportation infrastructure. The construction and upgrading of transportation infrastructure has been severely hampered by a lack of funding, rising infrastructure needs, budgetary constraints, and weak institutional frameworks, which has decreased transportation efficiency and limited economic growth (Kadyraliev et al., 2022; Appiah et al., 2023; Varghese & Pradhan, 2025).

Deteriorating road networks, ineffective railway systems, crowded ports, subpar airport facilities, and restricted multimodal transport connectivity are all consequences of the infrastructure financing gap that still exists in many African nations. Despite the fact that governments have historically relied on public spending to support transportation infrastructure, the public sector's ability to sufficiently fund large-scale infrastructure projects has been diminished due to financial constraints and conflicting developmental agendas. As a result, inadequate infrastructure maintenance, underinvestment, cost overruns, and project implementation delays have all continued to impair transportation performance and lower national economies' productivity (Kadyraliev et al., 2022; Tirumala & Tiwari, 2022; Oyegbade et al., 2022).

Alternative financing methods like public-private partnerships (PPPs), sovereign infrastructure funds, infrastructure bonds, concessional financing, multilateral development assistance, and blended finance have been promoted as viable ways to raise additional resources for transportation infrastructure. Due to institutional weaknesses, inconsistent policies, inadequate regulatory frameworks, and low private sector involvement, the adoption and effectiveness of these financing mechanisms have varied considerably across developing countries, despite their successful implementation in several developed and emerging economies. Consequently, many countries have yet to fully realize their potential for improving transportation efficiency and promoting sustainable economic growth through innovative infrastructure financing (Oyegbade et al., 2022; Tirumala & Tiwari, 2022; Zahirah et al., 2025; Mahmood et al., 2024).

A large portion of the literature has concentrated on infrastructure availability, public investment, or transport performance separately, despite the fact that previous research has thoroughly explored the connection between transport infrastructure and economic growth. Understanding how various infrastructure funding strategies affect transport efficiency and ultimately support sustainable economic growth has received very little attention. Additionally, there is still a lack of conceptual integration between economic development, transportation efficiency, and infrastructure financing within the framework of sustainable development, especially in developing nations where funding limitations continue to hinder infrastructure modernization and expansion (Varghese & Pradhan, 2025; Mahmood et al., 2025; Tan et al., 2024).

Given the worldwide commitment to accomplishing the United Nations Sustainable Development Goals (SDGs), this knowledge gap is especially significant. While SDG 8 (Decent Work and Economic Growth) emphasizes sustained economic growth through greater productivity and investment, SDG 9 (Industry, Innovation, and Infrastructure) calls for the development of resilient infrastructure and sustainable industrialization. Additionally, enhancing financing for transportation infrastructure supports SDG 17 (Partnerships for the Goals) through increased cooperation between governments, private investors, and international development organizations and indirectly supports SDG 11 (Sustainable Cities and Communities) by encouraging effective and accessible transportation systems. Achieving these global development goals will continue to be extremely difficult in the absence of efficient and sustainable financing mechanisms (Khan et al., 2022; Mahmood et al., 2024; Usman et al., 2024).

Against this background, this study examines the role of infrastructure financing mechanisms in promoting economic growth and enhancing transportation efficiency. Specifically, the study synthesizes current theoretical and empirical evidence to provide a comprehensive understanding of how innovative financing approaches can strengthen transport infrastructure development, improve logistics performance, enhance economic productivity, and contribute to the achievement of the Sustainable Development Goals in developing economies (Mahmood et al., 2025; Tirumala & Tiwari, 2022; Zhao et al., 2022).

## Objectives of the Study

The study seeks to:

1. Examine the relationship between infrastructure financing and transport efficiency.

2. Assess the contribution of transport infrastructure to economic growth.
3. Identify major financing mechanisms used in infrastructure development.
4. Propose policy measures for improving infrastructure financing outcomes.

## LITERATURE REVIEW

### 2.0 Literature Review

#### 2.1 Infrastructure Financing

The process of organizing, allocating, and overseeing financial resources for the design, development, maintenance, and growth of infrastructure assets that promote social and economic advancement is known as infrastructure financing. Due to its capital-intensive nature and lengthy economic lifespan, transportation infrastructure which includes roads, railways, airports, seaports, bridges, and inland waterways requires significant long-term investment. Governments have historically funded transportation infrastructure through public spending, but growing budgetary constraints, urbanization, population growth, and increased infrastructure demand have made it necessary to adopt alternative financing methods that involve participation from both the public and private sectors (Kadyraliev et al., 2022; Tirumala & Tiwari, 2022; Varghese & Pradhan, 2025).

Public–Private Partnerships (PPPs), infrastructure bonds, sovereign wealth funds, concessional financing, multilateral development assistance, export credit facilities, blended finance, and green financing instruments are among the diversified financing mechanisms that have increasingly complemented traditional government budget allocations for infrastructure development. These financing approaches are designed to bridge infrastructure financing gaps while enhancing project delivery, risk sharing, and long-term sustainability. Beyond providing financial resources, effective infrastructure financing improves project quality, operational efficiency, maintenance, and the resilience of transport infrastructure (Oyegbade et al., 2022; Zhao et al., 2022; Mahmood et al., 2024; Zahirah et al., 2025).

The performance of transport infrastructure is strongly influenced by the quality of financing systems. Adequate funding ensures the timely execution of projects, minimizes construction delays, improves maintenance, and facilitates the integration of modern technologies that enhance the efficiency of transportation systems. Conversely, inadequate financing often leads to deteriorating infrastructure, higher maintenance costs, reduced service quality, and lower economic productivity. Consequently, infrastructure financing has become a critical determinant of sustainable transportation development, national competitiveness, and long-term economic growth (Ke et al., 2020; Wan et al., 2024; Mahmood et al., 2025; Zhang & Cheng, 2023).

#### 2.2 Transport Efficiency

The ability of a transportation system to carry people and cargo securely, dependably, swiftly, and economically while reducing resource consumption and environmental effects is referred to as transport efficiency. Travel time is optimized, operating expenses are decreased, accessibility is improved, logistics performance is improved, and supply chain reliability is strengthened by an effective transportation system. Because it directly affects the flow of commodities, labor mobility, industrial production, and market accessibility, transport efficiency is widely acknowledged as a crucial factor in determining economic productivity (Ke et al., 2020; Yingfei et al., 2022; Zhang & Cheng, 2023).

Travel time, freight transit time, logistics expenses, infrastructure quality, vehicle operating costs, cargo throughput, service dependability, and network connectivity are some of the metrics that are frequently used to evaluate transport efficiency. By lowering delays, raising productivity, and raising customer satisfaction, improvements in these metrics support enhanced economic performance, supply chain resilience, and trade competitiveness (Wan et al., 2024; Varghese & Pradhan, 2025; Cigu et al., 2018). Intelligent Transportation Systems (ITS), digital logistics platforms, artificial intelligence, big data analytics, and smart traffic management systems are examples of recent technological developments that have further improved transportation efficiency. These innovations facilitate sustainable transportation operations, optimize traffic flow, enhance infrastructure utilization, and reduce congestion. However, achieving and sustaining transport efficiency continues to depend on adequate infrastructure investment and long-term financing mechanisms capable of supporting the continuous maintenance, modernization, and digital transformation of transportation assets (Behera et al., 2024; Wan et al., 2024; Usman et al., 2024; Mahmood et al., 2025).

#### 2.3 Economic Growth

Economic growth, which is typically gauged by the Gross Domestic Product (GDP) growth rate, is the steady rise in the production of goods and services within an economy over time. It reflects increases in industrial output, employment opportunities, income levels, national productivity, and overall living standards. Sustainable economic growth is influenced by several factors, including capital investment, technological innovation, human capital development, institutional quality, and infrastructure development (Appiah et al., 2023; Xi & Wang, 2023; Behera et al., 2024).

Transport infrastructure plays a crucial role in promoting economic growth by facilitating the efficient movement of people and goods, reducing production costs, enhancing market access, and fostering regional integration. Well-developed transportation systems improve supply chain efficiency and productivity across sectors such as manufacturing, agriculture, mining, tourism, and services. Consequently, investments in transportation infrastructure generate multiplier effects that stimulate private investment,

create employment opportunities, increase government revenue, and enhance national competitiveness (Ke et al., 2020; Kadyraliev et al., 2022; Zhang & Cheng, 2023; Varghese & Pradhan, 2025).

In many developing countries, however, inadequate transportation infrastructure continues to constrain economic growth by increasing logistics costs, reducing business efficiency, limiting market accessibility, and discouraging foreign direct investment. Sustainable infrastructure financing has therefore become increasingly recognized as a prerequisite for long-term economic transformation, inclusive growth, and improved transport performance. Innovative financing mechanisms, combined with investments in sustainable infrastructure and digital technologies, can strengthen economic resilience while supporting the achievement of the Sustainable Development Goals (Mahmood et al., 2025; Ning et al., 2023; Khan et al., 2022; Zhao et al., 2022).

#### **2.4 Public-Private Partnerships (PPPs)**

Public-Private Partnerships (PPPs) are cooperative contractual agreements for the funding, development, management, upkeep, and operation of public infrastructure and services between government agencies and private sector businesses. Because PPPs allow governments to share project risks between public and private partners while leveraging private capital, technical competence, innovation, and management efficiency, they have become one of the most widely adopted infrastructure financing mechanisms globally (Oyegbade et al., 2022; Tirumala & Tiwari, 2022).

Enhancing infrastructure delivery while lowering the financial burden on governments is the main goal of PPPs. Infrastructure facilities are usually financed, designed, built, operated, and maintained by the private sector under PPP agreements for a predetermined concession period before ownership is returned to the government. Build-Operate-Transfer (BOT), Build-Own-Operate (BOO), Design-Build-Finance-Operate (DBFO), and concession agreements are examples of common PPP structures (Tirumala & Tiwari, 2022; Oyegbade et al., 2022).

PPPs have been widely used in the transportation industry, including highways, railways, airports, seaports, bridges, and urban transit systems. Successful PPP projects have improved infrastructure quality, accelerated project delivery, enhanced operational efficiency, and promoted technological innovation, thereby contributing to improved transport performance and economic development (Kadyraliev et al., 2022; Varghese & Pradhan, 2025). However, the effectiveness of PPPs depends on strong regulatory institutions, transparent procurement processes, effective risk allocation, stable policy environments, and good governance. In many developing economies, weak institutional capacity, regulatory uncertainty, and limited private sector participation remain major barriers to the successful implementation of PPP projects (Mahmood et al., 2021; Oyegbade et al., 2022).

#### **2.5 Sustainable Transport Development**

The design, funding, building, and administration of transportation systems that concurrently advance social inclusiveness, economic efficiency, and environmental sustainability is referred to as sustainable transport development (Mahmood et al., 2025; Khan et al., 2022). It aims to reduce greenhouse gas emissions, air pollution, energy use, and environmental damage while offering accessible, reasonably priced, safe, and dependable transportation services. Due to transportation's substantial impact on resource consumption and carbon emissions, sustainable transport has emerged as a key element of global sustainable development (Li et al., 2021; Tan et al., 2024).

The idea incorporates three interconnected aspects: environmental sustainability, social sustainability, and economic sustainability. Sustainable transportation boosts economic growth, trade competitiveness, and productivity. Socially, it improves fair access to transportation services, safety, mobility, and accessibility. In terms of the environment, it encourages resource efficiency, low-carbon transportation systems, renewable energy, and greener technologies (Fernandes et al., 2021; Karieva & Mottaeva, 2020; Mottaeva & Nechaeva, 2021).

Through investments in electric mobility, intelligent transportation systems, public transportation, railway modernization, multimodal logistics, and climate-resilient infrastructure, governments are progressively promoting sustainable transportation (Wan et al., 2024; Varghese & Pradhan, 2025). Innovative methods including blended financing, green bonds, climate finance, sustainability-linked loans, and foreign development aid are needed to finance these projects (Ning et al., 2023; Zhao et al., 2022; Mahmood et al., 2024). Sustainable transportation development directly supports the United Nations Sustainable Development Goals (SDGs) 8, 9, 11, and 13, which prioritize economic growth, resilient infrastructure, sustainable cities, and climate action (Usman et al., 2024; Mahmood et al., 2025).

#### **2.6 Infrastructure Investment**

The term infrastructure investment describes the distribution of funds for the development, renovation, modernization, expansion, and upkeep of tangible infrastructure assets that facilitate social and economic activity. Because it increases productivity, facilitates commerce, improves connectivity, generates employment opportunities, and draws both domestic and foreign investment, infrastructure investment is often considered a catalyst for long-term economic development (Ke et al., 2020; Kadyraliev et al., 2022; Zhang & Cheng, 2023).

Roads, highways, railroads, seaports, airports, inland waterways, bridges, logistics hubs, intelligent transport systems, and digital transport infrastructure are all included in the transportation sector's infrastructure investment. These improvements boost supply chain resilience, enhance transportation capacity, ease traffic congestion, minimize vehicle operating costs, and improve safety.

Additionally, they produce significant multiplier effects through regional development, employment generation, and increased industrial production (Cigu et al., 2018; Wan et al., 2024; Varghese & Pradhan, 2025).

In many developing nations, infrastructure investment remains insufficient despite its significance because of financial limitations, budgetary constraints, governance issues, and inadequate project preparation capabilities. As a result, governments are increasingly relying on innovative financing mechanisms involving institutional investors, pension funds, public-private partnerships (PPPs), multilateral development banks, sovereign wealth funds, and blended finance to bridge infrastructure investment gaps (Oyegbade et al., 2022; Tirumala & Tiwari, 2022; Mahmood et al., 2024).

Sustained infrastructure investment is essential for developing resilient transportation systems capable of supporting industrialization, international trade, urban development, and sustainable economic growth (Mahmood et al., 2025; Khan et al., 2022; Du et al., 2022). Furthermore, it contributes to SDG 8 (Decent Work and Economic Growth) through enhanced productivity, employment creation, and inclusive economic development, while also advancing SDG 9 (Industry, Innovation, and Infrastructure) by promoting resilient infrastructure, innovation, and sustainable industrialization (Usman et al., 2024; Behera et al., 2024; Appiah et al., 2023).

## 2.7 Theoretical Framework

The foundation of this essay is the Infrastructure-Led Growth Theory (ILGT), which holds that investments in infrastructure act as a fundamental catalyst for economic growth by boosting connectivity, increasing productivity, lowering transaction costs, and enabling the effective flow of people, goods, and services. The theory contends that by boosting production efficiency, enhancing market access, promoting trade, and drawing in both local and international investment, well-developed transportation infrastructure generates positive externalities across a number of economic sectors. In order to achieve long-term economic development and boost national competitiveness, it is therefore thought that consistent investment in transport infrastructure is necessary.

According to the Infrastructure-Led Growth Theory, infrastructure should be seen as a profitable investment with the potential to produce large economic and social rewards rather than only as a public expense. Travel times are shortened, logistics and transportation expenses are reduced, supply chain performance is enhanced, regional integration is made easier, and industrial growth is encouraged by efficient transport networks. Higher levels of productivity, job creation, income generation, and sustained economic growth are all directly impacted by these results. As a result, nations that regularly make investments in transportation infrastructure are typically in a better position to experience faster economic growth and greater living standards.

The Growth-Enhancing Public Investment Theory, which highlights that profitable public investment in infrastructure boosts an economy's productive capacity by lowering production costs, promoting private sector investment, opening up new markets, and enhancing overall economic efficiency, further informs this paper (World Bank, 2018; World Bank, 2021). This viewpoint holds that investments in infrastructure have multiplier effects across the economy by boosting industrial activity, enhancing trade competitiveness, fostering long-term economic change, and generating employment opportunities during development and operation. However, the availability of sustainable finance options that can support infrastructure expansion, upkeep, and modernization is crucial to the realization of these advantages.

These theoretical stances highlight how important infrastructure finance methods are to the efficacy and sustainability of transportation infrastructure development in the context of this study. The financial resources needed for building, modernizing, and maintaining transportation infrastructure are provided by financing mechanisms like Public-Private Partnerships (PPPs), sovereign infrastructure funds, concessional loans, multilateral development financing, infrastructure bonds, and blended finance. Infrastructure quality, project completion, operational performance, and long-term sustainability are all directly impacted by the effectiveness and sufficiency of these funding sources.

The theories also clarify how the major ideas discussed in this work relate to one another. Increased infrastructure investment is made possible by adequate and sustainable infrastructure financing, which improves transportation infrastructure and efficiency through less traffic, quicker travel times, cheaper logistics, better connectivity, and more reliable supply chains. By fostering commerce, raising productivity, drawing in investment, generating job opportunities, and boosting national competitiveness, improved transportation efficiency subsequently spurs economic growth. In this sense, sustained economic development and effective transportation networks are based on infrastructure finance.

The theoretical framework also closely aligns with the Sustainable Development Goals (SDGs) of the United Nations, especially SDG 8 (Decent Work and Economic Growth), which promotes sustained, inclusive, and sustainable economic growth through improved productivity and infrastructure development, and SDG 9 (Industry, Innovation, and Infrastructure), which encourages investment in resilient infrastructure and sustainable industrialization. By acknowledging the significance of cooperation between governments, private investors, development finance organizations, and international organizations in mobilizing resources for infrastructure development, it also promotes SDG 17 (Partnerships for the Goals).

As a result, the Growth-Enhancing Public Investment Theory and the Infrastructure-Led Growth Theory offer a suitable theoretical framework for this work since they clarify how efficient infrastructure financing mechanisms can boost transportation efficiency, which in turn speeds up sustainable economic growth. They also support the claim that building robust transportation networks and

sustainable national development requires bolstering institutional capacity, encouraging increased private sector participation, and strengthening finance mechanisms.

### 3.0 METHODOLOGY

The qualitative desktop research design used in this study was based on narrative and documentary literature review techniques. Because the study is conceptual and aims to synthesize current theoretical and empirical information on the role of infrastructure finance methods in improving transportation efficiency and economic growth, the technique seemed appropriate. Peer-reviewed journal articles, books, policy documents, government publications, and studies from respectable international organizations were among the secondary sources from which the data were gathered. To make sure the evaluation represented recent advancements in transportation policy and infrastructure financing, recent publications from 2018 to 2026 were given priority.

Infrastructure financing, transport efficiency, infrastructure investment, public-private partnerships (PPPs), sustainable transportation development, and economic growth with a focus on emerging economies were the main topics of the studied literature. Thematic content analysis was used to analyze the data, allowing for the discovery and synthesis of recurrent themes, funding sources, implementation difficulties, and policy implications. In order to produce useful suggestions for bolstering infrastructure financing and encouraging sustainable transport development in accordance with the Sustainable Development Goals (SDGs), specifically SDG 8 (Decent Work and Economic Growth), SDG 9 (Industry, Innovation and Infrastructure), and SDG 17 (Partnerships for the Goals), the results were further interpreted through a comparative review of best practices.

### 4.0 FINDINGS AND DISCUSSION

The conclusions in this part are based on an analysis of the body of research on infrastructure funding, transportation efficiency, and economic growth, as well as policy documents and institutional reports. The debate is structured in accordance with the particular goals of the research.

#### 4.1 Relationship between Infrastructure Financing and Transport Efficiency

The analysis indicates a significant positive relationship between infrastructure financing and transport efficiency. The reviewed literature consistently identifies adequate and sustainable financing as a fundamental prerequisite for the development, modernization, and maintenance of efficient transportation infrastructure. Financial resources enable governments and private investors to construct new transport facilities, rehabilitate aging infrastructure, deploy intelligent transportation systems, and ensure the continuous maintenance of roads, railways, airports, and seaports. These investments enhance the operational performance of transport systems and improve the movement of passengers and freight (Ke et al., 2020; Kadyraliev et al., 2022).

This finding is consistent with the work of Cigu et al. (2018), who reported that investment in transport infrastructure significantly improves public sector performance and contributes to long-term economic growth across European countries. Similarly, Ke et al. (2020) found that sustained investment in transport infrastructure enhances logistics performance, strengthens regional connectivity, and promotes economic productivity by reducing transportation bottlenecks. More recently, Varghese and Pradhan (2025), through a systematic review, concluded that improvements in transportation infrastructure consistently lead to greater transport efficiency, lower logistics costs, and enhanced trade competitiveness.

Furthermore, the findings support the studies of Wan et al. (2024) and Zhang and Cheng (2023), who demonstrated that modern transport and information infrastructure improve urban productivity, optimize freight movement, reduce travel time, and strengthen supply chain performance. Likewise, Khan et al. (2022) argued that investment in advanced logistics infrastructure is essential for achieving efficient and low-carbon transport systems capable of supporting sustainable economic development.

Conversely, the reviewed literature shows that inadequate infrastructure financing results in deteriorating transport facilities, delayed maintenance, project abandonment, congestion, and poor service delivery. These deficiencies reduce network reliability, increase vehicle operating and logistics costs, prolong freight transit times, and ultimately constrain economic productivity and competitiveness (Cigu et al., 2018; Kadyraliev et al., 2022). Consequently, infrastructure financing should not be viewed merely as a fiscal obligation but rather as a strategic investment that determines the long-term efficiency, resilience, and sustainability of national transportation systems.

Overall, the reviewed studies consistently demonstrate that sustainable infrastructure financing significantly enhances transport efficiency by improving infrastructure quality, strengthening logistics systems, reducing transportation costs, increasing operational reliability, and facilitating regional and international trade. The findings further suggest that innovative financing mechanisms including public-private partnerships, multilateral development financing, infrastructure bonds, and blended finance can play a crucial role in bridging infrastructure investment gaps, particularly in developing economies where public financial resources remain limited (Oyegbade et al., 2022; Tirumala & Tiwari, 2022; Mahmood et al., 2025).

This evidence reinforces the view that efficient infrastructure financing is not only essential for improving transport performance but also serves as a catalyst for sustainable economic development and the achievement of the Sustainable Development Goals (SDGs).

#### 4.2 Contribution of Transport Infrastructure to Economic Growth

The body of literature consistently demonstrates that transportation infrastructure is a critical driver of economic growth and sustainable development. Efficient transportation systems facilitate the movement of goods, services, labor, and capital while reducing production and transaction costs, improving market accessibility, and stimulating business expansion. These improvements enhance industrial productivity, strengthen trade competitiveness, attract domestic and foreign investment, and create employment opportunities across multiple sectors of the economy (Ke et al., 2020; Zhang & Cheng, 2023; Varghese & Pradhan, 2025).

This finding is consistent with the study of Kadyraliev et al. (2022), who argued that investments in transport infrastructure generate substantial multiplier effects by improving productivity, enhancing national competitiveness, promoting regional integration, and attracting private investment. Likewise, Cigu et al. (2018) found that improvements in transport infrastructure significantly contribute to long-term economic growth by enhancing public sector performance and increasing the efficiency of economic activities across European economies. Similarly, Ke et al. (2020) reported that transport infrastructure development promotes economic growth by improving logistics performance, strengthening connectivity, and facilitating the efficient movement of goods and services.

Further empirical evidence from developing economies supports the argument that investments in transportation infrastructure stimulate international trade, agricultural commercialization, manufacturing expansion, tourism development, and industrialization by improving accessibility and reducing transportation bottlenecks (Khan et al., 2022; Wan et al., 2024). Modern seaports, efficient railway systems, and well-maintained road networks enhance export competitiveness, reduce logistics costs, and facilitate rural–urban market integration, thereby improving supply chain efficiency and supporting sustainable economic transformation (Li et al., 2021; Yingfei et al., 2022).

Beyond their economic benefits, transportation infrastructure investments also generate important social outcomes. Improved transport systems enhance access to education, healthcare, employment opportunities, and other essential public services, thereby improving social inclusion, regional development, and overall quality of life (Cigu et al., 2018; Zhang & Cheng, 2023). These findings suggest that infrastructure investment creates both direct economic benefits through increased productivity and indirect benefits through improved human development and social welfare.

From a sustainable development perspective, the reviewed literature indicates that transportation infrastructure plays a vital role in achieving the United Nations Sustainable Development Goals (SDGs). Specifically, investment in transport infrastructure advances SDG 8 (Decent Work and Economic Growth) by promoting productive employment, industrial expansion, and sustained economic growth, while supporting SDG 9 (Industry, Innovation and Infrastructure) through the development of resilient infrastructure and technological innovation. Furthermore, investments in sustainable and low-carbon transportation systems contribute to SDG 11 (Sustainable Cities and Communities) and SDG 13 (Climate Action) by improving urban mobility, reducing greenhouse gas emissions, and promoting environmentally sustainable transport systems (Mahmood et al., 2025; Usman et al., 2024; Khan et al., 2022).

#### 4.3 Major Financing Mechanisms Used in Infrastructure Development

The literature lists a number of funding sources that are now used to assist the construction of transportation infrastructure in both developed and developing nations.

Government budgetary allocation, which finances infrastructure projects through public spending, is still the most conventional method. Despite giving governments direct control over infrastructure development, this strategy is becoming more and more limited due to a lack of funding, conflicting development agendas, and growing public debt.

Public-Private Partnerships (PPPs) have become the most popular alternative funding strategy. Through PPPs, governments and private investors can work together to finance, build, run, and maintain transportation infrastructure while sharing investment risks and utilizing the knowledge of the private sector. Globally, there have been reports of successful PPP projects in ports, railroads, airports, highways, and urban transit systems.

Concessional loans from international development organizations like the World Bank, the African Development Bank, and regional development banks are also noted in the assessment as important sources of funding for infrastructure, especially in emerging nations. Large-scale transport projects are frequently supported by these financing agreements, which offer long-term funding under advantageous terms.

Sovereign infrastructure funds, infrastructure bonds, blended finance, export credit facilities, and green financing instruments are other significant financing mechanisms. Green bonds and climate finance have become more well-known as cutting-edge funding options for environmentally friendly transportation projects that lower carbon emissions.

The literature identifies a number of enduring issues that limit the efficacy of financing mechanisms despite their diversity, such as weak institutional capacity, regulatory uncertainty, poor project preparation, governance flaws, political meddling, and low private sector confidence. To maximize the results of infrastructure investments, these issues must continue to be addressed.

#### 4.4 Policy Measures for Improving Infrastructure Financing Outcomes

According to the analysis, improving infrastructure financing outcomes requires comprehensive policy reforms aimed at strengthening institutional effectiveness, enhancing investment efficiency, and encouraging greater participation from both domestic

and international investors. The reviewed literature consistently suggests that sound governance, innovative financing mechanisms, and effective institutional frameworks are fundamental to sustainable infrastructure development and long-term economic growth (Mahmood et al., 2024; Usman et al., 2024).

First, governments should establish stable, predictable, and transparent regulatory frameworks that promote investor confidence while ensuring accountability throughout the infrastructure project lifecycle. Strong governance structures reduce investment risks, improve project implementation, and create an enabling environment for private sector participation. This recommendation is consistent with the findings of Mahmood et al. (2021) and Usman et al. (2024), who emphasized that institutional quality, effective governance, and sound regulatory policies are critical determinants of sustainable infrastructure investment and economic development.

Second, the literature advocates expanding the use of Public-Private Partnerships (PPPs) by strengthening institutional capacity for PPP project management, developing clear legal and regulatory frameworks, and improving risk-sharing arrangements. Well-structured PPPs enable governments to leverage private capital, technical expertise, and managerial efficiency while reducing fiscal pressures associated with infrastructure development. Similar conclusions were reached by Oyegbade et al. (2022) and Tirumala and Tiwari (2022), who identified PPPs as effective financing mechanisms for accelerating infrastructure delivery and improving project sustainability.

Third, countries should diversify infrastructure financing sources beyond traditional public budget allocations. The reviewed studies recommend greater utilization of infrastructure bonds, sovereign wealth funds, pension funds, blended finance, green bonds, climate finance, concessional financing, and multilateral development assistance to bridge infrastructure financing gaps. Diversified financing portfolios enhance financial resilience, reduce dependence on limited public resources, and mobilize long-term capital for strategic transport investments (Mahmood et al., 2024; Ning et al., 2023; Zhao et al., 2022).

Fourth, improving investment efficiency requires strengthening project preparation, appraisal, and implementation processes. Comprehensive feasibility studies, environmental impact assessments, technical expertise, and effective monitoring and evaluation systems increase project bankability, reduce implementation delays, minimize cost overruns, and improve investment returns. These recommendations align with the findings of Kadyraliev et al. (2022) and Varghese and Pradhan (2025), who emphasized that sound project planning and effective infrastructure governance significantly enhance transport infrastructure performance and economic outcomes.

Finally, governments should accelerate the adoption of digital technologies throughout the infrastructure development lifecycle. The integration of Geographic Information Systems (GIS), Building Information Modeling (BIM), Artificial Intelligence (AI), Big Data Analytics, and digital project management platforms can improve project transparency, optimize resource allocation, enhance cost control, and support evidence-based decision-making. This recommendation is supported by Behera et al. (2024), Wan et al. (2024), and Goigova et al. (2021), who demonstrated that digital technologies and innovation improve infrastructure management, operational efficiency, and long-term economic productivity.

Collectively, these policy measures contribute directly to the achievement of the United Nations Sustainable Development Goals (SDGs). Specifically, they advance SDG 8 (Decent Work and Economic Growth) by promoting productive investment, employment creation, and economic competitiveness; SDG 9 (Industry, Innovation and Infrastructure) by strengthening resilient and sustainable transport infrastructure; and SDG 17 (Partnerships for the Goals) by fostering collaboration among governments, private investors, multilateral development institutions, and international development partners. Furthermore, investments in sustainable and digitally enabled transport infrastructure indirectly support SDG 11 (Sustainable Cities and Communities) and SDG 13 (Climate Action) through improved urban mobility, enhanced transport efficiency, and reduced environmental impacts (Mahmood et al., 2025; Khan et al., 2022; Usman et al., 2024).

### **Summary of Finding**

The analysis shows that infrastructure funding is a key factor in determining both sustained economic growth and the effectiveness of transportation. Sustainable finance methods boost national competitiveness, promote logistical performance, lower transportation costs, and improve infrastructure quality. Through increased productivity, trade facilitation, job creation, and regional integration, transport infrastructure produces significant economic benefits. Innovative financing methods, especially public-private partnerships, concessional financing, infrastructure bonds, blended finance, and sovereign infrastructure funds, have grown in significance in filling the financing gaps in infrastructure, even though governments still play a significant role. Stronger institutions, better governance, a variety of finance options, and cogent policy frameworks that can promote long-term sustainable infrastructure development are necessary to maximize their efficacy.

### **5.0 CONCLUSION**

Through a qualitative analysis of previous research and policy papers, this study investigated the function of infrastructure finance methods in improving transportation efficiency and fostering economic growth. The results show that infrastructure funding is a key factor in determining the effectiveness of the transportation system and a vital force behind sustainable economic growth. Construction, modernization, restoration, and upkeep of transportation infrastructure are made possible by sufficient and creative

funding, which improves connectivity, lowers logistics costs, boosts supply chain efficiency, and facilitates the flow of people and commodities.

The analysis also found that by boosting productivity, fostering trade competitiveness, drawing in both domestic and foreign investment, generating job opportunities, and fostering regional integration, effective transport infrastructure greatly helps to economic growth. In addition to facilitating market access and promoting industrial growth, well-developed transportation networks also boost national economies' overall competitiveness. As a result, rather than just being a public expense, investments in transportation infrastructure should be viewed as strategic economic investments.

The study also showed that, although if traditional government funding is still crucial, it is becoming less and less adequate to deal with the expanding infrastructure deficit, especially in developing nations. Public-Private Partnerships (PPPs), concessional financing, infrastructure bonds, sovereign infrastructure funds, blended finance, and multilateral development aid are examples of alternative financing structures that have become effective ways to raise more capital. However, strong governance, clear legal frameworks, efficient project planning, institutional capability, and effective implementation are necessary for their success.

The paper's overall conclusion is that a comprehensive and sustainable infrastructure finance architecture that incorporates public investment, private sector involvement, and international financial support is necessary to improve transport efficiency and achieve sustained economic growth. In addition to improving the performance of transportation infrastructure, strengthening financing mechanisms will help achieve the Sustainable Development Goals (SDGs) of the United Nations, especially SDG 8 (Decent Work and Economic Growth), SDG 9 (Industry, Innovation and Infrastructure), and SDG 17 (Partnerships for the Goals). In order to guarantee that infrastructure investments are sufficiently funded, effectively carried out, and in line with long-term national development aspirations, governments, development finance organizations, and private investors must cooperate.

## 6.0 POLICY RECOMMENDATIONS

Based on the findings of this study, the following recommendations are proposed:

1. **Diversify the sources of funding for infrastructure:** To close the infrastructure financing gap, governments should encourage creative financing methods like Public-Private Partnerships (PPPs), infrastructure bonds, sovereign wealth funds, blended finance, and concessional loans.
2. **Strengthen institutional and regulatory frameworks:** To increase the effectiveness and sustainability of infrastructure investments, governments should create clear policies, improve institutional capacity in project planning, appraisal, procurement, implementation, and monitoring, and strengthen governance.
3. **Boost private sector involvement:** To promote more private sector involvement in the construction of transportation infrastructure, governments should establish an environment that is conducive to investment through transparent legislative frameworks, equitable risk-sharing agreements, and investment incentives.
4. **Make strategic and sustainable transportation infrastructure investments a top priority:** Infrastructure investments should concentrate on projects that enhance connectivity, lower logistics costs, facilitate trade, encourage regional integration, and support environmentally sustainable transportation systems that are in line with national development priorities.
5. **Ensure that infrastructure funding is in line with the SDGs:** In order to achieve SDGs 8 (Decent Work and Economic Growth), 9 (Industry, Innovation and Infrastructure), and 17 (Partnerships for the Goals), governments should make sure that infrastructure financing strategies foster resilient infrastructure, sustainable economic growth, and improved cooperation between public institutions, private investors, and development partners.

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