IMPACTS OF PORT INFRASTRUCTURE ON ECONOMIC GROWTH IN TANZANIA: A CASE OF SELECTED DAR ES SALAAM PORT

FADHILA F. MUHANGA

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CERTIFICATION

The undersigned certifies that she has read and here by recommends for acceptance by the Open University of Tanzania a research dissertation titled "**Impacts of Port Infrastructure on Economic Growth in Tanzania; A Case of Selected Dar es Salaam Port**" In partial fulfilment of the requirement for the award of degree of Masters of Science in Economics **(MSc Econ)** of the Open University of Tanzania.

……..……..

Dr. Timothy Lyanga

Supervisor

…….…….

Date

……..……..

Dr. Elna Lyamuya

Supervisor

…….…….

Date

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DECLARATION

I, **Fadhila F. Muhanga,** declared that the work presented in this dissertation is original. It has never been presented to any other University or Institution. Where other people's works have been used, references have been provided. It is in this regard that I declare this work as originally mine. It is hereby presented in partial fulfillment of the requirement for the Degree of Master of Science in Economics (MSc.-Econ).

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Signature

13/06/2025

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Date

DEDICATION

I dedicate this dissertation to my beloved mother Salama Ally Lubawa who has always inspired me through her tireless efforts and encouragement in my education.

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ABSTRACT

The study objective was to examine the contribution of Dar es Salaam Port infrastructure in driving Tanzania's economic development, focusing on ICT systems, Port equipment, and facilities. The findings are based on a comprehensive survey of 120 stakeholders involved in Port operations, including professionals with varied educational backgrounds and significant industry experience. The research adopted a cross-sectional design, applying both primary and secondary data sources to support the analysis.The collected data were analyzed through descriptive statistics and regression analysis. The results show that, Port ICT Infrastructure and Port Equipment have positive relation and supported the impacts of Port infrastructure on economic growth in Tanzania while Port facilities has negatively signed but significant at the 5% level of confidence and each supported hypothesis is strongly significant to insignificant at $p > 0.05$. Major challenges such as ICT integration, lack of skilled operators, underutilization of new Port facilities is identified as key areas needing improvement. The study concluded that, ICT modernization, use of modern Port equipment, interconnected supply chains, and government policies is important not only in transforming performance of Ports but also have a ripple effect on the larger economy, supporting growth and development. The study is therefore recommended to prioritize investment in Port community systems, implement rigorous training programs for equipment operators and develop long-term master plans for Port facility development.

Keywords: *Economic growth, Port Infrastructure, Information, Communication Technology.*

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LIST OF ABBREVIATIONS AND ACRONYMS

FY	Financial Year
GDP	Growth Domestic Product
KPIs	Key Performance Indicators
SEM	Structural Equation Model
SPSS	Statistical Package for the Social Sciences
TEUs	Twenty - foot Equivalent Units
TPA	Tanzania Ports Authority
TRA	Tanzania Revenue Authority
TZS	Tanzania Shillings
STATA	Statistical Software for Data Science
U.S.	United State
UNACT	United Nations Conference on Trade and Development
WB	World Bank
CLRM	Classical Linear Regression Model
OLS	Ordinary Least Square

CHAPTER ONE

INTRODUCTION

1.1 Overview

Gross Domestic Product (GDP) states as the total value of all final goods and services produced at market prices within a given timeframe (Mitchell et al., 2019). It signifies the overall monetary value of all products and services generated in a specific country during that period. Moreover, the movement of goods in and out of a country influences its GDP. To assess economic trends of growth or decline, it is essential to evaluate the monetary value of these goods. A careful calculation of imports and exports is necessary to determine their direct effects on a nation's economic growth.

1.2 Background of the Study

Global economy remains remarkably strong, with growth holding steady as inflation returns to target, as despite to many low predictions, the world avoided a recession, the banking system proved largely resilient, and major emerging market economies did not suffer sudden stops (World Economic Outlook, October 2022). Advanced economies are projected to experience prominent growth, mainly determined by a recovery in the euro area. For the meantime, emerging markets and developing economies are anticipated to see steady growth through 2024 and 2025, although there will be variations across different regions.

Globally in 2023 economic grow at 3.3 percent, forecast at 3.2 percent in 2024 and 3.3 in 2025 (World Economic Outlook, April 2024). The World Economic Outlook specifies that advanced economies will see a slight increase in growth, rising from

1.6 percent in 2023 to 1.7 percent in 2024 and reaching 1.8 percent in 2025. However, this will be refuted by an anticipated slowdown in emerging markets and developing economies, which are projected to decline from 4.3 percent in 2023 to 4.2 percent in both 2024 and 2025.

Despite improvements in growth, Latin America and the Caribbean are anticipated to see a decline, with projections of 2.0 percent in 2024 before rising to 2.5 percent in 2025. In contrast, the Middle East and Central Asia are estimated to increase growth from 2.0 percent in 2023 to 2.8 percent in 2024 and 4.2 percent in 2025. In Asia and the Pacific, growth exceeded expectations in late 2023, reaching 5.0 percent for the year. While inflation has been declining at different rates, some economies are still suffering persistent price pressures, while others face deflationary risks. For 2024, growth is anticipated to modestly slow to 4.5 percent (Regional Economic Outlook for Asia and Pacific, April 2024).

Sub-Saharan Africa's position is slowly refining, with growth of 3.4 percent in 2023, predictable to accelerate to 3.8 percent in 2024 and 4.0 percent in 2025 as inflationary pressures affluence and financial conditions improve (World Economic Outlook, April 2024). Price increases have nearly halved, public debt ratios have steadied, and several countries have restarted issuing Eurobonds after a two-year hiatus from international markets.

Tanzania experienced significant economic growth, with a rate of 5.2 percent in 2023 and 4.6 percent in 2022, attainment a GDP of $75.5 billion. This places it as the second-largest economy in East Africa, following Kenya, and the seventh in sub-

Saharan Africa (Tanzania Invest, 2023). Forecasts advocate a GDP growth of 5.7% in 2024 (Tanzania Invest, 2023). Thoughtful the key drivers behind Tanzania's long-term growth, such as sustainable development, full employment, poverty reduction, and addressing income inequality, is crucial as other African nations pursue similar objectives. However, the COVID-19 pandemic triggered the country's economic growth to slow to approximately 2% in 2020, upsetting the labor market, tourism, production capacity, and overall productivity (Kinyondo and Pelizzo, 2021; Tanzania Invest, 2023). In 2021, GDP growth further dropped to 2%, marking the lowest level in the past 15 years, compared to the typical 4% to 7% range over the previous decade (World Bank Indicators, 2021).

The positive economic growth in Tanzania have created positive opportunities for expansion of maritime transportation services which is the backbone of international trade and the global economy and Tanzania may continue improve its economic prospects if the country accelerated further the process of opening up the country to international trade (Tanzania Economic Update, 2013).Various authors, have revealed that, “No matter information technology advances, the world trade cannot be materialized without Ports. This is why every country developed much more advanced efficient Ports for its prosperity”. As according to UNCTAD (2023), Port services account for 80% of global international trade, this implying that Seaport infrastructure plays an essential role in improving global connectivity and international trade growth for a given region. The Port sector plays a vital role in Tanzania's rapid economic growth as according to the Tanzania Ports Authority (TPA), the Government has made significant investments to enhance Port facilities,

including technological upgrades and the construction of new berths, increasing their number from 11 in 2005 to 17 in 2023.

Globally, Port infrastructure plays a pivotal role in facilitating international trade, economic growth, and regional integration. As gateways for the import and export of goods, ports are critical nodes in the global logistics and transport chain. Sophisticated port infrastructure enhances a country's competitiveness by reducing cargo dwell time, improving vessel turnaround, and lowering overall trade costs. Port infrastructure comprises a wide range of components, including physical facilities such as berths, terminals, storage yards, access roads, and rail connections, as well as operational systems like cargo handling equipment, security installations, and information and communication technology (ICT) systems. These elements must work in an integrated and efficient manner to support the smooth movement of goods.

In the context of Sub-Saharan Africa, and particularly in Tanzania, the development of port infrastructure has become increasingly important as economies seek to attract investment, boost exports, and serve as transit hubs for landlocked near countries. The Dar es Salaam Port, as Tanzania's principal maritime gateway, serves not only the domestic market but also land-linked countries such as Zambia, Malawi, the Democratic Republic of Congo, Burundi, Rwanda, and Uganda.

Enhancements of Port infrastructure, such as deepening channels and expanding berths to accommodate larger vessels, will not only boost cargo capacity but also lower shipping costs. This is expected to attract more trade and investment, further stimulating economic growth. The latest Tanzania Economic Update from the World

Bank in 2022 suggests that Tanzania and its East African neighbors could increase their annual GDP by up to US$1.8 billion and US$830 million, respectively, by enhancing the efficiency of the Port of Dar es Salaam.

Notwithstanding the port sector's critical role in economic development, there is continuing debate in Tanzania concerning the extent of the impact that port infrastructure has on the national economy. Thus, it is important to explore the economic contributions of Tanzania's Port infrastructure to the country's overall economy.

1.3 Problem Statement

A port is a maritime area where ships load and unload cargo and passengers. In recent years, ports have transformed into key transportation hubs, linking various infrastructure networks such as railways, roads, and airports (Song & Wang, 2019; Wang & Wang, 2019). In Tanzania, the government has continued to focus on upgrading port infrastructure by securing soft loans and grants from development partners to modernize Tanzanian port facilities, including Dar es Salaam, the major port handling over 90 percent of the country's seaborne trade (TPA Annual report and Accounts, 2021/2022). The recent upgrades to Tanzania's port infrastructure have contributed to increased cargo traffic and revenue performance. According to data from the Tanzania Ports Authority, in the financial year 2022/23, overall cargo traffic reached 24.899 million tons, while revenue increased by an average of 24.7 percent, from TZS 896,951 billion in 2020/21 to TZS 1,394,584 trillion in the financial year 2022/23.

However, the role of port infrastructure in economic growth remains unclear in Tanzania, leading to various political arguments about the impact of port infrastructure on the country's economy. The government has been allocating substantial funds to develop port infrastructure, yet Tanzania's economy continues to experience fluctuations in growth rates during the same period. Therefore, this study aims to better understand the economic effects of port infrastructure on Tanzania's economic sector, and the empirical results could inform decision-makers about future port policies, such as planning for the implementation of new port infrastructure.

1.4 Research Objectives

1.4.1 General Objectives

This study examines the Port infrastructures contribute to overall economic growth in Tanzania.

1.4.2 Specific Objectives

The study focuses on the following specific objectives:

i. To examine the impacts of Information, Communication and Technology (ICT) to Port infrastructure on economic growth at Dar es Salaam Port.
ii. To examine the impacts of Port equipment to Port infrastructure on economic growth at Dar es Salaam Port.
iii. To examine the impacts of Port facilities to Port infrastructure on economic growth at Dar es Salaam Port.

1.5 Alternative Hypothesis

H_1: Port Information, Communication and Technology have significant impacts on economic growth

H2: Port equipment has significant impacts on economic growth

H3: Port facilities have significant impacts on economic growth

1.6 Significance of the Study

The Government of Tanzania has undertaken various initiatives to enhance port infrastructure by allocating substantial budgets to support the development and modernization of port construction projects. This study is important for a diverse array of stakeholders. It will assist the Government and relevant Ministries in making evidence-based policy and investment decisions. Academics can use it as a reference, while researchers may utilize the findings to support further investigations. Additionally, political leaders and the general public will gain a better understanding of the crucial role that port infrastructure plays in fostering the country's economic development. The study provides valuable insights that can guide stakeholders in making informed decisions about investments, policy formulation, and the strategic development, management, and promotion of port infrastructure and superstructure.

1.7 Organization of the Study

The study was structured to achieve its main goal of evaluating the effects of Port infrastructure on Tanzania's economic growth, specifically at the Port of Dar es Salaam. It is organized as follows; Chapter one provides background information, Chapter two examinations the literature on Port infrastructure, Chapter three

summaries the research methodology used for data analysis, Chapter four presents the findings and discussions, and chapter five offers conclusions and recommendations.

1.8 Study Delimitation

This study focuses on the contribution of port infrastructure to economic growth, specifically examining the Dar es Salaam Port in Tanzania. It is limited to three key components of port infrastructure: ICT systems, port equipment, and port facilities. The research targets stakeholders directly involved in port operations, such as port authorities, customs officials, freight forwarders, shipping agents, and transport operators. Data for the study is collected from the 2024/2025 fiscal year and does not include information from other ports in the country or historical data before this period. Additionally, the economic contribution assessed is confined to measurable impacts within Tanzania's national context and does not consider broader regional or global effects. The study also excludes the exploration of external factors, such as policies, international trade agreements, or global market trends that may indirectly influence port performance.

CHAPTER TWO

LITERATURE REVIEW

2.1 Definitions of Key Concepts

This part provides definition of key terms and concepts which are used in this study.

2.1.1 Economic Growth

Economic growth refers to the sustained increase in Tanzania's productive capacity and overall economic output over time, as reflected in rising Gross Domestic Product (GDP). In the context of port development and logistics infrastructure, economic growth signifies an enhanced national capacity to produce, transport, and export goods and services, driven by improved trade facilitation, increased private sector investment, and expanded regional integration. This growth is measured not only by GDP but also by indicators such as job creation, increased cargo throughput, and improved competitiveness in the East and Central African trade corridors. (Adapted from Rihab et al., 2014).

2.1.2 Port Infrastructure

Port infrastructure refers to the comprehensive range of physical facilities located within a seaport, along with its land and sea access points, that facilitate maritime transport, cargo handling, and logistics operations. It consists of four key components: Basic Infrastructure - These foundational structures are not directly involved in cargo transfer but are essential for port protection and connectivity. They include sea locks, breakwaters, piers, seawalls, maritime access points, canals, and primary road and rail links to and from the port, as well as pipelines and buffer zones at the port's boundaries. Operational Infrastructure - This category encompasses port

facilities specifically dedicated to the commercial handling of sea-going and inland vessels.

Examples include quay walls, jetties, roll-on/roll-off ramps, fencing, berthing aids and internal port access roads that support ship docking and the movement of cargo. Superstructure - This includes all built assets that do not fall under basic or operational infrastructure, such as storage sheds, silos, warehouses, container yards, and administrative or service buildings. Port Equipment - This refers to the mechanical and technological assets used to support and enhance port operations, particularly in cargo handling. It includes cranes (such as gantry and mobile cranes), reach stackers, forklifts, conveyor systems, terminal tractors, and other handling machinery and information and communication technology (ICT) systems that are essential for efficient loading, unloading, and movement of goods within the port (World Bank Port Reform Toolkit, 2022).

2.1.3 Information, Communication and Technology (ICT)

Information, Communication and Technology (ICT) refers to the infrastructure, systems, and mechanisms that enable modern digital operations and computing. In the context of port operations, ICT plays a vital role in ensuring seamless communication, data exchange, and operational efficiency. According to Rodrigue, et al., (2022), port terminals comprise integrated infrastructure and superstructure systems, which include essential ICT components such as: Video surveillance systems for port security and monitoring; and Telecommunication installations and structured wiring to support voice, data, and network connectivity across terminal operations. These ICT elements form the backbone of smart port operations,

enabling automation, real-time coordination, enhanced safety, and improved service delivery in port logistics and management.

Information, Communication and Technology is the infrastructure and mechanisms that enable modern computing. According to Rodrigue,et al., 2022, Port terminals are composed of integrated infrastructure and superstructure systems which among them includes video surveillance (Port security), Telecommunication installations and wiring.

2.2 Theoretical Literature Review

This part of the theoretical literature review focuses on the existing theories, models, and concepts that are relevant to a research topic.

2.2.1 Neoclassical Growth Model

The Neoclassical Growth Model is an economic model that explains how a unchanging rate of economic growth occurs through the interplay of three main factors: labor, capital, and technology. The origin of this model is drawn to Solow (1956) and with other important contributions notably by Swan (1956), It well-thought-out a growing economy as one in which demand plays no role, since it concerned about the long run, the purpose of the model is to discover how much of economic growth is due to factor accumulation and how much is due to technical improvements (Jha, 2003). Therefore, this theory will be employed to measure the economic effects of the quality of Port infrastructure.

At a fundamental level, the growth models developed by Solow (1956) and Swan (1956) share the same core principles. The key dissimilarity between them lies in

how they are presented: Solow's diagrams emphasize the capital-to-labor ratio, whereas Swan's focus on the output-to-capital ratio and growth rates. Figure 2.1 presents a basic Swan diagram, with the output-to-capital ratio (denoted as Y/K) on the horizontal axis and growth rates on the vertical axis. In the modest version of Swan's model (1956), labor growth, represented as $(dL/dt)/L \equiv n$ in Figure 2.1, is preserved as exogenous, depicted by a horizontal line. Since investment equals savings and savings are a fixed portion, s, of income, we have $dK/dt = sY$. The capital growth rate, given by $(dK/dt)/K = sY/K$ in Figure 2.1, forms a straight line through the origin with a slope of s. With constant returns to scale and no technical progress, the output growth rate, $(dY/dt)/Y$, lies between (or equals) the capital and labor growth rates, as shown by the lower dotted arrows in Figure 2.1. equilibrium occurs at point E, where the growth rates of capital, labor, and output align. To the left of point E, output grows faster than capital, increasing Y/K toward (Y/K) E. To the right of E, output grows more slowly than capital, causing Y/K to decrease.

The model viewed a growing economy as one where demand is extraneous, as it focuses on long-term undercurrents. The major strength of neo classical model is it efficient in the allocation of limited productive resources, and the its weakness is the overdependence on its mathematical approaches which leads to the missing of empirical science in the study. Therefore, this theory will be used to approximation the impact of Port infrastructure on economic.

The model assumes diminishing returns to both capital and labor, meaning that as extra capital is introduced, its marginal contribution to economic growth declines unless there is technological advancement. In the end, the economy reaches a steady

state where capital per worker and output per worker stay unaffected, unless innovations or improvements, such as infrastructure, shift the production function.

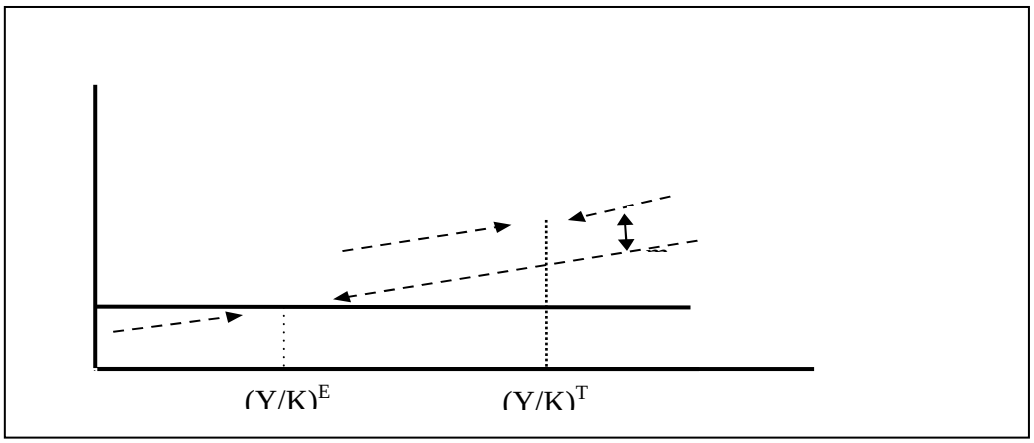

Figure 1.1: The Swan Diagram

The model implies that, the output growth rate (which is exogenous) depends on the factors of production and is unaffected by the saving rate and technological progress. Nevertheless, an increase in the saving rate raises output per worker by boosting capital per worker, thereby influencing the output growth rate. Therefore, the application of Neoclassical Growth Model to the impacts of Port infrastructure on economic growth will provides insights into how improvements in infrastructure contribute to a country's economic performance by increasing productivity, capital accumulation, and overall efficiency.

As illustrated in Figure 2.1, exogenous technological progress at a rate of m shifts the output growth rate by m, resulting in a new equilibrium at point T with an increased output-to-capital ratio, (Y/KT. While Solow's model emphasizes the substitution between labor and capital, Robert Dixon (2003) argues that the Swan model more effectually proves the impact of technological progress. In equilibrium,

the output-to-capital (Y/K) ratio remains constant for a given rate of technological progress, whereas Solow's capital-to-labor (K/L) ratio must be adjusted in efficiency units to maintain constancy.

The study utilizes both Solow's model and Swan's model for a comprehensive analysis. Solow's model emphasizes the capital-labor ratio (K/L), making it particularly effective for examining how technological progress influences labor productivity. In contrast, Swan's model focuses on the output-capital ratio (Y/K) and growth rates, offering valuable insights into how savings and capital accumulation affect output growth. By employing multiple versions of the Neoclassical model, the study aims to balance theoretical limitations and enhance empirical applicability, especially in the context of port infrastructure, which involves both capital investment and technological advancements.

2.3 Empirical Literature Review

This area involves a group of related ideas that guide a research project.

2.3.1 Impacts of ICT to Port Infrastructure on Economic Growth

Seaports play a critical role in regional economic development by generating positive externalities through their operations. Efficient port functioning increasingly relies on the adoption of new technologies and innovations, which help reduce operational costs, enhance business facilitation, increase transparency, and attract new businesses. In this regard, Mudronja, Jugović, and Škalamera-Alilović (2020) explored the impact of seaports on regional economic growth using endogenous growth theory, focusing on research and development (R&D). Their study covered

107 port regions in the European Union (EU) from 2005 to 2015 and demonstrated that technological advancements at ports significantly contribute to regional growth.

Similarly, Lotfal and Sara (2018) investigated the impact of Information and Communication Technology (ICT) on the transport sector across selected Middle Eastern countries. Their study utilized a panel data model over a 14-year period (2000–2014). Their findings indicate that active labor in the transport sector, along with machinery, transport equipment, and the ICT penetration ratio, all have a significant positive effect on transportation value added. Furthermore, they concluded that strengthening ICT infrastructure and providing training for transport personnel in machinery and equipment can enhance sectoral growth. As a result, the study recommends promoting ICT and road infrastructure investments in both the public and private sectors.

In Tanzania, James and Ulingeta (2018) analyzed the effect of information systems on logistics performance at the Dar es Salaam Port. Using a quantitative approach and canonical correlation analysis, they collected data from 110 port employees through structured questionnaires. Their results showed that effective use of information systems leads to reduced shipping and trucking costs, improved timeliness in service delivery, increased trade volumes, and enhanced organizational logistics capabilities. Based on these findings, the authors recommend that ports invest in capacity-building initiatives for staff to effectively utilize and manage information systems, thereby improving overall port performance.

2.3.2 Impacts of Port Equipment to Port Infrastructure on Economic Growth

Port equipment is essential for strengthening port infrastructure and improving port

performance, which significantly contributes to both national and international economic growth. Omoke, et al. (2017) emphasize that maritime transportation, which accounts for over 90% of global trade, is crucial for economic development. They point out that various port operations—such as vessel scheduling, berth and crane allocation, cargo loading and unloading, yard activities, and gate operations—rely heavily on the adequacy and quality of port infrastructure and equipment.

The study suggests using a vessel's gross registered tonnage as a basis for calculating port charges due to its direct impact on the national economy. It further recommends increasing the number and capacity of cargo handling equipment to enhance vessel turnaround times, berth occupancy, and overall operational efficiency. Additionally, it advocates for the development of inland infrastructure, such as railways and waterways, to alleviate congestion in ports and on roads.

In a related study, Rudy et al. (2017) highlight the economic significance of ports, which correlates with the volume and efficiency of cargo handling and movement. They observe that as ports grow larger, the management of port equipment becomes increasingly vital for achieving economies of scale. Their review of technological advancements and equipment improvements in ports, particularly for containerized and dry bulk cargo, underscores a trend toward automation and the integration of information and communication technology (ICT). The authors conclude that intelligently integrating port equipment with information systems can significantly enhance both inter-terminal and intra-terminal operations, leading to improved port efficiency and competitiveness.

Mwita (2017), focusing on Dar es Salaam Port, finds that inadequate cargo handling

equipment is a significant bottleneck to port performance and its economic contributions. Utilizing both qualitative and quantitative methods with a sample of 110 respondents, the study reveals that a shortage of critical equipment—such as wagons for container loading and unloading, as well as an insufficient number of trucks for inland transportation, combined with frequent breakdowns of handling equipment, impedes port efficiency. The study recommends that port management prioritize the procurement of modern equipment and implement improved facility designs to address congestion and operational delays.

Together, these studies underscore that investing in modern port equipment is crucial for maximizing the productivity of port infrastructure, reducing operational delays, and ultimately enhancing a port's contribution to economic growth.

2.3.3 Impacts of Port Facilities to Port Infrastructure on Economic Growth

Port facilities play a crucial role in enhancing the effectiveness of port infrastructure and significantly contribute to economic growth. According to Sharapiyeva et al. (2019), among 37 countries studied, 16 landlocked nations faced obstacles to economic development due to limited or non-existent access to seaports. The authors argue that a lack of access to maritime transport has resulted in higher transportation costs, delays, and underdeveloped infrastructure, which in turn restricts participation in global trade. Using a neoclassical economic framework, the study found a strong positive correlation between the quality of transport infrastructure, including port facilities, and national economic development. These findings underscore the importance of modernizing outdated facilities and equipment, such as rolling stock, ships, trucks, and cargo handling tools, to enhance logistics performance and

facilitate trade.

Similarly, Natalia, et al.. (2022) present empirical evidence from a case study on the Port of Szczecin, where a project to deepen the fairway to 12.5 meters is expected to boost cargo handling and transshipment volumes. This investment has prompted additional infrastructure upgrades, including modifications to port headlands and quays. The study emphasizes that efficient transshipment operations require not only deeper fairways but also upgraded port quays, advanced handling equipment, and expanded storage areas. The authors recommend ongoing investment in port handling facilities, improvements to bulk and general cargo terminals, and the strengthening of business relationships among port stakeholders to ensure sustained growth and operational efficiency.

Mingxin and Jing (2024) investigate the role of port infrastructure within the broader context of the 21st Century Maritime Silk Road. Their study of 30 countries along this route highlights how the connectivity of port facilities significantly influences trade expansion and regional economic integration. They found that enhancing the connectivity and alignment of port infrastructure strategies, particularly between China and Europe, could improve bilateral maritime trade. The authors conclude that investments in port facilities should be accompanied by supportive policies, cross-border coordination, and the development of integrated trade chains to maximize economic benefits.

Collectively, these studies confirm that well-developed port facilities are essential for improving the efficiency of port infrastructure, reducing trade barriers, and promoting both national and regional economic growth. Modernizing port facilities

not only supports increased cargo handling capacity but also enhances logistics integration, infrastructure connectivity, and competitiveness in global trade.

2.3.4 Impacts of Port Infrastructure on Economic Growth

Port infrastructure is widely acknowledged as a crucial driver of economic growth, particularly due to its impact on trade, investment, and the development of related sectors. According to Jouili and Allouche (2016), seaports play a vital role in stimulating economic development by promoting various sectors and generating extensive economic benefits. Their study, which analyzed 28 years of annual data (1983–2011), concluded that global investment in seaport infrastructure significantly contributes to economic growth, especially benefiting the services and manufacturing sectors, while the agricultural sector has seen relatively limited gains.

Sleeper (2012) similarly highlighted the direct correlation between a country's gross domestic product (GDP) and the number of internationally recognized ports it possesses. Analyzing 120 port regions across 13 European countries, this study established that ports contribute to GDP growth in their immediate regions and create positive spillover effects on neighboring areas. Bottasso, et al., (2014) supported this perspective, asserting that port infrastructure acts as a growth pole that enhances regional GDP and stimulates surrounding economic activities. Moreover, Jouili (2016) conducted a country-specific analysis of Tunisia, emphasizing the strategic importance of seaports in linking national and international economies. The study revealed that the Tunisian government had made significant investments in developing and constructing new port infrastructure to not only support foreign trade but also promote broader economic integration. The findings indicated that

investments in seaports stimulate growth through enhanced production capacity, increased trade, and the attraction of foreign direct investment (FDI). The high elasticity of GDP concerning seaport infrastructure reinforces the idea that such investments have a substantial indirect impact on economic performance.

In the context of Tanzania, Sun and Kauzen (2023) examined the relationship between port infrastructure and economic growth using Structural Equation Modeling (SEM). Their results indicated a strong positive link between improved port infrastructure and increased port throughput, which, in turn, positively affects national economic growth. The study emphasized that strategic investments in port development could significantly enhance Tanzania's economic performance.

The United Nations Conference on Trade and Development (UNCTAD, 2019) underscored the critical role of port development and productivity in promoting economic development and improving regional connectivity, particularly in Asia and the Pacific. The report noted that while the region has achieved trade and economic growth rates above the global average, port capacity constraints continue to hinder international trade. As a result, there has been an increasing government commitment to address these limitations through infrastructure investment and policy support. Munim, et al., (2018) provided additional evidence that ports serve as essential nodes in global maritime transport networks. Their study found that high-quality port infrastructure and strong logistics performance are positively correlated with national economic growth. Improved port infrastructure enhances logistics efficiency, facilitates seaborne trade, and significantly boosts overall economic development.

In summary, the reviewed literature confirms that port infrastructure is a strategic

asset that not only supports trade and logistics but also drives economic growth

through improved productivity, increased investment, and enhanced international competitiveness. Therefore,modernizing and expanding port facilities are essential for sustaining long-term economic development. Table 2.1 provides a summary of the theoretical implications.

Table 2.1: Summary for Theoretical Implications

S/N	Author, and Year	Study Objective	Country	Sampling Method	Analytical Method	Sample Size	Findings
1	Gorana Mudronja, Alen Jugovi´c and Dunja Škalamera-Alilovi´c, (2020).	The impact of seaports on the growth of regional economies.	Croatia	Purposive sampling	Panel data analysis	107 European Union's (EU) port regions	Employing new technologies and innovations is crucial for the efficient operation of seaports.
2	Lotfal and Sara, (2018).	To examine the effect of ICT on growth of transport value added among the selected Middle – East countries.	Iran	Simple random sampling	Panel data analysis	14 years (2000 – 2014)	Enhancing ICT infrastructure and providing training for transport personnel in machinery and equipment leads to greater growing in the transport sector and related services.
3	James and Ulingeta (2018).	The role of information systems usage in enhancing port logistics performance.	Tanzania	Simple random sampling	Cronbach's alpha and Canonical correlation analysis	110 respondents	The use of information systems may improve timely delivery of goods and services, lower trucking and shipping costs, and strengthen organizational capacity.
4	Omoke V. et al., 2017	To analysis impact of Port Operation on Nigerian Economy.	Nigeria	Purposive sampling	Multiple Regression Analysis	15 years (2000-2015)	Efficient Port infrastructure improves the effectiveness of port operations.
5	Rudy et al. (2017)	Port Equipment and Technology.	Netherlands	Purposive sampling	Data Environment Analysis and Sensitivity Analysis	Reviewing the equipment technology	The future of Port equipment emphasizes on effective management and shows a clear trend toward greater reliance on information, communication, technology, and automation.
6	Mwita, (2017)	To analyse on the effect of port congestion on port performance.	Tanzania	Simple random sampling	Descriptive Statistics	110 respondents	No enough equipment such as wagon for loading and unloading containers which hinder speed for loading and unloading containers.

S/N	Author, and Year	Study Objective	Country	Sampling Method	Analytical Method	Sample Size	Findings
7	Sharapiyeva et al. (2019)	To examine impact of Port Transport-logistics Infrastructure and LPI for Economic Growth.	Republic of Kazakhstan	Purposive sampling	Structural equation modelling (SEM).	37 countries	The quality of Port infrastructure positively impacts logistics efficiency and the country's economy.
8	Natalia et al. (2022)	To examine impact of Improving the Quality of Port's Infrastructure on the Shippers' Decisions.	Poland	Case study approach	Case study analysis	Five transport chains	The key factors for cargo shippers comprise adapting Port quays to accommodate new depths, refining the efficiency of transshipment equipment, and escalating storage capacity.
9	Mingxin and Jing (2024)	To conduct research on the connectivity of Port infrastructure along the 21st Century Maritime Silk Road.	China	Stratified Sampling	Structural equation modelling (SEM).	30 countries	The connectivity of Port facilities has a major stimulus on trade and levels of regional integration.
10	Jouili and Allouche (2016)	To examine impact of seaports infrastructure to other sectors and economics.	Tunisia	Stratified Sampling	Cobb – Douglas Production Function	28 years annual data (1983 -2011)	Investment in seaports aids the services and manufacturing sectors more than other sectors.
11	Sleeper (2012)	To examine Contributions to competitiveness in Latin America and Asia.	Brazili & China	Purposive sampling	Regression analysis	120 Port regions	Ports subsidize to the GDP of their respective regions.
12	Jouili (2016)	To evaluated the economic impact of a Seaport in the process of economic growth.	Tunisia	Stratified Sampling	Cobb – Douglas Production Function	27 years (1987 - 2014)	Seaport infrastructure drives economic growth through numerous channels of transmission.
13	Sun and Kauzen (2023),	To assess the impacts seaports infrastructure on the Tanzanian economy.	Tanzania	Purposive sampling	Structural equation modelling (SEM).	12 years (2005 – 2017)	There is significant linkage exists between Port infrastructure and economic growth.
14	Munim et al.,2018)	To assess the impacts of Port infrastructure and logistic performance on economic growth.	Norway	Purposive sampling	Structural equation modelling (SEM).	91 Countries	High-quality Port infrastructure positively stimuluses logistics performance and the national economy.

Source: Compiled by the researcher as of empirical literature reviews (2024).

2.4 Research Gap

Globally, Port economic impact studies have become increasingly and many national finds such studies useful in the determination of investment and operational budget allocation to the Port; however, previous Port impacts studies have several shortcomings in accounting to what degree did Port infrastructure contribute to the national economic growth due to its confidentiality, lack of availability of complete data and the unwillingness of respondents to share information.

2.5 Conceptual and Theoretical Frameworks

Figure 2.2 illustrates the conceptual framework that links port infrastructure improvements to national economic growth, drawing from the model proposed by Lakshmanan (2011). The framework conceptualizes those investments in port infrastructure, specifically in Port ICT systems, port equipment, and physical port facilities, generate economic benefits. These infrastructure components collectively enhance port efficiency, which leads to better trade facilitation and enhances GDP growth. This causal sequence—Port ICT, Equipment, and Facility Improvements → Enhanced Port Efficiency → Trade Facilitation → Economic Growth—reflects Lakshmanan's assertion that infrastructure investment has a multiplier effect on productivity, connectivity, and economic development.

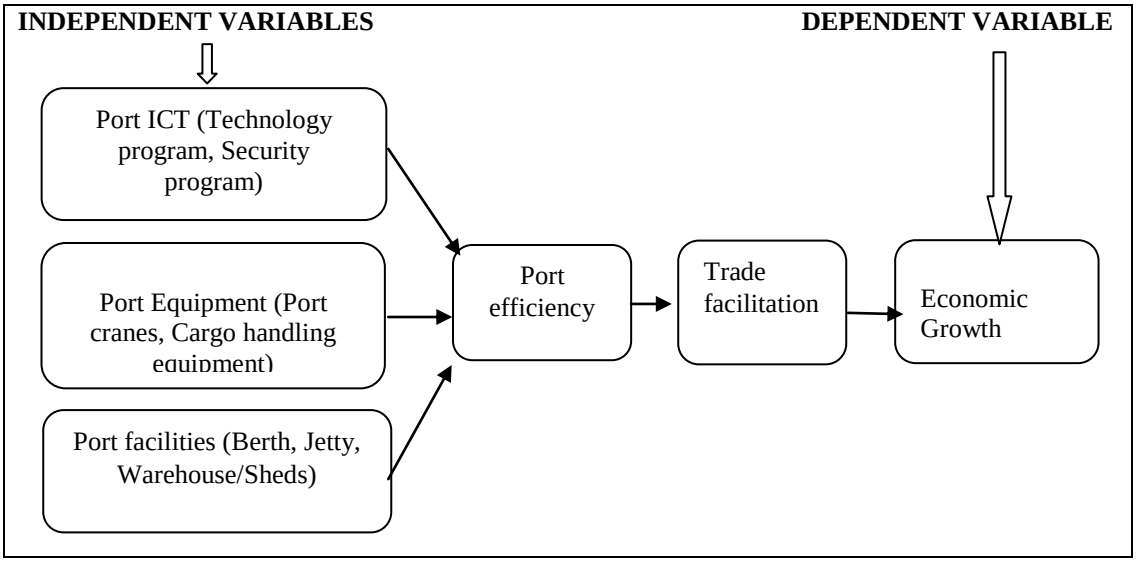

Figure 2.2: Conceptual Framework
Source: Researcher, 2024.

2.5.1 Description Measurement of the Variables

The Measurement of the Variables was expressed in terms of number of Port infrastructure, number of equipment and number of facilities as shown in the Table 2.2.

Table 2.2: Description Measurement of the Variables

S/N	Variables	Description	Measurement/ Units	Expected Sign
1.	Economic Growth	This is the dependent variable or exogenous variable which measure a rise in general production within an economy.	Percentage	+/-
2.	Information, Communication & Technology	This is independent variable or endogenous variable used to describe innovative technology to enhance Port operations, management and safety.	Number of technology program	+/-
3.	Port equipment	This is independent variable or endogenous variable which involves mechanical and other devices used for loading and unloading commodities and passengers, including fork lifts, Port cranes, spreaders, terminal tractors and Mafi trailers.	Number of equipment	+/-
4.	Port facilities	This is independent variable or endogenous variable which involves services and facilities within the Ports such as docks, warehouse, storehouse, jetties, piers, tunnels, oil tanks, boats, conveyors, railway intermodal terminal and container storage areas.	Number of facilities	+/-

CHAPTER THREE

RESEARCH METHODOLOGY

3.1 Introduction

This chapter outlines the methods employed to conduct the research study.

3.2 Research Philosophy and Paradigm

This study is based on the positivist research paradigm, which views reality as objective and measurable. This approach is ideal for examining the relationship between port infrastructure and economic growth, as it allows for systematic analysis of empirical data through structured questionnaires and statistical techniques. The research incorporates objectivist epistemology, suggesting that knowledge exists independently of the researcher. Primary data from port employees and secondary data from official reports are utilized to ensure an evidence-based analysis of the impact of port infrastructure on Tanzania's economy. Additionally, the study adopts realist ontology, asserting that the economic benefits of port infrastructure are observable phenomena. By employing econometric and descriptive analyses, the research aims to identify the causal links between port development and national economic growth. In summary, this study's philosophical foundation reflects a positivist, objectivist, and realist orientation, which is suitable for addressing research questions that require empirical validation regarding the economic impacts of port infrastructure in Tanzania.

3.3 Research Design

The study utilized cross-sectional data, which allows for the examination of multiple variables at a single point in time. This approach enables researchers to identify

patterns, relationships, and associations among different respondent groups simultaneously. It is particularly effective for understanding the current status and perceptions related to port infrastructure and its impact on economic growth, without the need for long-term follow-up.

3.4 Study Area

The study was conducted at the Port of Dar es Salaam. The main reason for selecting Dar es Salaam Port as a case study, is because Dar es Salaam Port handle more than 85 percent of the overall cargo throughput served by TPA Ports and contributed nearly 90 percent of TPA revenue (TPA Annual Report of the Financial Year 2022/23).

3.5 Research Population

According to Kothari (2004), a population refers to the entire group of individuals, items, or units that are being studied from which a sample may be drawn. In research, the population includes all elements that share common characteristics relevant to the study, often defined by geographical, institutional, or demographic boundaries. For this study, the study population consists of 1,220 employees of the Dar es Salaam Port who are directly or indirectly involved in port operations. These individuals were chosen as the population of interest because they have firsthand experience and insights into port infrastructure, logistics performance, and related economic outcomes. Their perspectives are crucial for evaluating the relationship between improvements in port infrastructure and economic growth.

3.5.1 Sample Size

Mugenda and Mugenda (1999) define a sample as a smaller group selected from a

larger population. In many research contexts, including this study, it is often impractical, time-consuming, and expensive to examine the entire population. Therefore, a representative subgroup—known as a sample—is chosen from the larger population to facilitate the generalization of findings (Kombo and Tromp, 2006).

In this study, the target population consisted of 1,220 employees at the Dar es Salaam Port. To determine a manageable and statistically valid sample size, the researcher followed the guideline by Mugenda and Mugenda, which suggests that at least 10 percent of the population should be selected when the total exceeds 1,000 individuals. Using this approach, the researcher selected 10 percent of the total population, resulting in a sample size of 122 respondents (see Table 3.1). This sample size was deemed sufficient to provide reliable and valid insights while ensuring feasibility in data collection and analysis. The selected respondents were drawn from various departments to capture a diverse range of perspectives on port infrastructure, and economic outcomes.

Table 3.1: Sample Distribution N=122

Type of respondent	Number expected of respondents	Sample size	Sampling techniques
TPA – Dar es Salaam Port	122	122	Random sampling
Total			

Source: Field Data, 2024.

3.6 Source of Data

Sources of Data refer to physical or digital locations where information can be stored. In this study, both primary and secondary data were applied. Primary data comprised of firsthand information, while secondary data was attained from reports issued by Tanzania Ports and other government publications.

3.7 Types of Data and Data Collection Procedures

This study utilized both primary and secondary data sources to provide a comprehensive understanding of the research problem. Primary data was collected directly from respondents using structured questionnaires, which allowed the researcher to gather firsthand, context-specific information related to the relationship between port infrastructure and economic growth. The collection of primary data is crucial in empirical research because it offers original insights that are specific to the study area and timeframe (Kothari, 2004).

In addition, secondary data was gathered through a systematic review of existing literature, including official reports, academic books, peer-reviewed articles, and reliable electronic sources. This secondary data was essential for establishing the theoretical and conceptual framework of the study, identifying existing research gaps, and validating the findings from the primary data. The triangulation of data enhances the reliability and validity of the research outcomes (Creswell, 2014).

To select participants, the study employed a non-probability purposive sampling technique. This method was scientifically justified due to the target population's nature, specifically, employees with knowledge or responsibilities related to port infrastructure and operations. Purposive sampling is especially suitable when a researcher wants to include respondents based on predefined criteria, such as expertise, experience, or relevance to the subject (Etikan, et al., 2016). This approach ensured that key informants with the most relevant insights were included in the sample, thereby improving the quality and relevance of the collected data.

3.7.1 Questionnaires

The researcher disseminated questionnaires to 122 employees. These structured questionnaires included questions regarding demographic characteristics, Likert scale, as well as close and open-ended questions aim to eases the exercise of analysis by saving time and enabling to get detailed information.

3.8 Data Analysis

Data were collected, edited and cleaned for accuracy and completeness using SPSS version 26 and both qualitatively and quantitatively were used in order to make it easier for the readers understand the content of the study. The collected data was analyzed by logistic regression analysis and descriptive statistics to recap and form it in a meaningful manner. The analysis was interpreted to provide clear insights for the reader. Descriptive statistics were employed to capture frequencies, means, and percentages of qualitative data, particularly demographic information, while logistic regression analysis was secondhand to evaluate the relationship between Port infrastructure and economic growth. Port ICT infrastructure and economic growth, Port equipment and economic growth and Port facilities and economic growth as well as used to determine the variables which are significantly and insignificantly.

3.9 Diagnostic Tests

The data gathered from the survey undertook various econometric tests to verify their suitability for use and to produce optimal results. This study applied several econometric tests to measure the accuracy of the variables, including tests for heteroscedasticity, multicollinearity, autocorrelation, and normality. The F-test was employed to determine overall significance, with the decision rule stating that if the

p-value allied with the F-statistic is less than 0.05, the model is believed to be statistically significant.

3.9.1 Normality Test

The normality test is directed to regulate if the variables in a regression model exhibit a normal distribution. This test is crucial because both the t-test and F-test assume that the residual values conform to a normal distribution (Arifin, 2017).The variables both dependent and independent variable tested by normality test by using Shapiro-Wilk Test method. The decision rule detailed that, if the p-value is greater than 0.05, the null hypothesis would not be rejected, signifying that the residuals are normally distributed.

3.9.2 Heteroscedasticity

Heteroscedasticity is stated as a situation whereby the variances of error terms in the model are not equal, Gujarati, (2004). This situation arises when the fourth assumption of the Classical Linear Regression Model (CLRM) is not met, which states that, the instabilities in the population regression function should be homoscedastic, meaning they all have the same variance. When heteroscedasticity is existing, the estimated coefficients remain unbiased but become inefficient, resultant in alterations that may be either too small or too large, which can lead to Type I or II errors. Subsequently, the Ordinary Least Squares (OLS) method is no longer the Best Linear Unbiased Estimator (BLUE). To address this issue, since the data in this study exhibition variability, the numeric variables will be transformed into natural logarithms, and a heteroscedasticity test will be conducted using the Breusch-Pagan/Cook-Weisberg method to ensure the estimated coefficients remain unbiased.

A variable is considered to be in a heteroscedasticity position if the observed points are scattered above and/or below zero on the Y-axis and exhibit a separate pattern. Conversely, if the observed points are scattered above and/or below zero on the Y-axis without a clear pattern, it indicates homoscedasticity (Gani & Amalia, 2015).

3.9.3 Multicollinearity

According to Andren (2007) multicollinearity is a situation where there is high correlation among the explanatory variables in a multiple regression model. In assumption number 10 of the CLRM statuses that "there is no perfect multicollinearity," which means that there are no perfect linear relationships among the explanatory variables. In this study, multicollinearity is assessed using the Variance Inflation Factor (VIF) test to determine if any exact linear relations exist among the explanatory variables in the regression model used. The VIF is calculated using the following formula:

$$VIF = \frac{1}{1-r_{23}{}^2} \quad \text{..... (xi)}$$

Whereby;

VIF= Variance Income Factor

r = coefficient of correlation between dependent variable and independent variable.

The study uses both qualitative and quantitative explanatory variables. The qualitative explanatory variables, represented as dummy variables, were tested for multicollinearity by excluding one category of the dummy variables to prevent a perfect linear relationship between the set of dummy variables and the constant (known as the dummy variable trap).

The multicollinearity test is designed to determine whether there is a correlation amongst the independent variables in the regression model. Ideally, a good model should not exhibit any correlation between these variables. The Tolerance Value and Variance Inflation Factor (VIF) are used in this context, where the Tolerance Value evaluates the proportion of variance in the selected independent variables that is not explained by other independent variables, and the VIF indicates how much multicollinearity bloats the variance of a coefficient estimate for an independent variable. Typically, the cutoff values indicating the presence of multicollinearity are a Tolerance Value of ≤ 0.1 and a VIF greater than 10 (Gani & Amalia, 2015).The decision rule is based on the fact that as the VIF of a variable increase and exceeds 10, that variable is said to be highly collinear and if the VIF approaches 1 the variable is said to be less collinear (Gujarati, 2004).

3.9.4 Karl Pearson's Coefficient of Correlation

The study measured the degree of relationship between the two variables (Economic growth and Impact of Port infrastructure) through using Karl Pearson's Coefficient of Correlation. The decision rule is based on the belief that values approaching +1 or -1 signify a strong correlation, whereas values near 0 suggest a weak correlation.

3.9.5 Autocorrelation Test

The autocorrelation test measures whether there is a correlation between the confounding error at time t and the error at time t−1 in a linear regression model. This matter occurs when subsequent observations over time are related to one another, leading to residuals or confounding errors that are not independent from one observation to the next. A good regression model is one that is free from

autocorrelation (Ghozali, 2013). In this study, the autocorrelation test was conducted using the Durbin-Watson statistic method. The decision rules were as follows: (a) a value close to 2 indicates no autocorrelation, (b) a value less than 2 suggests positive autocorrelation, and (c) a value greater than 2 indicates negative autocorrelation.

3.9.6 Econometric Model

The econometric model is specified as follows;

Model 1: ICT = $\alpha + \beta_1 x_1 + \beta_2 x_2 + \varepsilon_0$; *Where as* x_1 *= Technology program,* x_2 *= Security programm,*

Model II: PE = $\alpha + \beta_1 x_1 + \beta_2 x_2 + \varepsilon_0$; *Where as* x_1 *= Port cranes,* x_2 *= Cargo handling equipment*

Model III: PF = α $+\beta_1 x_1 + \beta_2 x_2 + \beta_3 x_3 + \beta_4 x_4 + +\varepsilon_0$; *where as* x_1 *= Jetties* x_2 *= Berth,* x_3 *= Railway,* x_4 *= Warehouse/ sheds*

Combined Model = LnGDP=lnβ0 + β1lnICT1+ + β2lnPE2 + β3lnPF3 + ε_0

Table 3.2: Variables to be Included in Logit Regression Model

Variables	Unit	Expected sign
Technology program	Important =1 Not Important =0	+/-
Security program	Important =1, Not Important =0	+/-
Port cranes	Number	+
Cargo handling equipment	Number	+/-
Jetties	dummy variable participation =1 non-participation=0C	+
Berth	Important =1, Not Important =0	+
Railway	dummy variable participation =1 non-participation=0	+
Warehouse/ sheds	Number	-

3.10 Reliability and Validity of Instruments

The study ensured that, there are consistently results by giving the same results if the same variables are tested multiple times.

3.10.1 Data Validity

In thematic analysis, validity and reliability require an evaluation of the themes to ensure they precisely reflect the entire text (Alhojailan, 2012). The researcher acknowledged four aspects of trustworthiness relevant to qualitative data analysis: credibility, dependability, transferability, and conformability. Credibility allowable the researcher to establish a clear connection between the findings and reality, thereby validating the truth of the results (Onwuegbuzie and Leach, 2007). To discourse the issue of dependability, the researcher meticulously documented all processes in the study, making it possible for future researchers to replicate the work, even if identical results are not guaranteed. Conformability was applied to ensure that the researcher's findings precisely replicated the experiences involved in the study. Additionally, transferability was evaluated by proving that the results of the current study could be relevant in other contexts and at different times.

3.10.2 Ethical Consideration

Bhattacherjee (2012) proclaims that, the key ethical principles include voluntary participation, non-maleficence, informed consent, anonymity, confidentiality, and disclosure. This study sticks to these ethical standards by fortifying research clearance from the Directorate of Postgraduate Studies. Respondents' names were not requested in the research instrument, ensuring their anonymity. Information was collected with the consent of the Tanzania Port Authority, and participants were

guaranteed that their responses would be used only for academic purposes. They were also informed that; their participation was entirely voluntary. Additionally, severe measures were applied to prevent plagiarism and avoid the fabrication or duplication of previous studies.

CHAPTER FOUR

FINDINGS AND DISCUSSIONS

4.1 Introduction

This section examines the crucial role that Port infrastructure has in the economic development of Tanzania. By analyzing the responses from a diverse group of stakeholders, including their demographics and professional backgrounds, the study provides a comprehensive evaluation of the current state of Port facilities, ICT systems, and Port equipment availability. The findings show that, the popular of respondents view the Port's infrastructure positively, noting significant contributions to international and local trade, as well as job creation. However, challenges such as ICT Integration, equipment – skills mismatch, underutilization of new Port facilities are identified as key areas needing improvement. Hence, the study underscores the vital impact of Dar es Salaam Port on the region's economic growth, emphasizing the importance of continuous investment and strategic enhancements to maximize its potential.

4.2 Demographic and Socio-economic Characteristics of the Respondents

This section presents the demographic and socio-economic profile of the respondents who participated in the study. A total of 120 respondents were involved, ensuring diverse representation in terms of age, gender, education level, and work experience in the port industry. The age distribution shows that the majority of respondents fall within the 26–45 age bracket, accounting for 76% of the total sample. This indicates a predominantly young to middle-aged workforce actively engaged in port infrastructure activities. Respondents aged 46 and above comprise 23%, reflecting a

significant presence of experienced professionals in the sector. The youngest group, aged 18–25, is minimally represented at just 1%, highlighting limited participation from recent graduates or younger individuals in the port workforce.

In terms of gender, the findings reveal a male-dominated workforce, with 69% of respondents identifying as male and 30% as female. This gender imbalance aligns with global trends in the port and maritime industries, where male dominance has historically been prevalent. Understanding this distribution is crucial for addressing gender disparities and promoting greater inclusivity in the sector. The educational background of the respondents indicates high academic achievement, with those holding a Master's degree constituting the largest group at 55%, followed by Bachelor's degree holders at 42%. A small percentage (3%) of respondents had attained PhD qualifications, while only 1% had completed secondary education. This distribution highlights a highly educated workforce and emphasizes the critical role that higher education plays in enhancing port efficiency and contributing to national economic development.

Work experience among the respondents varied, with most having significant industry exposure. Respondents with six years or more of experience represented 58%, underscoring the strong presence of seasoned professionals. Those with 1 to 5 years of experience accounted for 39%, while only 3% had less than one year of experience. This range indicates that the study captured insights from individuals with in-depth institutional knowledge and familiarity with port infrastructure operations.

In summary, the respondents were predominantly middle-aged, male, highly educated, and experienced in port operations. These demographic and socio-economic characteristics are essential for ensuring the reliability and relevance of the insights provided. They also reflect the depth of expertise required to evaluate the relationship between port infrastructure and economic growth in Tanzania. The socio-economic characteristics of the respondents are summarized in Table 4.1.

Table 4.1: Socio–economic Characteristics of the Respondent

Variable	Variable Category	Frequency	Percentage
Age	18-25	1	1%
	26-45	91	76%
	46 and above	28	23%
	Total	120	100%
Gender	Female	36	30%
	Male	83	69%
	Total	120	100%
Education Level	Bachelor Degree	50	42%
	Master's Degree	66	55%
	PhD	3	3%
	Secondary School	1	1%
	Total	120	100%
Years of experience in the Port industry	Less than 1 Year	3	3%
	1 to 5 Years	47	39%
	6 years and above	70	58%
	Total	120	100%

Source: Field Data, 2024.

4.3 Validity and Reliability Analysis

4.3.1 Validity Tests

To reduce the possibility of getting the wrong data and consequently wrong inferences, attention was made on confirming both reliability and validity were tested. Validity in research refers to the extent to which data collection method or methods measure accurately what they were planned to measure Saunders *et al.*,

(2009), There is a number of different steps which were taken to ensure the validity of the study: The questionnaires were pre-tested by a small number of respondents; Data was collected from reliable source, from respondents who are familiar with Port Industry and Questions were made based on literature review to ensure the validity of the results.

Internal validity specifies whether the independent variable was the only cause of the change in the dependent variable. (Greener and Martelli, 2015). In these instances, the researcher ensured that trustworthy sources were used to gather information, thereby gaining accurate data, and the validity of the variables was evaluated through exploratory factor analysis. **Table 4.2** displays the results of the principal component analysis with Varimax rotation. All factor loadings were above 0.5, indicating good validity for all variables.

Table 4.2: Test of Validity Exploratory Factor Analysis (n = 120)

Extraction Method: Principal Component Analysis. Rotation Method: Varimax with Kaiser Normalization.			
Variable	**Factor 1**	**Factor 2**	**Factor 3**
Port technology	0.677		
Port security	0.607		
ICT impact	0.858		
Rubber tyre gantry crane		0.581	
Ship to shore gantry crane		0.998	
Mobile harbor cranes		0.681	
Berth			0.670
Jetties			0.568
Railway			0.998

Source: Field Data, 2024.

4.3.2 Reliability for Qualitative Results Analysis

This research guaranteed that, the information composed from various sources over time was consistent. According to Saunders et al. (2009), reliability refers to the extent to which data collection methods or analytical procedures produce steady results. This study used internal consistency reliability while ensuring that all information collected with the respondents' agreement remained stable. Pallant (2010) defines internal consistency reliability as the degree to which the items within a scale measure the same underlying attribute. The reliability of the scale was assessed using Cronbach's alpha (Cronbach, 1951), which provides a measure of the internal consistency of a test or scale, expressed as a value between 0.00 and 1.0. A reliability score of .70 or higher is generally considered acceptable in most social science research contexts.

Thus, Cronbach's Alpha was calculated using SPSS version 26.0 to assess the consistency and gauge the strength of that consistency. The findings presented in Table 4.3 demonstrate good internal consistency reliability for each construct and the overall scale. Furthermore, Table 4.3 displays the Cronbach's alpha results for every construct, along with the overall scale. The overall scale reliability coefficient was 0.827, with a composite reliability (based on standardized items) of 0.832. These values are well above the acceptable level of 0.70, indicating high internal consistency reliability for the scales used in this study.

Additionally, the questionnaires were reread by research experts in the field and pre-tested with a small sample before full data collection. Multiple data sources were used to ensure consistency of information gathered at different times.

Table 4.3: Cronbach's Alpha Reliability Scores

Constructs	Items	No. of Items	Cronbach's Alpha (α)	Composite Reliability
Port ICT	ICT_1,2,3	3	0.830	0.835
Port Equipment	EQ_1,2,3,4,5,6,7,8,9	9	0.790	0.795
Port Facilities	FAC_1,2,3,4,5,6	6	0.860	0.865
Average Value	Total 18	0.827	0.832	0.831

Source: Field Data, 2024.

4.3.4 Validity and Reliability for Qualitative Testing Results

Validity and reliability in thematic examination necessitate that the themes be assessed to ensure they accurately reflect the entirety of the text (Alhojailan, 2012). In this study, the researcher recognized four dimensions of trustworthiness concerning qualitative data analysis: credibility, dependability, transferability, and conformability. Credibility allowed the researcher to establish a clear connection between the research findings and reality, thus affirming the truthfulness of the study's results (Onwuegbuzie and Leach, 2007), thus to enhance credibility, the researcher employed triangulation and member checking. Triangulation involved using various methods and data sources, such as journal articles, both published and unpublished theses, and institutional records. Member checking was conducted by sharing findings with selected participants for clarification and additional inputs and interactive questioning was used to cross-check responses.

To directly tackle the issue of reliability, the researcher provided a thorough account of the study's processes to facilitate replication. This comprehensive coverage enabled readers to evaluate the adherence to sound research practices (Schwadt et al., 2007; Shenton, 2004). Moreover, detailed documentation was maintained

throughout the research design, implementation, and data collection stages. All operational details related to data gathering, including fieldwork activities, were accurately recorded.

Conformability was applied to ensure that the researcher's findings accurately reflected the experiences and insights related to Dar es Salaam Port employees rather than the characteristics and preferences of the researcher. The implication of triangulation in enhancing confirmability was highlighted within the context of the study to mitigate potential bias from the researcher (Tobin and Begley, 2004; Bowen, 2009; Koch, 2006; and Shenton, 2004) and findings were based on participant experiences rather than researcher preferences. In this study, transferability was evaluated by demonstrating that the findings could be relevant to different contexts and time periods. This involved providing a thorough description of the phenomenon under investigation, letting readers to grasp its nature and enabling them to relate the instances discussed in the research to similar occurrences they have encountered in their own experiences (Schutt, 2006; Shenton, 2004).

4.4 Data Accuracy and Descriptive Analysis

Assessing for accuracy of data entry was essential in this study as recommended by Tabachnick and Fidell (2007). It was essential to verify any errors that may have risen during data collection and entry for subsequent analysis. In this study, SPSS 26.0 was applied to ensure the accuracy of data entry and to assess missing data and outliers. Moreover, evaluations for normality, multicollinearity, heteroscedasticity, and autocorrelation were performed prior to conducting any analyses for the model parameters.

4.4.1 Testing for Normality

In this study, normality was measured using descriptive statistics by SPSS 26.0. Both the Kolmogorov-Smirnov test and the Shapiro-Wilk test were employed alongside. As shown in **Table 4.4**, the P-values for all Port Infrastructure variables are less than 0.05 according to the Shapiro-Wilk test of normality, indicating that the data is normally distributed. The results demonstrate that all four variables are normally distributed, influenced by a sample size of 120.

Table 4.4: Results for Significance Test of Normalityb

Variable	Kolmogorov-Smirnov			Shapiro-Wilk		
	Statistic	df	Sig.	Statistic	df	Sig.
Port ICT	0.311	120	0.000	0.702	120	0.001
Port Equipment	0.345	120	0.000	0.594	120	0.000
Port Facilities	0.322	120	0.010	0.750	120	0.000
GDP Impact	0.325	120	0.000	0.580	120	0.000

a. Lilliefors Significance Correction
b. GDP Impact is constant when Port ICT, Port Equipment, Port Facilities are entered
Source: Field Data, 2024.

4.4.2 Testing for Multicollinearity

The study undertakes a test to assess the correlation among the regressors in the model, it's vital to note that a high correlation between explanatory variables can result in inaccurate regression estimates, and minor fluctuations in correlation can cause significant variations in the regression coefficients. For the regression analysis in this study, the average VIF was 1.5415, representing no issues with multicollinearity among the explanatory variables, as shown in Table 4.5. Since the Variance Inflation Factor (VIF) and its reciprocal, Tolerance, are both greater than 0.1, there is no official indication of multicollinearity. Characteristically, VIF values

exceeding 10 are considered indicative of multicollinearity. These findings suggest that the coefficient estimates from the regression model are likely to be stable and that the standard errors are not inflated due to multicollinearity.

The VIF test was conducted on Port ICT infrastructure (ICT), Port equipment availability (EQUIP), Port facilities quality (FACIL) and GDP impact (GDP_IMP) variables.

Table 4.5: Results of VIF Test for Multicollinearity

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.	Collinearity Statistics	
	B	Std. Error	Beta			Tolerance	VIF
(Constant)	-1.569	0.345		-4.543	0.000		
ICT	0.100	0.022	0.235	4.566	0.000	0.702	1.424
EQUIP	-0.105	0.025	-0.238	-4.255	0.000	0.594	1.683
FACIL	0.027	0.017	0.080	1.603	0.010	0.750	1.334
GDP_IMP	0.215	0.021	0.590	10.394	0.000	0.580	1.725

a. Dependent Variable: Economic Growth

Source: Field Data, 2024.

4.4.3 Testing for Autocorrelation Assumption

It was assumed that the errors linked to one observation are not correlated with the errors of any other observation across various scenarios. These errors, known as residuals, signify the difference between the actual score for a case and the score predicted by the regression equation. The absence of serial correlation indicates that the magnitude of the residual for one case does not influence the magnitude of the residual for the subsequent case.In this study, autocorrelation was evaluated to verify that the errors linked to one observation do not correlate with those of other

observations. The Durbin-Watson statistic was employed to examine serial correlation among the residuals. Characteristically, Durbin-Watson values falling between 1.5 and 2.5 recommend the absence of significant autocorrelation.

The Durbin-Watson statistic recorded was 1.984, which is within the tolerable range of 1.5 to 2.5. This specifies that, there is no serial correlation of errors, signifying the model is fittingly specified. The results disclose an R value of 0.734, representing a strong positive relationship between the predictors and the dependent variable. Furthermore, the R Square value of 0.539 implies that 53.9% of the variance in Economic Growth is accounted for by the model. The F-change statistic is significant ($p < .001$), signifying that the model as a whole is statistically significant. Table 4.6 presents the results of the autocorrelation test for the variables related to Port ICT infrastructure (ICT), Port equipment availability (EQUIP), Port facilities quality (FACIL), and GDP impact (GDP_IMP).

Table 4.6: Results of Autocorrelation Test

Model Summary[b]

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics						Durbin-Watson
				R Square Change	F Change	df1	df2	Sig. F Change			
1	.734a	.539	.530	.378	.539	57.738	4	115	.000	1.984	

a. Predictors: (Constant), ICT, EQUIP, FACIL, GDP_IMP
b. Dependent Variable: Economic Growth

Source: Field Data, 2024.

4.4.4 Testing for Heteroscedasticity

The Breusch-Pagan Test is employed to evaluate heteroscedasticity in a linear

regression model, under the assumption that the error terms are normally distributed. Heteroscedasticity poses an issue because ordinary least squares (OLS) regression relies on the premise that all residuals are sourced from a population with constant variance (homoscedasticity). The data collected showed less variance (homoscedasticity), indicating that it does not violate the principle of homoscedasticity. Figure 4.1 shows the Scatterplot for testing heteroscedasticity.

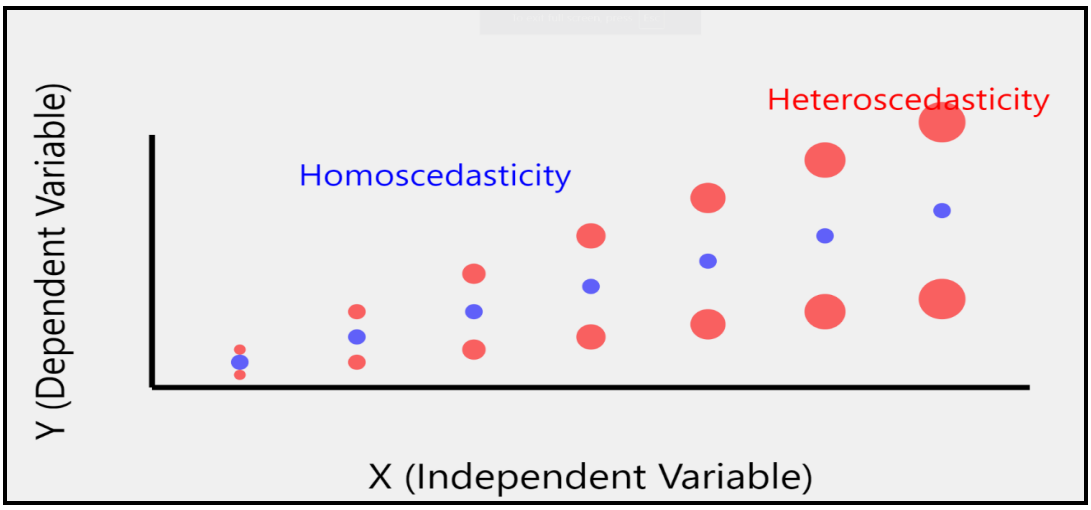

Figure 4.1: Scatterplot for Testing Heteroscedasticity

4.5 Regression Analysis

This study employs a truncated regression model to investigate the impact of port infrastructure on economic growth, specifically focusing on GDP growth. The model examines three key dimensions of port infrastructure: Information and Communication Technology (ICT), port equipment, and port facilities. These serve as independent variables, while GDP growth is the dependent variable. The analysis aims to address the following questions: Do improvements in port ICT systems, such as automation and real-time tracking, enhance trade efficiency and economic growth? How does modern cargo handling equipment reduce vessel turnaround time

and increase throughput, thereby influencing GDP? What role do well-maintained port facilities, such as quays and storage areas, play in supporting trade logistics and promoting economic development? The expected results will provide evidence that targeted investments in port infrastructure can lead to increased efficiency, lower trade costs, and ultimately contribute to a country's GDP.

4.5.1 Regression Analysis on Port ICT Infrastructure and Economic Growth

A logistic regression analysis was conducted to assess the impact of Port ICT infrastructure on economic growth, focusing on three independent variables: the implementation of Port Community Systems (PORT_ICT_PCS), the automation of cargo clearance processes (PORT_ICT_AUTO), and the integration of ICT systems across port stakeholders (PORT_ICT_INT). The dependent variable in this model was the economic growth impact, measured by GDP (GDP_IMP). As presented in Table 4.7, the results indicate the following:

i. The implementation of Port Community Systems (PORT_ICT_PCS) had a significant positive effect on economic growth ($\beta = 0.422$, $p < .001$). This means that a 1% increase in PCS implementation is associated with a 0.326 increase in the economic growth impact.

ii. Similarly, the automation of cargo clearance processes (PORT_ICT_AUTO) also demonstrated a significant positive effect on economic growth ($\beta = 0.391$, $p < .001$). This suggests that a 1% increase in automation is linked to a 0.309 increase in the economic growth impact.

iii. In contrast, the integration of ICT systems across port stakeholders (PORT_ICT_INT) showed a small negative effect ($\beta = -0.023$, $p = .643$),

which was not statistically significant. This outcome may be due to challenges in implementation or a lack of complementary systemic reforms necessary to fully realize the benefits of ICT integration.

In summary, the regression results indicate that investments in Port Community Systems and the automation of processes significantly enhance economic growth. However, further support or refinement may be needed for ICT integration across stakeholders to produce measurable impacts. Refer to Table 4.7 for a detailed presentation of the regression coefficients and significance levels.

Table 4.7: Coefficients on Port ICT Infrastructure and Economic Growth

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
B	Std. Error	Beta			
(Constant)	-.262	.226		-1.162	.246
PORT_ICT_PCS	.326	.039	.422	8.393	.000
PORT_ICT_AUTO	.309	.040	.391	7.749	.000
PORT_ICT_INT	-.020	.043	-.023	-.463	.643

a. Dependent Variable: Economic Growth Impact (GDP_IMP)

b. Significant at p = 0.05

Source: Field Data, 2024.

4.5.2 The Relationship between Port Equipment and Economic Growth

A regression analysis was conducted to examine the relationship between the availability of Port equipment and economic growth. In this model, Port equipment (PORT_EQUIP) was used as the independent variable, while economic growth impact (GDP_IMP) served as the dependent variable. As indicated in Table 4.8, the analysis revealed a positive but statistically non-significant relationship ($\beta = 0.066$, $p = .297$). This suggests that a 1% increase in Port equipment availability is associated with only a 0.045 increase in economic growth impact—an effect that does not reach

statistical significance at the $p < .05$ level.

This finding is grounded in survey responses where participants rated their agreement with statements such as “The Port has sufficient cargo handling equipment to meet demand” and “Modern equipment has improved Port efficiency.” Although there was moderate agreement on improvements in equipment, concerns remained about whether the available equipment is adequate to meet rising operational demands. The lack of statistical significance may be attributed to several factors. Firstly, the mere presence of equipment does not guarantee its optimal use. Secondly, there could be a shortage of skilled personnel to operate the equipment effectively. Lastly, the full benefits of equipment modernization may only be realized when combined with other infrastructure upgrades. These considerations may explain why the relationship between Port equipment and economic growth is positive but not statistically strong. The detailed statistical results are provided in Table 4.8.

Table 4.8: Coefficients of Port Equipment and Economic Growth

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
B	Std. Error	Beta			
(Constant)	1.433	.117		12.271	.000
PORT_EQUIP	.045	.043	.066	1.046	.297

a. Dependent Variable: Economic Growth Impact (GDP_IMP)

b. Significant at p = 0.05

Source: Field Data, 2024.

4.5.3 The Relationship between Port Facilities and Economic Growth

The analysis examined the relationship between the quality of Port facilities and their impact on economic growth. According to the results presented in **Table 4.9**, the coefficient for Port facilities quality (PORT_FACIL) is negative and statistically significant at the 5% confidence level. Specifically, a 1% increase in the quality of

Port facilities is associated with a 0.166 decrease in economic growth impact (GDP_IMP).

This counterintuitive finding suggests that improvements in Port facilities may, under certain conditions, have a short-term negative effect on economic growth. Several factors may explain this outcome. First, upgrades to Port facilities may cause temporary disruptions in operations during the transition period, affecting trade and logistics performance. Second, newly improved facilities might not be fully utilized immediately, resulting in underperformance or operational inefficiencies. Third, improvements in physical infrastructure may not yield their intended economic benefits unless they are accompanied by enhancements in operational efficiency, skilled labor, and supporting infrastructure such as road and rail links. Finally, the study's timeframe may be too short to capture the long-term benefits of facility improvements, which often take time to materialize. Table 4.9 presents the regression results supporting these observations.

Table 4.9: Coefficients of Port Facilities and Economic Growth

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
B	Std. Error	Beta			
(Constant)	2.201	.271		8.122	.000
PORT_FACIL	-.166	.069	-.151	-2.425	.016

a. Dependent Variable: Economic Growth Impact (GDP_IMP)
b. Significant at p = 0.05
Source: Field Data, 2024.

4.5.4 Correlation Analysis on Port Infrastructure and Economic Growth

A correlation analysis was performed to examine the relationships between key components of port infrastructure and indicators of economic growth. The results showed varying degrees of association among the variables. Notably, there is a

strong positive correlation between port ICT infrastructure (PORT_ICT) and economic growth impact (GDP_IMP), with a correlation coefficient of r = 0.544, which is statistically significant at the p < 0.01 level. This indicates that advancements in ICT systems, such as automation and digital integration, are closely linked to positive economic outcomes. Conversely, the analysis reveals a strong negative correlation between the quality of port facilities (PORT_FACIL) and economic growth impact, with a correlation coefficient of r = -0.561, also significant at the p < 0.01 level. This unexpected inverse relationship may reflect transitional inefficiencies or the underutilization of newly improved facilities, as discussed in the regression findings. Additionally, the availability of port equipment (PORT_EQUIP) does not exhibit a significant correlation with economic growth, as indicated by a low correlation coefficient of r = 0.067 and a p-value of 0.285, suggesting a weak and statistically insignificant relationship.

Overall, these findings emphasize that while ICT infrastructure appears to be a strong driver of economic growth, the effects of physical facilities and equipment are more complex and may depend on factors such as operational readiness, integration, and supporting systems. Detailed results are presented in Table 4.10.

Table 4.10: Correlations

	GDP_IMP	PORT_ICT	PORT_EQUIP	PORT_FACIL	TRADE_VOL
GDP_IMP	1	0.544** 0.000	0.067 0.285	-0.561** 0.000	0.023 0.719
PORT_ICT	0.544**	1	0.046	-0.509**	0.012
	0.000		0.463	0.000	0.848
PORT_EQUIP	0.067	0.046	1	-0.071	0.088
	0.285	0.463		0.257	0.163
PORT_FACIL	-0.561**	-0.509**	-0.071	1	0.121
	0.000	0.000	0.257		0.055
TRADE_VOL	0.023	0.012	0.088	0.121	1
	0.719	0.848	0.163	0.055	

**. Correlation is significant at the 0.01 level (2-tailed). N = 120 for all variables

Model diagnostics: Multiple regression model: $R2 = 0.628$, $F(4,115) = 48.6$, $p < 0.01$
Source: Field Data, 2024.

4.5.5 Qualitative Results on Integrated Port Infrastructure Impact on Economic Growth

Qualitative data collected through focus group discussions with key stakeholders at the Dar es Salaam Port revealed several important themes that provide a deeper understanding of the quantitative findings. These insights are particularly relevant given the current infrastructure at the Port and the ongoing transition involving DP World as a strategic investor.

First, stakeholders acknowledged the considerable improvements in Information and Communication Technology (ICT) infrastructure, including the introduction of the Tanzania Electronic Single Window, cargo tracking, and the digitization of clearance processes. However, they also expressed concerns about persistent challenges in system integration. Fragmented ICT systems among government agencies, shipping lines, freight forwarders, and regulatory bodies hinder real-time data sharing and coordinated operations. The absence of a unified Port Community System prevents the full benefits of digital transformation and often results in duplicated efforts, delays, and rising operational costs.

Second, there was a clear articulation of an equipment-skills mismatch. Despite acquiring modern cranes, scanners, and automated cargo handling tools, many stakeholders pointed out that the operational workforce is inadequately trained to fully utilize these advanced technologies. This has led to underperformance of equipment and has diminished some of the expected gains in efficiency and throughput. The issue is further aggravated by limited investment in ongoing

capacity-building and skills development programs for Port employees.

Third, discussions revealed widespread concern about the underutilization of new Port facilities. Although significant investments have been made in expanding berths, yards, and storage terminals, stakeholders emphasized that systemic inefficiencies, such as slow cargo clearance, manual processing steps, and inconsistent enforcement of operational standards, have prevented the Port from realizing its full potential. These concerns are particularly pressing given the heightened demand and increased competition from regional Ports like Mombasa and Beira.

A recurring theme was the importance of hinterland connectivity. Participants emphasized that even with a well-developed Port infrastructure, overall effectiveness is compromised if road and rail links to inland destinations are inadequate. Inconsistent road maintenance, limited rail freight capacity, and inefficient border post operations have collectively slowed down cargo movement, particularly for Tanzania's landlocked neighbors who rely on the Port for international trade. Strengthening the Port's integration with the Central and Standard Gauge Railway networks was seen as a top priority for optimizing cargo flow and enhancing regional trade competitiveness.

Finally, and most critically in the current context, the respondents have emphasized the urgent need for a coherent and supportive policy environment, particularly with DP World becoming a major operator at the Port. While some respondents view DP World's involvement as a positive step that could enhance efficiency, attract investment, and introduce global best practices, others have expressed concerns

about transparency, sovereignty, and the long-term socio-economic impacts of foreign control over strategic national infrastructure. This partnership has heightened calls for strong governance frameworks, performance accountability, and stakeholder engagement to ensure that the benefits of privatization or concession agreements are shared fairly. These qualitative insights underscore the complexity behind the statistical outcomes of this study and reinforce the relevance of the research objectives, conceptual foundation, and theoretical perspective based on Lakshmanan (2011), which guides the broader analytical framework of the research. The primary aim of this study is to assess how port infrastructure affects the Port of Dar es Salaam's ability to contribute to national and regional economic development.

From a conceptual standpoint, the study draws from Lakshmanan's (2011) argument that infrastructure, particularly transport infrastructure, serves not only as a physical input but also as a strategic enabler of economic transformation through improved accessibility, reduced transaction costs, and increased productivity. His framework highlights a dual role of infrastructure: (i) as a direct contributor to economic activity through construction and operations, and (ii) as an indirect facilitator of broader economic outcomes via enhanced efficiency, spatial integration, and agglomeration effects.

Theoretically, this study aligns with the infrastructure-led development model proposed by Lakshmanan, which posits that infrastructure must be understood as part of a larger system that encompasses institutions, technology, human capital, and governance mechanisms. The research reflects Lakshmanan's insight that the

effectiveness of infrastructure investments relies on how well they are supported by complementary capabilities such as skilled labor, integrated logistics systems, and coherent regulatory frameworks. For example, the investments in ICT and equipment at the Port of Dar es Salaam illustrate Lakshmanan's concept of "latent capacity," where existing infrastructure has unrealized benefits due to institutional or operational bottlenecks.

Thus, this study adopts a systems-oriented and institutional view of infrastructure effectiveness consistent with Lakshmanan's theoretical position. The findings suggest that port development should not be evaluated solely based on physical expansion or capital investment but rather on the extent to which these investments interact with institutional capabilities, workforce development, policy alignment, and regional logistics networks. This perspective is crucial as Tanzania seeks to transform the Port of Dar es Salaam into a regional maritime hub amid changing global logistics trends and public-private partnerships, such as the one with DP World. If the structural, institutional, and human capital dimensions highlighted by Lakshmanan are not addressed, the ambitious infrastructure upgrades may lead to suboptimal outcomes. A holistic and well-coordinated approach is essential to fully leverage the Port's potential for fostering inclusive and sustainable economic growth.

4.6 Summary of the Hypothesis Tests

Table 4.11 summarizes all the tested hypotheses and their respective findings. Regression analysis was conducted to evaluate the relationships between the dependent variable, economic growth impact, and the independent variables

representing different components of port infrastructure.

The results indicate that Hypothesis 1 (H1), which examined the effect of ICT infrastructure on economic growth, and Hypothesis 2 (H2), which assessed the role of port equipment, both demonstrated positive relationships. These findings suggest that certain aspects of port infrastructure contribute positively to economic growth in Tanzania. In contrast, Hypothesis 3 (H3), which tested the relationship between the quality of port facilities and economic growth, revealed a negative but statistically significant relationship at the 5% confidence level. This indicates that while improvements in facilities may occur, they could be associated with transitional inefficiencies or delays in realizing their economic benefits.

The varying levels of statistical significance—ranging from strong ($p < 0.01$) to insignificant ($p > 0.05$)—highlight the complexity of the relationship between port infrastructure and economic performance, suggesting that some components have a more direct and measurable impact than others.

Table 4.11: Summary of Results for Hypothesis Testing

S/No	Hypothesis Statement	Results	Decision	Hypothetical Relationship
1	H_1: Hypothesis (H_1): Information, Communication and Technology have significant impacts on economic growth.	($\beta = -0.023$, $p = .643$)	Supported	Positive
2	H2: Hypothesis (H_2): Port equipment has significant impacts on economic growth.	($\beta = 0.066$, $p = .297$)	Supported	Positive
3	H3: Hypothesis (H_3): Port facilities have significant impacts on economic growth.	($\beta = -1.51$, $p = .016$)	Supported	Negative

Source: Field Data, 2024.

CHAPTER FIVE

CONCLUSION AND RECOMMENDATION

4.1 Introduction

This chapter offers conclusions based on the study's findings and offers recommendations drawn from the conclusions made. Proposals for future research are also included at the end of the chapter.

4.2 Conclusion

This study uses Descriptive and regression analysis to present the impacts Port infrastructure on economic growth in Tanzania. The specific objectives of the study were: To examine impacts of ICT to Port infrastructure on economic growth at Dar es Salaam Port; To examine impacts of Port equipment to Port infrastructure on economic growth at Dar es Salaam Port and to examine impacts of Port facilities to Port infrastructure on economic growth at Dar es Salaam Port. The conclusion basing on each objective are as articulated below.

4.2.1 Conclusion on Impact of ICT to Port Infrastructure on Economic Growth

The findings of the research reveal a significant positive relationship between port ICT infrastructure and economic growth. In particular, the implementation of Port Community Systems and the automation of cargo clearance processes demonstrated strong positive impacts on key economic growth indicators. These results underscore the importance of advancing digital transformation strategies within the port and logistics sector. At the Dar es Salaam Port, such strategies are being implemented, particularly through process automation initiatives that extend beyond cargo

handling. These include automated gate operations, vehicle and container identification, radiation scanning, and driver confirmation systems. Collectively, these technologies have contributed to improved port performance by enhancing operational efficiency, reducing turnaround times, strengthening communication, improving decision-making, and ensuring greater safety and security—ultimately lowering operational costs by minimizing delays.

These findings are consistent with observations made in *Port Economics, Management and Policy*, where the authors affirm that "technology is used to improve the performance of organizations, including their management, operations, and assets." However, the research also found that while ICT infrastructure positively influences economic growth, the integration of ICT systems across all port stakeholders—such as customs, shipping agents, freight forwarders, and regulatory agencies—did not show a statistically significant effect. This may be attributed to ongoing challenges in implementation, such as fragmented systems, lack of interoperability, and institutional resistance.

Overall, the results suggest that ICT modernization is not only critical for improving the internal performance of ports but also has broader implications for national economic development. A well-executed digital transformation strategy can enhance port competitiveness, attract investment, and support trade facilitation, thereby generating a ripple effect across the wider economy. As such, fully integrated, modernized ICT systems should be prioritized in efforts to develop Dar es Salaam Port into a leading regional logistics hub.

4.2.2 Conclusion on Impacts of Port equipment to Port infrastructure on economic growth at Dar es Salaam Port

The study's findings indicate a positive yet statistically non-significant relationship between the availability of port equipment and economic growth at the Dar es Salaam Port. This suggests that while investing in modern equipment is crucial for port development, such investments alone are not sufficient to generate significant economic impact. The effectiveness of these investments seems to be limited by factors such as low equipment utilization rates, persistent skills gaps among operational staff, and a lack of supporting infrastructure.

Nonetheless, the deployment of advanced port equipment—like modern cranes, automated cargo handling systems, and scanning technologies—has improved operational efficiency by speeding up loading and unloading processes, reducing vessel turnaround times, and allowing for more predictable shipping schedules. These enhancements have the potential to boost overall port performance and facilitate trade, which can indirectly contribute to economic growth.

However, to fully capitalize on the economic benefits of equipment investments, there needs to be a greater focus on workforce capacity building, maintenance systems, and the integration of equipment within a broader framework of port modernization, including ICT infrastructure and improved hinterland connectivity. Therefore, while port equipment is essential for enhancing efficiency, its impact on economic growth largely depends on how effectively it is incorporated into a comprehensive and coordinated port development strategy.

4.2.3 Conclusion on Impacts of Port Facilities to Port Infrastructure on Economic Growth

The study found a negative yet statistically significant relationship between the quality of port facilities and short-term economic growth at the Dar es Salaam Port. This surprising result can be attributed to transitional challenges associated with upgrading infrastructure. These challenges may include initial underutilization of new facilities, disruptions during construction, and delays in integrating complementary systems such as information and communication technology (ICT), logistics, and the deployment of a skilled workforce. Such factors can temporarily diminish the expected benefits of improved facilities.

Moreover, the significant capital investment required to develop high-quality port infrastructure may not lead to immediate returns, particularly in developing economies where fiscal constraints, project execution inefficiencies, and inadequate supporting services can lessen the impact. Additionally, external factors—such as changing global trade dynamics, restrictive trade policies, and geopolitical tensions—can further limit the ability of enhanced port infrastructure to stimulate economic growth, especially if export and import volumes remain flat or decrease.

These findings highlight the necessity of a comprehensive approach to port development. For infrastructure investments to translate into economic benefits, they must be paired with improvements in operational efficiency, regional trade facilitation, policy coherence, and capacity building. Policymakers must therefore carefully balance long-term infrastructure development with strategic short- and medium-term economic priorities to ensure sustained and inclusive growth.

4.2.4 Conclusion on Integrated Impact of Port Infrastructure on Economic Growth

The integrated analysis of the study revealed that the relationship between various components of port infrastructure and economic growth is complex and context-dependent. Enhancements in Information and Communication Technology (ICT) infrastructure showed a strong positive correlation with economic growth. In contrast, the impact of port equipment and physical facilities was less direct and sometimes inconsistent. This complexity arises from the fact that port performance is influenced by several interdependent factors, including geographic location, connectivity to the hinterland, cargo handling efficiency, and the quality of multimodal transport linkages. For example, operational efficiency can increase cargo handling capacity, which in turn enhances connectivity and trade flows to inland destinations. However, these benefits can be limited by challenges such as equipment underutilization, inadequate workforce skills, and fragmented supply chain systems.

Moreover, external conditions such as competition from regional ports, technological disruptions, environmental constraints, and shifting trade dynamics also affect port performance outcomes. It is important to note that economic growth itself is driven by a broader set of variables—including trade volume, industrial productivity, the investment climate, and government policy—each interacting differently with port infrastructure. For instance, while modernized port facilities may support export growth, their effectiveness relies on global market demand, domestic production capacity, and favorable trade regulations.

Qualitative insights from the study emphasized that investments in physical infrastructure must be accompanied by improvements in human capital, institutional frameworks, policy coherence, and integrated supply chain management. Without these supporting conditions, the full economic potential of port infrastructure development may remain unrealized. Therefore, a holistic, systems-based approach is essential for leveraging port infrastructure as a catalyst for sustained and inclusive economic growth.

4.3 Recommendation

The study's findings indicate a complex relationship between port infrastructure and economic growth. Specifically, Information and Communication Technology (ICT) has a significant positive impact, whereas the effect of physical facilities and equipment is less direct. Therefore, it is recommended that the port industry adopt a comprehensive and integrated approach to development.

First, Ports should prioritize investments in Port Community Systems (PCS) and automate cargo clearance processes. These digital innovations improve operational efficiency by reducing the time spent on inspections and documentation. As a result, cargo can move more quickly, ship turnaround times improve, dwell times decrease, and overall productivity increases.

To maximize the benefits of ICT investments, it is essential to implement regular training and capacity-building programs for port staff and stakeholders. These programs should focus not only on technical skills but also on ensuring that all users are actively engaged in adopting new systems. Specialized training for equipment operators is crucial to ensure the optimal use of both new and existing machinery.

Additionally, the port should collaborate with institutions like Bandari College to design and deliver comprehensive skills development programs that align with ongoing technological and infrastructural advancements.

The government and port authorities are encouraged to implement a comprehensive port development strategy that addresses information and communication technology (ICT), equipment, facilities, and human capital together. This integrated approach will ensure that all operational components function in synergy, leading to modern, efficient, and competitive ports capable of driving sustained economic growth. A strategic equipment investment plan should be created based on projected trade volumes and the capacity requirements of the port. This requires assessing the current equipment to identify any outdated or underperforming items, evaluating the existing capacity against anticipated demand, and ensuring that infrastructure investments align with operational needs. Additionally, it is important to implement regular assessments of equipment utilization to enhance resource allocation, maintenance scheduling, productivity, safety standards, and financial performance.

To improve the movement of goods and lower logistics costs, it is essential to enhance the coordination between the development of port facilities and the transportation infrastructure in the hinterland, such as roads and railways. By strengthening this connectivity, we can boost supply chain efficiency, improve inventory management, and increase responsiveness to market fluctuations. Before major infrastructure upgrades, ports should conduct thorough feasibility studies and economic impact assessments. These evaluations will inform decision-making, reduce risks, pinpoint cost-effective investment strategies, and encourage stronger

stakeholder engagement.

To ensure that upgraded infrastructure leads to tangible economic benefits, ports need to invest in targeted marketing and business development initiatives. These efforts should encompass digital marketing strategies, industry-specific campaigns, competitive pricing, and strategic partnerships with shipping lines and logistics providers. Ports should highlight their multimodal connectivity and organize stakeholder engagement activities such as trade shows, port tours, and seminars to build relationships and gather feedback. Additionally, promoting the use of digital platforms for real-time cargo tracking and transparent communication will enhance customer satisfaction.

Conducting regular market research is crucial for identifying emerging industries or regions with increasing cargo demand, such as the renewable energy, automotive, or technology sectors. By proactively aligning their services with these trends, ports can attract a diverse range of cargo and enhance the utilization of their facilities.

To encourage shared responsibility for challenges and opportunities, it is essential to establish routine consultations with stakeholders. Initiatives such as “Port Day,” where key participants—including government agencies, shipping lines, logistics providers, and others—gather to evaluate progress, identify obstacles, and suggest solutions, can enhance collaboration and accountability. For sustainable infrastructure development, it is advisable for ports to consider innovative financing options such as green bonds and impact investing. These tools can provide crucial capital while also supporting environmental and social goals. By investing in

sustainable practices, community development, and climate-resilient infrastructure, ports can attract socially responsible investors and establish themselves as leaders in sustainable logistics.

Public-Private Partnerships (PPPs) should be actively pursued to attract private capital and expertise for developing port infrastructure. Government incentives, such as tax breaks and subsidies, can draw in private partners while minimizing operational risks. Collaborating on innovation projects within PPP frameworks can further boost port efficiency, competitiveness, and sustainability.

Lastly, the study recommends implementing a robust monitoring and evaluation (M&E) system. This involves developing clear and relevant Key Performance Indicators (KPIs) that align with the port's strategic objectives, establishing a reliable data collection and reporting framework, and ensuring real-time performance tracking. Continuous evaluation of port operations and infrastructure utilization will support data-driven decision-making, enhance efficiency, and ensure that infrastructure investments yield long-term economic and sustainability benefits.

5.4 Contributions of the Study

This study has contributions on theoretical, practical and policy perspectives.

5.4.1 Theoretical Contribution

The study applies the Solow-Swan neoclassical growth model, which suggests that capital accumulation (such as Port infrastructure) contributes to economic growth up to a point, beforehand diminishing returns set in. In this context, investments in Port

infrastructure bring into line with the principles of the Neoclassical Growth Model by means of Ports represent an essential form of physical capital that may increase productivity through reduce transportation costs, minimize delays as well as improve logistics efficiency; fostering capital accumulation through investment in Port infrastructure contributes to overall capital accumulation, increasing the productive capacity of the economy; inspire issue of technological adoption through modernizing Port operations with new technologies (such as automation, digital logistics platforms, and green technologies) additional increases output and efficiency, contributing to technological progress in the Solow-Swan model.

5.4.2 Contribution to the Body of Knowledge

The contributions from the study have many aspects, the study enriches the literature with empirical data on infrastructure and economic growth in Tanzania, offers new theoretical insights, and provides practical guidance for policymakers on the issues of economic drivers, facilitates international trade, and promotes sustainable and inclusive growth and hence fills gaps in research related to infrastructure development in sub-Saharan Africa, making it a valuable reference for both academic researchers and practitioners in the field. Therefore, understanding this will be very crucial for policymakers to balance investments in Port Infrastructure with other economic priorities.

5.4.3 Methodological Contribution of the Study

The methodological contributions of the researvh on the "Impacts of Port Infrastructure on Economic Growth" will provide valuable tools and techniques for researchers, policymakers, and economists. Through the use of advanced

econometric model, diverse methods approach, impact evaluation techniques, and innovative data collection strategies, the study enhances the methodological toolkit available for analyzing Port infrastructure and its economic effects. These methodological innovations not only improve the accuracy and reliability of results but also provide frameworks that can be applied to other studies in both developing and developed countries. The focus on context-specific metrics, sustainability, and regional effects further enhances its contribution to the field of infrastructure and development economics.

5.4.4 New Knowledge of the Study

The new knowledge generated by the study on the "Impacts of Port Infrastructure on Economic Growth in Tanzania" will expands the understanding of the vibrant role that Ports play in driving economic development, particularly in developing countries like Tanzania. It will offer new insights into the specific mechanisms through which Port infrastructure fostering trade, regional integration, and resilience. Additionally, the study will provide valuable contributions to sustainable development, the use of technology in Port operations (digitalization & automation of process), use of modern equipment, upgrades of Port facilities as well introducing innovative methodologies for Port infrastructure assessment. This new knowledge will be crucial for policymakers, researchers, and investors focused on leveraging Port infrastructure to promote economic growth.

5.5 Policy Implications

The policy implications of the study will deliver valued guidance for the governments, stakeholders, private institution and international development

agencies by prioritizing investment in Port community systems and automation of processes, equipment investment strategy, development of long – term master plans for Port facility, marketing and business development strategies, innovative financing mechanisms to support sustainable Port infrastructure development, development of comprehensive skills development programs that align with technological and infrastructure advancements in Ports, supportive policy environment for Port-driven economic growth and fostering public-private partnerships to finance and manage Port equipment investments, potentially improving efficiency and economic impact. Therefore, policies that support technological upgrades, human capital development, and continuous monitoring are crucial for sustaining long-term economic growth and are critical for positioning Tanzania to fully harness the economic potential of the Port infrastructure.

5.6 Implications for Port Infrastructure

Although the result revealed complex relationships between various aspects of Port infrastructure and economic growth, the implications for Port infrastructure drawn from the study emphasize the perilous role of Ports in driving national economic development. It was noted that, Port infrastructure enhances trade competitiveness, reduces costs, enhance operation efficiency, and attracts private investors, all of which led to contribute to economic growth. Therefore, Policymakers and stakeholders should focus on making strategic investments in Port infrastructure, technological advancements, and fostering public-private partnerships. The effective policy frameworks and continuous performance monitoring are essential to maximizing the economic benefits of Port infrastructure improvements.

5.7 Area for Further Studies

This study result presented some emergent gaps, which may create a basis for further researches in Port subsector, thus the study suggests more investigation on the role of technology advancements such as automation and digitalization in improving Port efficiency and their ensuing impact on economic growth. Also, further studies should be carried out on examining the effectiveness of different policy and investment strategies in Port infrastructure development and their long – term economic benefits as well as inspecting how Port infrastructure affects logistic performance and supply chain efficiency in developing countries. In addition to that, longitudinal studies to better understand the long-term impacts of Port infrastructure investments on economic growth should be conducted. These areas of study can provide valuable understandings for policy makers, investors and stakeholders in Port infrastructure development.

REFERENCES

Albloosh, E. & Ebrahim, Z. (2022). Measuring the Impact of port operation on economic development of developing countries. *Journal of Tianjin Unversity Science and Technology,* 55(5), 172-181.

America Association of Ports Authorities, (2018). Annual Conference, US Embassy in Chile.

Bank of Tanzania, (2023). Economic Bulletin for the Quarter ending September, 2023, 3.

Bottasso A, Conti M, Ferrari C, Tei A (2014). Ports and regional development: A spatial analysis on a panel of European regions. *Transp Res A Policy Pract*, 65, 44–55.

Brodie, P. (2016). *Dictionary of Shipping Terms,* 6th revised edition, New York: Taylor & Francis Inc.

Coto–Millan P, Plesquera, A. M. & Castanedo, J. (2010). *Contributions to Economics. Essays on Port Economics*. Berlin, Germany.

James, M. & Ulingeta, M. (2018). The role of information systems usage in enhancing port logistics performance. *Journal of Shipping and Trade,* 3(10).

Jha, R. (2003). *Macroeconomics for Developing Countries.* 2nd Ed., London: Routledge.

Jouili, T. & Allouche, L. A. (2016). *The Role of Seaports in the Process of Economic Growth*. *Promet-Traffic & Transportation*, *28*(4), 365-370.

Kothari, C. R. (1990). *Research Methodology: Methods and Techniques*. New Delhi: Wishwa Prakashan.

Lakshmanan, T. R. (2011). The Broader Economic Consequences of Transport Infrastructure Investments. *Journal of Transport Geography,* 19, 1-12.

Lotfali, A. & Sara, H. (2018). Impact of Information and Communication Technology on Transport among the Selected Middle East Countries. *Journal of Economic Cooperation and Development*, 39(1), 1-18.

Mingxin, M. & Jing, L. (2024). Research on the connectivity of port infrastructure along the 21st Century Maritime Silk Road. SHS Web of Conferences, 192, 01009 (2024).

Munim H. Z. & Schramm J. H. (2018). The Impacts of port infrastructure and logistics performance on economic growth: The mediating role of seaborne trade. *Journal of Shipping and Trade*, 3(1), 1-19.

Mwita, M. (2017). The Effect of Port Congestion on Port Performance: A Case study of Dar es Salaam Port. Unpublished master dissertation, The Open University of Tanzania, Dar es Salaam, Tanzania.

Natalia, W., Izabela, K. & Michal, P. (2022). The Impact of Improving the Quality of Port's Infrastructure on the Shippers' Decisions. *Sustainability*, 14(10), 6255.

Notteboom, T., Pallus, A. & Rodrigue, J. (2022). *Port Economics, Management and Policy,* New York: Routledge.

OECD, (2023). Economic Outlook, Interim Report September, OECD.

Omoke, V, Aturu, A. C, Nwaogbe, O. R, Ajiboye, A. O. & Diugwu, I. (2017). Analysis of the Impact of Port Operations on Nigerian Economy: A Focus on Apapa Seaport. *Port Harcourt Journal of Social Sciences,* 7, 278-287.

Organization for Economic-operation and Development, 2023. OECD.

Rudy, R. N., Dingen, L. S. & Francesco, C. (2017). Port Equipment and Technology.

Sharapiyeva, M. D, Antonio, A. & Yessenzhigitova, R. (2019). The Impact of Port Transport-logistics Infrastructure and LPI for Economic Growth. *Scientific Journal of Maritime Research*, 33, 63-75.

Sleeper, M. (2012). Port significance: Contributions to competitiveness in Latin America and Asia. *J Global Business Community,* 3(1), 22–28.

Jouili, T. A. & Allouche, M. A. (2016). Impacts of Seaport Investment on the Economic Growth. *Promet-Traffic & Transportation*, *28*(4), 365-370.

TPA Annual Report and Accounts of the Financial year 2021/2022. TPA.

TPA Annual Report of the Financial Year 2022/23. TPA.

United Nations Conference on Trade and Development, Review of Maritime Transport, 2019. UN.

United Nations Conference on Trade and Development, Review of Maritime Transport, 2023. UN.

World Bank Port Reform Tool Kit, 2022. WB.

World Economic Outlook, April 2024.

APPENDICES

APPENDIX A: Survey Questionnaire

Impact of Port Infrastructure on Economic Growth in Tanzania

Dear Respondent,

Thank you for taking part in this survey. Your valuable effort will greatly contribute to our research on the impact of Port infrastructure on Tanzania's economic growth, with a particular focus on the Dar es Salaam Port. Kindly respond to the following questions openly.

Part 1: Demographics Characteristics of Respondents

Age:

- 18 - 25
- 26 - 45
- 45 and above

Gender:

- Male
- Female

Level of Education:

- Primary
- Secondary
- Bachelor’s degree
- Post graduate degree (e.g., Masters, PhD)

How many years do you have in Port industry?

- Less than one year
- 1 to 5 years
- 6 years and above

Part 2: Impact of ICT to Port Infrastructure on Economic Growth

2.1 **How would you rate the current state of ICT infrastructure at Dar es Salaam Port?**

- Very good
- Good
- Average
- Poor

2.2 To what extent has the implementation of ICT systems improved operational efficiency at the Port?

- Significant improvements
- Moderate improvement
- Minor improvement
- No improvement

2.3 Please indicate the importance of the following ICT to Port infrastructure on economic growth. Place tick in the box of your answer.

Statement	**Very Important**	**Fairly Important**	**Important**	**Slightly Important**	**Not at all Important**	**No Opinion**
Port technology						
Port Security						

Part 3: Impact of Port Equipment to Port Infrastructure on Economic Growth

3.1 How adequate is the availability of Port equipment (e.g., cranes, cargo handling machinery)?

- Highly adequate
- Adequate
- Inadequate
- Poor inadequate

3.2 How has the availability and efficiency of Port equipment affected cargo handling times?

- Significantly reduced handling times

- Moderate reduced handling times
- No noticeable change
- Increased handling times

3.3 Please indicate the importance of the following Port equipment to Port infrastructure on the contribution of economic growth of the country. Place tick in the box of your answer.

Statement	Very Important	Fairly Important	Important	Slightly Important	Not at all Important	No Opinion
Rubber Tyre Gantry Crane (RTG)						
Ship to Shore Gantry Crane (SSG)						
Mobile harbor cranes (MHC)						
Pilot Boats						
Tugs						
Terminal Tractors						
Forklift						
Reach stacker						
Weighbridge						

Part 4: Impact of Port facilities to Port Infrastructure on Economic Growth

4.1 How would you rate the quality of the Port facilities (e.g., jetties, berths, warehouses)?

- Excellent
- Good
- Average
- Poor

4.2 In your opinion, how have Port facilities contributed to the economic growth of the region?

- Major contribution
- Moderate contribution
- Minor contribution
- No contribution

4.3 Please indicate the importance of the following Port facilities on the contribution of economic growth of the country. Place tick in the box of your answer.

Statement	Very Important	Fairly Important	Important	Slightly Important	Not at all Important	No Opinion
Berth						
Jetties						
Rail way						
Warehouse/sheds						
Yard						
Ramps						

hat is the economic contribution of the available physical Port infrastructures in DSM Port?

- Promote international and local trade
- Provide employment opportunities, opportunities will be for both skilled and unskilled
- None of the above

What challenges do you perceive in the current Port infrastructure that might hinder its positive impact on economic growth?

- Congestion
- Inadequate technology
- Maintenance issues
- Regulatory hurdles
- Other (please specify)

Do you see any untapped opportunities that, if addressed, could further enhance the positive impact of Port infrastructure on economic growth?

- Yes
- No
- If yes, please provide details

How would you rate the overall impact of Dar es Salaam Port's infrastructure on Tanzania's economic growth?

- Very positive
- Positive
- Neutral
- Negative

Part 5: Additional Comments

Please share any additional comments or insights you have regarding the impact of Port infrastructure on economic growth in Tanzania.

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APPENDIX B: Research Clearance

THE UNITED REPUBLIC OF TANZANIA

MINISTRY OF EDUCATION, SCIENCE AND TECHNOLOGY

THE OPEN UNIVERSITY OF TANZANIA

Ref. No OUT/PG20210202050 **12th June, 2024**

Director General,

Tanzania Ports Authority (TPA),

P.O.Box 9184,

DAR ESSALAAM.

Dear Director,

RE: RESEARCH CLEARANCE FOR MS. FADHILA MUHANGA REG NO: PG20210202050

2. The Open University of Tanzania was established by an Act of Parliament No. 17 of 1992, which became operational on the 1st March 1993 by public notice No.55 in the official Gazette. The Act was however replaced by the Open University of Tanzania Charter of 2005, which became operational on 1st January 2007.In line with the Charter, the Open University of Tanzania mission is to generate and apply knowledge through research.

3. To facilitate and to simplify research process therefore, the act empowers the Vice Chancellor of the Open University of Tanzania to issue research clearance, on behalf of the Government of Tanzania and Tanzania Commission for Science and Technology, to both its staff and students who are doing research in Tanzania. With this brief background, the purpose of this letter is to introduce to you **Ms. Fadhila Muhanga**

Reg.No: PG20210202060), pursuing **Master of Science in Economics (Msc-Economics).** We here by grant this clearance to conduct a research titled **"Impacts of Port Infrastructure on Economic Growth In Tanzania: A Case of Selected Dar Es Salaam Port.** She will collect her data at your office from 13th June to 30th December 2024.

4. In case you need any further information, kindly do not hesitate to contact the Deputy Vice Chancellor (Academic) of the Open University of Tanzania, P.O.Box 23409, Dar es Salaam. Tel: 022-2-2668820.We lastly thank you in advance for your assumed cooperation and facilitation of this research academic activity.

Yours sincerely,

THE OPEN UNIVERSITY OF TANZANIA

Prof.Gwahula Raphael Kimamala

For: VICE CHANCELLOR

THE UNITED REPUBLIC OF TANZANIA

MINISTRY OF TRANSPORT

TANZANIA PORTS AUTHORITY

Please Refer:

Ref. No. NB.50/566/02A/16 Date: 14th June, 2024

Vice Chancellor,
The Open University of Tanzania,
P.O. Box 23409,
DAR ES SALAAM.

REF: RESEARCH CLEARANCE FOR MS. FADHILA FIKIRI MUHANGA, REG NO: PG202102050

Subject: Permit for Data Collection at TPA -Dar es Salaam Port

Please refer to the subject matter above and your letter with Ref.No.OUT/PG202102050 dated 12th June, 2024.

2. We acknowledge receipt of your letter introducing Ms. Fadhila Fikiri Muhanga, who is conducting research for her Master of Science in Economics.

3. We hereby notify you that we permit Ms. Fadhila to collect data at our port from June 16 to December 30, 2024. This data collection is related to the research titled "Impacts of Port Infrastructure on Economic Growth in Tanzania: A Case Study of Selected DSM Ports.".

4. We are committed to supporting research endeavours that aim to improve port performance at our organization. To complete her research, Ms. Fadhila was provided with

i. Access to relevant documents and data.
ii. Put in touch with appropriate staff members who can answer his questions.
iii. Facilitate interviews with relevant personnel.

5. We wish Ms. Fadhila all the best in her research endeavours.

Dr. Boniphace S. Nobeji
For: Director General

Bandari Tower-One Stop Centre, ½ Sokoine Drive, P.O. Box 9184, 11105 Dar es Salaam
Telephone: +255 22 2110 401/8, Fax: +255 22 2130 390/2113 938 Email: dg@ports.go.tz
Website: www.ports.go.tz