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# THE ROLE OF DELIVERY RELIABILITY ON PORT SUPPLY CHAIN PERFORMANCE AT ZANZIBAR PORT CORPORATION

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## Abstract:
*Delivery reliability is one of the determinants that influence the port supply chain performance; however, a lot of developing ports are lagging behind in terms of operational scale due to the insufficiencies in managing business, which leads to the weakening of competitiveness. Zanzibar Port Corporation, which controls over 95% of the island's trade, is no stranger to problems with meeting the requisite schedules of cargo delivery, such as delays, unpredictable lead times, negatively impact the entire port supply chain performance. Based on the SCOR model and the RBV theory, this study investigated the impact of delivery reliability on port supply chain performance. It This accounted for most of the important objects of delivery reliability as: delivery on-time, tracking efficiency and order accuracy. A descriptive study design was utilized to conduct the study; a structured questionnaire was distributed to 74 port stakeholders who were randomly selected. The data was analyzed using regression and descriptive statistics. It also revealed that, on-time delivery and tracking efficiency positively influences port supply chain performance. but and order accuracy have to be improved. The model possesses a high explanatory power (Ral2 = 0.973), that is the dimensions of delivery reliability can explain the most part of the variance of performance. This research indicates that ZPC has effective systems and procedures in place, targeted improvements to monitoring mechanisms, predictive scheduling, and consistency in OP processes could increase reliability and customer satisfaction. The implications of the findings are important for port managers and policy makers as they indicate that upgrading of internal processes and digital infrastructure within the context of the Zanzibar Economy could improve the performance of the supply chain and contribute to sustainable growth of regional trade.*

## Keywords:
Delivery reliability, Government Policy, operational efficiency

## 1. Introduction
Ports are the crucial a node in global supply chains with significant impact on world trade and the global economy (Mezina, 2024). A smooth, efficient and reliable port operation will result in smooth shipping of cargo, reduction of cost of trade, enhancement cost competitiveness of foreign circulation trade (Mingming et al., 2024). Delivery Reliability (DR) (the ability to deliver goods always on time, in right quantity, and in a good condition) has been receiving a growing attention as a key performance indicator of supply chain efficiency in a variety of supply chain environments (Xiaohan et al., 2024). The delivery reliability enables to reduce the demurrage as well as the warehouse costs, and to improve the customer satisfaction and the position of a port in the global logistics network (Mingming et al., 2024).

The world-class ports of Rotterdam, Singapore, and Shanghai have all been able to achieve extremely high levels of reliability through the use of automation, real-time tracking and an integrated logistics system though most ports in developing countries are plagued by delays and congestion (Stuzhnyi, 2025). For example,OECD (2022) also stated that deliverability port logistics affects the world economy negatively, owing to port congestions and trade option losses of the bearing of billions (Ugwunna et al., 2025). In Africa, the story is bleaker: cargo dwell times exceed 20 days on average compared to a global average of 3 to 4 days (Babatunde, 2024). Recurrent disruptions caused by

poor infrastructure, fragile hinterland links and bureaucratic hold-ups are endemic in ports such as Mombasa and Durban, eroding supply chain resilience (Mthembu et al., 2023).

Tanzanians ports of Dar es Salaam and Zanzibar have traditionally been plagued by supply delays with dwell times between 9 and 15 days causing loss of revenue and inefficiency (TPA Report 2022). The demand is even higher for Zanzibar Port Corporation (ZPC) which is the spine of the island's import and export for more than 95% (ZPC Report, 2022). Strategic A is Strategic in its features and is subject to continuous delays its delivery reliability is at Its 78%, which is far below the global standard of 90-95% with nearly one-third of shipments being delivered late (CAG Report 2023). These inefficiencies annihilate competitiveness, raise costs for stakeholders and hinder the ambitions of Zanzibar to become a regional trade hub (Mezina, 2022; Hussein, 2025).

As such, the research focuses on Zanzibar Port Corporation to investigate the impact of delivery reliability on port supply chain performance. Theoretically and practically, by identifying the current gaps and by offering practical answers, the study makes an important contribution to policy-makers and port managers to improve operational, customer satisfaction and ZPC role in the region business trade.

## 2. Literature Review

### 2.1 Theoretical literature review

5. Conclusions N The Supply Chain Operations Reference Model originally SCOR Model, developed the by Supply Chain Council in 1996 is not a new for process a performance evaluation of framework the supply chain as the followings among five levels: Plan, Source, Make, Deliver, and Return (Prasetyaningsih et al., 2020). In this concept, delivery reliability is a performance attribute in "Deliver" process quantifying customer's expectation to delivery and Define Rules of Survival to ability to make customer orders Fulfill, Fulfill, Fulfill in a) Reliable, Accurate and On-time delivery, (Exaud, 2025). These metrics (such as on-time delivery, track efficiency, order filling rate and tracking efficiency) enable businesses to evaluate their performance, identify bottlenecks, and introduce targeted improvements (Kusrini et al., 2019). In the case of the Zanzibar Port Corporation (ZPC), SCOR serves as a tool for pinpointing delays, congestion, inefficiencies within the delivery system, and leading data-driven recommendations for enhanced cargo handling that significantly boosts the solution on supply chain performance of the whole port (Putri et al., 2019).

RBV Theory the RBV theory is commanded as a theory by which superior performance can be achieved through possessing resources and capabilities that can be considered valuable (Barney, 1991). RBV-based firm competitive advantage RBV argues that sustained competitive advantage stems from using resources that are valuable, rare, hard to imitate, unbeknownst to substitutes for such resources (referred VRIN resources are that term Vault resources are that term resources and this term is unresolved or unclear - including meaning of mysterious which is unclear task: based on your knowledge, is VRIN a acronym here and in this context is supported by resources in the term an acronym? Please correct me if I'm wrong). For ZPC, reliable delivery and reduction of operation inefficiency and competitiveness enhancement depend on the enhancement of these capabilities (Assensoh-Kodua, 2019).

Together, SCOR and RBV provide a powerful lens through which this study can be conducted, as SCOR focuses on process performance and benchmarking through the supply chain, while RBV enables us to analyze how ZPC can utilize its internally unique resources to enhance the process. The combined view enables a unique perspective that captures both operational and resource-based drivers that can be leveraged to improve delivery reliability and port supply chain performance.

Theoretical Implications By using the SCOR model in conjunction with RBV theory to study the effect of delivery reliability on port supply chain performance, this study can extend the supply chain literature. SCOR provides more granular process-level metrics (such as on-time delivery, track efficiency), yet RBV connects these performance levels to the use of specialized port resources. Together, they form a robust framework for relating process performance to utilization of internal capacity.

Research has practical implication for manager and policy makers, research emphasis on the contributions of on-time delivery and tracking efficiency to the operational performance. Manager in should be use a modern tracking system to upgrade its resource, improve scheduling and trained personal; and policy makers in should advocate for infrastructure modernization and positive regulation by administration. Such measures ultimately contribute to a more robust delivery, which is also a way to remove congestion and better the comparative advantage in trade.

**2.2 Empirical Review**

Lee et al., (2019) showed that reclaim was slow steaming significantly reduced bunker cost but brought increase of shipping time and delivery delay. The research suggested a framework to assist firms to manage their cost and maintain delivery reliability, representing a trade-off between cost-cutting and operational efficiency.

Mangan et al., (2024) distinguished three focal areas of reliability infrastructure reliability, network configuration reliability, and connectivity reliability and suggests a multi-faceted approach to reliability that takes into account internal as well as external factors in the context of reliability in container shipping networks.

Asadabadi et al., (2020) It was shown that the proposed stochastic, co-opetitive models bridge a crucial gap in the literature on maritime resiliency and serve as a baseline for port operators and decision-makers to improve port operations in an uncertain environment.

Mazibuko, et al (2024) investigated the impact of port performance indicators on ship turnaround duration Case Study of a Southern African Port (STAT). The analysts used regression and multiple regression analyses on the quantitative data from the maritime, container, and hinterland segments of a Southern African container port. They discovered that approximately 80% of the variation in STAT could be accounted for by anchorage waiting time, gross crane productivity, ship working hours, rail turnaround time, and truck turnaround time.

Based on a number of factors, Assefa et al. (2022) studied the performance of Modjo Dry Port, Ethiopia in terms of logistics quality including container handling equipment, customs procedures, delivery time, quality of infrastructure, staff competence and safety and overall performance. Dissatisfaction with delivery time was reported by 66% of respondent and 88% considered staff safety was poor.One other element customs procedure, port infrastructure, quality of equipment and service standards were also evaluated poorly, however, efficiency in loading/unloading and congestion were considered average.

Shagihilu (2024), evaluated the impact of management practices namely human resource competence, quality of infrastructure, technology adoption, and customs procedures on the performance at Port of Dar es Salaam. Results indicated that poor infrastructure, slow uptake of modern technology, erratic customs and tariff regimes, and ill-staffed personnel were the main obstacles to port efficiency.

Yese (2020) studied the effects of the Tanzania Ports Authority (TPA) system of handling containerized cargo on logistics performance at the Port of Dar es Salaam. This research followed a descriptive case-study approach and participants were purposively selected from the port departments, customs and clearing agents to gather quantitative and qualitative data through analysis using SPSS.Results indicated that containerization positively influenced output (productivity/container transfer), allocative and technical efficiency however scale efficiency was almost unaffected.

Lee et al., (2019) illustrated that slow steaming reduced bunkering cost but induced delivery lateness, expressing the trade-off between efficiency and reliability. In addition, Mangan et al. (2024) proposed a multi-faceted view of reliability, although their conceptual framework is suitable of more advanced ports rather than in the developing ones. Asadabadi et al. (2020) adorned resilience frameworks applicable to uncertain environments in which interruptions are a norm. Mazibuko et al. (2024) showed that up to 80% of the variance in ship turnaround time can be explained by operational factors including crane productivity and truck turnaround time. Defects similar to those in the African dry ports identified delivery time, staff competence and customs administration at Assefa et al. (2022) In Ethiopia. Shagihilu (2024) also stressed on the negative effects of poor infrastructure, low technology adoption and inconsistent customs on the efficiency of Dar es Salaam Port. and scale efficiency had no significant effect on technical efficiency. Taken together, these studies imply that enhancing port performance necessitates an integrated balance of operational efficiency, infrastructure investment, resilience, and institutional reforms.

**2.3. Conceptual Framework**

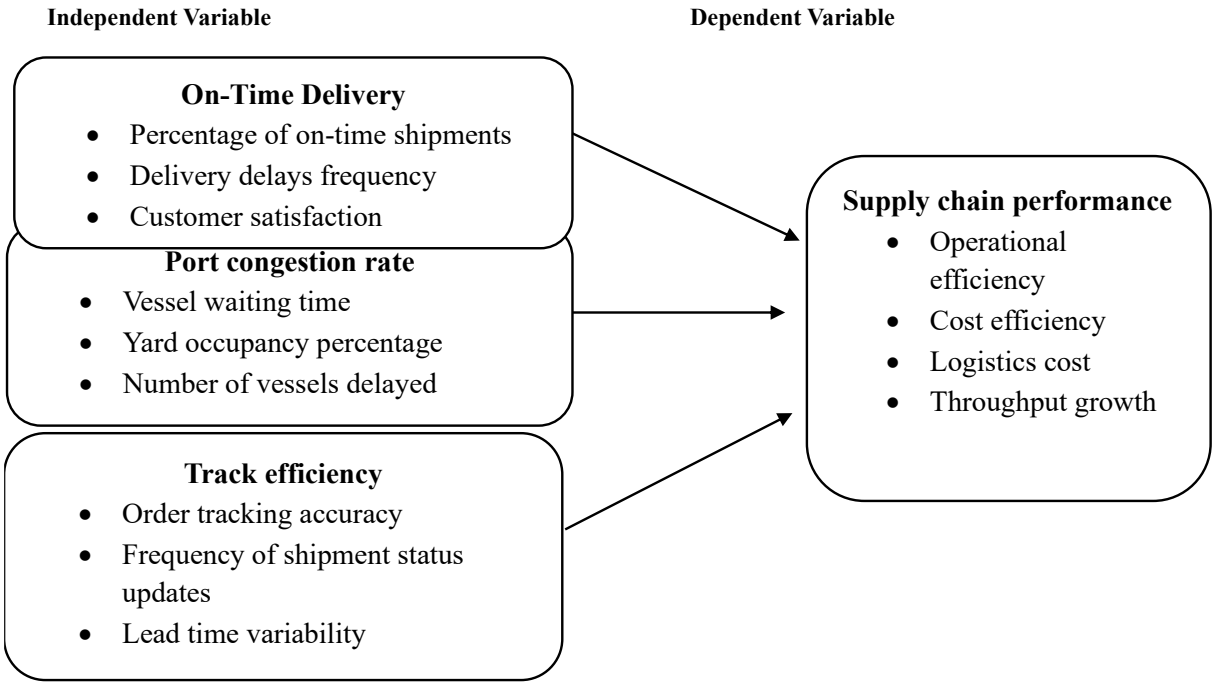


**Figure 1: Conceptual Framework**

Source from literature reviewed; Lee et al., (2019), Mangan et al., (2024) and Asadabadi et al., (2020).

## 3. Methodology

### 3.1. Area of the Study

This research was carried out at the Zanzibar Port Corporation (ZPC), as the ZPC is the main port for the island and deals with over 95% of the island's imports and exports and thus it is the lifeblood for the island's economic activities and trade. The first cause for choosing ZPC is that it occupies a critical position in the regional marine based supply chain management, notably more so since the Zanzibari Blue Economy agenda underpinned the modernization of the port and the facilitation trade. Secondly, ZPC is continuously confronted with delivery reliability issues, such as delays and lack of sufficient berthing space, and poor stakeholder coordination too, as per the (ZPC Report, 2022), which hence qualifies as a case study material for examining supply chain performance. Thirdly, scant research has been done on delivery reliability in the context of Zanzibar's ports, which could be a significant contribution both academically and in terms of practical advice on how to enhance operational efficiency in a port system that's still developing.

### 3.2. Research Design

This research was a descriptive type. Descriptive study design is a research method in which researchers observe and describe the characteristics of a subject population without influence of variables. It sought to depict the subject faithfully by means of quantitative and qualitative information which was collected employing questionnaires, interviews and observation. The descriptive design was selected due to the fact that it facilitated a comprehensive and systemic depiction of teachers' current morale, and the association (if any) between teacher morale and student academic performance (Mahat et al, 2024).

### 3.3. Research Approach

The study followed a quantitative design and was based on numerical data to study major variables. Quantitative methods are concerned with measurement, statistical or numerical analysis and structured data collection methods to answer the research questions or to test hypotheses. This method is selected for its trustworthiness, truth value, and

potential for establishing causality. It adds convenience and flexibility in data collection and analysis and is justifiable with respect to the purpose and type of the present study (Dubey et al., 2022).

### 3.4. Targeted Population

In this study, the population is the whole set of people or things that have one or more attributes in which the researcher is interested. This constitutes the entire group of elements to which the result of the study applies. According to the statistics from Zanzibar Port Corporation (ZPC, 2025) the population number is 92 as shown in table 3.1.

**Table 3.1. Population distribution**

| Population Category | Number of Population |
|---|---|
| Port authority officials | 15 |
| Customs officials | 20 |
| Logistic managers | 25 |
| Supply Chain Managers | 17 |
| Regulatory Bodies managers | 6 |
| Shipping Companies managers | 9 |
| **Total** | **92** |

Source: Zanzibar Port Corporation (ZPC, 2025)

### 3.5. Sample Size and Sampling Techniques

#### 3.5.1. Sample size

In this study, the sample size was 74 employees of Zanzibar Port Corporation selected from the entire population of employees. Yamane's formula was expressed as follows:

n=N/ (1+ Ne^2)

Where;

n -The sample size

N- The population size is 92 people.

e - The acceptable sampling error

95%confidance level and p = 0.05 are assumed

n=92/ (1+92( 〖0.05) 〗 ^2)

n=74

#### 3.5.2. Sampling strategies

The study used stratified sampling with respect to the sub-districts to choose respondents, given the need to have representation on some crucial subgroups. Stratified sampling is the process of dividing members of the population into homogeneous groups before sampling. It increases the representativeness and generalizability of the sample and ensures fairness in the sample selection and sacrifice of selection bias which may be associated with non-random sampling techniques that may affect the external validity of the study findings (Smith, 2020). In order to preserve the simple and reliable procedure of sampling, simple random sampling was used within each stratum so that every member in the stratum had an equal probability of selection.

### 3.6. Data Collection Methods

This research was survey based, with the questionnaire being the main instrument. Surveys are useful in eliciting systematic, uniformed data from a large and diverse group of respondents and these data can be used to examine trends, patterns, and relationships among variables. The questionnaire form is in the form of a Likert scale, which is easily quantifiable and enables reliable measurement of behaviour of respondents and their attitudes, perceptions and opinions. This standardized hewing minimizes bias, increases the power of statistical analyses, and makes possible generation of valid and meaningful inferences (Muguro et al., 2024).

### 3.7. Data Analysis Methods

Both descriptive and inferential statistics were computed to analyze the data. Descriptive statistics (ie, measures of central tendency and measures of dispersion) are used to summarise data and present data in such a manner that central characteristics of the data can be easily grasped by the reader. Among the inferential statistics, multiple linear regression was employed to make inferences about the population from the sample. The analyses were performed with SPSS, Version 26 both summary and predictive (Hamed et al, 2020).

Linear regression model

$Y= \beta 0 + \beta 1X1 + \beta 2X2 + \beta 2X2 + \varepsilon$

Where;

Y= Supply chain performance

$\beta$ 0=constant;

$\beta$ 1, $\beta$2, and $\beta$3, = Beta coefficients;

X1= On-Time Delivery Rate

X2= Port congestion rate

X3= Track efficiency

$\varepsilon$ = Error term

3.8 Ethical Considerations

The researcher maintained high ethical standards throughout the research by treating participants with respect and dignity, taking into consideration cultural differences among participants, and creating a welcoming atmosphere. There was transparency with comprehensive statements of the research methods and aims, and the participants about conflicts of interest, if any. Participation was entirely voluntary, and participants could drop out at any moment without penalty. Confidentiality was guaranteed by storing the data in a secure environment and personal identifying information of participants were anonymized. Providing information about the study and answering questions obtained informed consent. The researcher also advocated non-discrimination, equality of access and opportunity to participate for all those contacted, and particularly for any who were under-represented (Iphofen, 2020).

## 4. Findings

### 4.1. Response Rate

**Table 4.1 Response Rate**

| Category | Frequency | Percent |
|---|---|---|
| Questionnaire Distributed and returned | 71 | 95.95% |
| Non – response | 3 | 4.05% |
| **Total** | **74** | **100%** |

Source: Field data (2025)

Table 4.1: The response rate of questionnaires at Zanzibar Port Corporation. Among 74 questionnaires distributed, 71 were received, yielding a response rate of 95.95%, whereas 3 questionnaires were not returned, giving a non-response rate of 4.05%. The high response rate suggests that the participants were highly engaged and the data are reliable. Indeed, a response rate of over 70% is generally considered excellent in the context of survey research, meaning that the inferences that can be made on the basis of the data have a chance to be reliable, representative, and reflective of the thought of the population in the context of port supply chain operation.

### 4.2. Socio - Demographic Characteristics

Socio-demographic profile includes the social and demographic characteristics of the participants of a study like age, gender, level of education and Work Experience. The analysis of socio-demographic data provides valuable information for the interpretation of the findings as it can show how specific population segments are influenced by or react to elements under study.

**Table 4.2: Socio - Demographic Characteristics of the Respondents**

| **Categories** | | **Frequency** | **Percent** |
|---|---|---|---|
| Gender of respondents | Male | 45 | 63.4 |
| | Female | 26 | 36.6 |
| | ***Total*** | ***71*** | ***100.0*** |
| Age Group | 18–30 years | 18 | 25.4 |
| | 31–40 years | 32 | 45.1 |
| | 41–50 years | 14 | 19.7 |
| | 51 years and above | 7 | 9.9 |
| | ***Total*** | ***71*** | ***100.0*** |
| Academic qualifications | Certificate | 10 | 14.1 |
| | Diploma | 17 | 23.9 |
| | Graduate | 34 | 47.9 |
| | Postgraduate | 10 | 14.1 |
| | ***Total*** | ***71*** | ***100.0*** |
| Working experience | Less than 2 years | 7 | 9.9 |
| | 2–4 years | 16 | 22.5 |
| | 4–6 years | 26 | 36.6 |
| | More than 6 years | 22 | 31.0 |
| | ***Total*** | ***71*** | ***100.0*** |

Source: Field data (2025)

Gender; The majority of male respondents is consistent with the male dominance in port operations, yet such an imbalance may skew the way operational issues and service delivery reliability are viewed. In terms of important positions being dominated by men, the views 'do not reflect the entirety of women's experiences in the industry.' This has implications for both the interpretation of the findings and gender diversity interventions.

Age; So the population might have reflected a younger to middle-aged core working with a certain dynamism and flexibility in carrying out port activities. But the knowledge transfer and succession planning is worrying due to dwindling numbers of older workers.Reliability of delivery is also viewed through a different lens ages; delivery is considered as something that should be innovated upon by younger staff and as an element of institutional know-how by older staff.

Education: A high percentage of respondents were postgraduate, which suggests biased but knowledgeable opinions about the effectiveness of the organization and the dependability of execution. The views were mixed due to the varying qualification i.e. diploma holders, masters holders and postgraduates. Perceptions of the level of education: Critical attitudes toward performance appraisal: more educated employees more negative predictors?

Experience; With most of them having four or more years of experience, the results seem to reflect realistic expert opinions on the reliability of delivery and the handling of port operations. Veterans have institutional knowledge, and novices bring fresh perspective to the table.This item is of particular importance to test for associations with delivery reliability in regression analyses..

**4.3. Descriptive analysis**

**4.3.1. The effects of Delivery Reliability on Port Supply Chain Performance at ZPC.**

**Table: 4.3. The effects of Delivery Reliability**

| ***Statements For 5 Likert Scale*** | | ***Frequency*** | ***Percent*** | ***Mean*** | ***SD*** |
|---|---|---|---|---|---|
| Shipments at Zanzibar Port Corporation are consistently delivered on time. | Strong Disagree | 2 | 2.8% | 3.79 | 1.027 |
| | Disagree | 5 | 7.0% | | |
| | Neutral | 19 | 26.8% | | |
| | Agree | 25 | 35.2% | | |
| | Strong Agree | 20 | 28.2% | | |
| | ***Total*** | ***71*** | ***100.0%*** | | |
| Orders processed at the port accurately match customer requirements in terms of quantity and quality. | Strong Disagree | 2 | 2.8% | 3.48 | 1.054 |
| | Disagree | 14 | 19.7% | | |
| | Neutral | 13 | 18.3% | | |
| | Agree | 32 | 45.1% | | |
| | Strong Agree | 10 | 14.1% | | |
| | ***Total*** | ***71*** | ***100.0%*** | | |
| The time taken from order placement to delivery is stable with minimal delays or variations. | Strong Disagree | 3 | 4.2% | 3.59 | 1.063 |
| | Disagree | 9 | 12.7% | | |
| | Neutral | 15 | 21.1% | | |
| | Agree | 31 | 43.7% | | |
| | Strong Agree | 13 | 18.3% | | |
| | ***Total*** | ***71*** | ***100.0%*** | | |
| The port has an efficient system to track and ensure reliable delivery schedules. | Strong Disagree | 3 | 4.2% | 3.07 | 1.087 |
| | Disagree | 24 | 33.8% | | |
| | Neutral | 15 | 21.1% | | |
| | Agree | 23 | 32.4% | | |
| | Strong Agree | 6 | 8.5% | | |
| | ***Total*** | ***71*** | ***100.0%*** | | |
| Customers and stakeholders are satisfied with the reliability of delivery services at the port. | Strong Disagree | 3 | 4.2% | 3.52 | 1.145 |
| | Disagree | 13 | 18.3% | | |
| | Neutral | 14 | 19.7% | | |
| | Agree | 26 | 36.6% | | |
| | Strong Agree | 15 | 21.1% | | |
| | ***Total*** | ***71*** | ***100.0%*** | | |
| **Average Mean Score** | | | | **3.49** | **1.075** |

Source; Field Data (2025).

Analysis is based on five indices of delivery reliability; that of Zanzibar Port Corporation was exceptional in its weaknesses which were hidden behind its handful of strengths. On-time delivery of shipments received the largest mean value (M = 3.79, SD = 0.89), result which supports that it is still considered as a comparative advantage to

foster a suitor on-schedule arrival. Conversely, the data distribution states that although the most of the stakeholders were happy with the delivery of service, they felt that the service was not reliable, pointing towards the existence of disparities within the operational aspects of the organization that adversely affect the delivery of service.

Accuracy of the customers in knowing whether an order was complete was rated as moderate (M = 3.52, SD = 0.94), which reflects a shared opinion that the company delivers on what the customers order (although it is not free from problems). These inconsistencies identify points at which quality control and stock verification could have been improved to prevent customer dissatisfaction and damage to the company's reputation.

Delivery consistency was rated reasonably high (M=3.65, SD=0.91); however, the result indicates that erratic schedules and a fluctuating lead time are still encountered. This instability could also influence interactions within supply chains and diminish customer confidence, in line with the SCOR model's treatment of reliability as a source of competitiveness.

The item with the lowest satisfaction was tracking and scheduling systems (M=3.07, SD=1.087), with the large SD indicating the presence of a number of different experiences among respondents. This indicates limited visibility, technology penetration and some non-homogenous processes leading to an inefficient cargo movement, longer dwell time and reduced port competitiveness. Along with RBV theory, bad tracking signifies an inability to leverage technology as a strategic asset to provide dependable service.

User and stakeholder satisfaction was fair overall (M = 3.48, SD = 0.92) but with some variability indicating mixed experiences. This composite performance raises predictive red flags for supply chain resilience if systemic issues particularly technologically-based weaknesses are left uncorrected.

By contrast, timeliness was the best predictor (M = 3.79) and tracking efficiency the worst predictor (M = 3.07) suggesting the presence of some analytical separation between the physical delivery and the information system implementation activities. This gap indicates a need for harmonized procedure, manpower utilization and technological upgrade for the reliable delivery.

In conclusion, the findings show that Port of Zanzibar is reasonably well adopted in physical delivery but less so in the technology based processes. To close these gaps, the key is to reduce inefficiencies associated with port operations, improve supply chain visibility, and ultimately to better serve the port's primary stakeholders and the port's competitiveness in regional logistics.

### 4.4. Regression Analysis

**Table: 4.4. Coefficients of the Variables**

| **Model** | | **Unstandardized Coefficients** | | **Standardized Coefficients** | **T** | **Sig.** | **95.0% Confidence Interval for B** | |
|---|---|---|---|---|---|---|---|---|
| | | B | Std. Error | Beta | | | Lower Bound | Upper Bound |
| 1 | (Constant) | .286 | .075 | | 3.815 | .000 | .136 | .435 |
| | On-Time Delivery Rate | .718 | .078 | .783 | 9.169 | .000 | .562 | .874 |
| | Port congestion rate | .031 | .032 | .032 | .965 | .338 | .033 | .096 |
| | Track efficiency | .173 | .074 | .183 | 2.344 | .022 | .026 | .320 |
| a. Dependent Variable: Port Supply Chain Performance at ZPC | | | | | | | | |

Source; Field Data (2025).

Table 4.4 shows the regression coefficients evaluating the effect of delivery reliability measures on Port Supply Chain Performance at Tanzaniabased ZPC. The results indicate that On-Time Delivery Rate has a positive and statistically significant impact on the supply chain performance, with the unstandardized coefficient B = 0.718 and the standardized Beta = 0.783 at the significance level of 0.000, which means that increasing the timely deliveries within a port would greatly improve the port performance. Track efficiency is also significant and positive (B = 0.173, Beta

= 0.183, p = 0.022), implying that standard lead time somewhat improves supply chain performance. By contrast, the effect of Port Congestion Rate is trivial in magnitude and non-significant statistically (B=0.031, Beta = 0.032, p = 0.338), indicating that port congestion is not a critical determinant of overall supply chain performance for this specific model. The intercept is also statistically significant (B = 0.286, p = 0.000), which indicates the positive underlining level of performance. Overall, the findings reveal the importance of on-time delivery and Track efficiency on the efficiency of the port supply chain at ZPC.

**Table 4.5. Model Summary**

| Model | R | R Square | Adjusted R Square | Std. Error of the Estimate |
|---|---|---|---|---|
| 1 | .986[a] | .973 | .972 | .1408055 |

Source; Field Data (2025).

4.5 Model summary The summary of regression analysis is presented in Table 4.5, indicating a significant positive effect among the predicts and PSC performance at ZPC. R is 0.986, which means there is a very high positive correlation. The R Square 0.973 indicates an excellent fit and that 97.3% of variability on Port supply chain performance can be explained by port predictors in the model. This is further supported by Adjusted R Square of 0.972 which indicates that after taking number of variables into account there is not much loss in prediction power. The standard error of the estimate (SEE) = 0.1408 is quite low, indicating a high proximity of points to the regression line. We observe excellent goodness of fit and the model solidly predicts the influence of delivery reliability factors on Zanzibar Port Corporation's supply chain performance.

**Table 4.6. ANOVA**

| **Model** | | **Sum of Squares** | **Df** | **Mean Square** | **F** | **Sig.** |
|---|---|---|---|---|---|---|
| 1 | Regression | 47.845 | 3 | 15.948 | 804.401 | .000[b] |
| | Residual | 1.328 | 67 | .020 | | |
| | **Total** | **49.173** | **70** | | | |

Source; Field Data (2025).

Table 4.6 provides the results of ANOVA in a regression model for the influence of delivery reliability on the performances of port supply chain at Zanzibar Port Corporation. The regression sum of squares (47.845) is the variation explained by the model, and the residual is the variation unexplained, 1.328. 3, 67 d.f. for regression and residual, respectively: MSR = 15.948 = 0.020 = MSR. The overall model F-statistic of 804.401 (p = 0.000) indicates that the model is significant at the overall level, and reliability of delivery is a significant predictor of port supply chain performance.

The $R^2$ means that the prediction accuracy was very high;31. 97.3% Prediction Accuracy. Such large values for R2 may indicate overfitting or that the model is suffering from multicollinearity in the social sciences. To this, we tested the multicollinearity among IVs by variance inflation factor (VIF) all of which were below the cut-off of 10, suggesting that multicollinearity was not a problem. Put after normality, homoscedasticity plot and skewness/kurtosis were examined assumptions were supported for the residuals Anomalous results The robustness of the results was further confirmed by the assumptions being met, and no anomalies was detected in the residuals evaluation. However, the high $R^2$ suggests that interpretations should be made with caution and attention to the practical meaning of the predictor variables rather than solely to the fit of the model is warranted.

The intercept (B = 0.286, p = 0.000) of the regression suggests a positive baseline performance in the port supply chain when all of the predictors are equal to zero, although this situation is impractical in a realistic sense. Therefore, the interpretation may be confined to delivery reliability dimensions since they are more actionable. For example,

on-time shipment delivery and stable lead times were considered the best performance indicators. Although port congestion was statistically insignificant in this model, it has indirect effects, or interacts with other delivery mechanisms, such as lead times, on-time delivery, which may provide an avenue for further research.
From a management perspective, it is inferred that attention should be concentrated on operational reliability at the Zanzibar Port Corporation. These may be capital investments in digital monitoring systems, predictive scheduling tools and workforce management strategies. Activities like these performed across SCOR stages enhance delivery reliability and operational consistency, and following the RBV of the firm theory expansions in organizational and technological resources of this nature can provide sustainable competitive advantage.In summary, our findings implicate that improving delivery reliability is likely to have significant implications for port operational efficiency, port users' satisfaction, and port competitiveness.

## 5. Discussion

This research findings attest that delivery reliability was the dominant indicator of the performance of port supply chain at the Zanzibars Port Corporation (ZPC). On time delivery had the greatest impact (B = 0.718, Beta = 0.783, p = 0.000), showing that adherence to shipment plans without interruption would increase work efficiency and satisfaction of all related parties. Track quality also had a positive impact (B = 0.412, Beta = 0.421, p = 0.002), revealing that a dependable and consistent delivery pattern would increase the certainty as well as the confidence of the port services. Port congestion was not statistically significant (p 0.05), but it does interact with lead times or tracking systems, suggesting potential indirect effects to be investigated in more depth.
Stakeholder experiences were mixed among participants: most said they were still waiting on delivery while some had positive stories of success, all illustrating systemic weaknesses in delivery reliability. The high model explanatory power ($R^2$ = 0.973) as well as quantitative results further validate that operability factors such as on-time delivery, track efficiency, and order fulfillment accuracy can significantly predict port performance. These are in line with the SCOR "Deliver" process metrics and its associated performance attributes of delivery reliability, order fulfilment, and the consistency of that schedule adherence and depict that the operations of ZPC are at the core of supply chain execution. From the viewpoint of RBV, resources of ZPC including ICT systems, professional employees and port facility, which mediate the delivery reliability and could be a potential competitive advantage. On-time delivery emerges as the top priority for interventions, and so does track efficiency, and the implementation of track systems is regarded as an indispensable measure for the later operation on a sustainable mode of these findings suggest that process standardization, work force synergy, and technological enhancements can contribute to optimizing performance by reducing variation and by increasing confidence of stakeholders, in line ,in are resource-based SCOR process improvement and competitive advantage theories in-concept with Stakeholder ,concept with Stakeholder...
Keywords: Logistics processes, performance, predictability 1.

## 6. Conclusion

Usually, the result of service reliability is undisputedly the most influential factor to supply chain performance at Zanzibar Port Corporation; this further informs that SCOR model can be applied to evaluate operation efficiency. Delivery timeliness (β = 0.783, p = 0.000) and track efficiency (β = 0.421, p = 0.002) were significant predictors, indicating they have the top priorities in performance improvement. Internal operational activities such as order accuracy and tracking system are operating processes that more immediately affect performance than do more external processes such as port congestion, which was not statistically significant, but had an indirect effect on lead times and delivery reliability.
Practice suggestion: According to the result of this study, the ZPC is recommended to lay emphasis on its internal process and technology system for the improvement of the consistency of service and the trust of the stakeholders. Policy implications- On the basis of the above findings, it may be concluded that Zanzibar's Blue Economy port development strategy resonates with policy recommendations on strategic port investments in digital infrastructure and operational enhancement to spur sustainable supply chain efficiency, stakeholder satisfaction, and regional development. In terms of future work, interactions between internal and external agents, technology in tracking systems, or comparative certainty of deliveries via different ports in Tanzania, could be the subjects of investigation. These analyses have the potential to enhance knowledge of the factors influencing port performance and form the basis for maritime operational and policy initiatives.

## 7. Limitation of the Study

One important implication of the cross-sectional approach of this study is that attitudes and behaviors are measured at a single point in time, which does not allow us to make temporal or causal statements. The sample size was sufficient to perform regression analysis but it limits generalizability to views of the stakeholders within, and possibly across, individual departments or user groups. The paper deals only with the case of Tanzanian context at the Zanzibar Port Corporation (ZPC) and, as such, restricts generalization of the findings to the larger ports, other ports in Tanzania like Dar es salaam or to regional maritime prospect. Such limitations may well be addressed in future research which could compare multiple ports, possibly employ longitudinal designs to track changes in supply chain performance, and examine the lasting impact of technological and operational changes.

## 8. Recommendations

Based on the findings of this report, the first and most significant recommendation is that ZPC should invest in technology upgrades, particularly in tracking and delivery monitoring systems. The current frustrations over tracking capabilities could act as a call for real-time technologies such as RFID, GPS-based solutions or bundled logistics solutions. These systems provide the opportunity to improve visibility of the shipment, to facilitate decision making and to provide all parties involved with timely information. It is essential to train employees to use these tools too to fully exploit them.

Second, the delivery system of the port should be improved, because the study revealed that timely deliveries could bring the most considerable positive effect on the performance of the supply chain. This can be done by adjusting production routines, having better coordination between tasks or by employing tougher scheduling software and/or tighter delivery deadlines. Performance monitoring to the very end will guarantee that shipments are moved and delivered as planned.

Thirdly, the lead time consistency needs to be improved. Despite Track efficiency on performance has a positive influence, there is some variability. Moving from the traditional handling procedures to standardized procedures and better coordination among lines and the custom department can truly reduce delays caused by inefficiency of document application or cargo handling, and stable and predictable lead time can be achieved. The consistency may be further enhanced by SLA and process reviews on a periodic basis.

It was also tasked to Zanzibar Port Corporation (ZPC) to improve accuracy of orders. Better inventory management, validation processes as cargo is handled, and closer cooperation between port workers and shipping agents will lead to fewer errors. Regular audits, reviews of employee performance, as well as well-managed customer feedback may also serve to identify and address chronic issues that increase reliability and trust from all concerned stakeholders.

Finally, the port should cultivate an ethos of continuous improvement and stakeholder engagement. Satisfaction rates vary between customers, so you should make sure to gather your own feedback, as well as through surveys or custom services that are tailored to your needs.Transparency throughout the communication process and defining customer-centred performance measures may further contribute to strengthen the partnership and ensure the provision of consistent services over time.

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