

Research Article

The Correlation Between Organizational Characteristics and Performance of African Ports: The Moderating Effect of Governance Reforms

Joseph Ouma Atonga^{1,*} , Zachary Bolo Awino², Kennedy Omondi Ogollah², Stephen Ochieng Odock²

¹Department of Business Studies, University of Nairobi, Nairobi, Kenya

²Faculty of Business and Management Sciences, University of Nairobi, Nairobi, Kenya

Abstract

The main objective of this study was to determine the moderating effect of governance reforms on the relationship between organizational characteristics and organizational performance. Structured questions in the form of questionnaires were employed to collect primary data targeting executive managers of 54 container-handling seaport terminals in Anglophone Africa who are conversant with port operations and management. Some data was also obtained from the websites of the ports and regional port management Associations. The response rate was 83.6%. Out of these responses, 46 terminals (78%) were found to have adopted the landlord model while 10 terminals (22%) were found to be using the public service model of operations. The reliability and validity of the indicator items were ascertained through diagnostic tests. Model fitness was confirmed by the use of Standard Root Means Square Residual (SRMR) and Normed Fit Index (NFI). Partial Least Squares Structural Equation Modelling (PLS-SEM) using Smart-PLS 4.0 software was used for data analysis and measurement model estimation to test hypothesis which stated that there is no significant moderating effect of governance reforms on the relationship between organizational characteristics and the performance of seaports in Anglophone Africa. The findings established positive and significant moderating effect of governance reforms on the relationship. The study concluded that the landlord model of governance reforms enhances performance thereby creating competitive advantage for ports in Anglophone African. The study also finds that seaports in Africa, seen from both theoretical and empirical point of view are increasingly identifying themselves with port governance reform models. The study recognizes that the landlord model of port governance is dominant amongst African seaports and concludes with the recommendation that all African seaports that are still operating as public service ports should reform and adopt especially the landlord model in order to experience remarkable performance improvement and maintain competitive advantage.

Keywords

Organizational Characteristics, Governance Reforms, Partial Least Squares Structural Equation Modelling, Container Handling Terminal, Measurement Model Estimation, Landlord Model

*Corresponding author: josephatonga@gmail.com (Joseph Ouma Atonga)

Received: 7 August 2024; **Accepted:** 2 September 2024; **Published:** 16 December 2024



1. Introduction

Given the present competitive situation facing many seaports, it is imperative for managers to identify and understand the characteristics which are critical for achieving acceptable levels of sustainable performance [1, 2]. Organizational characteristics are proven to explain an organization's general performance in a number of ways, and hence recognizing them becomes necessary while considering development of a new institution, expanding an existing one, improving its performance, market share and growth [3]. The definition of organizational performance and its measurement continues to compound scholars due to its complexity. In this regard the concept of performance needs to be clearly understood [4]. Governance reforms has been progressively adopted by seaports with a view to enhancing organizational performance albeit with mixed results that require further validation.

The natural resource based view (NRBV), the dynamic capabilities theory (DCT), the agency theory and the stakeholder's theory offer explanations and information on the anchorage of this study. The NRBV and DCT explain the organizational characteristics and performance. The NRBV focuses on new contexts where organizations have established new capabilities, like eco-innovations, new management tools like governance reforms and the integration of stakeholder's demands which enable ecologically maintainable performance [5]. DCT accounts for sustenance of competitive advantage by building new resources and capabilities. The Agency theory explains the governance structure of organizations where shareholders delegate power to an agent to exercise control of an organization on their behalf. The equity holders expect the agent to run the organization in their very best interests which may include adopting new governance reform models and integration of stakeholders concerns [6].

Sea ports act as interfaces between interlinking modes of transport including maritime, rail, road, and inland waterways. Ports from developing countries command 72 percent of world container trade out of which African share is only one percent [7]. The main challenges facing African ports are inefficient operations, lengthy cargo clearing and dwell times, inadequate port and hinterland infrastructure; lengthy documentation processes and low levels of automation [8]. The measures that if implemented would improve performance and competitiveness of African seaports which include among others, improved public investment structure, eradication of operational inefficiencies, and ambitious governance reforms to mobilize and attract public-private partnerships for financing [9]. The motivation behind this study was to respond to the concerns regarding poor performance by majority of seaports in Africa in comparison to well established seaports in the developed world and the desire to find a solution to the problem. Furthermore, the fact that some of the seaports had undergone governance reforms but had not shown any considerable improvement in performance needed to be explained. The research attempted to unravel the cause of inferior per-

formance as cited in these scenarios and especially the effect of governance reforms on the relationship between the port characteristics and performance of seaports in Africa. The main aim was to achieve high productivity and sustained performance [9].

2. Literature Review

2.1. Organizational Characteristics

Organizational characteristics refer to aspects of the organizations that can be identified particularly in relation to performance. These characteristics are present in form of internal and natural environment resources of the organization. These characteristics include size, age, ownership and diversification [10, 11]. According to studies by [12, 2], determinants of performance include organization's size, infrastructure, age, strategic location, information communications technology, efficiency level, costs, reliability and the region's economic expansion. Size of a firm can be measured in terms of its physical size, number of employees and production equipment that it has. Studies have indicated that large sized firms tend to give better performance than smaller ones and that age of an organization and the many years of experience may result into higher possibility of better industry performance [10]. Also long period of existence enables a firm to build resources and capabilities that may lead to enhanced performance [13]. Strategic location refers to proximity to the main trade routes by sea, air, rail and road with highly efficient infrastructure. Close proximity of an organization to these resources is a catalyst for higher performance [14]. Organizations that lack the advantage of strategic location can leverage on efficiency and technology to enhance performance [15]. Infrastructure refers to the size and quality of an organization's internal capability and in a seaport context it refers to the quality of physical structures like berths, draught, yards, quays, equipment and road and rail infrastructure for entry and evacuation of cargo [16]. Costs of production and transport, contribute towards an organization's charges and are known characteristics of performance because costs of goods and services is a matter which users will reflect when choosing goods and services which are similar. Reliability of services, efficiency and good reputation are other factors that give rise to better performance. Some customers would be willing to pay slightly more for efficiency [17].

2.2. Governance Reforms

Governance is the structure of practices, guidelines, and procedures through which an organization is controlled and directed [18]. Governance reforms refer to the acceptance and application of new rules central to conducting and exercising authority and organizational assets to manage and accomplish

an organization's events principally matching the wishes of stakeholders to the advantage of society and the economy. The reforms concern both private and public sectors but the application is different depending upon whether private or public concerns are at stake. Its doctrines apply to relationships amongst organizations, public/private agencies, businesses, stakeholders, and those who inaugurate them to carry out activities on their behalf [17]. The intended objectives of governance reforms in the public sector were to enhance and sustain performance. Studies have shown that the reforms did not always achieve their intended purpose as some well-managed public sector organizations did better than some of those that had been reformed and the type of reform model adopted is what made the difference in performance levels [19].

Due to prevailing imperfect prototype governance reform models, new reform tool kits were introduced by [20] to be used by seaports to guide reforms namely, the Landlord model, where the public retains ownership and regulation while management remains in private hands; the Public Service model in which the organization retains ownership of all the assets including land but is also the regulator and operator; the Tool model where the organization owns, maintains facilities and equipment but operations is done by private parties and lastly the Private Service model where the organization owned and operated by private companies. The distinction and separation depend on who owns infrastructure, and who manages and provides services [20]. These reform models became more useful to seaports after the world economic meltdown as managers implemented new governance reform models and structures to positively adapt to changing environments. Evolving circumstances arising from the governance reforms affect market dynamics and stakeholders' relations [21].

2.3. Organizational Performance

Organizational performance is about efficiencies and effectiveness in the use of an organization's possessions and the attainment of its targets [23, 4] Good performance indicates institutional effectiveness and competence in utilizing its capital and a contributor to the economy of a nation [24]. Organizational performance involves the real output or outcome of an organization when compared against the anticipated outputs. The performance for organizations concerns various experts in fields of strategic planning, finance, legal, operations and in corporate development [25]. According to [26] organizational performance incorporates three precise zones of organizational outcomes namely product market performance (sales, market share, etc.); financial performance (incomes, return on capital, return on shares, etc.) and operational performance. Performance appraisal is requisite for the growth of any economic activity. They further state that performance should be measured through a yardstick since companies' performances have to be equated with each other

for comparative purposes. According to a study by [27], most performance measurements can be classified as either efficiency, effectiveness, timeliness, quality, or productivity. Performance measurement estimates the parameters under which programs, investments, and acquisitions achieve targets [25]. In the context of seaport terminals, performance measures are identified as berth cargo throughput, operational efficiency level, cranes moves per hour, truck turnaround time, vessel turnaround time, terminal charges, and vessel and truck turnaround which are crucial factors of performance for terminal operators [20].

2.4. Organizational Characteristics and Performance

From previous literature, there exists empirical evidence and academic explanations that support a positive and significant effect of organizational characteristics on organizational performance. From research already done, it is common knowledge among researchers, practitioners, and managers that full exploitation of organizational characteristics improves performance and what tends to vary is the combination of the factors which tend not to be always similar. For example, some studies found positive relationships between organizational size and age as great factors for financial performance [28]. Some researchers [12] found infrastructure and ICT as catalyzers for enhanced performance while others [2, 29] found strategic location and size as the causes of high performance yet studies from [39, 31] did not find any clear relationship between these variables and concluded that performance improvement arose from improved efficiency arising from increased use of ICT in operations and in supply chain networks. Other studies showed that the size of an organization increased productivity due to the economics of scale [29, 32, 33]. However, studies by [34-36] found a learning effect in large-sized organizations which improved performance. The foregoing studies were contrasted by [37, 38] who found that smaller-sized organizations were more competitive with higher performance than the larger ones due to improved efficiency hence raising a raging debate.

Previous studies [2, 3, 29] also identified infrastructure as another factor of performance but those findings were contradicted by [38, 39] when their studies found that equal levels of investment in infrastructure did not always yield the same levels of improvement in performance indicating that further studies were required on the role of other factors like location, intermodalism, and others. Studies by [31, 40] identified costs as another factor of organizational performance which was affirmed by [31, 41] who also found that customers did not mind paying higher charges if an organization portrayed a higher level of efficiency and exhibited effectiveness in performance. The role of organizational characteristics on performance continues to raise a debate hence the need for further empirical validation specifically in the context of seaports in Africa.

2.5. Organizational Characteristics, Governance Reforms and Performance

Empirical evidence exists to confirm that organizational characteristics influence organizational performance [2, 28]. It is the role that governance reforms play in the relationship that has compounded researchers in the past. The agency theory represents governance reforms in this study as it endeavors to explain the gap between shareholders and directors where control and proprietorship have been separated. According to [42] managers as agents might use the company's assets for their interests, which eventually leads to a conflict between the owners and agents. The role of shareholders is limited to maximization of their returns while the role of directors is limited only to monitoring the managers' performance. Governance reforms and stakeholders' management are targeted at mitigating some of the agency issues to enhance organizational performance [43]. Governments have delegated responsibility to manage seaports to Port Authorities that are continually carrying out reforms on behalf of the governments to improve performance which requires strategic leadership and is anchored on the agency theory [37].

There is clear evidence from past studies that governance reforms lead to superior performance. For example [44] among others found huge successes of the landlord model in Italian ports, while [45, 46] found that the corporatization model of reforms succeeded in China and Korea respectively where there was an increase in market-oriented governance and an increase in foreign investment in ports. Similarly, [18] found that full privatization had succeeded among Australian ports. Despite those recorded successes, contrasting views came from [47] who found that governance reforms at the port of Gothenburg led to price increases, industrial disputes, and delays in investments with only a modest increase in overall turnover being recorded. In Turkey, [48] found that competitiveness was undermined by inefficient governance structures and conflicting decision-making objectives among government bodies which ended up delaying investment in port development. On the privatization model, [36] found that fully privatized ports in the United Kingdom (UK) did not meet the expected improvement in efficiency which led [49] to conclude that full privatization would not guarantee improvement in performance unless it is a combined mix of private management and public ownership. From the foregoing, [48, 50] observe the best model of governance is still not yet found since there have been varying experiences of different governance reform models in different regions of the world. This raging debate on the lack of a universally accepted governance reform model means that a research gap still exists which calls for further research and empirical validation. Based on the above the study hypothesized that governance reforms have no significant moderating effect on the relationship between organizational characteristics and performance of seaports in Africa.

2.6. Conceptual Framework

The conceptual Framework was developed based on the literature review and theoretical groundwork. It was proposed that Governance reforms moderate the relationship between organizational characteristics and organizational performance. Organizational characteristics had location, size, information communications technology, infrastructure, maritime services, and hinterland connectivity. Governance reforms were measured using impact on investment, productivity impact, and impact on efficiency. The indicators for organizational performance were operational performance, financial performance, and market share performance.

H₁: Governance reforms have no significant moderating effect on the relationship between organizational characteristics and the performance of seaports in Africa.

3. Methodology

Positivist philosophy was adopted in the testing of the resultant model. Similarly, a descriptive cross-sectional census survey research design was preferred to accommodate a low population of only 54 seaports in Anglophone Africa. The design chosen was considered suitable where the aim is to reveal the relationships between variables at a specific point in time [51]. Data was collected across targeted seaport terminals essentially at the same point in time. Previous studies had successfully adopted this research design using PLS-SEM for analysis [52, 53]. The study targeted all container handling seaports in Africa where English is the language of management. Data was collected by use of structured questionnaires which were sent by email to executives of the targeted seaports, secretariats of regional port management associations, and also from the websites of the seaports. This research applied Partial Least Squares Structural Equation Modelling (PLS-SEM) in analyzing the data. As stated by [54], PLS-SEM is a soft modeling technique that does not make assumptions about the distribution of the data and is the best alternative to covariance-based structural equation modeling (CB-SEM) when dealing with small samples.

Diagnostics tests of normality, multicollinearity, autocorrelation, and heteroscedasticity were carried out on all the models of the study to determine whether the data collected met the threshold for further analysis. In the test of normality, the Shapiro-Wilk test showed a range between 0.983 ($p = 0.931$) for stakeholders' management and 0.983 ($p = 0.968$) for organizational performance. All the p -values from Shapiro-Wilk's test displayed insignificant outputs on all the latent variables and therefore confirmed the normal distribution of the data [55].

Test for multicollinearity was carried out using variance inflation factor (VIF) for checking the correlation and the correlation weight between exogenous variables in a model of regression. The VIF values varied between 1.001 for organizational characteristics and 1.126 for stakeholders' manage-

ment as proof that there was no correlation between the exogenous variables in the models [56]. The tolerance values between 0.888 and 0.999 implied no threat of multicollinearity. The value of tolerance above 0.2 indicates a lack of multi-collinearity [57].

The Durbin-Watson test was done to check autocorrelation and the findings confirmed that there was no autocorrelation between successive observations in the collected data for all three latent variables. The Koenker test was used for carrying out the heteroscedasticity tests for the models. In this test, the p-value had to be greater than 0.5 to ascertain that heteroscedasticity was not present. The results showed that p values for LM tests for the three models ranged from 0.626 to 0.996 a confirmation of the statistical insignificance of the models since the values were larger than 0.05 thus confirming lack of

occurrence of heteroscedasticity [58].

In summary, all the diagnostics tests of normality, collinearity, autocorrelation, and heteroscedasticity determined that the data that was collected for all the variables met the threshold required for further analysis. It was at this juncture necessary to carry out Kaiser-Meyer-Olkin (KMO) and Bartlett's analysis to examine the ability to carry out exploratory factor analysis (EFA) of all items of the latent constructs. The KMO checks revealed that all items were highly significant and equal to or above the threshold of 0.6 [59]. Bartlett's Test findings showed that chi-square values for all the latent constructs were significant as the value of p was 0.001 [60]. The findings of the examinations in Table 1 imply that it was appropriate to render all the items signifying the latent variables for EFA.

Table 1. KMO and Bartlett Test Results.

Objectives variables	KMO-Bartlett value	Chi-square	Df	Sig
Strategic Location	.731	97.904	3	.001
Size	.628	48.869	3	.001
Information Communications Technology	.741	89.916	3	.001
Infrastructure	.668	89.674	3	.001
Maritime Services	.764	104.66	3	.001
Hinterland Connectivity	.694	43.887	3	.001
Investment Impact	.596	9.575	3	.001
Impact on Productivity	.388	13.316	3	.001
Efficiency impact	.698	34.511	3	.001
Operational Performance	.651	27.883	3	.001
Financial Performance	.783	112.483	3	.001
Market share performance	.649	60.225	3	.001

4. Results

The objective of the study was to determine if governance reforms had any moderating effect on the relationship between organizational characteristics and the performance of seaports in Anglophone Africa. Questionnaires were sent out to 54 seaport terminals out of which only 46 eventually responded, thus a response rate of 83.63%. The collected data was cleaned, edited, coded, and then entered into SPSS for descriptive and inferential statistics tests including exploratory factor analysis to assess their factorability. The latent variable organizational characteristics comprised six sub-constructs each with three items per indicator. These were strategic location, size, information communications tech-

nology, infrastructure, maritime services, and hinterland connectivity. Stakeholder management comprised of three sub-constructs namely investment impact, impact on productivity, and efficiency impact. The dependent variable organizational performance had three sub-constructs operational performance, financial performance, and market share performance which had 3 indicators save for financial performance which had six indicators.

The statistical analysis was approached through the outer model estimation to determine the link between the observable variables and the hypothetical constructs denoted by them and also by specifying the structural model evaluating the proposed relationships and testing the hypothesis [61]. All the correlations between the observed variables and their respective indicators were postulated in the measurement model that

outlines how each group of indicators are aligned to their corresponding latent constructs. The observed variables were highly interchangeable and correlated, and were therefore reflective and therefore underwent analysis for reliability and validity [62, 54]. All the three constructs had a total of 12 indicators which were subjected to confirmatory factor analysis as part of PLS-SEM outer model assessment.

The variables were checked meticulously for reliability, validity and unidimensionality by conducting confirmatory factor analysis (CFA) using PLS-SEM using Smart PLS4.0 software to assess the relationship between the latent variables in order to determine the predictive potential of the conceptual

model for the seaports in Anglophone Africa. PLS-SEM is a statistical software that assesses the psychometric properties of the measurement models and parameter estimates of the structural model and is most suited for estimating a research objective where the sample size is below 100 (Hair et al., 2014) [62]. Table 2 illustrates the descriptive statistics for all the latent constructs in the outer model with results showing that data for all the variables are fairly normal as values for kurtosis and skewness fall within the range of -1 and +1, except for kurtosis of size. All variables were therefore seen as composite.

Table 2. Descriptive Statistics for Measurement Scale.

Latent Construct	Indicator	Mean	SD	Skewness	Kurtosis
Organizational Characteristics	Strategic Location Size	3.01	.707	-.499	-.932
		3.12	.452	.473	1.15
	Information Communications Technology	3.49	.906	-.338	-.534
	Infrastructure	3.79	1.12	-.720	.187
	Maritime Services	2.92	.869	.873	.308
Governance Reforms	Hinterland Connectivity	3.24	.663	-.781	.427
	Investment Impact	3.92	.630	.366	.712
	Impact on Productivity	3.13	.610	-.414	-.288
	Impact on Efficiency	3.21	1.16	-.187	-.231
Organizational Performance	Operational Performance	3.24	.862	-.068	-.277
Performance	Financial Performance	2.89	.454	.671	.284
	Market Share Performance	2.62	.749	.657	.577

Regarding outer model reliability, Table 3 shows that all of the indicators of the latent constructs in this model had individual indicator reliability values that greater 0.5 threshold, with majority above 0.7 [64]. Bootstrapping results showed that all factor loadings are significant as p-values are less than 0.05 and their t-statistics greater than 1.96. Therefore all the outer model loadings were highly significant.

Table 3. Reflective Outer Model Reliability.

Latent Variable indicator	Loadings	Indicator reliability	T Statistics	P Values
Strategic Location	.816	.955	5.437	.001
Size	.803	.885	3.791	.001
Information communications technology	.892	.835	1.998	.001
Infrastructure	.894	.836	5.176	.001
Maritime services	.870	.837	5.658	.001
Hinterland connectivity	.729	.855	2.593	.001
Investment Impact	.525	.833	1.974	.001

Latent Variable indicator	Loadings	Indicator reliability	T Statistics	P Values
Impact on productivity	.998	.713	1.968	.001
Impact on Efficiency	.812	.696	1.509	.001
Operational performance	.853	.769	4.183	.001
Financial performance	.682	.784	3.819	.001
Market share performance	.783	.709	5.920	.001

Table 4. Construct Reliability and Validity of Latent Constructs.

Latent Variable	Composite reliability	Cronbach's Alpha	AVE	$\sqrt{\text{AVE}}$
Organizational characteristics	.997	.913	.699	.836
Governance Reforms	.921	.983	.645	.803
Organizational performance	.773	.696	.602	.775

Internal consistency reliability was ensured through composite reliability scores which were obtained from PLS SEM output. From Table 4, it is observed that the values of composite reliability scores range from 0.809 for stakeholders' management to 0.929 for organizational characteristics and thus the three latent constructs were greater than the threshold of 0.6 [65]. In addition, Cronbach's Alpha values range from 0.696 to 0.913 against the threshold of 0.7 confirming internal reliability [66]. The results therefore confirm that there was a high level of internal consistency reliability for the constructs [67].

Convergent reliability was tested by observing the average values extracted (AVE) for all three latent constructs obtained from the PLS-SEM analysis in Table 4. The results revealed that all the AVE values range between 0.602 for organizational performance and 0.699 for organizational characteristics and these values are all greater than the threshold of 0.5 [67]. In addition, from the confirmatory factor analysis results obtained from the PLS-SEM output displayed in Table 5, all the indicators of the latent constructs loaded more heavily onto the corresponding latent variables as a further confirmation of convergent validity.

Table 5. Confirmatory Factor Analysis.

Indicator	Organizational Characteristics	Governance Reforms	Organizational Performance
Strategic Location	.816	.208	.662
Size	.803	.014	.545
Information communications. technology	.892	.371	.699
Infrastructure	.894	.311	.590
Maritime services	.870	.371	.661
Hinterland connectivity	.729	.084	.515
Investment impact	.195	.525	.322
Impact on productivity	.117	.998	.253
Impact on Efficiency	.077	.812	.154
Operational performance	.577	.298	.853
Financial performance	.148	.168	.682
Market share performance	.395	.207	.783

Before evaluating discriminant validity, it was necessary to establish the Pearson correlation matrix for the three latent variables in the model. The findings of Pearson's correlation coefficients of the variables ranged from 0.460 for operational performance correlation with organizational characteristics to 0.653 for governance reforms correlation with organizational characteristics as displayed in Table 6.

Table 6. *Pearson's Correlation Matrix.*

Variables	OC	GR	OP
Organizational characteristics (OC)	1		
Governance reforms (GR)	.653	1	
Organizational performance (OP)	.460	.509	1

Discriminant validity was evaluated using the Fornell-Larcker criterion and confirmed by the Heterotrait-Monotrait Ratios (HTMT) and factor loadings and associated constructs. The measurements were done to ascertain that the three latent variables organizational characteristics, governance reforms and organizational performance were as much as possible unrelated. The results of the Fornell Larcker criterion in Table 6, shows that the square root of the AVE for

organizational characteristics (0.699) was 0.836. This figure was greater than the score of correlation for the organizational characteristics column of (0.653, 0.460) in Table 5. The square root of AVE (0.645) for governance reforms was 0.803. This was also greater than the correlation score of 0.509 in the column of governance reforms. Discriminant validity was therefore confirmed by these results as recommended by [66].

Table 7. *Fornell-Larcker Criterion Analysis.*

Latent Variable	Organizational characteristics	Governance Reforms	Organizational performance
Organizational characteristics	.836		
Governance Reforms	.653	.803	
Organizational performance	.460	.509	.775

In order to confirm if the latent variables were unrelated, the HTMT ratios obtained from PLS-SEM output for the correlation of organizational characteristics and governance reforms was 0.289, the correlation between organizational performance and governance reforms was 0.338 and the correlation between organizational performance and organizational characteristics as 0.826. All these scores were below the maximum limit of 0.9 [69] to confirm discriminant validity as shown in Table 7.

Table 8. *Heterotrait-Monotrait Ratios.*

Hypothesized path relationship	HTMT Ratio
Organizational Characteristics -> Governance Reforms	.289
Organizational performance -> Governance Reforms	.338
Organizational performance -> Organizational Characteristics	.826

Predictive Relevance

The predictive relevance measure, Q^2 [68, 69] which was

obtained from PLS-SEM output was 0.220 [62] suggested a Q^2 score of 0.02 displayed a small relevance, 0.15 medium

relevance, while 0.35 demonstrates a large predictive relevance of an exogenous construct. Therefore the predictive relevance of this model falls midway between medium and large predictive relevance. For the overall model fit, the SRMR value from PLS-SEM was 0.103. This was marginally higher than 0.1 while the NFI value was 0.767 against maximum 0.9 for the best fit. These small variations were due to a small sample size [70]. The combined SRMR and NFI results indicated that the model was well constructed [71, 72]. A bootstrapping procedure with 500 resamples was carried out to establish the model's statistical significance which was confirmed as all p values were below 0.05.

Overall Model Fit

SRMR value should be 0.10 or less than 0.08 [73], while [71] suggested a value of SRMR of 0.1. The SRMR for this model obtained from PLS-SEM analysis was 0.103, which is marginally higher than 0.1 due to the small sample size [70]. Bootstrapping with 500 resamples confirmed the significance of SRMR at 0.001 level which is indicated in Table 9. The NFI threshold for an excellent fit is 0.9 [73]. The NFI value from PLS-SEM was 0.758 which is marginally smaller than the threshold of 0.9 because of the small size of the sample. The results of SRMR and NFI confirm that the model fits well [71-72].

Table 9. SRMR Composite Model Statistics.

Original Sample	Sample Mean	Standard error	T Statistics	P value
0.103	0.103	0.0715	3.253	0.018

Model Path Diagram

Governance reforms were hypothesized to moderate the linkage between organizational characteristics and organizational performance as shown in Figure 1. In PLS-SEM analysis organizational characteristics were represented by OC which has a strategic location (B1), size (B2), information communications technology (B3), infrastructure (B4), maritime services (B5), and hinterland connectivity (B6). Governance reforms were displayed as GRLM which was represented by investment impact (C4), impact on productivity (C5), and efficiency impact (C6). Organizational performance was displayed as OP, which was represented by operational performance (E1), financial performance (E2), and market share performance (E3).

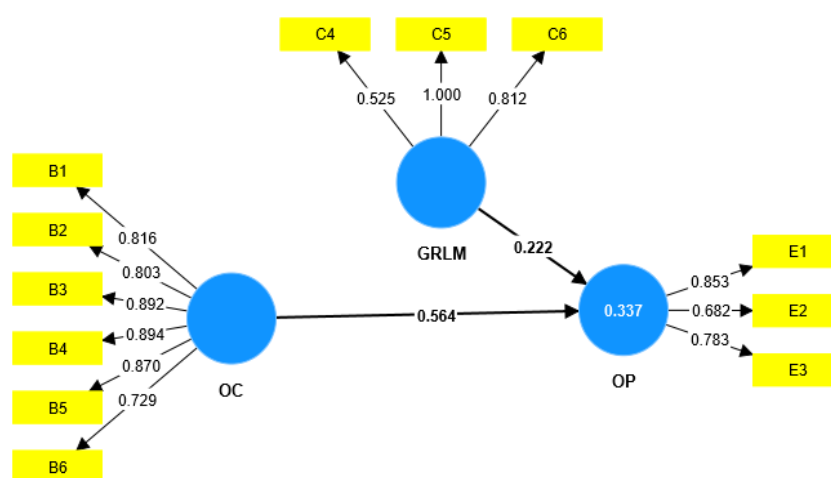


Figure 1. Structural Equation Modelling Path Diagram showing the Effect of Governance Reforms on the Relationship Between Organizational Characteristics and Performance.

Endogenous Variable Variance and Path Coefficient Significance

From the path diagram Figure 1, it is observed that the coefficient of determination, R^2 attributed to organizational performance was 0.337. This implied that organizational characteristics and governance reforms explained 33.7% of the change in organizational performance. The values of R^2 should be 67 percent, 33 percent, and 19 percent to represent large, medium, and low variance in that order [74]. It is concluded that the variance that organizational characteristics and governance reforms account for in organizational performance,

was marginally above medium.

Information from Figure 1 shows the postulated correlation of the path between organizational characteristics and organizational performance ($\beta=0.564$, $t=5.527$, $p=0.001$) is statistically significant since p is less than 0.05 while a value of t is more than 1.96. Likewise, the path correlation between governance reforms and organizational performance ($\beta=0.222$, $t=2.586$, $p=0.016$) is also significant as the value of p is less than 0.05 and t is more than 1.96. The statistical significance was confirmed through a bootstrapping procedure of PLS-SEM analysis with 500 resamples.

Effect Size

The effect sizes f^2 shown in Figure 2, were also obtained from PLS-SEM output for organizational characteristics was 0.473, while that of governance reforms was 0.073. [75] proposed effect sizes of 0.025, 0.01, and 0.005 representing substantial, moderate, and small effect sizes respectively. In accordance with the rules suggested by [75], the results therefore indicated that the effect sizes for organizational characteristics and governance reforms were all substantial since they were all above 0.025.

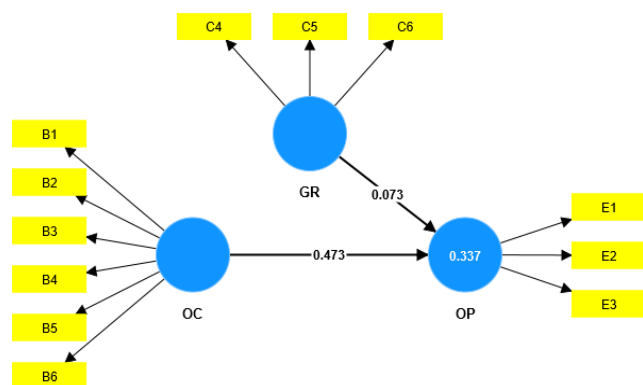


Figure 2. Structural Equation Modelling Path Diagram showing the Effect Sizes and Statistical Significance.

The Moderation Effect

Figure 3 the impact of governance reforms as a moderator on correlation between organizational characteristics and organizational performance. The moderation effect was carried out using a two-stage approach. If the main intention is to measure the effect of moderation's significance, a two stage method should be used. It is preferred because it results into higher statistical power in comparison to other methods [76].

Information from Figure 3 further reveals that the effect of moderation's value is -0.042 while the impact of organizational characteristics on performance was 0.564. The explanation is that the association between organizational characteristics with organizational performance is 0.564 for a regular level of governance reforms. However, when governance reforms is enhanced by one standard deviation, the link between organiza-

tional characteristics to organizational performance decreases by the impact of interaction [thus $0.564 + (-0.042) = 0.522$].

Alternatively, if governance reforms is reduced by a standard deviation, the link between organizational characteristics and organizational performance increases by effect of interaction [i.e., $0.564 - (-0.042) = 0.606$]. It can also be observed that after applying the moderating effect, the R^2 value increased marginally from 0.337 to 0.339 while the path coefficient between governance reforms and organizational performance decreased marginally from 0.222 to 0.218 after moderation.

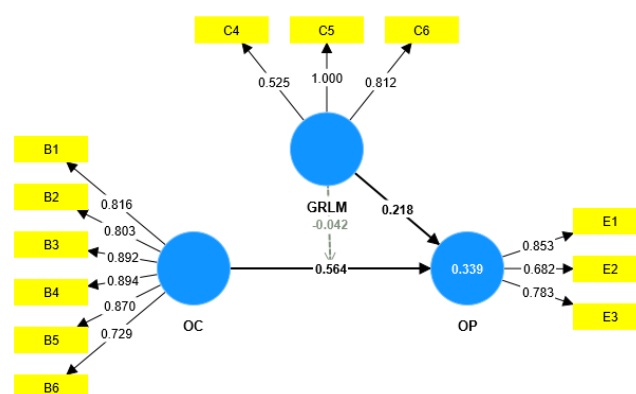


Figure 3. Structural Equation Modelling Path Diagram showing the Moderating Effect of Governance Reforms.

The Significance of the Moderating Effect

Table 10 statistics show that the moderation impact is significant as the t value is 2.904. This score is higher than the threshold of 1.96. It is also observed that the p-value was 0.024 which is less than the maximum limit of 0.05 to confirm the statistical significance. The result implies that governance reforms had an indirect but significant moderating impact on the correlation between organizational characteristics and organizational performance [77]. guided that if all the path coefficients are significant when the moderating impact is also significant, it means that the direct impact of the independent variable on the endogenous is also significant.

Table 10. Results for Moderating Effect.

	Path coefficient	T statistics	P value	f^2
Moderating effect	-0.042	2.904	0.024	0.004

Total Effect Analysis

The results from the total effect analysis in Table 8 indicate that the postulated path relationships between organizational characteristics and organizational performance have significant total effects ($\beta = 0.564$, $t = 5.527$, $p\text{-value} = 0.001$), governance reforms influence on organizational performance follows ($\beta = 0.218$, $t = 2.586$, $p\text{-value} = 0.016$). The moderating effect of

governance reforms on organizational performance had an indirect effect ($\beta = -0.042$, $t = 1.981$, $p\text{-value} = 0.010$).

Table 11. Total Effect Analysis.

Hypothesized Path Relationship	Path Coefficient	T Statistics	P values
Moderating effect Governance reforms -> Operational performance	-.042	1.981	.010
Governance Reforms -> Organizational Performance	.222	2.586	.016
Organizational performance -> Organizational Characteristics	.564	5.527	.001

In this model, all the path relationships were statistically significant. PLS-SEM analysis outcomes affirmed that organizational characteristics explain 56.4% of the change in the performance of seaports in Africa. It also revealed a direct significant and positive correlation between organizational characteristics and the performance of seaports in Africa ($\beta = 0.564$, $t = 5.527$, $p = 0.001$). Model estimation findings further confirmed that a significant moderating impact of governance reforms on the performance of seaports in Africa ($\beta = 0.222$, $t = 2.316$, $p\text{-value} = 0.016$). The moderating effect of the hypothesized path relationship between governance reforms and performance was negative but significant statistically ($\beta = -0.042$, $t = 1.981$, $p = 0.010$). Therefore, the findings based on data collected from seaports in Anglophone Africa did not endorse the null hypothesis because the value of the p was smaller than 0.05. The conclusion therefore supported the idea that governance reforms exhibit a significant moderation influence on the correlation between organizational characteristics and performance of seaports in Anglophone Africa.

5. Discussion

The research determined that the landlord model of governance reforms had a significant impact on the performance of Anglophone African seaports and supported the idea from the questionnaire responses that the landlord model accounts for 78% of the ports surveyed. The study findings therefore agree with [78] who found that ports in Africa were gravitating towards the landlord reform model and that the most efficient and higher quality ports in Africa had adopted the landlord model. The study outcomes also support the findings of [79] that the landlord model for port administration was so far the most popular worldwide accounting for over 80% of ports globally and therefore the most preferred by port governance reformists. The findings are also in congruence with [80], who also found that in the early 21st century, the landlord reform model was the most popular and prevailing model of governance of seaports that surfaced. The findings were also in congruence with [81] who found that the most successful reform model preferred by port reformists in the world is the landlord model. The model was also found to have gained

popularity in the European Union where it is the preferred choice of seaport governance [82].

The findings also confirmed the application of the natural resource-based view theory (NRBV) as an anchor for this study. The NRBV's proposition is that sustained competitive advantage is attained once an organization's possessions which are rare, inimitable, valuable, and non-substitutable are linked with the natural environment to define strategic competencies [83]. The study confirmed these attributes to include infrastructure, ICT, strategic location, size, maritime studies, and hinterland connectivity. The study also confirmed that with the moderation of governance reforms which is anchored on the agency theory, these attributes lead to competitive advantage. In the port environment, competition is premised on tangible assets and intangible ones like the provision of services [84]. These come from the effects of external resources, like hinterland structure and accessibility, supply chain, and natural environment which are grounded on the DCT and NRBT [85].

The study findings confirmed that governance reforms of seaports in Anglophone Africa have been proven to lead to increased direct investment in port infrastructure which in turn led to improvement in the ports' operational, financial, and market share performance. A typical example is the Moroccan port of Tangier Med. The report by [86] titled "World Container Port Performance Index" ranks the Moroccan Port of Tangier Med container terminal as the fourth most efficient container handling port globally and is also the leading terminal in Africa based on vessel time in the port after adoption of the landlord model. This observation is supported by [87] who stated that port concession had an extremely positive and very significant impact on superstructure and ship turnaround time in Nigerian ports and [88] who found that Nigerian ports invested in improved infrastructure and equipment due to reforms and achieved an annual average efficiency of 67% in performance after reforms. With regard to public service ports, even though there is an apparent increase in investment in port infrastructure and container handling equipment in East and South African ports, their performances were found to be still below par compared to the successes in landlord ports [89]. It follows therefore that heavy investment in infrastructure and equipment in public service seaports does not inspire im-

proved performance as long as the ports remain under public ownership and management. Further governance reforms were needed beyond landlord status for African ports especially the East African ports where regulatory reforms should be completed for reforms to have a meaningful impact [90]. This study therefore recommends that the interests of all the African ports that are still under public ownership and management will be better served through a focus on governance reforms especially on the landlord model and where necessary reforms be carried out on regulatory framework in order to inspire higher productivity and efficiency.

6. Conclusion

The main objective of the study sought to verify whether governance reforms had a significant moderating effect on the direct relationship between organizational characteristics and the performance of seaports in Anglophone Africa. To achieve this objective, a structural model and a hypothesis were first developed. The hypothesis predicted no significant moderating effect of governance reforms on the relationship between organizational characteristics and the performance of seaports in Anglophone Africa. PLS-SEM analysis using Smart PLS4.0 software was conducted to test the hypothesis. The findings showed that the path between organizational characteristics and organizational performance was positive and significant. Likewise, the relationship between organizational characteristics and organizational performance with governance reforms acting as a moderating variable was also positive and significant. The verdict from empirical evidence was that governance reforms have a significant moderating effect on the link between organizational characteristics and the performance of seaports in Africa.

This study concludes that governance reforms especially the landlord model positively and significantly improved the performance of what were previously public service ports post reforms. This study therefore recommends that those seaports in Africa that have not undertaken reforms should do so immediately for them to remain competitive and relevant. In doing so they should consider the landlord model which is the most popular globally. In contribution to practice and policy, the study will enable seaport managers, shareholders, government, and regulators to benefit from enhanced new knowledge which is necessary for the improvement of port performance to gain competitive advantage.

The limitation of this research was that the questionnaires were directed only to senior executives of seaports who are knowledgeable in port operations. Future studies should consider interviewing seaport stakeholders like shareholders, shipping lines, clearing and forwarding agents, government agencies, regional governments, port regulators, transporters, suppliers, and employees instead of relying on port executives whose views may have appeared subjective with a relatively small rate of response which necessitated the use of PLS-SEM analysis technique instead of the more robust covari-

ance-based SEM technique. Similar replicated studies can be considered for other regions for comparative results.

Abbreviations

SPSS Statistical Package for Social Sciences

Acknowledgments

My most sincere thanks to managers of port terminals in Africa and the regional port management associations who assisted me in reaching out to various ports across Africa for the collection of data required for this research.

Conflicts of Interest

The authors declare no conflicts of interest.

References

- [1] Sunitiyoso, Y., Nuraeni, S., Pambudi, N.F., Inayati, T., and Tiara, A.R. (2022). Port performance factors and their interactions: A systems thinking approach: *The Asian Journal of Shipping and Logistics*. Vol. 38, (2) pp 107-123.
- [2] Felicio, J. A., and Caldeirinha, V.R. (2013). The influence of the characterization factors of the European ports on operational performance: conceptual model testing. *International Journal of Shipping and Transport Logistics*, Vol. 5, No. 3, 2013.
- [3] de Waal, A. (2007). Characteristics of high performance organizations: *Business Strategy Series* (3). pp. 179-185.
- [4] Santos, J. B., and Brito, A. (2012). Towards a subjective measurement model for Organizational performance: Handbook of intelligence: *Cambridge University Press*, pp16-33: New York, (2012).
- [5] Molina-Azorín, F., Pereira-Moliner, J. and Tari, J. J. (2009). Environmental practices and firm performance: An empirical analyses in the Spanish hotel industry: *Journal of cleaner production* Vol. 17. No. 5 516-524 ref. 9.
- [6] Panda, B. and Leepsa, N. M. (2017). Agency theory: Review of theory and evidence on problems and perspectives. *Indian Journal of Corporate Governance*, Vol. 10(1). pp. 74-95.
- [7] UNCTAD. World Investment Report, (2018). UNITED NATIONS PUBLICATION. Sales No. E. 14.II. D.1 ISBN 978-92-1-112873-4.
- [8] African CEOs forum. (2021). Anew World Coming: How can Africa and its private sector navigate the change; Digital, (28th -30th September 2021).
- [9] Ports Strategy. (2021). Insight for Port Executives: *Mercantor Media, Fareham, UK*, (26th May 2021).

- [10] Notteboom, T. Pallis, A. and Rodrigues, J. P. (2022). Port Economics, Management, and Policy; London, Routledge, 690 pages, eBook ISBN 9780429318184.
- [11] Handoyo, S., Erlane S. M., and Soedarsono, S. (2023). Firm Characteristics, Business Environment, Strategic Orientation, and Performance. *Journal of Administrative Sciences*. Vol. 13 (3) 10.3390.
- [12] Mc Mahon, J. (2012). Performance Management in Human Resource Management: *Palgrave Macmillan*. ISBN. 13: 978.
- [13] Birley, S., and Westland, P (1990). Growth and performance contrasts between 'Types' of small firms: *Strategic Management Journal*. Vol. 11, No. 7 (Nov-Dec 1990). pp 535-557.
- [14] Ju, S., Xie, J., and Tang., H. (2023). The impact of competition on operational efficiency of ports: Empirical evidence from Chinese coastal port-listed companies: *Research in Transportation Business and Management* Vol. 46.
- [15] Felício, J., Caldeirinha, V., and Da Cunha, S. F. (2015). Government policies and Portuguese port governance, 2005 - 2015. *Transportation Business & Management* Vol. 22, 11-20.
- [16] Rodrigue, J. P. (2005). Geography of Transport Systems. Fourth Edition, Routledge, New York, 2005.
- [17] Notteboom, T.E, and Rodrigue, J. P. (2005). Port regionalization: towards a new face port development: *Maritime Policy and Management*. Vol. 32 (3), pp 297 - 313.
- [18] Chen, P., Pateman, H. and Sakalayan, Q. (2017). The latest trend in Australian port privatization, Drivers, Processes, and Impacts: *Transportation and Business Management*. Vol. 29 (2). pp 167-181.
- [19] Brooks, M. R, Knatz, G., Pallis A.A., and Willemsmeir, G. (2020). Visibility and verifiability in port governance transparency: exploring stakeholder expectations: *WMU Journal of Maritime Affairs* vol. 20, pp 435-455.
- [20] World Bank. (2007). Port Reform Tool Kit: International Bank for reconstruction and development: *World Bank Group*.
- [21] Zaucha, J and Kreiner, A. (2021). Engagement of stakeholders in the marine/maritime spatial planning process. *Mar Policy* 132:103394.
- [22] Cera, E, and Kusaku. A. (2020). Factors influencing organizational performance; work environment training and development, and organizational culture: *European Journal of Economics Business Studies* Vol. 6 (1) 16.
- [23] Contu, E. G. (2020). Organizational performance: theoretical and practical approaches; study on students' perceptions; *Proceedings of the International Conference on Business Excellence*. Vol. 14(1). pp 398-406.
- [24] Perez, M. S., Gasquez-Abad, J. C., & Martin-Carillo, G.M. and Fernandez, F.M. (2007). Effects of service quality dimensions on behavioral purchase intentions: A study in the public transport sector: *Journal of service theory and practice* Vol. 17(2): pp134-151.
- [25] Richard, P., Devinney, G., Yip, G. and Johnson, G. (2009). Measuring Organizational performance: Towards Methodological Best Practice. *Journal of Management*, Vol. 35, pp 718-804.
- [26] UNCTAD (1976). Port Performance Indicators: *UNITED NATIONS PUBLICATION* (1976) Sales No. E.76.11.D.7. Geneva GE76.6133.
- [27] Ali, S., Yassin, M., and Aburaya, R. (2020). The Impact of Firm Characteristics on Corporate Financial Performance in Emerging Markets: Evidence from Egypt: *International Journal of Customer Relationship Marketing and Management*, Vol. 11(4), pp 70-89.
- [28] Caldeirinha, V., Felício, J. A., and Dionício, A. (2011). Effect of the container terminal characteristics on performance. *Maritime Economics & Logistics*, Vol. 17(4), pp 493-514.
- [29] Notteboom, T. E., and Wang. S. (2015). The role of port authorities in the development of LNG bunkering facilities in North European ports: *Journal of Maritime Affairs* Vol.14 (1), pp 61-92.
- [30] Murphy, K. R. and Cleveland, J.N. (1991). *Performance appraisal: An organizational perspective*. Allyn & Bacon.
- [31] Liu, B.L. (2005). Efficiency Analysis of Container Terminals in China. *Tianjin: Institute of Transportation Economics, Nankai University, China*.
- [32] Wiegmans, R. (2003). 'Performance Conditions for Container Terminals', *Maritime Economics & Logistics*, Vol.6, pp 276-277.
- [33] Estache, A. and Goicoechea, A. (2005). 'Research' Database on Infrastructure Economic Performance: *SSRN Electronic Journal*. <https://doi.org/10.2139/ssrn.757364>
- [34] Turner, H., Windle, R. and Dresner, M. (2004) North American Container Port Productivity: 1984-1997. *Transportation Research*, Part E,40,339-356.
- [35] Trujillo, L. and Tovar, B. (2007). The European Port Industry: An Analysis of Its Economic Efficiency. *Maritime Economics and Logistics*, Vol. 9, pp 148-171.
- [36] Tongzon, J. and Heng, W. (2005). Port privatization efficiency and performance: Some empirical evidence from Container Terminals: *Transportation Research*, Vol. 39(5), pp 405-424.
- [37] Pires da Cruz, M. R., Ferreira, J. R and Azevedo, S. (2013). Key factors of seaport performance based on the stakeholder perspective: *An Analytic Hierarchy Process (AHP) model*.
- [38] Rodriguez, J. P. (2017). The governance of intermediacy. The insertion of Panama in the global liner shipping network: *Research in Transportation Business and Management*, Vol. 22, pp 21-26.
- [39] Alonso-Garsia, L., and M. Bofarull, M. (2007). Impact of Port Investment on efficiency and capacity to attract traffic in Spain: Bilbao and Valencia: *Maritime Economics & Logistics* Vol. 9. pp 254-267, (2007).

- [40] Wang, K., Shou, E., Zhang, H. and Ng, A. (2007). Strategy formulation of new generation ports: A Case study of HIT Ltd: *Research in Transportation business and Management*, Vol. 22 pp 239-254.
- [41] Yeo, G. T., Ng, A. K., and Yang, P. T. W. (2014). Modelling port choice in an uncertain environment. *Maritime Policy & Management*, Vol. 41 (3), pp 251 – 267.
- [42] Means, G, and Berle, A. (1932). The Modern Corporation and private property: *Commerce clearing, Hone New York*.
- [43] Emiroglu, C., and Caylan, D. O. (2014). The importance of strategic leadership for port management: *Journal of Global Strategic Management*, Vol 8 (2).
- [44] Parola, F., Ferrari, C., Tei, A., Satta, G. and Musso, E. (2017). Dealing with multi-scalar embeddedness and institutional divergence: Evidence from the renovation of Italian port governance: *Research in transportation business and Management* Vol. 22, pp 89-99.
- [45] Notteboom, T. E., and Yang, Z. E. (2017). Port governance in China: Institutional layering and impact of wider policies: *Research in transportation business and management*, Vol. 22, pp 78-88.
- [46] Song, D. W. and. Lee, S. W. (2017) Port governance in Korea: Revisited. *Research in Transportation Business and Management*, Vol. 22, pp 27–37.
- [47] Bergvist, R. and Cullinane, K. (2017). Port privatization in Sweden: Realism in the face of global hype: *Research in Transportation Business & Management*, Vol. 22, pp 224 - 231.
- [48] Brooks, M., Cullinane, K., and Pallis, A. (2017). Revisiting port governance and port reforms: *Research in Transportation Business Management* Vol 22, 1-1.
- [49] Saundry, R., and Turnbull, P. (1997). Private profit, public loss. The financial and economic performance of the UK Ports: *Maritime Policy and Management* 24(4), pp 319-342.
- [50] Anderson T., Aryee, J., Acheampong, G., and Hansen, A. S. (2023). The continuous search for new port governance models: experiences from a developing country: *Journal of shipping and trade* Vol. 8 (1).
- [51] Saunders, M., Thornhill, A. and Lewis, P. (2007). Research Methods for Business Students. (5th ed.). Harlow: *Financial Time prentice-Hall*.
- [52] Chirchir, K. M. (2022). Supply chain integration and firm performance, the mediating effect of competitive advantage among large manufacturing: *African Journal of Business Management* Vol. 7, (2), pp 45-67.
- [53] Odock, S. O., Awino, Z.B., Njihia, J.N., and Iraki, M.N. (2016). Green supply chain management practices and performance of ISO 1401 Certified manufacturing firms in East Africa: *DBA Africa Management Review*. 6(3); 103-128 No. 3.
- [54] Wong, K.K. (2013). Partial Least Squares Structural Equation Modeling (PLS-SEM) Techniques Using Smart PLS. *Marketing Bulletin*, Vol. 24, pp 1-32, (2013).
- [55] Tabachnick, B. G., and Fidell, L. S. (2001). Principal components and factor analysis. Using multivariate statistics, 4(1), pp 582-633.
- [56] Razali, N.M., and Wah, B.Y. (2011). Power comparisons of Shapiro-Wilk, Kolmogorov- Smirnov, Lilliefors and Anderson-Darling tests: *Journal of statistical modeling and Analytics*, 2, 21-33.
- [57] Miles, J. (2005). Tolerance and Variance Inflation Factor. Encyclopedia of Statistics in Behavioral Science, <https://doi.org/10.1002/0470013192.bsa683>
- [58] Knaub, J.R. (2021). When would heteroscedasticity in regression occur? *Pakistan Journal of Statistics*. Vol. 37(4), pp 315-367. (2021).
- [59] Kaiser, M. O. (1974). Kaiser-Meyer-Olkin measure for identity correlation matrix. *Journal of the Royal Statistical Society*, Vol. 52, pp 296-298.
- [60] Bartlett, M.S. (1954). A note on the multiplying factors for various chi-square approximations. *Journal of Royal Statistical Society*, 16 (Series B), 296-8.
- [61] Byrne, M. (2010) Structural equation modeling with AMOS: *Basic concepts, applications, and programming* (2nd. Ed) New York: Routledge, (2010).
- [62] Hair, J. F., Hult, G. T. M., Ringle, C. M., & Sarstedt, M. (2014). *A Primer on Partial Least Squares Structural Equation Modeling (PLS-SEM)*. Thousand Oaks: Sage.
- [63] Bagozzi, R., and Yi, Y. (1988). On the evaluation of structural equation models. *Journal of the Academy of Marketing Sciences*, 16, pp 74–94.
- [64] C.M Ringle, M. Sarstedt, R. Mitchell and S.S. Gudergan. (2018). Partial least squares structural equation modeling in HRM research. *The International Journal of Human Resource Management* 31(1) pp 1-27.
- [65] Hair, J. F., Black, W.C., Babin, B.J. & Anderson, R. E. (2010) *Multivariate Data Analysis*. 7th Edition, Pearson, New York.
- [66] Fornell C. and Larcker, D. F. Structural equation models with unobservable variables and measurement error: Algebra and statistics, (1981).
- [67] Teo, T.S.H., Srivastava S.C., & Jiang, J.Y. (2008). Trust and electronic government success: An empirical study. *Journal of Management Information Systems*, 25(3), pp 99–132.
- [68] Stone, M. (1974). Cross-validators choice and assessment of statistical predictions. *Journal of the Royal Statistical Society: Series B Methodological*, 36(2), pp 111–133.
- [69] Geisser, S. (1974). A predictive approach to the random effect model. *Biometrika*, 61(1), pp 101–107. <https://doi.org/10.1093/biomet/61.1.101>
- [70] Hooper, D., Coughlan J., Mullen, R. and Micheal, R. (2008) Structural equation modeling: Guidelines for determining model fit: *The Electronic Journal of Business Research Methods* Vol. 6(1) pp 53-60.

- [71] Ringle, M. C. (2016). Partial Least Squares Structural Equation Modelling: *Handbook of Market Research*. pp 1-47. Springer.
- [72] Kline, R. B. (2015). Principles and practice of structural equation modeling. *Guilford Publications*, 2015.
- [73] Hu, L., and Bentler P.M. (1999). Structural Equation Modeling: Cut off criteria for fit indices in covariance structure analysis: *Multidisciplinary Journal*, Vol. 6 (1).
- [74] Ringle, C. M., Sarstedt, M., Mitchell, R., and Gudergan, S. S. (2022). Partial least squares structural equation modeling in HRM research. *The International Journal of Human Resource Management* Vol. 31(1) 1-27.
- [75] Peng, D. X., and Lai, F. (2012). Using Partial Least Squares in Operations Management Research: A Practical Guideline and Summary of Past Research Vol. 30 (6).
<https://doi.org/10.1016/j.jom.2012.06.002>
- [76] Hair, J. F., Tomas, G.M., Ringle, C. M., Sarstedt, M., Danks, N. P., and Ray, S. (2021). A workbook: Partial Least Squares Structural Equation Modelling, ISBN 978-3-030-80518-0.
- [77] Henseler, J. J., and Chin, W. W. (2010). A comparison of approaches for the Analysis of interaction effects between latent variables using partial least squares.
<https://doi.org/10.1080/10705510903439003>
- [78] Hair, J. F., Sarstedt, C., Hopkin L., and Kuppelwieser. V. (2013). PLS-SEM an emerging tool for business research: *European Business Review* Vol. 26(2) pp 106-121.
- [79] Trujillo, L., and de-Lara-Penute, P. I. (2020). Ports Performance: The Case of East African Ports. *Palgrave Studies in Maritime Economics*. pp 145-170.
- [80] Notteboom, T. E., Haralambides, H.E. (2020). Port management and governance in post Covid-19 era: *Maritime Economics and Logistics* Vol. 22, pp 329–352.
- [81] World bank (2022). Public private partnerships in ports-port reform.
- [82] Cristina, A., and Casaca. F. C. P. (2022). Assessment of port governance model: evidence from the Brazilian ports. *Maritime Business Review*, Vol. 7(1), pp. 70-85.
- [83] Carvalho, M. and Marques. R. C. (2007). Economic regulation in the Portuguese seaport sector. Athens: In IAME Conference, 3–6.
- [84] Hart, S. L. (1995). A natural-resource-based view of the organization. *Academy of Management Review*, 20: pp 86-1014.
- [85] Notteboom, T. E., Pallis, A. and Rodrigues. J. P. (2022). Port Economics, Management, and Policy; *London, Routledge*, 690 pages, eBook ISBN 9780429318184.
- [86] Bichou, K., and Gray, R. (2014). Review of performance approaches and supply chain framework to port performance benchmarking. *Maritime and economics logistics* Vol. 17(1), pp 567-598.
- [87] World Bank (2023). The Container Port Performance Index 2023: A Comparable Assessment of Performance Based on Vessel Time in Port (English). *Washington, D.C., World Bank Group*.
- [88] Okeke, A. F. (2022). Port Concession and Ship Turnaround Time in Nigerian Ports. *Chukwuemeka Odumegwu Ojukwu University. Researchgate*.
- [89] Akenyemi. Y. C. (2016). Port reform in Nigeria: efficiency gains and challenges. *Geo Journal*. Vol. 81. No. 5 pp 681- 697.
- [90] Dooks M. and Farrell, S. (2017). Lions or gazelles? The past present and future of African port authorities: The case of East Africa. London: *Research in Transportation and Business and Management*, Vol. 22, pp 135-152.