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Effect of Reliability of Information Systems on Links Between Cross-Functional Co-Ordination and Customer Satisfaction: Empirical Evidence from Tanzania Port Operations

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Abstract

This study assessed the influence of reliable information system on the relationship between cross-functional co-ordination and customer satisfaction based on the empirical evidence drawn from Tanzania ports' operations. Specifically, the study had set out to assess the influence of cross-functional co-ordination on customer satisfaction with Tanzania ports and examine the moderating effects of information system reliability on cross-functional co-ordination and customer satisfaction. The study adopted a positivism philosophy alongside an explanatory deductive case study research design. Moreover, it and applied quantitative methods whose primary data were generated using self-administered structured questionnaires. The data came from sample of 298 respondents drawn from a population of 1,325 agents using simple random sampling, with 228 coming from five Tanzania ports of Dar es Salaam, Tanga, Mtwara, Mwanza, and Kigoma.

Data were subjected to the use of Smart PLS 3.0 for Structural Equation Modelling for hypothesis testing. Also, the Port Service Quality (PSQ) theory and Relational Co-ordination Theory (RCT) helped to operationalise the interactions of three constructs—cross-functional co-ordination, reliability of information systems, and port customer satisfaction. The assumption was that little is known about the use a study model, we have multiplied the combined effect of cross-functional co-ordination let alone the moderation effects of reliable information systems on port customer satisfaction. The research discovered a considerable moderating impact of reliability of information systems on the relationship between cross-functional co-ordination and port customer satisfaction. Moreover, the IPMA results affirm the highest levels of importance and performance of cross-functional co-ordination in predicting port customer satisfaction. Thus, cross-functional co-ordination positively influences port customer satisfaction.

Keywords: Cross-functional co-ordination, customer satisfaction, reliability of information systems

Introduction

Transport infrastructure is having a considerable impact on national integration into the global economy, being a powerful factor in encouraging balanced regional and economic growth, and (Dwarakish & Salim, 2015).Studies by Dwarakish and Salim (2015) and Pienaar (2013) found that in terms of the amount of weight transported, the size of the fleet, the distance travelled, and maritime transportation constitute the cheapest and most effective transportation mode compared to others in improving the living standard of locals (Dwarakish & Salim, 2015;

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Pienaar, 2013; Yin, 2020). Also, customers are a rich source of information for businesses, offering their opinions on services, especially for service enhancement while boosting the user experience with the finished products. (Busagara, Mori, Mossberg, Jani, & Andersson, 2020). In fact, interactions with customers allow service providers to gather enormous information for improving services as well as designing and developing future services to optimise customer satisfaction (Kadir, Rahmani, & Masinaei, 2011).

There has not been much empirical research on how port service quality, in particular in the port industry, affects customer satisfaction. (Yeo, Thai, & Pak, 2016). Moreover, Phan, Thai, and Vu (2020) in their study, the authors noted that there had not been many studies on service quality in the marine sector generally or in the port industry specifically ; instead, the majority of these studies have placed a lot of emphasis on port effectiveness, port selection, or carrier. Mkawuganga (2018) also found that there is relatively little literature available on customer satisfaction in the port industry and, specifically, on the influence of port service quality on customer satisfaction. The purpose of this study was to determine the impact of cross-functional co-ordination on customer satisfaction in Tanzania ports using the Resource-Based View (RBV) and Relational Co-ordination Theory (RCT). As informed by literature coupled with the study's environment and variables, we adopted the moderation approach to portray the co-variation effects rather than mediation which portrays transitive effect (Umanath, 2003).

In Tanzania, the role of trade in economic growth has not received as much attention and it is difficult to find studies that quantify the subject sufficiently (Magai, 2018). Yet, the ports in Tanzania ports serve many of the land-linked countries comprising Burundi, Rwanda, DR Congo, Uganda, Malawi, and Zambia (Issa & Masanja, 2022). There are also lake ports to go along with the seaports. The market share analysis of for respective Tanzania and Kenya ports for the of 2013 – 2017 period depicts that for the incoming cargo traffic to Tanzania, Burundi, Rwanda, DR Congo and Uganda, the average percentages of 97.92, 88, 77.2, 53.4 and 2.8 went through Tanzania ports whereas 2.08, 12, 22.8, 46.6 and 97.2 opted for Kenya ports, respectively. Such market share potentials amidst competition as well as future dynamic demand in the port industry suggest the need to investigate factors for enhancing customer satisfaction to retain the existing and attract new customers. This study strived to cover that theoretical gap, determine statistical potential and came up with practical implications for the Tanzania ports and the industry generally.

The study assessed the influence of cross-functional co-ordination on customer satisfaction with empirical evidence from Tanzania port operations. Specifically, the study had set out to assess the influence of cross-functional co-ordination on the customer satisfaction with Tanzania ports and examine the moderating effects of the reliability of information system on cross-functional co-ordination and customer satisfaction The assumption was that findings on the relationships of study variables could evidently enhance the existing knowledge and understanding at the local level. In this regard, setting port improvement priorities and strategies, cross-functional co-ordination and customer satisfaction can serve as competitive factors. The Important-Performance Map Analysis (IPMA) for Tanzania ports has been developed based on the study findings using variables and relationships established for management consideration. Moreover, the objectives of this study have addressed, firstly, the Ports Act 2004 No 17 regarding port promotion; secondly, the National Transport Policy of 2003 (Tanzania, 2003) particularly its

mission; and, finally, the National Trade Policy for a Competitive Economy of 2003 (Biashara, 2003) focusing on its vision.

Literature Review

Cross-functional co-ordination, Information system reliability and Port Customer Satisfaction

Cross-functional co-ordination focuses on the degree to which a company organizes distinct intra-organizational departments' actions and behaviours into synchronized and coordinated processes (Li, Wang, Huo, Zhao, & Cui, 2022). In fact, companies need to coordinate across functional lines in order to promptly respond to the complex and volatile needs of their customers to undertake all internal departments contributing to concerted efforts aimed to satisfy customers and (Li et al., 2022) bring about a competitive advantage in addition to enhancing the development of new products for firms (Li et al., 2022). Customer satisfaction refers to the response of consumers to determining whether there is a gap between expectations and how well a product or service performed as viewed by the consumer. (Yi, 1990). A reliable Information system performs specified functions within a given time interval (Ivan Brokarev & Vaskovskii, 2022). In this regard, reliability entails error- and bias-free information whose data in the accounting information systems fairly reflect its operations, and which appropriately portrays the events and activities of the company (Sujud & Hachem, 2019).

Theoretical literature review

In an attempt to address its objectives, the study applied both the Port Service Quality (PSQ) Theory and Relational Co-ordination Theory (RCT). Thai (2008) validated the Service Quality (SERVQUAL) to develop the Port Service Quality (PSQ) for measuring service quality in maritime transport. The theorem consisted of six dimensions: ‘resource’, ‘outcomes’, ‘processes’, ‘management’, ‘image’, and ‘social responsibility’. The comprehensive review of the ROPMIS mode informed customisation for the unique circumstances of ports (Yeo et al., 2016). Moreover, PSQ serves as a measurement of the level of service that must be consistently provided to clients by a business entity to meet expectations and ensure customer satisfaction. Reliability was an additional dimension that the study had used (Pahala, 2017). Yeo et al.'s (2016) further validated the conceptual model by looking at the connection between customer satisfaction and PSQ in the context of Korean container ports. Using data from a poll of 313 participants, the Korean Port Logistics Association (KPLA) confirmed the model. The study concluded that customer satisfaction is significantly and favourably influenced by PSQ, its management, image, and social responsibility issues (Yeo et al., 2016). The studies that applied PSQ also deployed variables related to reliability and customer satisfaction. Implicitly, PSQ has also supported both variables of the reliability of information system and port customer satisfaction applicable in the current study.

On the other hand, the relational co-ordination theory assumes that co-ordination that occurs through regular, effective communication backed by connections based on shared objectives, expertise, and respect helps companies more effectively to accomplish their desired results. In fact, relational co-ordination is the interaction between relationships and communication during task integration (Hoffer Gittell, 2002). Under this theory, the process of coordination depends on three aspects of relationships: mutual respect, common goals, and shared information. But these have been created and put to the test in the context of air transport (Gittell, 2001; Gittell, Godfrey, & Thistlethwaite, 2013), surgical and medical care. In the context of this study, the

relational co-ordination theory helped to generalise to cargo clearance procedures in which numerous providers carried out highly interconnected jobs within time and uncertainty limitations.

Empirical literature review

Cross-Functional Co-ordination and Customer Satisfaction Relationship

In practice, businesses use cross-functional co-ordination to deal with crises and environmental changes, and can improve new product creation in addition to providing them with a competitive edge (Li et al., 2022). The study considers how cross-functional co-ordination actions improve businesses' ability to manage the additional information processing needs caused by coordination with customers. The findings demonstrate a favourable relationship between cross-functional coordination and operational performance. Cheon and Deakin's (2010) conceptual model of port sustainability had examined multiple concepts including cross-functional coordination of supply chains surrounding port operations to determine institutional obstacles as well as supply chain bottlenecks. The study found that teamwork and co-ordinated efforts facilitated port authorities and other stakeholders in developing sustainable business and cargo transportation models at seaports. Oliva and Watson (2011) assessed the designing the supply chain with a cross-functional focus on sales and operations. The study found cross-functional collaboration to facilitate the assessment of the state of the supply chain and the needs of the organisation.

These studies had assessed the influence of cross-functional co-ordination on customer satisfaction not necessarily in generalizable conditions. This led the current study to evaluate the impact of cross-functional co-ordination on port customer satisfaction with empirical evidence from Tanzania ports. As such, we hypothesised:

H_1: Cross-functional co-ordination positively influences port customer satisfaction

Reliability of Information System and Customer Satisfaction Relationship

Raza, Jawaid and Hassan (2015) in their study had determined how factors related to service quality, such as reliability, affected customer satisfaction in Pakistan. The study had measured the correlation between customer happiness and the quality of service. Using a sample of 500 respondents attending universities in Malaysia and had personal bank accounts, the study found the traits of responsiveness and empathy to be insignificant in meeting the clients' demands but found reliability to significantly and positively correlate with the satisfaction level of customers (Raza et al., 2015). Sujud and Hachem (2019) assessed how reliability of information systems affects the delivery of natural gas quality as per expectations of supplier and clients. The study concluded that reliability depends on the internal factors and indicators including time of failure to meet the expectations. Also, Zahedi, (1997) analysed the reliability metric for information systems based on customer requirements. The study, firstly, found that reliability facilitates monitoring of the performance of the product or service and provision of guidelines for the continuous improvement in a bid to meet customer requirements. However, these studies overlooked the link between the reliability of information systems and its intangible resources, on the one hand, and port customer satisfaction, on the other. As such, this study assessed the moderating effect of the reliability of the information system on the relationship between cross-functional co-ordination and port customer satisfaction with empirical evidence from drawn Tanzania ports. Based on this background, we hypothesised:

H_2: *Reliability of the information system moderates the relationship between cross-functional co-ordination and port customer satisfaction*

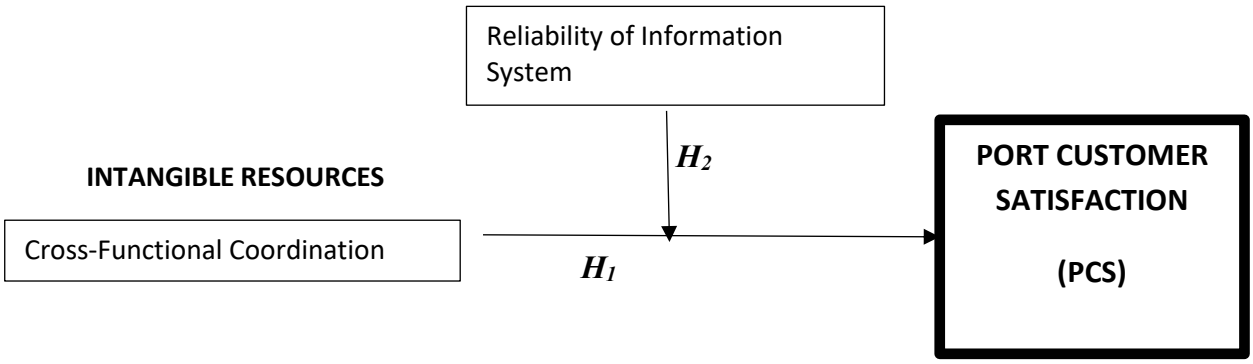


Figure 1: Conceptual Framework of the Study

Methodology

The study applied a positivism philosophical stance to relate the natural scientist stance with an observable social reality to produce law-like generalizations (Saunders, 2019). Moreover, the study used deductive reasoning to test the study hypotheses against observable consequences, (Antwi & Kasim, 2015). Using an explanatory design, the study looked at a new universe based on the study variables, relationships, and associated objectives, which had not been studied earlier and involved causes and reasons regrading some phenomenon related to study variables (Megel & Heermann, 1993). Also, the study applied the quantitative method since it identified and supported what is embedded in positivism paradigm while focusing on fresh data (Rahi, 2017). Furthermore, it integrates the deductive, objective, and generalised purposes and procedures (Morgan, 2014). The study applied Krejcie and Morgan's (1970) the formula that Januszyk *et al*. (2011) and Minani (2019) had also applied in their respective researches, to draw a obtain the representative sample size of $n = 298$ from a population of 1,325 thusly:

Using simple random sampling, the study identified the interview respondents to draw a sample size of 298 from regional ports. Simple random sampling gave each participant from the study population a fair chance of being drafted into the sample (Creswell, 2014). We also gained access to most of the stakeholders especially Clearing and Forwarding Agents through the TPA and specifically through the Port Director and managers.

Sampling, Unit of Analysis and Inquiry

The sample size consisted of port customers, other government departments, and the Tanzania Ports Authority from five regions of interest to the study. Due to the participation of several stakeholder groups, the study presented a more comprehensive analysis of the research issue (Kovacs & Moshtari, 2019). We also adopted a simple random sample from the sampling frame. The unit of analysis in this study was the Clearing and Forwarding Agency Company (Employer) whereas the unit of inquiry were employees of the company who had adequate information on and knowledge about the TPA port services related to the research objectives.

The study used a self-administered two-part questionnaire approach delivered by hand to generate requisite data. The first part of the questionnaire gathered demographic information of the respondents alongside the company profile whereas the second part had items as measures

based on 7-point Likert-scale. These statements ranged from 'Strongly agree' to 'Strongly disagree'.

Common method bias was also applied to prevent common method variance. Indeed, most researchers agree that common method variance is a potential problem in research (Podsakoff, MacKenzie, Lee, & Podsakoff, 2003). The technique for addressing the common method bias entailed reverse coding of the variable values applied in the questionnaire during data entry and the application of a seven (7) point Likert scale for independent and dependent variables instead of a five (5) or three (3) point scale. The reliability of the responses on a 7-point scale performs better than 5-point scale owing to items on the scale defined by the construct (Joshi, Kale, Chandel, & Pal, 2015). This study, therefore, applied a 7- point Likert scale for independent and dependent variables in addition to assessing CMV later in this report.

Findings and Discussions

Respondents' Profile

From the 298 questionnaires distributed in five regional ports, the study registered a high response rate of 76.5% (n=228). We had used the TPA Port Director and Regional Port Managers to facilitate access the targeted respondents. There were far more males gender (83.8%) than there female (16.2%) counterparts, which is also consistent with the gender demographic profile of TPA. The mean age of the sample was 35.5 years, implying that the employees were largely in their most active and productive ages. In terms of education and professional qualifications, 63.6 percent of the respondents had attainment college certificates, whereas 17.5 percent had secondary certificates as their terminal education, 16.7 percent had a degree, and a paltry number (2.2%) had non-formal education. Implicitly, the bulk of the responding employees had the necessary basic education necessary to operate in TPA. Furthermore, many of the respondents (32%) had a mean work experience of five years, followed by those (26.8%) with a mean of eight years' experience and minor respondents (20.6%) with three years' experience mean and lastly 10.5% and 10.1% with above fifteen and average of thirteen years' experience respectively.

Assessment of the Measurement Model

The assessment of the measurement model was conducted by composite reliability, Cronbach alpha, rho_A, Average Variance Extracted, and HTM to obtain the following results:

Table 1: Measures of Construct Validity and Reliability

	Composite Reliability (>0.7)	**Cronbach's Alpha** (>0.7)	**rho_A**	**AVE**(>0.5)	**VIF**	**HTMT** (HTMT < 1)		**Decision**
						CFC	**RIS**	
CFC	0.941	0.907	0.909	0.843	2.863			Good
RIS	0.911	0.870	0.905	0.911	2.793	$0.893CI_{0.95}$ [0.840;0.941]		Good
PCS	0.949	0.928	0.932	0.822		$0.858CI_{0.95}$ [0.800;0.908]	$0.825CI_{0.95}$ [0.764;0.880]	Good

The results obtained results show that exogenous latent variables have good measures on the reliability across all the variables which include the endogenous variable, PCS.

Evaluation of Common Method Bias

The amount of erroneous covariance that variables share because of the common method used to collect data is known as common method variance (CMV). (Kanani, 2020; Malhotra, Kim, & Patil, 2006). In this study, CMV was, firstly, examined through a simple Collinearity Test using VIF, it demonstrated that all construct had variance inflated factor (VIF) values below the suggested cutoff of 5. When VIF values are higher, the level of correlation or collinearity is greater. VIF values of 5 or above indicate collinearity problems (Hair, Sarstedt, Hopkins, & Kuppelwieser, 2014). In this study, CMV did not pose a threat.

Evaluation of the Model's Predictive Capability ($PLS_{Predict}$)

PLS_{Predit} (or out-of-sample) the ability of a model to forecast new or upcoming observations is known as predictive power (Hair, Sarstedt, & Ringle, 2021). The assessment of the model's predictive power conducted yielded the following results:

Table 2: Discrepancies between RMSE and Q2_prediction of PLS SEM and LM

	PLS SEM - Actual		LM - Prediction		DISCREPANCIES	
	RMSE	**Q^2_predict**	**RMSE**	**Q^2_predict**	**RMSE**	**Q^2_predict**
SATIS3	1.385	0.358	1.102	0.594	-0.283	0.236
SATIS4	1.332	0.323	1.119	0.522	-0.213	0.199
SATIS5	1.307	0.264	1.111	0.468	-0.196	0.204
SATIS2	1.401	0.401	1.040	0.670	-0.361	0.269

Source: Field Data (2022)

RMSE of LM (i.e., prediction) is greater than that of PLS SEM (i.e., actual) in SATIS3, SATIS4, SATIS5 and SATIS2 that translate into lower prediction error. Also, the values of Q^2_predict in the four indicators of endogenous variable are above 0, which means lower prediction error. The results confirm that the model has higher predictive power.

Evaluation Results of the Structural model

Janadari, Sri Ramalu, We, and Abdullah (2016) state The consistent, conceptually and theoretically defined contextual link between data observed on the input and output sides is represented by the structural model and its latent variables. Hair, Hult, et al. (2021) state that collinearity happens when two or more measurement model indicators have a high degree of correlation whereby VIF < 5 is acceptable. We measured the VIF values with results presented in Table 2 (above), which indicate acceptable levels of collinearity. In other words, the structural model has no collinearity issues.

Assessment of the path co-efficient

The measuring of the path coefficient value yielded 0.365, which signifies a strong positive relationship, meaning that the path coefficient value of 0.365 explain a 36.5% increase in PCS. Impliedly, if CFC construct increases by one standard deviation unit, the PCS construct will increase by 0.365 standard deviation unit when all other independent constructs remain constant. The results are as presented in Table 3:

Table 3: Path coefficients of Structural model for Direct and Moderated effects

No.	Relationship	Original Sample (O)	Sample Mean (M)	(SDV)	CI_ 5%	CI_ 95%	T-statistics (One tailed test, directional hypo, 1.645)	f^2	R^2	Q^2
Direct Effects										
H_1	**CFC -> PCS**	0.365	0.360	0.042	0.316	0.454	12.721	0.276	0.675	0.513
Indirect (Moderated) Effects										
H_2	**RIS*CFC -> PCS**	0.064	0.104	0.039	-0.169	0.003	5.734**(supported)**	0.018	0.678	0.513

Assessment of the coefficient of determination of R^2, effect size of f^2 and predictive relevance of Q^2

The explanatory power, also known as the in-sample predictive power, of a model is measured by the R^2, which computes the variance explained in each of the endogenous constructs. Measuring the coefficient of determination of R^2 produced 0.675 for the direct model. This implies that 67.5% change in PCS can be accounted for one (1) exogenous construct. The effect size of f^2 is the change in the R^2 value. When a specified exogenous construct is omitted from the model, it can be used to evaluate its impact on the endogenous construct (Hair et al., 2021). Moreover, we measured the effect size of f^2 and obtained 0.274, which translates into a large effect size on R^2 . The Q^2 also establishes the predictive relevance of the endogenous construct that measures whether a model has predictive relevance or not whereby $Q^2 \geq 0$ has predictive relevance (Hair, Hult, et al., 2021; Hair, Sarstedt, et al., 2021)). The predictive relevance of Q^2 was measured and the value of 0.513 was obtained. Hence, the model has predictive relevance. The results are as presented provided in Table 3 (above).

Model Assessment

The structural model results shows that the significant relationship is found between CFC on PCS:

Direct Effect Results

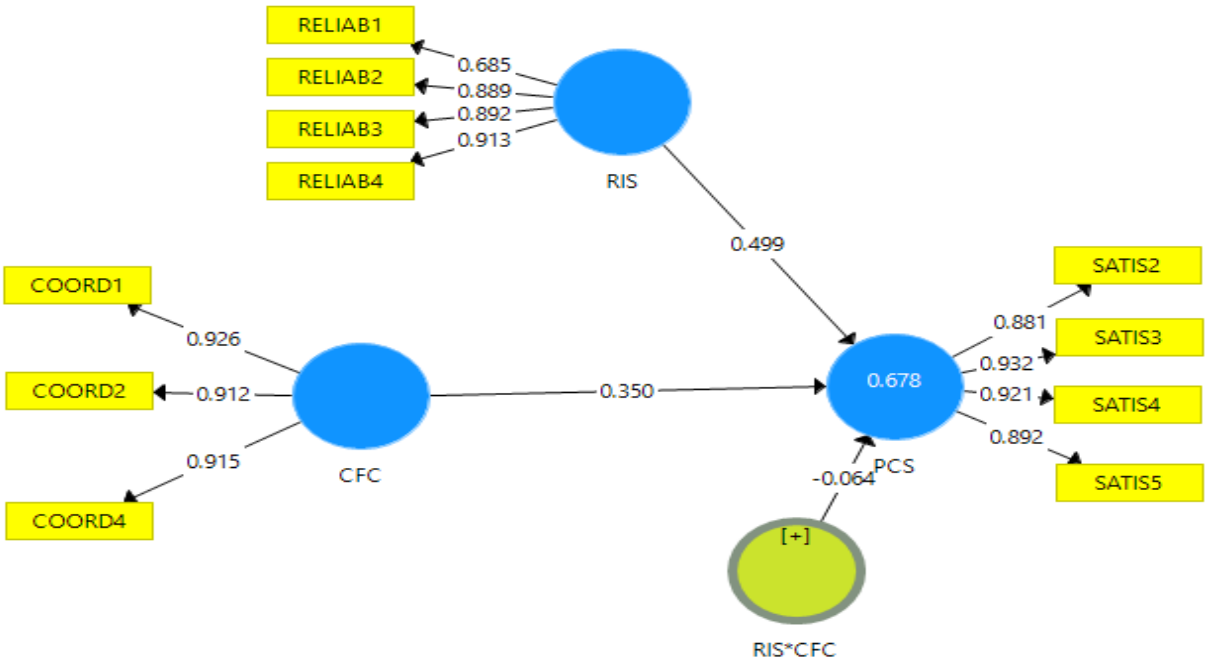
The direct model was measured and the coefficient of the determination of R^2 value was 0.675, which translates that 67.5% change in PCS can be accounted for by two (2) exogenous constructs as follows:

Direct effect of cross-functional co-ordination on port customer satisfaction

The first hypothesis, H_1 states that cross-functional co-ordination positively influences port customer satisfaction. In testing the hypothesis, the results revealed that CFC has a significant impact on PCS ($\beta = 0.365$, $t = 12.721$) i.e. one percent increase of CFC increases PCS by path coefficient of 36.5%, *ceteris Paribas* (Hair, Sarstedt, & Ringle, 2017). Also, the confidence intervals [0.316; 0.454] do not include 0, indicating the existence of direct effect (Hair et al., 2017). Moreover, the t-value of 12.721 is above the critical value for the z-test of 1.645. Therefore, H_1 was supported and, hence, not rejected.

Moderation Analysis Results

The measuring of moderated model shows that the coefficient of determination of R^2 value has improved from 0.675 to 0.678, which implies that a 67.8% change in PCS can be accounted for by two (2) exogenous constructs. The moderated model is as presented in Figure 2:



Source: Field Data (2022)
Figure 2: Moderated model

Reliability of Information System and cross-functional coordination on Port Customer Satisfaction

The second hypothesis, H_2: states that the higher (lower) the reliability of information system, the weaker (stronger) the influence of cross-functional coordination on port customer satisfaction. The results revealed that RIS*CFC has a significant impact on PCS (β = -0.064, t = 5.734). This indicates that one unit increase (decrease) of the reliability of information system decreases (increases) the influence of cross-functional coordination and port customer satisfaction by the size of the path coefficient (6.4%), *ceteris Paribas* (Hair et al., 2017). The t-value has weakened or reduced from 12.721 to 5.734 yet above the critical value for the z-test of 1.645. Therefore, H_2 was supported and hence not rejected.

Simple Slope Analysis

A typical moderator analysis results representation uses simple slope plots (Hair, Sarstedt, et al., 2021). In this study, there is an analysis of simple slope plot below:

Moderation Effect of Simple Slope Analysis between CFC, RIS and PCS

The relationship between CFC on PCS is positive for all the three lines as indicated by their positive slopes. Hence, lower levels of CFC are associated with lower levels of PCS. The upper line (in green), which represents a higher level of the moderator, shows RIS with standard deviation above the mean has a very slightly steeper slope, hence representing a slightly

stronger positive effect. Also, the bottom line (in red), which represents a lower level of the moderator, indicates RIS with a standard deviation below the mean; it has a very slightly flatter slope, hence representing a slightly weaker positive effect. The simple slope plot shows the positive interaction terms that lower RIS levels entail a slightly weaker relationship between CFC and PCS and vice versa which are accepted.

The Importance – Performance Map Analysis (IPMA)

Furthermore, the Importance-Performance Map Analysis provides a practical and accessible guide for determining the most important aspects of a product or service in terms of the requirement for managerial action, as a means of creating effective programs to gain an advantage over rivals (Abalo et al., 2007). However, the IPMA interpretation complicates any comparison of the total effects that include the moderating effects with those that lack a moderating effect (Hair et al., 2017). Similarly, Ringle and Sarstedt (2016) found that with multiple moderators in a total effect or moderated effect, the interpretation of the IMPA importance dimension becomes difficult. Therefore, it is advised against the inclusion of moderators in an IPMA (Hair et al., 2017; Ringle & Sarstedt, 2016). In this regard, we conducted IPMA through Smart PLS. The following are the findings based on the total effect of one exogenous variable, namely, the CFC towards endogenous variable of PCS. The study findings reveal that the exogenous variable, CFC has high levels of importance and performance in Quadrant I with 'Concentrate Here' status.

Implications of study findings

The Effect of Cross-functional co-ordination on Port Customer Satisfaction

The first objective of the study was to examine the effect of cross-functional co-ordination on port customer satisfaction. The study findings have supported hypothesis H_1 by substantiating how the effect of cross-functional co-ordination positively influences port customer satisfaction. This outcome suggests that the higher the level of cross-functional coordination the higher the level of port customer satisfaction. These results are also consistent with the results of Tan and Cross (2012), Hoffer Gittell (2002), Holweg and Pil (2008), and Hoffer and Director (2011).

Moderating Effect of Reliability of Information Systems on Cross-Functional Co-ordination and Port Customer Satisfaction

The second objective was to assess the moderating effect of the reliability of information systems on cross-functional co-ordination and port customer satisfaction. In this regard, the study findings have supported hypothesis H_2 by substantiating how the moderating effect of the reliability of information system positively influences cross-functional co-ordination and port customer satisfaction. In other words, the higher (lower) the level of reliability of information system does not necessarily lead to the weaker (stronger) influence of cross-functional co-ordination on port customer satisfaction. These results are consistent with the results of Hsu (2013), Pahala (2017), and Raza et al. (2015).

The findings are consistent with previous literature regardless of the theoretical, contextual and methodological differences. Since two hypotheses (100%) have been supported, the findings both routine port operations and theories employed in this study. As such, port managers can apply cross-functional co-ordination among other resources in a bid to enhance the effectiveness and efficiency of the port to improve satisfaction levels of the existing and new customers. Moreover, the reliability of information system plays a crucial role in enhancing cross-

functional co-ordination for the attainment of higher level of port customer satisfaction. However, this does not undermine the role of other variables in attainment of port customer satisfaction. Still, it does reveal critical areas where port managers should direct their resources given the scarcity of resources, prevailing competition, and dynamism of business environment, customer demand and technology.

Conclusion

Overall, the combination of Explanatory design with a positivism paradigm using the deductive approach in the quantitative method was adopted to address in line with the first objective, which supported the development of a hypothesis based on the PSQ and RCT theories and empirical studies such as Gittell, (2011), Hoffer Gittell (2002), Holweg and Pil, (2008), and Tan and Cross (2012). Also, the study has operationalised cross-functional co-ordination as an exogenous variable with four measurable indicators based on existing scales. On the other hand, port customer satisfaction was operationalised as an endogenous variable. Additional procedures, together with data analysis conducted allowed the study to determine that three out of four measurements of the cross-functional co-ordination variable were reliable and valid. These findings provide strong empirical confirmation that cross-functional co-ordination positively influences port customer satisfaction. The study findings imply that cross-functional co-ordination is a key determinant of port customer satisfaction, with its three internal indicators vital in devising cross-functional co-ordination.

With regard to the moderation effect of reliability of information system on port customer satisfaction, this study shows that combining the explanatory design with a positivism paradigm and using the deductive approach as part of quantitative led to the development of hypotheses based on the PSQ and RCT theories in congruence with empirical studies by Hsu (2013), Pahala (2017), and Raza et al. (2015). In this regard, the study had operationalised the reliability of the Information System as the moderation variable on cross-functional co-ordination and port customer satisfaction using five measurable indicators based on existing scales. It also conducted additional procedures coupled with data analysis. The findings provide empirically confirm that the moderation effect of the reliability of the information system positively influences the relationship between cross-functional co-ordination and port customer satisfaction. The moderation effect of the reliability of information systems is implicitly a key determinant of the relationship between cross-functional co-ordination and port customer satisfaction.

Apparently, this study appears first to provide a theoretical framework that delineates relationship among the variables of resources: Cross-functional co-ordination and reliability of information system. In essence, only a limited number of studies had hitherto established the relationships between resources and port customer satisfaction. Moreover, only anecdotal evidence had existed for the intervening roles of reliability of information system in the relationships between resources and port customer satisfaction. Thus, this study has confirmed that the two resources significantly and positively correlate with port customer satisfaction. Also, the study findings suggest that the reliability of information system can serve as a moderating variable in the relationships between resources and port customer satisfaction.

The study has also significantly contributed to theory by showing that unique resources enable ports to enhance resources, which consider cross-functional co-ordination aspects in their cargo clearance processes and related operations. In other words, resources positively relate to port customer satisfaction in terms of co-ordination and information sharing among TPA, TRA, OGDs and Stakeholders and flow of cargo within various modes of transportation. In consequence, the port can withstand the increased scarcity of resources, competition and dynamism of business environment, customer demand and technology. Specifically, previous studies had had paid limited attention tow its empirical contribution to port customer satisfaction along with moderating effects of reliability of information system. This practice has left practitioners with a complex task of selecting from among alternative resources while making the ports operate below customer satisfaction.

Consequently, this study extends and strengthens the theoretical foundations of resources. Through extensive literature review and the subsequent analyses, the study has revealed that one resource—cross-functional co-ordination—is its reliable and valid dimension. This truism is useful for both researchers and practitioners interested in measuring resources and yet unable to specify its dimensions. This realisation can also inform the revision of the further development of the existing theory in the field of port customer satisfaction management. Conversely, even though this study found cross-functional co-ordination to positively influence port customer satisfaction, future studies could apply these variables in other service settings such as banks to compare results. Additionally, future studies could use other resource attributes pertaining to port customer satisfaction to explore more insight into the resource and port customer satisfaction interface. Furthermore, other researchers could opt for a longitudinal as opposed to cross-sectional approach applied during this study.

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