MEASURING BUSINESS TO BUSINESS MULTI-PROCESS SERVICE QUALITY: A STUDY OF DAR ES SALAAM PORT CARGO CLEARANCE

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A THESIS SUBMITTED IN FULFILLMENT OF THE REQUIREMENTS FOR THE DEGREE OF DOCTOR OF PHILOSOPHY (Ph.D.) OF THE OPEN UNIVERSITY OF TANZANIA

2019

CERTIFICATION

The undersigned certify that they have read and hereby recommend for examination a thesis entitled: ***"Measuring Business to Business Multi-Process Service Quality: A Study of Dar es Salaam Port Cargo Clearance"*** in fulfillment of the requirement for the award of Degree of Doctor of Philosophy (PhD) of The Open University of Tanzania.

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DECLARATION

I, **Walter Kissimbo Eliakunda,** do hereby declare that, the work presented in this thesis is original. It has never been presented to any other University or Institution. Where other people's works have been used, references have been provided. It is in this regard that I declare this work as originally mine. It is hereby presented in fulfillment of the requirement of the Degree of Doctor of Philosophy (PhD).

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Signature

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Date

DEDICATION

I dedicate this thesis to my parents the late Mr. Eliakunda Gerson Righa Mndeme and late Mrs. Safinael Shangari Mkiramweni whose efforts to educate me has reached this far. May the Lord rest their soul in eternal Peace.

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ABSTRACT

This survey study was conducted in Dar es Salaam port in Tanzania with the aim of measuring Business to Business (B2B) multi-process cargo clearance employing service quality measurement theories. Primary data was collected from 364 cargo clearance service users and providers using structured questionnaire. The data were analyzed through PLS-SEM. The study employed INDSERV hierarchical service quality model in measuring B2B multi-process cargo clearance service quality. The findings indicated that INDSERV constructs and sub-constructs accurately predicted B2B multi-process cargo clearance service quality. The study proved that all INDSERV constructs and its hierarchical sub constructs were significantly important in measuring B2B multi-process service quality. The findings further indicated that, the most influential were the mediation effect of hard process quality, soft process quality and outcome quality on the potential quality relationship with B2B multi-process cargo clearance service quality. In all the five study objectives, twelve study hypotheses and sixteen paths proved to be significant. Only one hypothesis and six paths were found to be nonsignificant in predicting directly B2B cargo clearance although it was significant through mediation of hard process quality, soft process quality and outcome process quality. The Importance Performance Matrix Analysis (IPMA) indicated areas of importance in improving cargo clearance performance. The study recommended the use of proper B2B multi- process service quality measurement model which conform to particular business settings and suggested future research to focus on inter- process network and process concurrence in order to improve the cargo clearance service quality.

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

LIST OF APPENDICES

LIST OF ABBREVIATIONS AND ACRONYMS

ANOVA	Analysis of Variances
AVE	Average Variance Extracted
B2B	Business to Business
B2C	Business to Customer
BSQ	B2B multi-process service quality
CB-SEM	Covariance Based Structural Equation Model
CustOQ	Customs Output Quality
CustPHQ	Custom Process Hard Quality
CustPQ	Customs Potential Quality
CustPSQ	Customs Process Soft Quality
EDA	Exploratory Data Analysis
EFA	Exploratory Factor Analysis
FFs	Freight Forwarders'
FFPQ	Freight forwarding Potential Quality
FFOQ	Freight Forwarding Output Quality
FFPHQ	Freight forwarding Process Hard Quality
FFPSQ	Freight Forwarding Process Soft Quality
GCLA	Government Chemical Laboratory Agency
GDP	Gross Domestic Product
GLM	General Linear Model
HCM	Hierarchical Component Model
HTMT	Heterotraint-Monotrait

ICD’s	Inland Container Deports
ICDOQ	Terminals and ICDs Output Quality
ICDPHQ	Terminals and ICD Process Hard Quality
ICDPQ	Terminals and ICDs Potential Quality
ICDPSQ	Terminals and ICDs Process Soft Quality
INDSERV	Industry Service
IPMA	Importance Performance Matrix Analysis
ISO	International Standard Organization
MICOM	Measurement Invariance Composite Model
ML	Maximum Likelihood
NIF	Normed Fit Index
OGD’s	Other Government Departments
OGDPHQ	OGDs Process Hard Quality
OGDPQ	OGDs Potential Quality
OGDPSQ	OGDs Process Soft Quality
OGDOQ	OGDs Output Quality
OLS	Ordinary Least Square
OQ	Output Quality
PHQ	Process Hard Quality
PLS-SEM	Partial Least Squares Structural Equation Model
PQ	Potential Quality
PSO	Process Soft Quality
PWC	Price Waterhouse Coopers
RATER	Reliability, Assurance, Tangibility, Empathy, Responsiveness

RMSEA	Root Mean Square Error of Approximation
SAOQ	Shipping Agency Output Quality
SAPHQ	Shipping Agency Process Hard Quality
SAPQ	Shipping Agency Potential Quality
SAPSQ	Shipping Agency Process Soft Quality
SEM	Structural Equation Model
SERVPERF	Service Performance Measurement Model
SERVQUAL	Service Quality Measurement model
SRMR	Standardized Root Mean Square Residual
STDEV	Standard Deviation
SUMATRA	Surface and Maritime Transport Regulation Authority
TASAC	Tanzania Shipping Agency Corporation
TBS	Tanzania Bureau of Standards
TFDA	Tanzania Food and Drugs Authority
TICTS	Tanzania International Container Terminal Services
TPA	Tanzania Ports Authority
TRA	Tanzania Revenue Authority
UNCTAD	United Nation Conference on Trade and Development
USA	United State of America
USD	United State Dollar
VIF	Variance Inflation Factor

CHAPTER ONE

INTRODUCTION

1.1 Overview

The objective of this chapter is to present the research on business to business cargo clearance service quality in Dar es Salaam port. Further, it develops the research problem, state research objectives and the relevance of this study. The chapter is divided into six sections. The first section is the background to the study; followed by the statement of the problem in section three. Section four presents the research objective followed by section five on the relevance of the research, and finally the organization of the thesis.

1.2 Background to the Study

Ports form a vital link to the overall trading chain, and consequently, the level of cargo clearance speed determines to a large extent a country's competitiveness in international trade (Bruce and Wesley, 2006; PWC, 2014). Ports are only as good as visionary areas if their cargo clearance service providers do not move cargo on time (Ali and Hassan, 2015). Quick cargo movement attracts more cargo; reduces logistics costs and cost of doing business; improve the country's competitiveness in the international market and attracts global investments (Mariki, 2013). Delay in cargo clearance culminates in problems such as port congestion, high cargo dwell time and high logistics costs which increase commodity cost (Mariki, 2013) and hinder the country's product competitiveness in international market.

Service quality is defined as the degree to which a set of inherent service characteristics fulfills requirements (Springers, 2000). Service quality is a major factor of the competitive capability of cargo clearance in the port (Bojan, 2013). It helps to strengthen the port image, establish long term relationships, create references and reduce the perceived risk to the port users (Ikuthu and Kipkorir, 2017). Previous research of service quality focused on Business to Customer (B2C) services by applying SERVQUAL, SERVPERF and Hierarchical Structure service quality model. Thus, to the researcher's knowledge little is known about the measurement of service quality in B2B relationship within cargo clearance outcomes in Tanzania.

Cargo clearance services are highly intangible and complex to evaluate, with several numbers of subjects generally involved. Their provision and use are complex, with multi-organizations in which institutions and functions often intersect at various levels (Bojan, 2013). It consists of a large number of internal and external port community stakeholders (David, 2015). The stakeholders are public, Government institutions and private firms having conflicting interests and their participation in service provision are benchmarked. Those are specific requirements or targets which in most cases are not directly related to speed movement of cargo within the port. The complexity is caused mostly by those terminal operators, cargo handling companies, shipping lines, forwarding agents, inland transport operators, clients, and government agencies that belong to different ministries with different service setting (David, 2015).

Most of the studies on service quality were focused on B2C and were mostly conducted in developed countries which differ from developing countries in business set up, transport regulatory framework and social –cultural context (Binh and Kien, 2016; Mukhtarova, *et al.,* 2918). According to the available literature, service quality models are not yet rich enough to provide a specific knowledge of measuring service quality in Business to Business (B2B) context (Baffour, 2012, Tan, *et al.*, 2016). Thus it is necessary to measure service quality on B2B in a developing country setting (Mukhtarova, *et al.*, 2018). B2B is a type of transaction that exists between businesses, such as the one involving a manufacturer and wholesaler, or a wholesaler and a retailer. In a wider view B2B, refers to business that is conducted between companies, rather than between a company and individual consumers. B2B transactions are much higher than B2C in terms of volume of business, business dimensions and customer transactions (Myu-Shinitta, 2015).

Cargo clearance is a complicated multi-process B2B due to the fact that it involves multiple private and public companies with different business focus as well as different processes to attain its mission (David, 2015, Eliakunda *et al.*, 2018). The focus of those organizations does not necessarily speed cargo clearance rather the mission for their establishment. The complication is further caused by the fact that the service providers fall under different Government ministries which oversee its procedures and process (Mukhtarova, *et al.*, 2018). The organizations focus on different service factors which affect cargo clearances in port differently based on their organization vision and goals. The degree of its impacts on cargo clearance differs from one port to another and from one process of cargo clearance to another.

Cargo clearance service users and service providers viewed service delivery factors differently (Montwill, 2014). While others consider speed of documentation, simple procedures and connectivity among players as major factors, others consider availability of handling equipment, space, level of technology, cost and professionalism as factors for speed clearance (David, 2015). Thus it is important to ascertain the service factors affecting cargo clearance in order to establish service attributes relevant to cargo clearance movement in the organizations as other service factors are not necessarily related with cargo movement. Cargo clearance chain involves different process as shown in figure 1.1 and those processes are undertaken by different organizations.

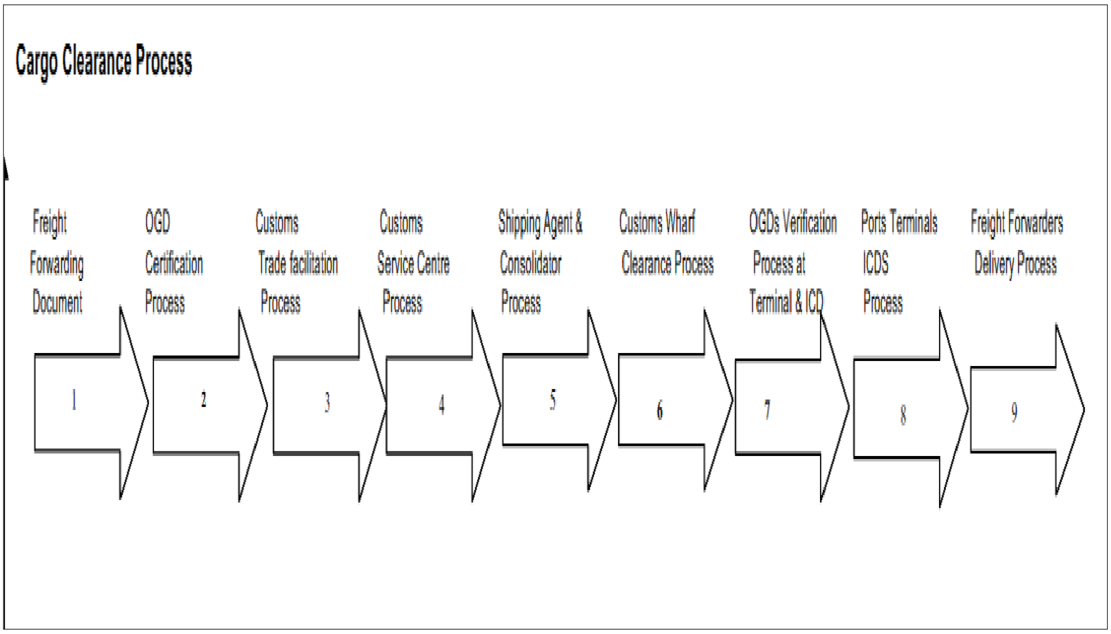

Figure 1.1: Cargo Clearance Chain
Source Researcher, 2017

The above process is categorized as customs clearance, OGDs clearance, shipping agency clearance, Terminal and ICDs clearance and Freight forwarding clearance (Eliakunda, *et al.*, 2018). These five categories are major driving force of maritime transport in terms of trade and cargo. The service delivery from any one of these categories had multiplier effects on port cargo clearance and maritime industry. Maritime transport in 2016, accounted for 59 percent of total goods loaded and 64 percent of total goods unloaded (UNCTAD, 2018). Maritime transport experienced considerable developments on how to measure cargo movement's service quality (Baluch and Edwards, 2010).

Cargo clearance in port is one of complex Business to Business (B2B) as it involves multi-process offered by different service providers. Thus, the service quality of cargo clearance industry is crucial to the world economy, because economic wealth and power of people or nation have been tied to service quality of transportation(Ho, *et al*, 2017). The issue of service quality to seaport cargo movements is contested, as there is yet no standard means of evaluating cargo movement outcomes (Baluach and Edwards, 2010). Ports assess cargo movement service quality outcomes differently, Rotterdam uses weight handled per process, while, Singapore considers cargo volume handled (World Bank, 2007). It was estimated that Tanzania and its neighboring countries could earn up to USD 2.6 billion more per year, only by enhancing service quality of Dar es Salaam Port to the level of port of Mombasa (World Bank, 2013). Likewise, with the current competition in port, service quality has become an inevitable factor for the port service quality outcomes as it determines the retention of customers.

Cargo clearance is completed once the document passes through the processes described. Cargo clearance time is sum up of all time taken to complete each process Eliakunda, *et al.,* 2018). Different consignments take different time to complete clearance and also time taken for each process do differ from port to port. Each process effect on consignment clearance time differs. Thus, in measuring cargo clearance service quality it is paramount to ascertain the process service quality. It is important to measure each process in the whole process chain as each process effect on cargo clearance differs (Bibh and Kien, 2016).

Cargo clearance requires those multiple organisations and processes coordinated in a manner that it facilitates seamless flow of cargo in ports (Ali and Hassan, 2015). The situation on ground show that after completion of process the document is not necessarily transferred to preceding process automatically, sometimes there is delay in transferring of document to the next stage (David, 2015; Nze and Onyemechi, 2018). The fact that each service provider provides his service in isolation and the process of communication does not talk to each other, most of time is transferred manually (Thuy, 2016). There is need to ascertain inter process communication between processes in cargo clearance. Level of good inter process communication between processes is a vital elements in obtaining speed cargo clearance.

Studies show that worldwide, ports are focusing on improving cargo movement efficiency (Ding, *et al.,* 2016; Aziz, *et al.,* 2015). However most of developing countries' ports find it challenging to be efficient in their daily operations (PWC, 2014). In this regard ports in developing countries such as Mombasa, Falkan, Dar es Salaam, Durban, and Lagos are facing high logistics cost due to, among other things, delays in cargo clearance (Baluch and Edwards, 2010). Studies show that the benefits of speed cargo clearance are limited in developing countries (Baluch and Edwards, 2010; Salim and Thomas, 2011). Further studies show that most of ports cargo clearance in developing countries had become barriers to trade (Baluch, 2005; Salim and Thomas, 2011). To the author's best knowledge, studies in developing countries that measure service quality in business to business context are very few if not none. Measuring service quality in cargo clearance in developing countries' ports represents more theoretical developments, whose emergence coincides with rising scholarly interests.

Studies show that high cargo dwell time, port congestion and high logistics costs are common problems in African ports (Baluch and Edwards, 2010; Salim and Thomas, 2011). Average cargo dwell time in African ports is about 14 days compared with three days in most of international ports (Baluch and Edwards, 2010). Dwell time in Sub Saharan African ports has abnormal dispersion, with evidence that clearance chain discretionary behaviors increase cargo clearance times and logistics costs (Salim and Thomas, 2011). Cargo clearance time in most of Sub Saharan ports are estimated to be five time higher than the developed countries' ports (Baluch 2005; Baluch and Edwards, 2010; TICTS, 2014). However, cargo clearance services are implemented in the form of an assignment or project, characterized by a great extent of interaction between customers and service providers who differ in their ability to integrate into the service provision process.

Debates exist on models for measuring B2B service quality, few studies used SERVQUAL model as it had been designed to handle to handle B2C nature of service quality. The RATER measurement model fail to capture most of B2B variables interms of technical, function and outcomes aspect of service quality.   In contrast INDSERV variables general cover those service quality aspects. Gunderson *et al., (*2009) support the applicability of the SERVQUAL model in the

B2B. In contrast, Ng (2010) indicated no support to SERVQUAL and SERVPERF models applicability in B2B service, and the author insisted INDSERV service quality model applicability to B2B services (Gounaris, 2005). Studies revealed the superiority of INDSERV model over SERVQUAL in measuring B2B service quality (Adebayo, 2017; Homkanicen, 2017; Janita and Miranda, 2013; Lian, 2012; Skudiene, *et al*., 2015). Thus, this study employs INDSERV hierarch service quality model in the B2B cargo clearance. INDSERV is defined by four variable including service quality potential, hard service quality, soft service quality and quality of service outcomes (Benazir and Dosen, 2012). INDSERV potential service quality are those elements that service providers must have in place to provide services adequately, including adequate staff, facilities, and management philosophy. It represents essential elements of perceived quality because it corresponds to an attribute that company clients need to consider and assess in advance of service provision.

Hard and soft process quality is based on the study of Szmigin (1993). Therefore, hard process service quality includes what is being performed during the service process. While soft process service quality refers to how the service is performed during the service process. Hard and soft quality constructs describe the service process itself with the former referring to the service plan the provider uses, the accuracy with which the service is delivered, a conception similar to Grönroos (1984) technical quality. Soft process quality refers to the front-line staff and the interactions evolve with the customer’s employees.

It goes beyond courtesy, capturing communal ingredients of the interaction between the managers of two organizations, such as understanding the client’s needs and personality match. In B2B services are extended and friendly exchanges are required to produce outcomes; thus the importance of soft quality construct.

Similarly, Szmigin (1993) suggested the variable of output quality, pertaining to the customer's evaluation of the end-results of the hard and soft parameters. Output quality refers to the effects the offered solution created for the customer after it has been implemented. The mediation between those constructs in measuring B2B cargo clearance service quality are also vital element to consider. In measuring B2B cargo clearance service quality, output quality mediating potential quality, hard process quality and soft process quality are important relationship to be measured. This study considers those constructs on measuring B2B cargo clearance service quality.

Further, the study finds multi-dimensional and hierarchical constructs that consist of various sub-dimensions (Clement *et al.*, 2014) as the cargo clearance service suggests. The current study in B2B involves key port stakeholder by employing INDSERV service quality measured in hierarchical way through five sub constructs namely customs process, OGDs process, shipping agency process, freight forwarding process and Terminal and ICDs process.

1.3 Statement of the Research Problem

Tanzania economy was estimated to be losing USD 1.8 billion annually due to inefficient cargo clearance services at the Dar es Salaam port (World Bank, 2014). Various studies focused on single process in the clearance chain rather than the whole chain as B2B multi-process (David, 2015; Eliakunda, *et al.*, 2018). Thus cargo clearance service quality output of the port of Dar es Salaam varied over time. The port users over a time experienced cargo clearance delays, high dwell time, high logistics costs due to payments of demurrages and storage charges, (TASAC, 2018). These inefficiencies created financial loss for shippers, port users, and shipping companies (SUMATRA, 2017).

Cargo clearance being B2B multi process needs to be measured in terms of how various INDSERV constructs affects and are affected by each other in offering process services quality. There is no consensus on how to measure service quality in B2B multi- process. In the literature, there are two primary conceptualizations of service quality in B2B. One is the Gunderson *et al.* (2009), which suggests SERVQUAL model applicability in the B2B service. The second conceptualization of service quality is the Gounaris, (2005), INDSERV model.

Despite the superiority of INDSERV over SERVQUAL in measuring B2B service quality (Saravanan and Rao, 2007), INDSERV has not yet developed model to measure B2B multi process as the cargo clearance. The complex nature of B2B multi-process services and the mixed diverse service setting are difficult to measure (Ines *et al.,* 2011. Matthyssens *et al.,* 2008). There is no established integrated model of the complex multi-process B2B service measurement. This study developed a model for measuring B2B multi-process cargo clearance using Lee (2011) internal structural INDSERV model in third order hierarchical.

1.4 Research Objectives

1.4.1 General research Objective

The general objective of the study is to assess the variables for measuring the B2B multi-process cargo clearance service quality in Dar es Salaam port.

1.4.2 Specific Research Objectives

The specific research objectives are:

(i) To assess the effect of process hard quality on measuring B2B multi-process cargo clearance service quality;

(ii) To assess the effect of process soft quality on measuring B2B multi-process cargo clearance service quality;

(iii) To assess the effect of potential quality on measuring B2B multi-process cargo clearance service quality;

(iv) To assess the effect of output quality on measuring B2B multi-process cargo clearance service quality;

(v) To assess the mediation effect of output quality, process hard quality and soft quality in the relationship between potential quality and measuring B2B multi-process cargo clearance service quality.

1.5 Relevance of the Research

Theoretically, the study enhances the body of knowledge about how service quality is measured in B2B multi-process. Secondly, the study measured B2B service quality in hierarchical construct using INDSERV constructs. The study developed and tested a comprehensive hierarchical multi- process through a set of first-order (Sub-dimensional level), second-order (primary dimensional level), third-order (overall B2B multi-process service quality) and the higher order process constructs (customs, shipping agent and consolidators, OGDs, terminal and ICDs, and freight forwarding) in a complex B2B multi-process. Moreover, this study includes assessment of mediations effects of ouput quality, hard process quality and soft process quality on potential quality in B2B multi-process cargo clearance service quality. This analysis add to the body of knowledge and help future researchers' overall understanding of the comprehensive and complex interrelationships between these high-order constructs in B2B multi-process service measuring.

This study illustrates a reliable and valid measurement instrument that can be used as a tool to evaluate service quality for the B2B multi-process cargo clearance in general, which would assist business service providers seeking to improve port market share and level of service in the port. Moreover, the information gained about the interrelationship between the higher order constructs assist port players marketing strategies to increase the Dar es Salaam port competitiveness and market share.

This study assists in improving knowledge on measuring service quality in B2B complex cargo clearance multi-process service delivery. It guides managers, policymakers and other stakeholders in measuring service quality for multi-processes B2B environment. The study helps both academicians and managers to apply the knowledge of service quality in the study of B2B multi-process service quality. The study acts as a springboard for future researches in the field of B2B multi-process cargo clearance service measurement.

1.6 Organization of the Thesis

This thesis comprises five chapters. Chapter one covered the background to the study, statement of the research problem, research objectives, research questions and significance of the study. Chapter two covers the literature review both theoretical and empirical. Further, the chapter presents the research gap and the conceptual framework of the study. Chapter three covers the research methodology of the study where research philosophy, research design, sampling procedure, data collection, and data analysis are discussed. Chapter four covers the findings of the study; chapter five is on discussion of the findings and chapter six covers conclusion and recommendations. Lastly, the list of referenced materials and appendices has been provided.

CHAPTER TWO

LITERATURE REVIEW

2.1 Overview

The objective of this chapter is to present a literature review on B2B cargo clearance service quality. In this chapter, both theoretical and empirical literature is reviewed. Consequently, specific areas to be addressed include definition of basic concepts, theories supporting the study, empirical literature review, and knowledge gap, conceptual framework, which aims to assess the variables so as to bridge the knowledge gap between independent and dependent variables and theoretical framework which is the description of characteristics of the variables explained in the conceptual framework. Further, the research hypotheses are presented in this chapter.

2.2 Conceptual Definitions

2.2.1 Service Quality

Definitions of term service quality narrated.

(i) "The extent to which service delivery matches customer expectations" Vize, *et al.*, (2017:46).

(ii) "The degree to which a set of inherent service characteristics fulfill requirements" Springer (2000:12).

(iii) "Service quality is the matching of perceived quality with expected quality and keeping this distance as small as possible to reach customers' satisfaction" Grönroos (1984:39).

The study, follow Grönroos (1984) definition of the service quality as this definition has been used mostly in B2B studies and fit the study focus.

2.2.2 Business to Business

Definitions of term Business to Business are as narrated:

(i) "A situation where one business makes a commercial transaction with another company" Tey, *et al*., (2015:181).

(ii) "Refers to methods by which employee from different companies can connect with one another through social media, network and other communication methods" Aidas, (2015:53).

(iii) "Describes the commercial transaction between businesses, such as between importer and forwarding agent, or when communication takes place amongst employees, or managers of the same company or different companies" Kumar and Raheja, (2012:448).

The study adopted Kumar and Raheja (2012) definition of B2B as it most relate to cargo clearance context.

2.2.3 Service Quality Outcomes

Definitions of service quality outcomes provided:

(i) "Refers to what customers receive as a result of the service transaction" Bai *et al.,(*2008:1057).

(ii) "The business outcomes that business aspire for- customer satisfaction, repeated purchase, and loyalty" Hossaina *et al.,* (2014:5).

For this study, it is following Bai *et al. (*2008) definition of the Service quality outcomes as they fit the focus of the research.

2.3 Theoretical Literature Review

2.3.1 Measurement Theory

Measurement theory states that to measure certain service or good, specific process should be in place with particular variables and steps to follow. According to that theory, the measuring process involves a systematic assignment of values or numbers based on a *priori* rules of measurement (Hair, *et al.,* 2014) . It is a critical step in quantitative research because it defines the subsequent steps in conducting research such as analysis and interpretation of the research findings (Hair *et al.*, 2014; Rajender, 2010). The measurement process involves recording observations that are manifestations of the underlying constructs, and operationalize those constructs based on the methodology used to capture these variables. Measurement theory specifies how the constructs are measured and how variables are related to each other (Hair *et al.,* 2014).

2.3.2 Service Quality Measurement Theory

Service quality measurement theory provides various models for measuring the quality of service in different business sectors depending on the nature of those industries. These models are based on measurement theory Service quality is difficult to define and measure because of the unique characteristics of service namely, its intangibility, inseparability, heterogeneity, perishability, and ownership (Apostolos *et al.,* 2013; Ekaterina, 2012).

In the literature, the meaning of the concept of quality and its associated variables has never been clear as different studies give a different definition (Aidas, 2015). Service quality has been shown as an elusive and abstract construct that is difficult to define and measure (Ali and Zurina, 2013). Springer (2000) defines service quality as the extent to which delivery service matches customer expectations. In another hand technical dictionary (ISO 9000:2005) defines service quality as the "degree to which a set of inherent service characteristics fulfills requirements. Service quality measurement studies flash back to early 1980's when different scholars researched on the concept of service quality and its measurement models (Vize *et al.*, 2017).

Service quality measurement literature is dominated by two main schools of thought: the Nordic School and the American school. The Nordic perspective defines service quality as the outcome of an evaluation process. A comparison between service expectations and service perceptions through technical quality and functional quality (Grönroos, 1984). The Nordic School led by Grönroos (1984), proposed that service quality consisted of "technical quality" and "functional quality," which describe the "what" and the "how" respectively, of the service, delivered to customers' (Grönroos, 1990). American school of thought commonly known as GAP defines service quality as the gap between customers` expectations and their perceptions of how the service is delivered. SERVQUAL (Parasuraman, *et al*., 1988) and SERVPERF (Cromin and Taylors, 1992) are the two most widely popular gap models used to measure service quality. American perspective defines service quality as a result of comparisons between expectation and perception of service performance via reliability, responsiveness, empathy, assurances, and tangibles (Parasuraman *et al*., 1988).

The two service quality perspectives have led to the development of several conceptual models of service quality measurement, either based on the Nordic or the American approach or a combination of both perspectives.

2.3.2.1 The Nordic Model

The Nordic model was the original perceived service quality model, developed and tested by Grönroos (1984). This model suggests that perceived service quality is an outcome of the gap which emerges from the differences between service expectations and service performance perceptions, through technical and functional quality dimensions (Grönroos, 1984). Functional quality refers to how a service is provided and delivered to customers, while technical quality refers to the actual outcomes received by customers after the service process and buyer-seller interaction have been completed (Grönroos, 1990). The model also suggests that "images" are built up as a result of technical and functional quality. Thus, a favorable image can influence the perceived service quality of service organizations and increase the likelihood that customers will continue to interact with the same service organizations.

As a result, prior experiences and overall perceived service quality of the firms are held in customers' memories, and these form an image in customers' minds, which remains after the actual service encounters (Gronroos, 2001). Kang and James (2004) note that if customers hold a positive image of an organization in their minds, minor mistakes might be easily forgiven, whereas if a negative image exists in the customers' mindsets, the same mistakes could be magnified.

2.3.2.2 The Three-Component Model

The three-component model proposed by Rust and Oliver (1994) was an expansion of the Nordic Model as the authors added a new service environment dimension (Rust and Oliver, 1994). The three-component model suggests that perceived service quality stems from customers' evaluation through three service quality dimensions: the service product or technical quality), service delivery (functional quality), and the service environment.

In the three-component model, the "service product" refers to the result or outcome that customers gain from the service performance, but the "service delivery" is the consumption process that occurs during the service act, and the "service environment" refers to the internal and external atmosphere that can be viewed as having an integral role in customer service perception development (Rust and Oliver, 1994). Rust and Oliver (1994) did not empirically test their proposed model. However, the existence of the three components in the retail banking industry was empirically confirmed by McDouglal and Levesque (1994) for the health care industry.

2.3.2.3 The Multilevel Model

Several researchers have found that the constructs and dimensions of service quality are complex. Perceived service quality could occur at multiple levels, as well as customers being capable of distinguishing between the quality of interaction with a service provider, the quality of the core service, and the overall quality of the organization. Conceptualizing service quality as multidimensional and hierarchical has been broadly accepted among service marketing scholars (Brady and Cronin, 2001; Dabholkar *et al.*, 1996).

2.3.2.4 The Integrated Hierarchical Model

Brady and Cronin (2001) state that service quality can be defined as any or all of a customer's perceptions regarding (1) an organization's technical and functional quality, (2) the service product, service delivery, and service environment, and (3) the reliability, responsiveness, empathy, assurances and tangibles associated with a service experience. In an attempt to integrate the different service quality conceptualization, to unify the abundance of service quality theories, and to reflect the complexity and the hierarchical nature of the service quality, Brady and Cronin (2001) developed and tested the integrated hierarchical model. The Integrated Hierarchical Model incorporates and expands the multi-level model of retail service quality of Dabholkar *et al.* (1996) and Rust and Oliver's (1994) three-component model.

The Integrated hierarchical model conceptualizes service quality as a third-order construct. The model suggests that perceived service quality explained by an aggregate perception of the three primary dimensions: interaction quality, physical environment quality, and outcome quality, with each primary dimension having three relevant sub-dimensions: attitude, behavior, and expertise (for interaction quality), ambiance, design, and social factors (for physical environment quality) and waiting for time, tangible and valence (for outcome quality).

In an attempt to make the integrated hierarchical model more relevant to generic service industries, Brady and Cronin (2001) surveyed four industries: fast food, photograph developing, amusement parks, and dry-cleaning. Besides, the integrated hierarchical model offered an improved understanding of three fundamental issues: (1) "what defines service quality perceptions? (2) How are service quality perceptions formed? And (3) how important is it where the service experience takes place?" (Brady and Cronin, 2001:.44). Brady and Cronin (2001) claim that only the physical dimension in the SERVQUAL can be considered as representing service quality, while, the other four dimensions (reliability, responsiveness, assurance, and empathy) repositioned as reflective indicators for the sub-dimensions in the model.

2.3.2.5 SERVQUAL Model

SERVQUAL founded on the view that the customer's evaluation of service quality is all important. This evaluation operationalized as a gap between what the client expects by way of service quality from service providers and their assessments of the performance of a particular service provider. Service quality is a multidimensional variable. At inception parasuraman, *et al.,* (1985) suggested ten variables of service quality, Later on, these variables reduced to five RATER variables; Reliability, Assurance, Tangibles, Empathy, and Responsiveness. Studies show SERVQUAL used mostly to measure service quality and its dimensions in different sectors (Cromin and Taylors, 1992; Clemes *et al.*,2014).

However, SERVQUAL does not measure the service outcome, even though the empirical evidence from several studies confirms that service outcome is an essential aspect of any service quality evaluation. Also, several researchers have noted that service quality and its descriptors should more thoroughly be evaluated across and within industries and cultures (Jain and Gupta, 2004; Shu, and Gan, 2014). Despite its usefulness, the gap model appears to perform weaker in B2B context as it designed for a B2C setting (Jasmine and Liz, 2013; Lee, 2011). Criticisms for gap models are:- it mainly focused on the process of service delivery and not the outcomes of the service encountered. Five RATER dimensions are not universal to all service settings and do not measure absolute service quality expectation (Lee, 2001; Paul and Gomes, 2017).

Further, it causes confusion and raises the chances of respondents error because of the polarity of some items in the scale; expectation cannot remain constant over time (Galaliyawe and Musa, 2015; Paul and Gomes, 2017).

2.3.2.6 Performance-based Measures (SERVPERF)

To overcome the weaknesses of the SERVQUAL scale, Cronin and Taylor (1992) introduced the Performance-based approach (SERVPERF) for measuring service quality, the SERVPERF scale measures the perceptions of service performance only. Cronin and Taylor (1992) empirically researched four industries (banking, pest control, dry-cleaning companies, and fast food restaurants).

To provide empirical evidence to support the SERVPEFR scale, Cronin and Taylor (1992) claim that the SERVPEFR has a higher degree of model fit, exhibits good convergent validity, and explains more of the variations in an overall measure of service quality than the SERVQUAL scale. Correspondingly, several studies strongly support the use of the performance-based approach to measure service quality over the gap-based approach (Babakus and Boller, 1992; Carman, 1990).

However, Parasuraman *et al.*, (1994) defend the gap methodology, arguing that it provides useful information to identify strengths and weaknesses within each service quality attribute. Besides, the gap scores or the amplitude of the difference between expectation and perception can be utilized as critical indicators or directions to improve quality of service delivered by service organizations (Parasuraman *et al.*, 1994).

Based on empirical evidence, several studies indicate that the performance-based approach out performs the disconfirmation approach when considering convergent and predictive validity (Clemens, *et al.*, 2014). Importantly, Zeithaml, *et al.*,(1996) conceded that the perception-only measure is more appropriate if the primary purpose of the research is to explain the independent variance constructs. The situation calls for a tailor-made measurement tool to fit in B2B service quality context. Many scholars have argued that gap models have failed to measure service quality in B2B service quality (Benazic *et al.*,2012; Makherjee, 2016). Other weakness of the gap models its that its variables lack dimensional stability, which is limited to application in service industries particularly B2B services (Galaliyawe and Musa, 2015, Paul and Gomes; (2017).

All gap models neglect the service outcomes and potential service quality in measuringB2B service quality (Yeo, *et al.*, 2015). Gronroos (1984) proposed a model with three variables of functional quality- the process or how the service process functions, technical quality- the outcome, or what the process leads to for the customer as well as the corporate image which incorporate outcomes quality component. Lehtinen (1991) argued the usefulness of the Gronroos attributes by developing a model characterized with three variables of interactive quality, physical quality, and corporate quality. Moreover, it is argued that SERVQUAL is not suitable to measure B2B service quality (Adebayo, 2017; Skudiene, *et al.*,2015).

2.3.3 INDSERV Model

The concept of B2B service quality initiative was proposed by Gronroos (1984), who suggested B2B service quality by using two variables of technical and functional service quality which included elements of service provision and its interactions, and technical service quality incorporates elements of service outcomes. Additionally, Gronroos incorporated six variables which included reliability and confidentiality, professionalism and competence/skills, attitude and behavior, accessibility and flexibility, error and reputation fixing and credibility(Biyik., (2017). The relationship between service quality and B2B is explained by the INDSERV of B2B service quality measurement which states that: there is a relationship between service quality and quality of service outcomes (Adebayo, 2017; Gounaris, 2005; Homkanieni, 2017; Skudiene, *et al.*,2015).

This is to say that an increase in service quality is associated with improved quality of service outcomes. Szmigin, (1993) developed a B2B service quality concept comprising three variables including soft service quality, hard service quality and service outcome. Gounaris, (2005) developed INDSERV(Industry Service) model based on the contribution of Szmigin, he described the model with four variables including potential service quality, hard process service quality, soft process service quality, and outcome service quality. The model tested and demonstrated excellent psychometric properties contrasted to SERVQUAL (Benazie and Dosen, 2012).

For measurement of port cargo clearance B2B service quality, the study is conceptualized according to INDSERV, which defines B2B service quality through those variables. Gournaris (2005) proposed a variable to assess Customer's service performance through INDSERV. The model states that "industrial customers base their evaluation of the perceived service quality on their assessment of corresponding variables: potential quality, hard quality, soft quality, and output quality" (Gounaris, 2005: 430).

The synthesis of all these variables makes up a client's overall perception of the quality of services. This model consolidates multiple service quality conceptualization within a single, comprehensive multidimensional framework, with a strong theoretical base suitable for seizing the real variables that consist of service quality in the B2B context (Gounaris, 2005). Indeed, it is widely recognized for the assessment of service performance in the B2B context that the measurement scale comprises four service quality variables which were measured through INDSERV scale represented by 22 items of service quality and other performance expectation.

INDSERV has developed three measurement models namely 2nd order latent variable model by Gounaris, (2005), internal structure model and latent variable model by Lee, (2011). 2nd order latent variable model has simplified the B2B service quality single variable as a measure of the quality of service outcomes without incorporating mediating variables. The model constructs are potential service quality, hard process service quality, and soft process service quality as the interdependence of a single variable in a structural model (Zolkiewski *et al.,* 2017).

Gounaris (2005) asserts that INDSERV should be treated as a hierarchical second-order variable Model. The outcome, overall service quality variable, with potential quality, hard process quality, soft process quality, outcome quality variables as first-order latent variables (Gounaris and Venetis, 2002). Figure 2.1 indicates the specification.

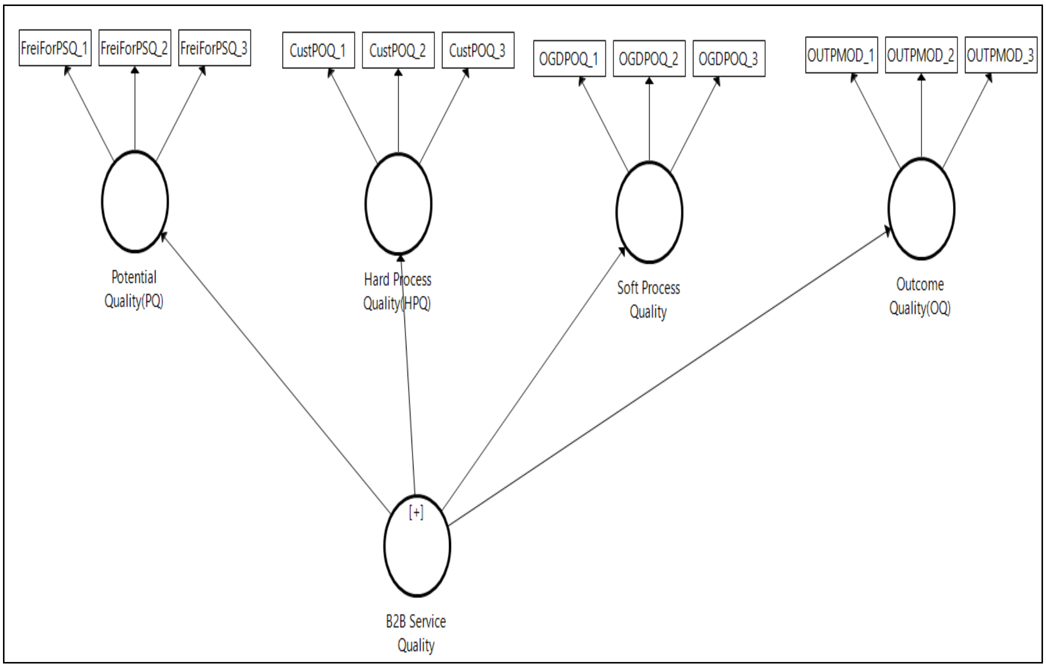

Figure 2.1: Second-order Latent Variable Model

Source: Gounaris, 2005:431

The Internal structural model considered those four variables as internal variables of INDSERV as differential variables within the nomological structural net, with direct relationships between them, rather than as indicators of a single factor. Figure 2.2 indicates specification, in terms of which there is a non-recursive structural path between the aspects of INDSERV. INDSERV denotes that the variables may operate at different places and times in the overall B2B service process.

INDSERV operationalizes as the potential quality leading to service processes which comprise soft and hard process quality which interact in them leading to conjunction with potential quality to perceptions of quality of service outcomes. Potential quality impacts on outcome quality through the mediating process effect of hard process quality and soft process quality and affect outcome directly. See Figure 2.2.

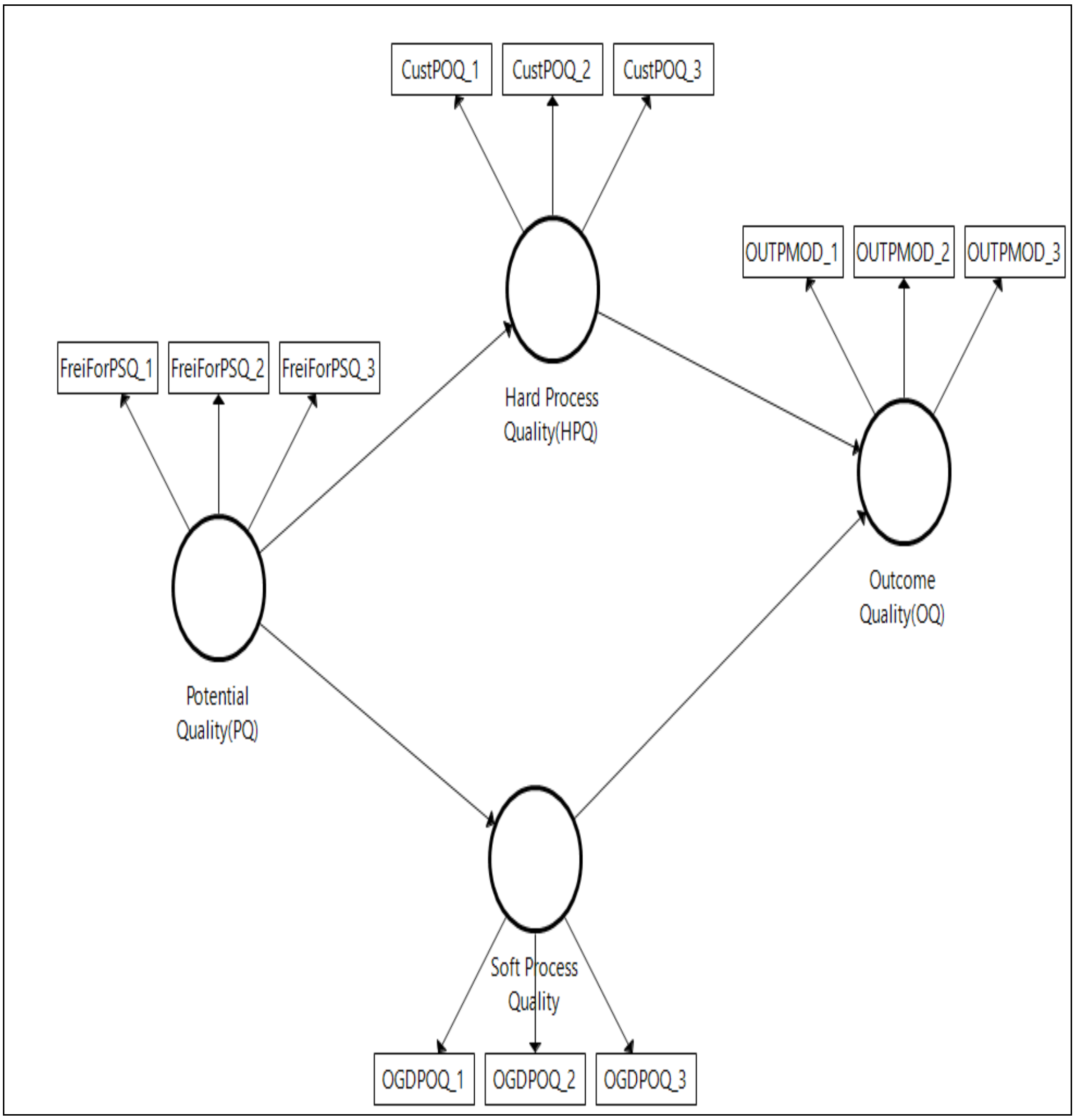

Figure 2.2: Internal Process Model

Source: Lee, 2011:3183

The internal process model includes the variables as a structural model rather than as second order indicators. The is possible by arranging the variables in the structural model rather than second order indicators. The outcome is the second-order latent variable and internal structure applies. See Figure 2.3 shows the specification of the model as revealed by Lee (2010).

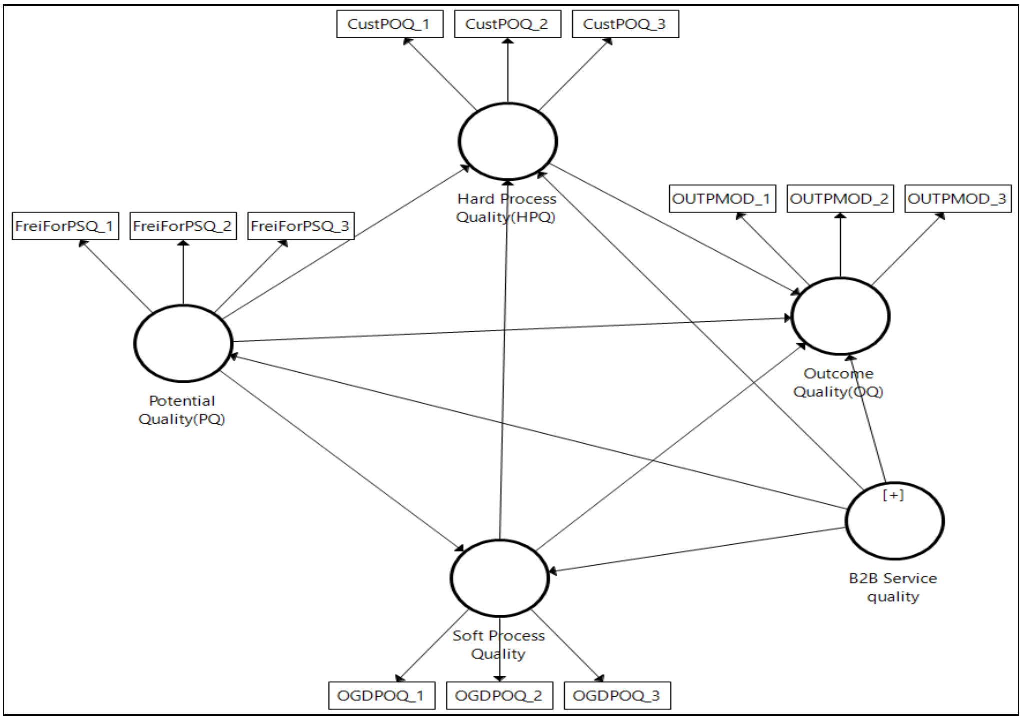

Figure 2.3: Internal Structure and Second-order Latent Variables Model

Source: Lee, 2011:3184

Figure 2.3 indicates specification in terms of which latent variables of INDSERV interacted directly, indirectly and related to a common latent variable. The system concept of inputs processes Outcomes, inter-process effects also occur. Potential quality affects outcome quality directly and indirectly through the hard and soft quality process and its useful variable for measuring B2B service quality. In this case potential quality mediated through soft process quality and hard process quality to produce outcome quality. Soft process quality and hard process quality affects outcome quality directly and indirectly through the hard quality process and is variable for measuring B2B service quality. Soft process quality further mediates hard process quality. Outcome quality measured by potential quality, soft process quality, and hard process quality also it is variable for measuring B2B service quality.

2.3.4 The Hierarchical Service Quality Model

Dabholkar *et al*., (2000) developed and validated the Hierarchical Service Quality Model, to conceptualize service quality for retail store environments. The Hierarchical Service Quality Model suggests service quality measured in three ordered hierarchical levels. The Hierarchical Service Quality Model best explains high inter-correlations among items across factors as well as the single factor structures found in previous studies in which other previous models were not supported.

In an attempt to integrate the different service quality conceptualizations, to unify the abundance of service quality theories, and to reflect the complexity and the hierarchical nature of the service quality(Riel, *et al*, 2017) Hierarchical Model incorporates and expands the multilevel model of service quality of Dabholkar *et al.* (2000) and Rust and Oliver's (1994) three-component model. The hierarchical model conceptualizes service quality as a third-order construct and suggests that different aggregate dimensions explain perceived service quality through sub-dimensions in hierarchal order (Riel, *et al.*, 2017).

In an attempt to make the integrated hierarchical model more relevant to generic service industries, Brady and Cronin (2001) surveyed four industries: fast food, photograph developing, amusement parks, and dry-cleaning. Also, the hierarchical model offered an improved understanding of three fundamental issues: (1) "what defines service quality perceptions? (2) How is service quality perceptions formed? And (3) how important is it where the service experience takes place?" (Brady and Cronin, 2001:44). Riel *et al.*, (2017) provide the way to estimate hierarchical constructs using consistent partial least squares.

Studies suggest that service quality is a multi-dimensional and hierarchical construct and that it consists of various sub-dimensions (Clemes *et al.,* 2014; Prakash and Mohanty, 2013). Scholars provide empirical evidence for applying a multi-dimension and hierarchical approach to conceptualize service quality for a variety of service industries and cultural settings, such as mobile phone services (Clemes *et al.,* 2014), education (Clemes, *et al,* 2014, Garson, 2016), A multi-dimensional and hierarchical modeling approach to conceptualize service quality has not applied in INDSERV. Recently, hierarchical modeling has been used to determine the type and number of dimensions of service quality and to determine the interrelationship between service quality and the other higher marketing constructs in a path model. In comprehensive hierarchical modeling, the service settings are simultaneously analysed using the perceptions from a single sample for SERVQUAL (Channoi, *et al.,* 2014). However, comparatively few studies have developed and tested a comprehensive hierarchical model as a framework to identify the sub-dimensions and primary dimensions of service quality specifically relevant B2B multi-process (Channoi.*et al.,* 2014).

As previously noted existing instruments such as SERVQUAL, and its variations have come under question regarding their ability to capture the complex nature of service quality (Nadiri and Hussain, 2015, Channoi, *et al.,* 2014). The notion that service quality is a multidimensional and higher order construct is now widely accepted in the literature (Brady and Cronin, 2001; Clemes *et al*., 2014; Dagger *et al.,* 2007; Howat and Assaker, 2013, Riel, *et al.,* 2017). Brady and Cronin (2001), Channoi, *et al.,* (2014) and Riel *et al.,* (2017) introduced hierarchical and multidimensional modeling as an alternative approach to conceptualizing the perceptions of service quality.

A hierarchical and multidimensional model conceptualizes perceived service quality as a third-order factor model in which service quality perceptions explained by at least three primary dimensions (interaction quality, physical environmental quality, and outcome quality) and each of these dimensions consists of corresponding sub-dimensions (Channoi.*et al*., 2014, Clemes, *et al.*, 2014; Henseler, 2017, Howat and Assaker, 2013).

Practically, customers are expected to evaluate service quality through multiple sub-dimensions (at a sub-dimensional level) and aggregate their perceptions of each sub-dimension to form their perceptions of three primary dimension. Lastly, the perceptions of all fundamental dimensions are combined to reflect the customer's overall service quality perceptions (Brady and Cronin, 2001; Clemes *et al*., 2014; Riel *et al.,* 2017).

Riel *et al.*, (2017) claim that the Hierarchical approach overcomes some weaknesses of the traditional service quality instruments (SERVQUAL and its variations) in the conceptualization of service quality. Nadari and Hussain (2015) note that the hierarchical model outperforms single level multi-factor models when investigating complex consumer behavior. Similarly, Brush *et al*., (2011) assert that a hierarchical model is a valuable approach for measuring service quality, as this model supports an improvement in understanding of a wide range of complex consumer behaviors in situations involving multiple levels of evaluation. Several scholars note that service quality evaluation is a complex process, as perceived service quality occurs at various levels in a service setting. Customers can distinguish between the quality of the interaction with the service provider, the core service and the overall quality of the organization, along with the abstractions which possibly occur at several levels (Carman, 1990). Several researchers indicate that a hierarchical model can accommodate this complexity, as the service quality constructs in diverse service settings may consist of at least three similar primary dimensions (Brush, *et al.,* 2014; Lehtinen and Lehtinen, 1991).

However, these primary dimensions are based on different sub-dimensional structures in different service contexts. In addition, the hierarchical model incorporates and redefines the technical and functional dimension of the Nordic model (Gronroos, 1984), the service product, service environment, and service delivery dimensions of the three-component model (Rust and Oliver, 1994), and the 5 dimensional SERVQUAL model (Parasuraman *et al.,* 1985) as the primary dimensions of the hierarchical model to capture both service delivery and service outcome (Brady and Cronin, 2001; Clemes *et al.,* 2007; Howat and Assaker, 2013).

These advantages of hierarchical modeling have led to a broad modification and adaptation of the hierarchical and multidimensional approach to conceptualize service quality in various service industries and cultural setting, such as mobile phone service (Channoi.*et al.,* 2014, Clemes, *et al.,* 2014). In measuring B2B multi-process consideration the service delivery setting is paramount in understanding the structure of the measuring model. Cargo clearance service delivered are arranged in vertical processes setting with some variables such as freight forwarders and OGDs affect outcomes. Despite how good are potential, hard and soft qualities but the results much depend on the way potential quality is mediated by hard process quality and soft process quality. Measurement of B2B multi-process should consider the hierarchy order of service delivery processes namely Customs quality, OGDs quality, Shipping line quality, Terminal and ICDs quality and Freight forwarders quality. The ways that potential quality is mediated in the Lee (2011) model creates need to studies its applicability in B2B multi-process cargo clearance.

2.4 Empirical Literature Review

2.4.1 General Studies

Galahitiyawe and Musa (2015) validated INDSERV model study in Sri Lanka, using 183 hotels. Four independent variables were used including potential quality, hard process quality, soft process quality, and output quality. The study employed principal component analysis and Structural equation modeling. The results of the survey found that INDSERV showed satisfactory reliability and validity. It also reported superior psychometric property than in SERVQUAL. Gounaris (2005) conducted a study on validation of an empirically derived measure for assessing perceived quality in the B2B context in Greece. The SERVQUAL scale was evaluated against INDSERV scale using 1285 companies from different industries. The findings show that SERVQUAL appears to suffer from methodological problems when applied to B2B service. INDSERV scale, on the other hand, had shown greater predictive power.

Benazić and Došen (2012) conducted a study on B2B service quality measurement in the consulting market context. The study used a sample of 75 consulting firms in Ukraine. The study found INDSERV model being useful in measuring service quality in the consulting industry. The study analyzed data using Structural Equation model. Ramaseshan *et al*., (2013) conducted studies in B2B setting in 358 telecommunication services providers in Australia. The study employed a self-administered questionnaire. Service quality and trust used as independent variables and loyalty as a dependent variable. Their research in B2B setting using global service quality and trust found that there is a specific relationship between quality of service and loyalty through INDSERV. Gounaris (2005) study on INDSERV variables.

Yeo *et al*., (2015) surveyed 313 shipping lines and cargo owners, clearing and forwarding companies, customers and Korea Port Logistics Association members. The study used resources, outcomes, management, image, and social responsibility as independent variables while the dependent variable was satisfaction. Using partial least Square –Structural Equation Modeling found all five variables to be significantly related to customer satisfaction. However, this study didn't utilize moderating factors like company size, structure, and even the environment.

2.4.2 Studies in African Countries

Lee (2011) conducted a study in South Africa with a sample of 170 supply dyads in South Africa on measuring B2B service. The study focused on the re-examination of Gounaris (2005) 2^{nd} order latent variable INDSERV measurement scale. It validated the use of internal structure and 2^{nd} order latent variable and internal structure models for measurement of INDSERV. The study results support the use of alternative Model for measuring B2B service quality. The study used structural equation model in data analysis.

On the other hand Onyamechi *et al.,* (2017) conducted a study on the assessment of service quality in Nigerian ports with Western and Eastern ports zone. The study used multiple linear regression and factor analysis investigating five service quality variables under RATER. The results found that tangibility, reliability; responsiveness, assurance, and empathy were not significant service quality variables in Nigeria Ports hence suggested the use of other service quality constructs rather than gap model.

Hirimba (2015) conducted a study in Egypt on port service quality from the shipping line perspective. The study used the SERVQUAL instrument and distributed it to 30 shipping lines calling at Egyptian ports. The study found most of the RATER constructs were not useful in measuring port service quality. It suggested uses of hierarch approach on measuring port service quality.

Adebayo (2017) conducted a study in Nigeria on the evaluation of the impact of B2C logistics service quality on customer satisfaction in Nigeria. The study used a sample of 450 logistics service providers and analyzed data through structural equation model. The result of the study showed that logistics service quality had a positive relationship with customer satisfaction in many constructs.

Ali and Zurina (2013) conducted a study in Libya on measuring the perceived service quality and customer satisfaction in Islamic Bank winos in Libya based on structural equation modeling. The study used 366 cross-sectional samples from three commercial banks in Libya. The study found responsiveness was the strongest indicator of customer satisfaction followed by reliability, empathy, and assurance.

2.4.3 Studies in Tanzania

In Tanzania, empirical evidence shows that few studies applied service measurement models. Tegambwage and Ame (2016) conducted a study in Tanzania on assessment of unidimensionality of SERVQUAL scale in Higher education context of Tanzania using a sample of 500 students. The findings indicated that the SERVQUAL scale was unidimensional. On the other hand, Mary (2013) assessed service quality and customer satisfaction using the SERVQUAL model in Tanzania Telecommunication Company limited and Lushakuzi(2015) assessed service quality in urban bus terminals.

Table 2.1: Studies that used INDSERV but not Related to Port Service

Author	Country	Methodology	Dependent	Independent	Results
Galahitiyawe and Musa (2015)	Sri Lanka	SEM and Principal Component Analysis	B2B service quality	INDSERV Potential quality Hard process quality Soft process quality Output quality	INDSERV Measure properly B2B service quality
Banazic and Dosen(2012)	Ukraine	SEM	Consulting firms INSERV constructs	Potential quality, Hard process, soft process quality and outcomes quality	INDSERV is useful in consulting firms service quality
Ramaseshan *et al*., (2013)	Australia	SEM	Royality	INDSERV constructs and trust	There specific relationship between service quality and trust
Lee(2011)	South Africa	SEM	B2B customer service	INDSERV models	2 order Predict effective B2B service quality
Gounaris (2005)	Greece	SEM	B2B service	SERVQUAL and INDSERV scale	INDSERV scale was superior in measuring B2B service quality

Source: Researcher, 2018

Table 2.2 shows studies in transport, port and cargo clearances but were not using INDSERV, thus give the research gap of the study.

Table 2.2: Studies in Port without use of INDSERV

Author	Country	Methodology	Dependent	Independent	Results
Onyemechi, *et al.,*(2017)	Nigeria	Multiple regression	Port service quality	Tangible, Reliability Responsiveness, Assurance, Empathy Uniqueness	RATER model predict effectively port service quality
Hirimba (2015)	Egypt	Spearman's regression test, MLR & SEM (in LISREL)	Egypt shipping lines	Service quality RATER model	Service quality give Egyptian port competitive advantages
Apostolos *et al.,*(2013)	Develop and test conceptual framework of logistics service quality	Greece logistics service providers	ANOVA	Developed conceptual framework model for logistics service quality.	The test sow the model well applicable in logistics service quality measurement
Vinh, T *et al.,*(2014)	Singapore	Tramp shipping line	Principal component analysis applies varimax with Kaiser normalization approach	Leverage the existence gap in contemporary literature in service quality applicable for maritime and tramp shipping	define service quality in tramp shipping conceptual model and empirical evidence in Singapore
Salim and Thomas (2011)	Cameron Duala port		CFA, SEM using AMOS	It shows that dwell times are caused by poor performance of logistics service providers, customs port operators, shipping and forwarding agent	Factors explain why containers stay longer in African ports
Yeo, *et al.,* (2015)	Korea	PLS-SEM	Customer satisfaction	Resources; Outcome; Processes; Management Image and social responsibility	+VE
Mary(2013)	Tanzania	Multiple regression	TANESCO service quality	SERVQUAL - RATER	-VE
Lushakuzi, (2015)	Tanzania	Factor analysis	Bus terminal service quality	SERVQUAL-RATER	-VE

Source: Researcher, 2018

2.5 Research Gap Identified

2.5.1 Theoretical gap

Most of the studies in B2B service quality through INDSERV were a single process. This study measured B2B multi-process cargo clearance service quality. Port cargo clearance is complex multi-process and involves many service providers and service users (Daft, 2016). The study of B2B multi- process using hierarchical model is a new area in the research.

2.5.2 Methodological Gap

There is no conclusive position on how B2B service quality should be measured. Some studies suggest the use of gap models and other studies found INDSERV model to be appropriate. There is a methodological gap on how the INDSERV model fit in a multi-process B2B setting. Under such circumstances, it is difficult to tell which model is appropriate.

2.5.3 Contextual Gap

The first research gap stems from the empirical results of several previous studies that support the capability of multi-dimensional and high order construct modeling in capturing the complexity of service quality for several types of services (Brush, *et al.*, 2011, Clemes *et al.,* 2014,). However, to date, no study has identified a specific set of service quality dimensions and examined how these dimensions fit B2B multi-process cargo clearance (Riel *et al.,* 2017). Besides, several scholars suggest that the multi-dimensional and hierarchical modeling approach still needs to be further investigated within different market places to validate this type of model (Clemes *et al*., 2014; Prakash and Mohanty, 2013).

The second research gap relates to a lack of published research that identifies the most and the least essential service quality dimensions, as perceived by the cargo clearance multi-process in Dar es Salaam port. Several studies have advocated recognizing the relative importance of the sub-dimensions for resource allocation and strategic planning purposes only (Clemes *et al.*, 2014).

The third research gap relates to developing and testing a comprehensive hierarchical construct model in cargo clearance (Dagger *et al.,* 2007).To date, a comprehensive high order construct model has not been developed or tested for multi-process cargo clearance as no study has measured the important and complex interrelationship between the higher order multi-process constructs such as customs authority, shipping agent, terminal and ICDs, OGDs and freight forwarding using, causal path model. In particular, no study has identified or measured the interrelationships between these constructs within a cargo clearance context. Nor has any study tested the moderating impacts of the management variables on outcome quality. Several scholars advocate to continue research into these relationships as they may not be stable within industries, across industries, or across cultures (Clemes *et al.,* 2014; Howat and Assaker, 2013).

Most of the studies in B2B service quality through INDSERV were a single process.. This study will measure Multi-process B2B service quality as cargo clearance in the port are a complex multi-process and involves many service providers and service users Daft (2016). There are few published researches conducted in Tanzania in the B2B cargo clearance service quality. Most of the studies had been done in developed economies and Asia. A study needs to consider this limitation as to contrast the results within what is known about the measurement of B2Bservice quality in Tanzania context.

2.6 Conceptual Framework

Based on the INDSERV model presented, a conceptual framework is designed to systematize the study and guide the research. The framework illustrated in Figure 2.4 is based on the model shown by Gouranaris (2005), Lee (2011) and Riel *et al.,* (2017). Measurable variables are hard to process quality (HQ), soft process quality (SQ), potential quality (PQ), output quality (OQ) and are directly affected by B2B multi-process service quality. Potential quality is mediated through hard process quality and soft process quality to produce output quality. Both variables are represented as third order latent model through sub-constructs namely customs quality, OGDs quality, Shipping quality, Terminal quality, and Freight forwarders quality (David, 2015).

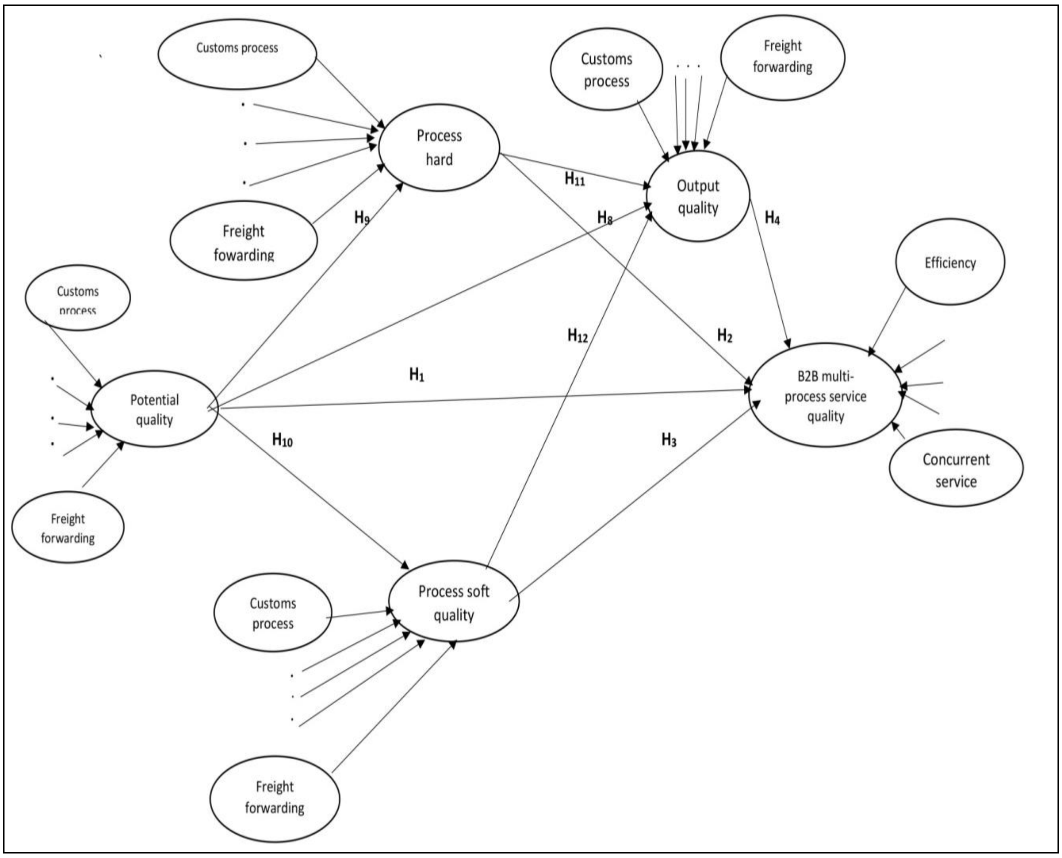

Figure 2.4: Conceptual Framework of the Study
Source: Resarcher, (2017).

The study independent variables are potential quality, process hard quality, process soft quality and output quality. While dependent variable is B2B multi-process cargo clearance service quality. In the conceptual framework output quality, process har quality and process soft quality mediate the relationship between potential quality and B2B multi-process cargo clearance swrvice quality.

The conceptual model was analyzed based on modified internal structure second-order latent variables model by Lee (2011) applying three-stage approach by Riel, *et al.*, (2017) in a hierarchal model with mediating variables. Three stage approaches are used to estimate and assess structural equation containing hierarchical constructs (Riel *et al.*, 2017). Output quality is mediating both potential quality, soft process quality, and hard process quality. Description of conceptual framework variables is as explained below.

2.6.1 Potential Quality (PQ)

Potential service quality relates to the search attributes that customers use to evaluate the provider's ability to perform the service before the relationship has begun (Gounaris, 2005).

2.6.1.1 Customs Potential Quality (CustPQ)

Customs potential service quality relates to the search attributes that importer, exporter and freight forwarders use to evaluate the custom’s ability to perform cargo clearance before the documents are processed in customs authority.

2.6.1.2 OGDs Potential Quality (OGDPQ)

OGDs potential service quality relates to the search attributes that importer, exporter and freight forwarders use to evaluate the OGD’s ability to perform cargo clearance before the documents are processed in OGDs.

2.6.1.3 Shipping Agency Potential Quality (SAPQ)

Shipping potential service quality relates to the search attributes that importer, exporter and freight forwarders use to evaluate the shipping agency’s ability to perform cargo clearance before the documents are processed by the shipping agency.

2.6.1.4 Terminal and ICDs Potential Quality (ICDPQ)

Terminal potential service quality relates to the search attributes that importer, exporter and freight forwarders use to evaluate the Terminal’s ability to perform cargo clearance before the documents are processed at the Terminal.

2.6.1.5 Freight Forwarder Potential Quality (FFPQ)

Freight forwarder potential service quality relates to the search attributes that importer and exporter use to evaluate the freight forwarders ability to perform cargo clearance before the documents are handed over to Freight forwarders.

2.6.2 Process Hard Quality (PHQ)

Hard process quality comprises "what" is being performed during the service process. These are the service user's concern with respect to processes through which the services are the assessment of the appropriateness of the process to produce the best solution timely and according to the service user's need. Hard process quality relates to what the customer receives in material terms. Hard process quality represents the core component of the service performed during the process and primary need of the customer like an employee's technical skills, ability, and accuracy in servicing a firm's customers (Lee, 2011).

2.6.2.1 Customs Process Hard Quality (CustPHQ)

Customs hard process quality comprises "what" is being performed during the customs clearance process. These are the variables, importer, exporter and Freight forwarder's concern for customs clearance processes through which the customs clearance process is delivered and the assessment of the appropriateness of these clearance process to produce the best solution timely and according to an importer, exporter and freight forwarder's need.

2.6.2.2 OGDs Process Hard Quality (OGDPHQ)

OGDs hard process quality comprises "what" is being performed during the OGDs clearance process. These are variables which relate to the importer, exporter and Freight forwarder's concern with respect to OGDs clearance process through which the OGDs clearance process is delivered and the assessment of the appropriateness of these clearance processes to produce the best solution timely and according to an importer, exporter and freight forwarder's need.

2.6.2.3 Shipping Agency Process Hard Quality (SAPHQ)

Shipping hard process quality comprises "what" is being performed during the shipping line clearance process. These are variables which relate to the importer, exporter and Freight forwarder's concern with respect to shipping line clearance process. through which the clearance process is delivered. Further, the assessment of the appropriateness of those clearance processes to produce the best solution timely and according to the importer, exporter and freight forwarder's need.

2.6.2.4 Terminal and ICDs Process Hard Quality ((ICDPHQ)

Terminal hard process quality comprises "what" is being performed during the terminals clearance process. These variables which relate to the importer, exporter and Freight forwarder's concern with respect to Terminals clearance processes. Focus on variables through which the clearance process is delivered and the assessment of the appropriateness of the clearance processes to produce the best solution timely and according to the importer, exporter and freight forwarder's need.

2.6.2.5 Freight Forwarder Process Hard Quality (FFPHQ)

Freight forwarder process hard quality comprises "what" is being performed during the cargo clearance process. These variables which relate to the importers' and exporters' concern with respect to cargo clearance processes through which the cargo clearance is delivered and the assessment of the appropriateness of the clearance process to produce the best solution timely and according to importer's and exporter's need.

2.6.3 Process Soft Quality (PSQ)

Process Soft quality pertains to "how" the service is performed during the service process. The soft process quality variable denotes the service user's assessment regarding the interaction with the first line employees from the service provider with whom interaction is developed as a result of the service delivery effort. It goes beyond courtesy capturing communal elements of the interaction between managers of companies or more in understanding customers’ needs and personality matching. In B2B services extended and intimate exchanges are required to produce successful outcomes (Gounaris, 2005).

2.6.3.1 Customs Process Soft Quality(CustPSQ)

Customs process Soft quality pertains to "how" the customs service is performed during cargo clearance. The customs soft quality variable denotes the importer's, exporter's and freight forwarder's assessment regarding the interaction with the first line customs employees with whom interaction developed as a result of the customs clearance delivery effort.

2.6.3.2 OGDs Process Soft Quality(OGDPSQ)

OGDs process soft quality pertains to "how" the OGDs clearance service is performed during cargo clearance. The OGDs soft quality variable denotes the importer's, exporter's and freight forwarder's assessment regarding the interaction with the first line OGDs employees with whom interaction developed as a result of the OGDs cargo clearance delivery effort.

2.6.3.3 Shipping Agency Process Soft Quality (SAPSQ)

Shipping soft process quality pertains to "how" the shipping line service is performed during cargo clearance. The shipping line soft quality variable denotes the importer's, exporter's and freight forwarder's assessment regarding the interaction with the first line shipping agencies employees with whom interaction developed as a result of the cargo clearance delivery effort.

2.6.3.4 Terminal and ICDs Process Soft Quality (ICDPSQ)

Terminal and ICDsprocess soft quality pertains to "how" the Terminal service performed during cargo clearance. The terminal soft quality variable denotes the importer's, exporter's and freight forwarder's assessment regarding the interaction with the first line terminal employees with whom interaction developed as a result of the cargo clearance delivery effort.

2.6.3.5 Freight Forwarder Process Soft Quality (FFPSQ)

Freight forwarder soft process quality pertains to "how" the freight forwarders service performed during cargo clearance. The freight forwarders soft quality variable denotes the importer's, and exporter's and service providers assessment regarding the interaction with the first line freight forwarders employees with whom interaction developed as a result of the cargo clearance delivery effort.

2.6.4 Output Quality (OQ)

Output quality pertains to the service user's concern regarding the actual offering delivered. This variable comprises not only the results of the technical efforts to service delivery but also the impact that the service delivery consequently produces for the buying organization. Output service quality describes the effects that the solution offered that created for the client after it had been implemented (Gounaris, 2005). In this study output quality mediate both potential quality, hard quality, and soft quality.

2.6.4.1 Customs Output Quality (CustOQ)

Customs Process Output quality pertains to the importer's, exporter's and freight forwarder's concern regarding the actual customs clearance delivered. This variable comprises not only the results of the technical efforts to customs clearance delivery but also the impact that the customs clearance delivery consequently produces for the importer's, exporters and freight forwarders.

2.6.4.2 OGDs Output Quality (OGDOQ)

OGDs Output quality pertains to the importer's, exporter's and freight forwarder's concern regarding the actual OGDs clearance delivered. This variable comprises not only the results of the technical efforts to OGDs clearance delivery but also the impact that the OGDs clearance delivery consequently produces for the importer's, exporters and freight forwarders.

2.6.4.3 Shipping Agency Output Quality(SAOQ)

Shipping Output quality pertains to the importer's, exporter's and freight forwarder's concern regarding the actual shipping line clearance delivered. This variable comprises not only the results of the technical efforts to shipping line clearance delivery but also the impact that the shipping line clearance delivery consequently produces for the importer's, exporters and freight forwarders.

2.6.4.4 Terminal and ICD Output Quality (ICDOQ)

Terminal Output quality pertains to the importer's, exporter's and freight forwarder's concern regarding the actual terminal clearance delivered. This variable comprises not only the results of the technical efforts to terminals clearance delivery but also the impact that the Terminals clearance delivery consequently produces for the importer's, exporters and freight forwarders.

2.6.4.5 Freight Forwarder Output Quality (FFOQ)

Freight forwarders Process Output quality pertains the importer's, exporter's and cargo clearance service providers concern regarding the actual cargo clearance delivered. This variable comprises not only the results of the technical efforts to cargo clearance delivery but also the impact that the cargo clearance delivery consequently produces for the importer's, exporters and cargo clearance service providers.

2.6.5 Mediations effect

The conceptual framework model shows that potential quality is mediated by hard process quality and soft process quality to produce output quality. Its delivery contributes to delay or expedite another service to obtaining service output.

2.6.6 B2B Multi-Process Cargo Clerance (BSQ)

B2B multi-process service quality of cargo clearance is defined as service that satisfies port user's requirements from cargo clearance service providers. A complexity of cargo clearance service quality is due to the existence of different processes and multiple service providers (Hirimba. 2015). Cargo clearance is measured by the speed of completion of processes in the chain (Ibrahim and Primiana, 2015).

2.7 Statement of Hypotheses

Based on the above theoretical analysis this research is guided by the following twelve hypotheses where study objective 1 to 4 are hypotheses 1 to 4 respectively. Study objective 5 has eight hypotheses, that is 5 to 12.

H1: There is a positive effect of potential quality on measuring B2B multi-process cargo clearance service quality.

H2: There is a positive effect of process hard quality on measuring B2B multi-process cargo clearance service quality.

H3: There is a positive effect of process soft quality on measuring B2B multi-process cargo clearance service quality.

H4: There is a positive effect of output quality on measuring B2B multi-process cargo clearance service quality.

H5: Relationship between potential quality and B2B multi-process service quality is mediated by output quality.

H6: Relationship between potential quality and B2B multi-process service quality is mediated by process hard quality.

H7: Relationship between potential quality and B2B multi-process service quality is mediated by process soft quality**.**

H8: There is a positive relationship between potential quality and output quality in measuring B2B multi-process service quality.

H9: There is a positive relationship between potential quality and process hard quality in measuring B2B multi-process service quality.

H10: There is a positive relationship between potential quality and process soft quality in measuring B2B multi-process service quality.

H11: There is a positive relationship between process hard quality and output quality in measuring B2B multi-process service quality.

H12: There is a positive relationship between process soft quality and output quality in measuring B2B multi-process service quality.

2.8 Summary

The adoption of INDSERV model perpetuates the previous literature on B2B service quality measurement in recent years. This involves using outcome service quality, soft process service quality, hard process service quality, and potential service quality. According to the literature, the purpose of integrating both technical, function and outcomes on measuring B2B service quality create inclusion of all variables of service constructs.

The relationship between service quality and B2B is explained by the INDSERV model of B2B service quality measurement (Adebayo, 2017). The use of three-stage approach as proposed by Riel, *et al.* (2017) and Rachaul (2014) are useful tools to use for improving the models proposed by Gounaris (2005) and Lee (2011) internal structure second-order constructs in measuring cargo clearance multi-processes B2B service quality.

The model must be mediated by process hard quality, process soft quality and outcome quality to predict B2B multi-processes service quality. The hierarchy approach model had been a useful tool in assessing B2C service quality and in this study it was used to measure B2B multi-process. Hierarchy constructs represent different prosses in cargo clearance as they are provided by different organisations.

CHAPTER THREE

RESEARCH METHODOLOGY

3.1 Overview

This chapter presents the research methodology of the study. Briefly, it presents the plan for the research. It begins with a discussion about research strategy where research philosophy, research approach, and research design are discussed. After that follows the description of the sampling methods, sample size, and its selection as well as techniques for data collection and analysis of the research finding. Reliability and validity, and ethical issues are also addressed in this chapter.

3.2 Research Philosophy

This study makes use of positivism research philosophy. According to Greener and Martelli (2015) positivism philosophy is a phenomenon which is usually associated with empirical testing. Saunders *et al.* (2015) argue that positivism assumes that an objective reality exists that is independent of human behavior; that is; the researcher and the researched are separate and independent units. Positivist philosophy is aimed at explaining the relationships through identification of causes that influence outcomes.

The ultimate aim is to devise laws and form a basis for prediction and generalization. Thus the use of positivist philosophy in this study was justified by the fact that the researcher aimed at testing the relationships between INDSERV variables and B2B cargo clearance service quality under the service quality measurement theory and testing of hypotheses.

3.3 Research Approach

Concerning the research approach, a deductive approach was followed in this study. Saunders *et al.* (2009) explain the meaning of the deductive method as a type of plan in which theory-based hypotheses are developed, and a research strategy is designed to test them. Accordingly, Bhattacherjee (2012) adds that; deductive is a typical approach to positivist philosophy and it employs empirical data. The design of this study was quantitative.

The study was built on existing knowledge of service quality and proposed to establish the relationship between variables of INDSERV model on measuring B2B multi-process service quality. The study used primary data techniques to answer the research hypotheses (Saunders *et al.,* 2015). The study used a survey strategy by employing quantitative interviewer-administered structured questionnaire. Accordingly, Bhattacherjee (2012) adds that; deductive is a typical approach to positivist philosophy and it operates with empirical data. Scotland (2012) adds that a deductive approach often involves empirical testing, random sampling techniques, and controlled variables such as independent, dependent, moderators and control groups.

3.4 Research Design and Strategy

The design of this study is explanatory research. According to Tharenou *et al.* (2007) and Saunders *et al.* (2015), explanatory research design is referred to as an attempt to study cause and effect. Accordingly, Yin (2011) argues that; the primary purpose of explanatory research is to identify any causal relations between the factors or variables relevant to the research problem. That is to say; the current study attempted to explain the interplay between the INDSERV constructs and their influence on B2B multi-process under port cargo clearance service using Structural Equation Modeling (SEM) technique.

The reason for the choice of Structural Equation Modeling; unlike other quantitative statistical models, it can be used to study the relationships among latent constructs that are indicated by multiple measures (Byrne, 2010). Byrne argues further that SEM provides precise estimates of measurement errors in the parameters and that, unlike other multivariate procedures, SEM measures both unobserved and observed variables. Concerning research strategy, this study utilized survey method. Easterby-Smith (2015) and Saunders *et al.* (2015) assert that survey methods allow researchers to collect quantitative data which can be analyzed quantitatively using descriptive and inferential statistics and that; it is usually associated with the deductive (positivism) approach.

3.5 Data Sources and Data Collection Techniques

3.5.1 Data Source

The research used both primary and secondary data.

3.5.2 Secondary Data

Secondary data were sought from various sources to help in writing the literature review as well as establish the research gaps. Research articles were extracted from JSTOR database, free full pdf, Google Scholar, Sage, Taylor, and Francis online, Wiley online library, and Emerald databases. Keywords were ports, cargo clearance, service quality, INDSERV, Hard process service quality, Soft process service quality, potential quality, outcomes quality, B2B service quality, SERVQUAL, SERVPERF, clearance process, clearance service factors. The articles were subjected to article content analysis through relation analysis by identifying service quality and B2B concepts present in the articles, exploring the relationship between various concepts of service quality and B2B.

The articles were subjected to content analysis and the information was summarized and tabulated. Hsieh and Shannon (2005) argue that content analysis is a flexible method for analyzing text and it is useful for exploring trends and patterns available in documents. Accordingly, Scotland (2012) argue that content analysis involves counting and comparison of keywords or content, followed by an interpretation of the underlying viewpoints. They point out further that, content analysis involves conceptual and relational analysis (Busch *et al.,* 2012). The conceptual analysis involves establishing the existence and frequency of concepts most often represented by words or phrases in a text whereas relational analysis involves an additional process of examining the relationships among concepts in a text (Garson, 2012). In the current study, the researcher explored both the frequency of occurrence (conceptual analysis) as well as relationships that existed among the concepts (relational analysis) of interest in various publications.

3.5.3 Primary Data

The study used primary data which was collected through structured questionnaire filled by cargo clearance service users and providers in Dar es Salaam. Primary data were used because there was no sufficient secondary data to undertake the study and primary data were original and relevant to the title of the study. This study made use of primary data collected through a self-administered structured questionnaire through the drop and collect technique. The drop-and-collect method entailed leaving an inquiry with a respondent and following it up later after having been filled. According to Bernard (2006), this technique allows researchers to gather data from a large, representative sample of respondents, at relatively low cost with a response rate of up 60 percent. A pilot study was conducted from May 2018 while data collection for the main research was done from July 2018 to November 2018. This study helped in refining the research instrument which included omission of ambiguous statements.

3.5.4 Questionnaire

The study collected quantitative data by using structured questionnaire because this study was an explanatory and survey strategy to assess the causal relationship between variables in B2B service quality (Saunders *et al.*, 2015). The study follows questions from INDSERV measurement model as stipulated by Lee (2011). This enabled the researcher to examine and explain the relationship between variables and to compare with results from other studies, in particular, cause-effect relationships. Pilot study for pretesting the questionnaire was done through 25 experts in Cargo clearance and the results were used to improve the questionnaire.

3.5.5 Primary Data Collection Procedure

The Research assistants were mentored on the instruments to be used during data collection process and the researcher supervised them. Before doing research, meetings were held with appropriate Chief Executive Officers of selected companies to gain acceptance of their participation. The questionnaires were delivered to each sampled company for five months, July to November , 2018. The managers were requested to respond to the questionnaires because they interact with the customers when offering service to them. Interaction in B2B services is significant when measuring service quality.

In order to conduct data collection process, consent was necessary from concerned government body and private organizations. For this purpose, the introductory letters were obtained from the Open University of Tanzania (Shown as Appendix 2) and submitted to Tanzania Shipping Agency Corporation, Tanzania International Container Terminal, Government Chemistry Laboratory Authorities, Confederation of Tanzania Industry, Tanzania Freight Forwarders Association, Tanzania Bureau of Standards and Tanzania Revenue Authority. The support and cooperation of these institution was considerable. They provided list of their respective respondents and convinced them to positively cooperate with data collection.

To gather data through the structured questionnaire, six experienced Research Assistants were recruited on competitive basis. These research assistants had the following responsibilities (i) distributing questionnaires to specified respondents, selected based on random sampling procedures, (ii) informing the respondents regarding the objectives of the study and requesting them to respond to the questionnaire, and (iii) collecting the competed questionnaires and submitting to the researcher.

The researcher assistants went through a two days training on how to conduct the research. The aim of the training was to describe the nature of each question, responsibilities of the research assistants, how respondents should be treated and the way how questionnaire s should be filled. After the training was provided, a one day pilot was conducted in order to test the knowledge of the research assistants on the questionnaires to be administered and evaluate the mechanical aspects (form, Grammar, readability, content and clarity of the questionnaires. This helped the writer to make necessary correction in order to ensure face validity of questionnaire, and reliability of instrument. Each day the researcher himself supervised the data collection field work and collected the completed questionnaire from research assistant after ensuring that they were correctly filled. Finally, collected data was entered to IBM SPSS software with the help of data entry expert.

3.6 Unit of Analysis

Unit of analysis refers to the person, collective, or object that is the target of the investigation (Bhattacherjee, 2012). In this study, a unit of analysis was the importing and exporting service provider and user through single key informant data collection. In each company, one well-informed employee preferably a manager or top executive took part in answering the questionnaire as they were considered to be the best person to assess corporate strategies and cargo clearance practices.

3.7 Study Area and Population

3.7.1 Area of the Research

The study was conducted in Dar es Salaam port. According to Customs Authority (2016), 90 percent of import and export cargo of Tanzania are handled in Dar es Salaam and over 95% licensed FF are based in Dar-es-Salaam.

3.7.2 Survey Population

The target population of the study comprised all service providers and service users' managers in Dar es Salaam port with a list of 2035 managers identified from various service providers and service User (Customs Department, 2016 and SUMATRA, 2016). Service providers, included the Customs Department, Consolidators, and Inland Container Depots (ICDs) Operators, shipping agents, and OGDs and Freight forwarders included regular importers and exporters. The detailed population of managers (middle and upper managers) was 2035 comprising of customs (145), OGDs (50), terminal and ICDs (245), a Shipping line and Consolidators (145), Freight Forwarders (900), regular importers and exporters (550) (Customs Department 2016 and SUMATRA 2016).

3.8 Sampling Design and Procedures

The sample size was estimated to be 335 respondents but the questionnaire distributed were 482 respondents and collected were 364 respondents. This study used a sample instead of the entire population because it was cheaper, easier and faster. The study used probability sampling procedures. From the study sampling frame, the study used simple random and stratified sampling procedures to obtain a sample of interest. The methods were chosen by considering the nature of the research where different stakeholders were involved, and each group ought to provide representatives. The sample frame consisted of a list of respondents from FFs, ICDs operators, terminal operators, and regular importer and exporter and these were obtained from the Customs Authority. The list of shipping lines and consolidators was received from TASAC.

3.9 Sample Size

In order to carry out multivariate analysis like PLS-SEM, the researcher was required to establish the adequacy of sample size. In the quantitative study, the larger the sample sizes the lower the likely error in generalizing to the population (Saunders *et al.* 2015). Thus, in order to conduct a research and more reliable data analysis including exploratory factor analysis, the sample size needs to be big enough. Many scholars hold different views on the sample size (Tabachnick *et al.,* 2019). Nunnally (1978) recommended a sample size of 300 – 400 where independent variables are more than three. Sample size was determined using the formula.

n **= N / [1 + N (e)** ^{2}**]** (Saunders, *et al.*, 2015).

Where **n** = the sample size; N = the population size and **e** = the level of precision, based on the nature of the study, 5% margin error and 95% confidence level were allowed to obtain the maximum sample size. By using the formula calculated study sample size was 335. In ensuring that 335 questionnaire were filled and collected the researcher distributed 482 questionnaire and managed to collect 364.

Table 3.1: Research Sample

Types	**Category**	**Population of managers**	**Sample as per calculation**	**Questionnaire distributed**	**Questionnaire collected**
Service providers	Customs	145	24	42	33
	OGDs	50	8	30	11
	Terminals and ICDs	245	40	65	41
	Shipping line and consolidators	145	24	55	30
Service Users	Freight forwarders	900	148	165	149
	Importer and exporter	550	91	125	100
Total		**2035**	**335**	**482**	**364**

Source: Researcher, 2018

Freight forwarders, importer and exporter, were the service users. Customs authority, OGDs, Terminals and ICDs, and shipping agency and consolidators were the service providers. Table 3.1 indicates population, samples as per calculation, questionnaire distributed and questionnaire collected.

3.10 Variables and Measurement Procedures

The study used primary data collected from managers of service users and providers. Both questions were adopted from INDSERV measurement scale using a seven-point Likert scale, ranging from 1 representing "strongly disagree" to 7 representing "strongly agree"(Galaliyawe and Musa, 2015; Lee, 2011). The first section covered demographic questions, such as the respondent's gender, types of process, ownership of the organization, experience, age, and level of education.

3.10.1 Dependent Variables

The dependent variable was Business to Business multi-process cargo clearance service quality (BSQ) and measured through loading factors for question 142-146 (refer appendix I).

3.10.2 Independent Variables

Independent variables in the study are dimensions of B2B constructs namely Potential Quality (PQ), Process Hard quality (PHQ),Process Soft Quality (PSQ), the Outcome quality of service (OQ) and the dependent variable was B2B multi-process service quality cargo clearance service (BSQ). The variables were measured out of observable loading factor in the questionnaire where (PQ) had loading factors for questions 7-

41; (PHQ) loading factors for question 42-76; (PSQ) loading factors for questions 77-111; OQ loading factors for question 112-141 (Appendix I).

3.11 Data Processing and Analysis

3.11.1 Processing Data

Data processing procedure involved editing the collected raw data to detect errors and omissions and to correct these whenever possible. Scrutiny of the contemplated questionnaire was conducted to ensure that data were accurate, consistent with other fact gathered, as complete as possible to facilitate coding and tabulation. After data editing, responses from the questionnaires were assigned numerals or other symbols. Coding was conducted during questionnaire design (Saunders *et al.,* 2015).

3.11.2 Data Analysis

This study used a quantitative approach where data were entered in SPSS software version 23. After the data collection, validation by conducting consistency checks to eliminate or control errors and missing information as practicable were done. Data were analyzed using Smart PLS version 3 (Hair *et al.,* 2013; Hair *et al.,* 2017) computer program. PLS-SEM was used to test the measurement of B2B multi-process cargo clearance service quality in Dar es Salaam port. Descriptive, inferential, and mediation analyses were conducted based on Lee (2011) B2B service quality model.

3.11.3 Descriptive Analysis

Data in this study were analyzed using graphs, tables, figures and descriptive statistics method such as frequency and percentages in order to profile and ease the understanding of various characteristics of the service providers and user firms including, respondent's gender, types of process, ownership of organization, experience, age, and level of education. Descriptive data provided a general picture of the sample representativeness in general which in turn makes valid the discussion of findings. In descriptive analysis, researcher examined the data to understand the nature and characteristics of data.

This analysis assists the researcher in choosing and using the appropriate procedures and analysis in hypothesis testing. The analysis of data from survey was accomplished by employing IBM Statistical package for Social Sciences programe (SPSS)version 23. There were six level of descriptive data analysis which were carried out in order to accomplish the objectives of the study, which included genders, type of business organization, firm ownership, experience in cargo clearance, education levels of respondents, age groups of respondents.

3.11.4 Inferential Analysis

Smart PLS software (version 3.2.7) was used for data analysis due to the low requirements for data distribution, sample size and measurement scales. In addition, this study was explanatory in nature. The Hierarchical Component Model (HCM) was used in this study, which allowed researchers to reduce the amount of relationships in the structural model, thereby making the PLS path model more parsimonious and easier to grasp (Hair, *et al.*, 2018; Hooper , *et al*., 2008).

The research measurement model and structural model were measured by employing a variance-based structural equation modeling (PLS-SEM). The choice of PLS-SEM was justified by the fact that; unlike other quantitative statistical models, it is used to study the relationships among latent constructs that are indicated by multiple measures (Byrne, 2010). Byrne argues further that PLS-SEM provides precise estimates of measurement errors in the parameters and that, unlike other multivariate procedures; PLS-SEM measures both unobserved and observed variables. In this study PLS-SEM was used for data analysis procedure. Before data was analyzed, response patterns were examined.

3.11.5 Measurement and Structural Models

Data collected were screened using SPSS Version 23 to ensure their suitability for the PLS analysis. Further the researcher ascertainedt reflective measurement indicator reliability by assessing individual indicator loadings. Standardized loadings over .70 was suggested (Hair, *et al.,* 2019; Ringle *et al.,* 2018). When outer loading are found below 0.40 the reflective items should be deleted, but if it was between 0.40 and 0.70 the item was analyzed its impact on outer loading deletion on AVE and composite reliability.

The analysis was based on whether its deletion increased measures above threshold the deletion of the reflective indicator. If deletion didn't increase measures above threshold then the reflective indicator was retained; internal consistency was evaluated by composite reliability which had a minimum of 0.70 and maximum of 0.90 (Hair, *et al.,* 2018). The researcher considered the outer loadings of the indicators and the average variance extracted (AVE) to establish convergent validity. At a minimum, all outer indicator loadings should be statistically significant and greater than 0.70. Additionally, AVE value should be 0.50 or higher.

Discriminant validity measured by assessing the indicator of outer loadings on a construct should be higher than all its cross-loading with other constructs. The square root of the AVE of each construct should be the highest correlation with any other construct (Fornell-Larcker criterion) (Henseler, 2010). Structural model assessment were done after confirming that the measure of the construct was reliable. It involved assessing a structural model in terms of collinearity, significance, and relevance of the structural model relationships, assessed values of R squares, assessed the effect size f^2 and predictive relevance Q^2 and q2 (Hair *et al*, 2013)(Refer appendix III).

3.11.5.1 Assessing the Measurement Model (Outer Structure)

The objective of the measurement model was to describe how well the measured variables serve as a measurement instrument for the latent constructs (Hair *et al,* 2012). The study tested measurement model (outer structure) through testing eight indicators namely content validity, internal consistency, indicators reliability, convergent validity, discriminant validity, and indicators loading, outer loading size and significance (Hair *et al.,* 2017) (refer appendix III).

3.11.5.2 Assessing the Structural Model (Inner Structure)

The structural model of B2B multi-process service quality was conducted to estimate the path coefficients or parameters. The purpose of conducting the structural model evaluation was aimed to test that B2B multi-process service quality (BSQ) was a multidimensional latent constructs consisting of five latent constructs and each had 5 sub latent constructs which had a positive relationship with B2B multi-process cargo clearance service quality (Bruce and Wesley, 2006; David, 2016).

Structural predictive hypothesis-path coefficients between the latent variables was assessed in terms of their algebraic sign, magnitude, and significance. The significance was tested using bootstrapping.

Combined predictiveness *Coefficient of multiple determination (R^2) (Multiple regression coefficient*) - to assess the combined predictability of the model's exogenous variables explain the endogenous construct variance (Assaker *et al.,* 2012, Hair *et al.,* 2018). Measures the relationship of latent variable's explained variance to its total variance by the exogenous latent variable. The values of R^2 greater than 0.5 mean that, on average, a majority of variance in the indicators was shared with the construct for the first order construct (Howat and Assaker., 2013; Hair *et al.,* 2018).

The goodness of path coefficients assessed the strength and significance of the beta path coefficients that were estimated by PLS-SEM algorithm. The researcher checked the path coefficient's algebraic sign, significance, and magnitude. Path coefficients were greater than 0.10. To assess significance, re-sampling methods known as jackknifing or bootstrapping was employed.

Effect size- effect size Cohen's f^2 captured the strength of influence from one exogenous construct on the endogenous latent variable. The effect of size was categorized as higher where it was above 0.35, medium greater than 0.15 to .35 and small, between .02 to 0.15(Hair, *et al.,* 2018).

Predictive relevance (Q^2) Assess the predictive relevance of the model in term of observed variables. It tests how well a model estimates each endogenous variable. The cut off is $Q^2 > 0$ (Gye-Soo, 2016; Hair *et al.,* 2018). Having confirmed the validity of the structural model, the results were assessed to test the research hypotheses (refer appendix III).

3.11.6 PLS-SEM Measurement and Structural Model

In assessing data set, the researcher employed the reflective measurement model (outer model) and structural model (inner model).

3.11.6.1 Partial Least Squares (PLS) Structural Equation Modeling(SEM)

One of exception in survey study is the selection of an appropriate statistical model for data analysis. The basic goal of statistical methods was to estimate the probability that the data gathered behavioral from the field or archival could have occurred by chance rather than by the causes proposed by the theory being tested (Haenlein and Kaplan, 2004; Hair, *et al*, 2017). Thus, with this in mind, these methods should be carefully chosen based on the category of data gathered and should be employed in the context of theory using measures derived from a theory (Hair *et al.,* 2017). In fact, there is tradeoffs among first generation, PLS-SEM and CB-SEM. This study used second – generation statistical methods, such as CB-SEM and PLS-SEM. The first-generation technics commonly employed methods like linear regression, logistic regressions, repeated measures, difference of means tests , t-tests and ANOVA. The techniques fit most for model with few independent and dependent variables and where data were normally distributed that are appropriate to simple modeling scenarios.

Nevertheless, first-generation methods provide limited modeling capabilities, specifically in relation to causal and complex modeling. In fact, first generation methods are ill appropriate to modeling latent constructs, mediation (indirect effects), multiple groups effects, moderation of multiple effects. Second generation methods (Structural equation modeling) are statistical techniques for modeling causal variables of effects simultaneously, instead of in a piecemeal manner. The first generation statistical tests the plausible of a single theoretical proposition such as changes in A causes changes in B. In really practice most theories, need more than a single proposition to predicts and explain observed variations in the phenomenon of the interest in the study. Indeed, second generation statistical methods such as SEM provides several, scalable, and flexible causal-modeling usefulness above those provided by first- generation. But, second generation methods do not invalidate the need for first generation methods.

SEM- second- generation statistical methods, is able to test an entire collection of propositions comprising a causal theory simultaneously. Therefore, SEM can model and examine multiple independent variables and multiple dependent variables, chains of causal effects and indirect effects, and latent variables that constructs are meant to measure. SEM jointly evaluates measurement and structrural model. SEM provides for holistic testing of multi-staged models.

The piecemeal testing of the causal relationships can lead to inflated t- statistics, which increases the possibilities of Type I error, -false positive limited application for the overall variation in the model employing R^2 (Increases the likelihood of Type II errors- false negative (Hair, *et al.*, 2010). SEM statistical models illustrate causal relationships as paths. A path is a hypothesized correlation between observed variables and latent variables, and between latent variables representing the antecedents/ causal and consequent variables of theoretical proposition.

Therefore, each path in the conceptual framework hypothesized. A SEM statistical model can have a path for every proposition in a theory, this provides for comprehensive testing of multi-staged theoretical relationship and able to analyze the path simultaneously rather one at a time. SEM may test relationship among latent constructs and unobservable latent variable, model errors in measurement for observed variables and statistically test a priori theoretical and measurement assumptions against empirical data (Chin *et al.*, 2003, Hair *et al.*, 2011). These features are specifically useful for building theories, because normally theories involve more than one-way relationships. For example, the current study had latent variable in multi stage process of causal links of latent variables. SEM avoids fixed scale construction of creating indices of averages, sums, or weighted across measurement items when they have multiple measures of a variable. Further first generation methods restrictively assume covariances and homogeneity of all dependent variables, in contrast , PLS SEM does not need this assumption (Hair *et al*.,2017; Henseler, *et al.*, 2016).

Generally, there are two main approaches within SEM: Co-variance based structural equation modeling (CB-SEM) which uses the maximum likelihood (ML) to minimize the differences between the sample covariance and those predicted by the theoretical model. The estimated parameters attempt to reproduce the observed values covariance matrix. When using the ML function , the observed variables have to follow a normal distribution and observation must be independent of one another (Chin *et al.*, 2003).

While, Partial Least Squares based Structural modeling (PLS-SEM) uses least square estimation for single and multi-component models and canonical correlation (Hair *et al.*, 2017; Henseler, 2017). The PLS method do not use several of the restrictive assumptions underlying ML methods and guarantees against improper solution and variable indeterminacy (Hair *et al*, 2017). Hence, In choosing which statistical technique is appropriate, this study selected PLS-SEM which has more benefits than CB-SEM as indicated in Table 3.2.

Table 3.2: Suggestions on Selecting PLS-SEM and CB-SEM

Model requirement	CB-SEM	PLS-SEM
Interaction effects	Difficult with small models, nearly impossible with complex ones	Preferable, as it is designed for handling easy interactions
Formative variables	Difficult	Easier
Testing alternative models	Preferable, as it demonstrates model fit statistics	Can use
Includes multi-group moderators	Preferable	Can use, but difficult
More than 30-50 variables	Sometimes unreliable if it converges; sometimes will not converge	Preferable, will work but must adhere to sample size requirements or results will affected
Non –normal distributions	Should not be used; results in unreliable findings	Preferable but it will affects results, just to a lesser extent
Non homogeneity of variance	Should not be used ; results in unreliable findings	Preferable (Although it will affect results, to a lesser extent
Small size of sample	Unreliable if it does not converge.	It will run (although it will still affect results negatively). PLS user still need to follow statistical guidelines on power
Hierarchical models(Second or third order latent variables)	Work well for reflective	Work well for formative and reflective

Source: Hair, *et al.*, (2018)

3.11.6.2 Use of PLS-SEM or CB-SEM

Fundamentally, there are two types of SEM. One is partial least squares or component based and represent latent constructs with components, the other is covariance based and represents latent constructs through factors (CB-SEM). Generally, most of the features and benefits of CB-SEM also mirror to PLS-SEM, but PLS-SEM may provide benefits over CB-SEM method for preliminary theory building, while CB-SEM and first generation have benefits over PLS-SEM in terms of model validation. PLS-SEM contains several other statistical methods that are not incorporated in CB-SEM, for example, redundancy analysis, principal component analysis, multiple regression, multivariate analysis –MANOVA and canonical correlation without inflating the t-statistic as would occur if each analysis were done in piece meal (Chin *et al*., 2003).

The advantages of PLS-SEM over CB-SEM are:

(1) Factor indeterminacy

CM-SEM basic objective seeks to model the co variation of all measured variables or indicators as assume that research model or null hypothesis is insignificant, however, CB-SEM ends with factor indeterminacy, which implies that it produces more than one solutions corresponding to the hypothesis being tested.

This indicates that CB-SEM is very unrealiable in the exploratory analysis needed for theory building, but CB-SEM is useful for testing nomology of a known theory and testing model fit (Chin, 1998). While, the primary purpose of PLS-SEM is to show that the alternative hypothesis is significant, permitting the researcher to reject a null hypothesis demonstrating significant t-values and High coefficient of determination – R^2.

(2) Data distribution flexibility, PLS-SEM does not need to assume that the endogenous variables are assume to normal distribution.

(3) Construct specification- CB-SEM as with first generation methods needs to use reflective measured variables instead of formative measured variables. By assuming that all measured variables are reflective CB-SEM introduces serious modeling errors and produce unreliable results. Thus when a theoretical model includes formative measured variable, it is useful to employ an appropriate methods, such as PLS-SEM, that can account for both reflective and formatives.

(4) Mediation and model complexity-CB-SEM enhances on several of the first generation concerns of detecting indirect effects. In most cases , CB-SEM methods, for example AMOS and LISREL, are not as sensitive to indirect effects as PLS-SEM is (Chin *et al.*, 2003).

3.11.6.3 Selection of PLS-SEM or CB-SEM

As discussed on section 3.11.6.2 PLS-SEM is dependent upon the principal component analysis, which is useful for theory building and employs the partial least squares estimators. Whereas CB-SEM is based on factor analysis, which is suitable for theory testing. Thus, in selecting whether to employ CB-SEM or PLS-SEM, the researcher considered whether this study was explanatory –building or testing a new theory or confirmatory –testing a well-established theory.

3.11.7 Assumptions underlying PLS SEM

SEM is a class of multivariate techniques that combine aspects of factor analysis and regression, simultaneously examine relationships among measured variables and latent variables and between latent variables (Hair *et al*., 2014). PLS-SEM is a useful method over CB-SEM when sample size is small, the data is nonnormally distributed or when complex models with many indicators and model relationships are estimated (Hair *et al.,* 2017). PLS-SEM is based on two theories namely measurement theory and structural theory. Measurement theory specifies how the latent variables (constructs) are measured while structural theory shows how the latent variables are related to each other (the path relationships between them in the structural model) (Hair *et al.,* 2011). To avoid wrong conclusions, testing for the multivariate assumptions is inevitable. The first assumption in the application of PLS-SEM is that each variable in the study is nonnormally distributed (Hair *et al.,* 2017; Ringle *et al.,* 2018).

The second assumption is the existence of complex models with many indicators. The study model as adopted from Lee (2011) internal structure and second-order latent variables model with modification of using the third order construct model of B2B multi-process quality are complicated as it has both mediation variables.

The third assumption is that; the relationship between the indicator variables and their underlying constructs as well as between one construct and another is linear (Kline, 2011).

The fourth assumption focus on integration of formative measured constructs with reflective measurements as causal indicators (Hair *et al.* 2011).

The fifth assumption is focus is on exploring new relationships starting from a hypothesized model that has reasonable good theoretical support (Hair *et al.* 2016).

The sixth assumption is the presence/absence of missing data and outliers. SEM operates under the assumptions that there are neither missing data nor outliers (Cheema, 2013; Rhoads, 2012). According to Byrne (2010), outliers refer to cases whose scores are substantially different from all the others in a particular set of data.

In the current study, Smart PLS 3 software was used to produce box plots for each variable to test for the presence of extreme outliers. To ensure that there was no violation of the assumptions, this study checked for outliers normality, linearity, and multicollinearity. Last assumption PLS-SEM used mostly when the study focus on m prediction rather than confirmation of the theory.

3.12 Mathematical Model for the Study

Bearing selection of PLS-SEM for data analysis, Diamantopoulos (2011) provides the most general form of a reflective measurement model can be illustrated by the following notation:

$$y_i = \Lambda_y . \eta_j + \varepsilon_i \quad (1)$$

$$\eta_j = \Gamma . \xi_k + \varsigma_j \quad (2)$$

The first equation defines the manifest variable (y_i) in terms of the first order latent construct(η_j) and measurement error (ε_i), Λ_y denotes the first order latent variable loadings.

The second equations define the first –order factors (η_j) in terms of second-order latent variables(ξ_k) and disturbance or residual terms.

η_{j} = B. η_j +Γ .ξ_k+ς_j (3)

Equation (3) for third order (Dagger, *et al.*, 2007).

The term Bη_j signifies the higher order latent constructs from the first-order to the n^{th} order, except for the highest order latent construct, which is signified by the term Γ ξ_k.

The above notations are reflective measurement (1) and hierarchical component model (2) can be represented as a first and second-order models variables in respect of Potential quality (PQ), Process hard quality (PHQ), Process soft quality (PSQ) and Output quality (OQ) and and B2B multi-process service quality (BSQ) respectively.

$C=C' +a_1b_2+a_2b_2b_3+a_1a_3a_4a_5b_3+\zeta$ (Hayes, 2009)**,** Where**:** **(2)**

c= Direct effect between potential quality and B2B service quality cargo clearance

c' = quantifies the direct effect of potential quality(X) as an independent variable

$a_1a_3a_4a_5b_3$ = four terms being specific indirect effects and their sum being the total indirect effect

a and b quantifies the indirect effect of potential quality (X) on B2B service quality cargo clearance (Y) through (process soft quality or process hard quality or output quality(M)

3.13 Testing Various Study Models

3.13.1 Testing Mediation effects Model

In testing mediation effects the study adopted model as shown in figure 3.1. the figure shows how various mdediation variables tested.

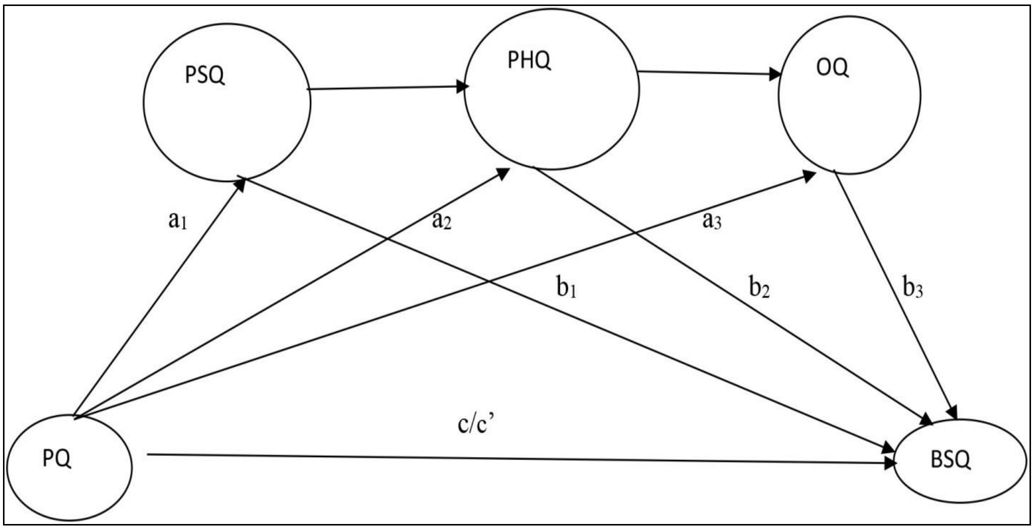

Figure 3.1: A Multiple –Step Mediator Model

3.13.2 Testing Measurement and Structural Model

The summary of INDSERV model is depicted in Figure 3.1 which has two key components: (1) The target constructs of the interest namely, potential quality (PQ), soft process quality(SPQ), Hard process quality(HPQ), Outcome quality(OQ)-Dependent variables/exogenous and B2B service quality(BSQ) and (2) twenty one INDSERV dimensions customs potential quality, OGDs potential quality, shipping potential quality, terminal potential quality, FF potential quality, customs soft process quality, OGDs soft process quality, shipping soft process quality, terminal soft process quality, FF soft process quality, customs hard process quality, OGDs hard process quality, shipping hard process quality, terminal hard process quality, FF hard process quality, customs outcome quality, OGDs outcome quality, shipping outcome quality, terminal outcome potential quality, FF outcome quality and mediation effects, these were independent variables of exogenous variable which represented key determinants of the target construct. Figure 3.2 shows the constructs and their relationships, which represented the structural model for the PLS-SEM the focus of this study.

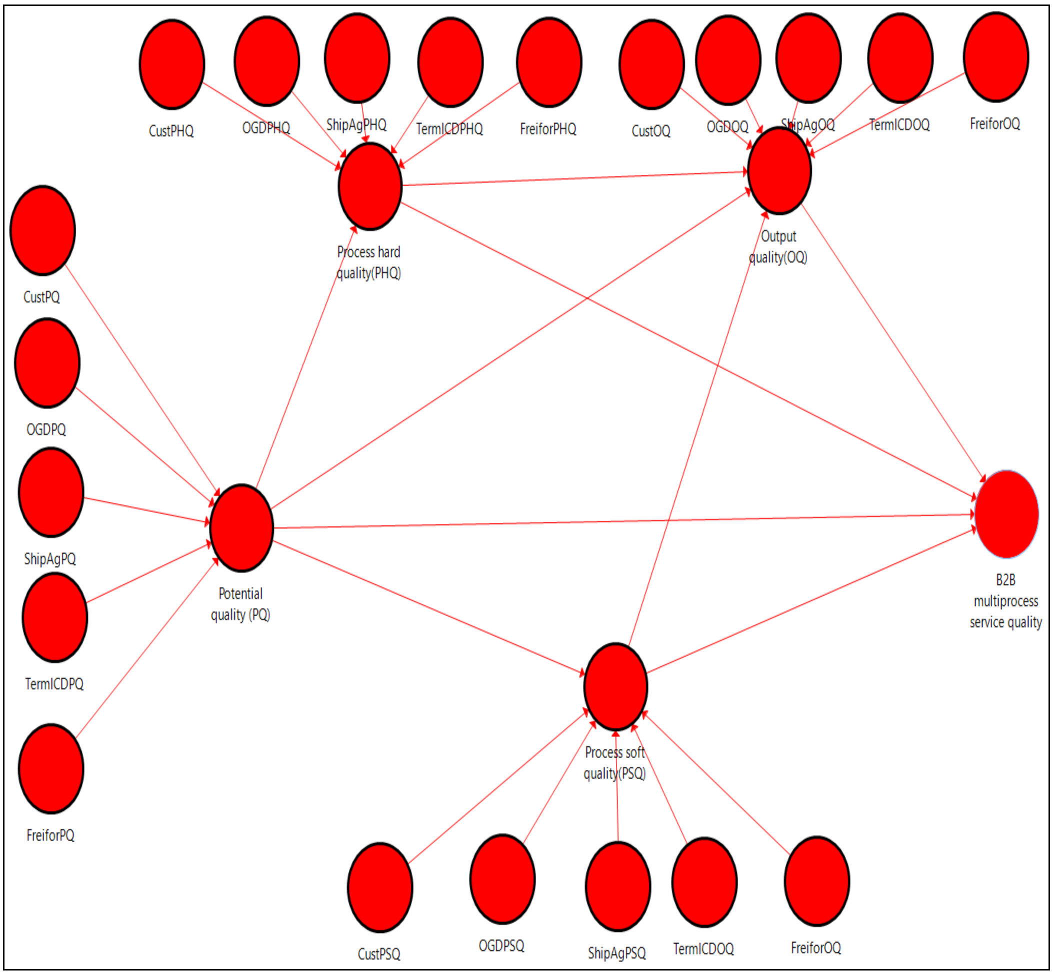

Figure 3.2: The Third Order Construct Model of B2B Multi-Process Quality

Source: Researcher, 2019.

INDSERV model was applied to PLS-SEM, structural model which displayed the INDSERV model with its vital element or constructs and cause-effects relationship to that paths.

3.13.3 Testing Hypotheses

The PLS used the Spearman's rank correlation coefficient–to assess the strength of relationship between two variables and the hypotheses used one tail t test. The result of individual regression coefficient was that if probability was less than 0.05 then the null hypothesis was rejected meaning that the regression coefficient for the variable was statistical significant (Hair *et al*., 2018).

Based on the conceptual framework and measurement model the researcher tested twelve study hypotheses by analyzing constructs and their path relationships in the structural model (Hair *et al.,* 2014). Further the hypotheses were measured in terms of their relationship with five processes of B2B cargo clearance service quality namely customs processes, OGDs process, freight forwarding process, shipping agency process and terminal and ICDs process. In testing hierarch constructs Riel, *et al.* (2017) proposed for testing both the constructs and sub constructs. The researcher tested following hypotheses and its sub constructs relationship.

H1: There is a positive effect of potential quality on measuring B2B multi-process cargo clearance service quality.

In testing the hypotheses the researcher examined both the potential quality and B2B multi – process cargo clearance path relationship, and the relationship between the potential quality and its five sub hierarchical path constructs.

Sub- hierarchical path constructs relationship tested were:

H1a: There is a positive relationship between custom potential quality and B2B multi -process cargo clearance potential quality.

H1b: There is a positive relationship between OGDs potential quality and B2B multi -process cargo clearance potential quality.

H1c: There is a positive relationship between freight forwarders potential quality and B2B multi -process cargo clearance potential quality.

H1d: There is a positive relationship between shipping agency potential quality and B2B multi -process cargo clearance potential quality.

H1e: There is a positive relationship between terminal and inland container depot potential quality and B2B multi -process cargo clearance potential quality.

H2: There is a positive effect of process hard quality on measuring B2B multi-process cargo clearance service quality.

In testing the above hypothesis mentioned, the researcher examined both the process hard quality and B2B multi – process cargo clearance path relationship , and the relationship between the hard quality and its five sub constructs.

Sub- hierarchical path constructs relationship tested were:

H2a: There is a positive relationship between the customs process hard quality and B2B multi -process cargo clearance process hard quality

H2b: There is a positive relationship between the OGDs process hard quality and B2B multi -process cargo clearance process hard quality.

H2c: There is a positive relationship between freight forwards process hard quality and B2B multi -process cargo clearance process hard quality.

H2d: There is a positive relationship between shipping agency process hard quality and B2B multi -process cargo clearance process hard quality.

H2e: There is a positive relationship between terminal and inland container depot process hard quality and B2B multi -process cargo clearance process hard quality.

H3: There is a positive effect of soft quality on measuring B2B multi-process cargo clearance service quality.

The researcher in testing the hypotheses examined both the process soft quality and B2B multi – process cargo clearance path relationship , and the relationship between the process soft quality and its five sub constructs.

Sub- hierarchical path constructs relationship tested were:

H3a: There is a positive relationship between the customs process soft quality and B2B multi -process cargo clearance process soft quality.

H3b: There is a positive relationship between the OGDs process soft quality and process soft quality.

H3c: There is a positive relationship between freight process soft quality and B2B multi -process cargo clearance process soft quality.

H3d: There is a positive relationship between shipping agency process soft quality and B2B multi -process cargo clearance process soft quality

H3e: There is a positive relationship between terminal and inland container depot process soft quality and B2B multi -process cargo clearance process soft quality.

H4: There is a positive effect of output quality on measuring B2B multi-process cargo clearance service quality.

The researcher in testing the hypotheses examied both the output quality and B2B multi – process cargo clearance path relationship , and the relationship between the output quality and its five sub constructs.

Output quality Sub- hierarchical path constructs relationship tested were:

H4a: There is a positive relationship between custom output quality and B2B multi -process cargo clearance output quality.

H4b: There is a positive relationship between OGDs output quality and B2B multi -process cargo clearance output quality.

H4c: There is a positive relationship between freight forwarders output quality and output quality.

H4d: There is a positive relationship between shipping agency process soft quality and B2B multi -process cargo clearance output quality

H4e: There is a positive relationship between terminal and inland container depot output quality and B2B multi -process cargo clearance output quality

Testing Mediation Effects

The researcher tested mediation effects of output quality, process hard quality, process soft quality on relationship between potential quality and B2B multi-process cargo clearance through three hypotheses. The output quality mediation effect on potential quality, process hard quality and process soft quality in predicting B2B cargo clearance service quality.

H5: Relationship between potential quality and B2B multi-process service quality is mediated by output quality.

The researcher in testing the mediation effect hypotheses examined both the potential quality and B2B multi – process cargo clearance mediation impact by output quality , and the mediation effects of potential quality five sub constructs.

Sub- hierarchical path constructs relationship tested were:

H5a: There is a positive relationship between potential quality and B2B multi-process cargo clearance;

H5b: There is a positive relationship between potential quality and output quality;

H5c: There is a positive relationship between output quality and B2B multi-process cargo clearance;

H5d: There is a positive relationship between potential quality and B2B multi-process cargo clearance.

H6: Relationship between potential quality and B2B multi-process service quality is mediated by hard process quality

Sub- hierarchical path constructs relationship tested were:

H6a: There is a positive relationship between potential quality and B2B multi-process cargo clearance;

H6b: There is a positive relationship between potential quality and process hard quality;

H6c: There is a positive relationship between process hard quality and B2B multi-process cargo clearance;

H6d: There is a positive relationship between potential quality and B2B multi-process cargo clearance.

H7: Relationship between potential quality and B2B multi-process service quality is mediated by soft process quality.

Sub- hierarchical path constructs relationship tested were:

H7a: There is a positive Relationship between potential quality and B2B multi-process cargo clearance

H7b: There is a positive relationship between potential quality and process soft quality.

H7c: There is a positive Relationship between process soft quality and B2B multi-process cargo clearance;

H7d: There is a positive relationship between potential quality and B2B multi-process cargo clearance

H8: There is a positive relationship between potential quality and output quality in measuring B2B multi-process cargo clearance service quality.

H9: There is a positive relationship between potential quality and process hard quality in measuring B2B multi-process cargo clearance service quality.

H10: There is a positive relationship between potential quality and process soft quality in measuring B2B multi-process cargo clearance service quality.

H11: There is a positive relationship between process hard quality and output quality in measuring B2B multi-process service quality.

H12: There is a positive relationship between process soft quality and output quality in measuring B2B multi-process cargo clearance service quality.

3.14 Checking for Missing Data

Many reasons exist for missing data in survey research which includes among others, respondents ignoring a few or all questions, questions being irrelevant to the respondent's situation, or inability of data collectors to locate the respondent (Cheema, 2014). According to Rhoads (2012), the method for handling missing data that is chosen have a substantial impact on the conclusions that are drawn from the study. Hence understanding how missing data was handled is crucial to understanding the implications of the study. In this study, list-wise deletion method of handling missing data was applied. The missed data may be handled by Smart PLS 3.0. Ringle *et al.*

*(*2018), provided two ways of handling missing data, which are mean value replacement and case wise deletion. In the case of Mean value replacement, the missing data of items are replaced with the mean of valid values of that indicator, but this procedure is normally used when less than five percent values are missing per indicator (Cheema,2013; Hair *et al.*, 2014).

3.15 Test for Validity

Validity can be in form of convergent validity or discriminant validity (Hamid *et al.* 2017). Convergent validity is the extent of positive association of the construct with other measures of the same construct while discriminant validity demonstrates the degree to which the construct does not show a relationship with other measures that are similar to it (Hair *et al*., 2015). Convergent validity was examined by assessing the average variance extracted of each latent construct (Zeit and Bertea, 2011). Discriminant validity was examined by comparing the correlation among the latent construct with the square roots of average variance extracted (Forner and Larker, 1981). To ascertain convergent validity, the average variance extracted (AVE) score should be 0.50 or more, and the square root of the AVE should be greater than the correlation among the latent constructs (Hair *et al*., 2015).

3.15.1 Testing for Reliability of the Measurement Instrument

Reliability of this study measurement instrument was enhanced in four aspects; using measurements level that was precise, plainly conceptualizing all constructs, making use of multiple indicators through a pilot test. Thus, the reliability of the measures was ascertained by PLS-SEM algorithm by examining individual items reliability by outer loadings and internal consistency reliability by composite reliability (Hair *et al.*, 2015). To ascertain the internal consistency reliability of the constructs used, the composite reliability coefficient should be at least 0.70 or greater.

3.15.1.1 Internal Consistency Reliability

Is a form of reliability used to judge the consistency of results across items on the same test. In PLS-SEM internal consistency reliability was measured in the form of composite reliability and Cronbach alpha. Composite reliability are the types of reliability that take in to account the different outer loadings of the indicator variables. The composite reliability varies between 0 to 1, with higher values indicating higher levels of reliability (Hair. *et al.*, 2017).

3.15.1.2 Indicator Reliability

The indicator's outer loadings should be higher than 0.7 to become statistically significant. The researcher assessed the significance of indicator weights using bootstrapping significance level at 0.05 implying that the indicator was relevant for constructing the formative index. Lohmoller (1989) recommended path coefficients greater than 0.1,while Chin (1998) recommended value greater than 0.2.

3.15.2 Multicollinearity

The extent of the multicollinearity among formative indicators assessed by calculating the Variance Inflation Factor (VIF). However, for the reflective measurement model the issue of multicollinearity was not a concern (Ringle *et al.,* 2018). This depicted how much of an observed variable's variance was explained by other observed variables of the same construct. The value should be below 10, indicate that multicollinearity is not an issue and a VIF greater than ten are redundant and should be considered for subsequent elimination (Hair *et al.*, 2018; Ringle *et al.*, 2016).

3.15.3 Outlier

An outlier is an exceptional and extreme response to a particular question. The procedure of dealing with outliers was by first identifyed them. Outliers were identified through IBM SPSS and had an option termed Explore that developed box plots and stem-and-leaf plots that assisted the identification of outliers (Hair *et al.*, 2014). Thus, the outliers were identified first before conducting a SmartPLS 3 programme.

3.15.4 Exploratory Factor Analysis

The resercher conducted exploratory factor analysis to check whether the first order measurement indicators had sufficient indicator loading, above . 0.70 cuttinng point.

3.15.5 Testing for Validity for HCM Second Order

The researcher tested validity for the second order by conducting through multicolinearity test, convergent validity of second order, redundance analysis , first order formative multicolinearity and significance.

3.15.6 Tesiting Structural Model Realibility

Stuctural model or third oder constructs validity and reliability were tested through coefficient of dertermination R2, effect of size f2, predictive reliance Q2 and path coefficient.

3.16 Importance Performance Analysis

In order to guide managerial activities to improve B2B multi-process service quality the researcher conducted Importance – Perfomance analysis through IPMA for constructs and indicators.

3.17 Measurement Invarience Analysis

Taking into account that studies show that cargo clearance is male dominance sector (Baluach and Edwards, 2010), the researcher tested invarance between male and female respondents. Procedure known as Measure Invarience Composite Model employed. Both configual invarience, compositional invarience and Equality of mean and varience measured. Further multi group analysis was tested through outer loadings bootstrapping MGA test.

3.18 Ethical Issue

To ensure ethical standards, the researcher observed the ethical principles as proposed by Bhattacherjee (2012) which were voluntary participation and harmlessness, informed consent, anonymity, and confidentiality as well as disclosure. Introduction letter was solicited from the University to allow the researcher access to data collection refer (appendix II). Further, the collected information was handled confidential and anonymous by not divulging the respondents' identity in the report.

The conduct of research brought ethical considerations. This study posed several ethical problems that needed to be handled during the whole process of study. In observing confidentiality, the researcher ensured that the identity of respondents answering the questionnaire in the research process was highly protected. The consent of individual respondents was checked by ensuring that these who responded to the questionnaire in the study hasd freely consented to participate without being coerced or unfairly pressurized.

CHAPTER FOUR

FINDINGS OF THE STUDY

4.1 Overview

The study objective was to assess the variables for measuring B2B multi-process cargo clearance service quality in Dar es Salaam port. In this chapter, the results of the study are presented. Starting with a pilot study, demographic variables, validity and reliability results. This is followed by the presentation of the results of the overall evaluation of the structural model which involved the analysis of coefficient of determination (R^2), predictive relevance (Q^2), size and significance of path coefficients, f^2 effects sizes and q^2 effect sizes this was done to test the proposed relationship among the latent variables including mediation. The chapter also presented the importance performance analysis and hierarchical structural multi-process analysis. Lastly, the chapter presented hypotheses testing.

4.2 The Pilot Study

In order to evaluate the questionnaire's readability and comprehension by respondents, the questionnaire items were pilot tested. Twenty-five questionnaires were administered in a pilot study through a drop and pick method which was conducted to 25 cargo clearance experts in Dar es Salaam from April 2018 to May 2018. In this study, out of the twenty-five (25) questionnaires administered, a total of 20 questionnaires were returned in time for analysis, representing 80 percent of the pilot sample, which was considered to be an acceptable range (Saunders *et al.,* 2015). The respondents in this pilot study were excluded from the main study. To ensure the effective and efficient collection of data, two research assistants were recruited.

Results from this study were used to refine the research instrument through the omission of ambiguous statements. All indicators in the latent variables were noted with acceptable results on the composite reliability with the minimum composite reliability value of .869; which was above the 0.7 minimum acceptable value in composite reliability (Hamid *et al.*, 2017).

The researcher found a way of enhancing internal consistency by increasing the number of indicators in each variable. The scale used was a seven-point Likert type ranging from strongly agree to strongly disagree. After incorporating the recommendation of these expert respondents it was decided to proceed with the actual survey.

4.3 Descriptive Analysis

The researcher explored the respondents' profile data to gain insight into the nature and characteristics of the respondents of the study. There were a total of six (6) questions used to profile the cargo clearance that was involved in the research.

4.3.1 Gender

Analysis of the sample indicated that the majority of respondents were male. Percent of male and female respondents are as shown in Table 4.1. the fact that cargo clearance considered as male dominance(Baluch and Edwards, 2010), neseciated the test on situation in Dar es salaam port. The results in table 4.1 confirm the dominance of male.

Table 4.1: Gender of Respondent

GENDER					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Male	227	62.4	62.4	62.4
	Female	137	37.6	37.6	100
	Total	**364**	**100**	**100**	

Source: Field Data (2019)

4.3.2 Type of Business Organization

Analysis of the sample indicated that majority of the respondents came from freight forwarders' agents, followed by importer and exporters, inland container depots, customs authority, shipping agency, OGDS and lastly consolidators. Percentages of respondents by type of business organization is presented in Table 4.2.

Table 4.2: Organization Composition of Respondents

Type of business organization	Frequency	Percent	Valid Percent	Cumulative Percent
Customs Authority	33	9.1	9.1	9.1
OGDS	11	3.0	3.0	12.1
Shipping Agency	21	5.8	5.8	17.9
Consolidators	9	2.5	2.5	20.3
Inland Container Depots	41	11.3	11.3	31.6
Freight Forwarding Agent	149	40.9	40.9	72.5
Importer and Exporter	100	27.5	27.5	100
Total	**364**	**100**	**100**	

Source: Field data (2019)

4.3.3 Firm Ownership

As regards to ownership, the majority of the firms were purely locally owned followed by joint venture between foreign and local investors, and lastly multinational company. The percentage of firm ownership is as shown in Table 4.3.

Table 4.3: Firm Ownership

Type of ownership		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Governmental Institution	44	12.1	12.1	12.1
	Pure Locally Owned	264	72.5	72.5	84.6
	Pure Foreign-owned but based in Tanzania	3	.8	.8	85.4
	Joint Venture Between Foreign and Local Investors	38	10.4	10.4	95.9
	Multinational company operating in Tanzania	15	4.1	4.1	100.0
	Total	**364**	**100.0**	**100.0**	

Source: Field Data (2019)

4.3.4 Experience in Cargo Clearance

With reference to Table 4.4 more than half of the respondents had cargo clearance experience of between five and ten years. This was followed by a group of respondents which was less than one third of the entire sample with cargo clearance experience of between ten to twenty years. About 14.2 percent of the respondents had cargo clearance experience of less than five years and very few employee had cargo clearance experience of more than 20 years. Percentage of each age group is shown in Table 4.4.

Table 4.4: Duration of Employment

		Frequency	Percent	Valid Percent	Cumulative Percent
	Less than one year	10	2.7	2.7	2.7
	Between 2 and 5 years	42	11.5	11.5	14.3
	Over 5 -10 years	204	56.0	56.0	70.3
	Over 10 - 20 years	105	28.8	28.8	99.2
	Over 20 years	3	.8	.8	100.0
	Total	**364**	**100.0**	**100.0**	

Source: Field Data (2019)

4.3.5 Education Level of Respondents

Analysis of the educational background of respondents indicated that half of the respondents had a diploma, followed by bachelor degree (one third), form six, masters level, ordinary level and lastly Standard seven. The frequency percentages of respondents education level are shown in Table 4.5.

Table 4.5: Education of Respondents

Education level	Frequency	Percent	Valid Percent	Cumulative Percent
Standard seven	4	1.1	1.1	1.1
O' Level secondary education	9	2.5	2.5	3.6
A' Level secondary education	38	10.4	10.4	14.0
Diploma level	180	49.5	49.5	63.5
First-degree level	124	34.1	34.1	97.5
Postgraduate level	9	2.5	2.5	100.0
Total	**364**	**100.0**	**100.0**	

Source: Field Data (2019)

4.3.6 Age Group

The analysis of the age composition of the sample indicates that about half of the respondents were below the age of 50 years. The remaining half was between the age of 50 and 60 years and a very insignificant number of respondents fell in the age of over 60 years. The "active group" constituted a large part of the sample (See Table 4.6).

Table 4.6: Age Composition of Respondents

Age group		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	20 to 30 years	31	8.5	8.5	8.5
	31 to 40 years	155	42.6	42.6	51.1
	41 to 50 years	144	39.6	39.6	90.7
	51 to 60 years	33	9.1	9.1	99.7
	over 60 years	1	.3	.3	100.0
	Total	**364**	**100.0**	**100.0**	

Source: Field Data (2019)

4.4 Response Rate

Out of the 482 questionnaires, 364 of them were filled and returned to the researcher. This number was equivalent to a response rate of 75.5 percent; which was above the one suggested by Bernard (2006) who achieved a response rate of 60 percent. The higher rate of return was a result of the support and cooperation accorded to the researcher by TASAC the regulator of the industry. TASAC regulates both cargo clearance service providers and users.

4.5 Missing Data, Outliers and Common Methods Bias

4.5.1 Missing Data Analysis in PLS-SEM

PLS-SEM was not designed for dealing with missing data (Hair *et al*., 2018). Therefore, complete data was necessary, and adjustments was made to the items or observed indicators that were are missing. In this study there were no missing values. The reason behind of non-missing value was that the questionnaires were administered by research assistants who were ensured completeness of observed indicators by respondents during questionnaires collection and data entry were carefully administered.

Questionnaires were vetted after being collected and those which were not properly filled in were returned to the respondents for proper completion. Initially, there were few missing fields but after careful rechecking the questionnaires, data was corrected. The final model was noted with no missing data as shown in Table 4.8.

Table 4.7: Indicator Means, Standard Deviations, Kurtosis and Skewness

	No.	Missing	**Mean**	**Median**	**Min**	**Max**	**Standard Deviation**	**Kurtosis**	**Skewness**
Gender	1	0	1.376	1	1	2	0.484	-1.747	0.512
Organization	2	0	5.365	6	1	7	1.831	0.648	-1.345
Form_type	3	0	2.22	2	1	5	0.932	2.051	1.55
Firm_Exp	4	0	3.135	3	1	5	0.727	0.689	-0.514
Education	5	0	4.203	4	1	6	0.837	1.841	-0.85
Age_Group	6	0	2.505	2	1	7	0.81	1.825	0.48
CustPQ_1	7	0	5.025	5	1	7	1.263	2.678	-1.344
CustPQ_2	8	0	5.624	6	1	7	1.188	5.346	-2.045
CustPQ_3	9	0	5.607	6	1	7	1.3	3.41	-1.579
CustPQ_4	10	0	5.745	6	1	7	1.235	4.701	-1.894
CustPQ_5	11	0	5.67	6	1	7	1.306	3.373	-1.633
CustPQ_6	12	0	5.714	6	1	7	1.205	4.835	-1.879
. . .	. . .	. . .	. .	. . .	. . .	. . .	. . .	. . .	. . .
BSQ_1	125	0	5.121	5	1	7	1.113	3.068	-1.129
BSQ_2	126	0	5.56	6	1	7	1.109	4.783	-1.773
BSQ_3	127	0	5.684	6	1	7	1.207	3.776	-1.518
BSQ_4	128	0	5.654	6	1	7	1.082	6.253	-1.967
BSQ_5	129	0	5.808	6	1	7	1.135	3.698	-1.509

4.5.2 Outliers

After running IBM SPSS 21 to test for outliers, it was found that there were a few outliers in the data set. The common approach was to remove them or to perform some adjustments. The outliers are real data from the field. Thus, removing or adjusting outliers would unnecessarily cause bias, which was not desirable. In the data set, the outliers were few, given the fact that this study used PLS-SEM, the few outliers were retained for possible deletion during the exploratory factor analysis (EFA) procedures. SPSS reports the most extreme outliers for each category of a variable, to produce separate box plots for each variable and for reasons of space only a box plot for education was included.

After inspecting the box plot (Figure 4.1), the extreme points indicated with an asterisk *. For example, in this box plot, one outlier were identified which were in education of post graduate level indicated as case number 84 in the data setting,

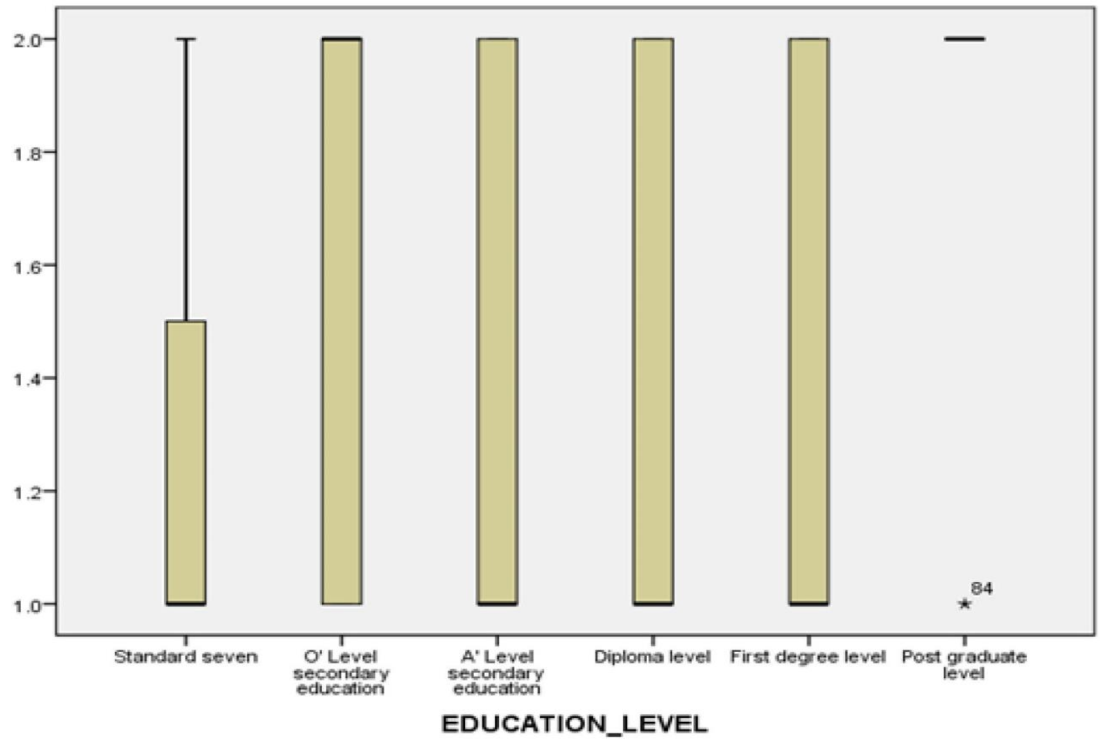

Figure 4.1: Box Plots for Checking Outliers of Selected Variables

Source IBM (2012)

4.5.3 Test for Common Methods Bias

Since the endogenous variables were collected at the same time and using the same questionnaire as exogenous variables, common methods bias was tested to evaluate if such bias did not affect the data gathered. This was a useful consideration in a survey research; thus, EFA was examined to find the results of Harman's single –factor test for all the hierarchical latent constructs using SPSS package. The objective of the test was to find out if a single factor that explained the majority of the variance in the model emerged. If that was the case, then the common method bias was present to a significant level. The results of factor analysis produced 117 distinct measured variables which 16 variables accounted for a total of 69.55% , the largest of which accounted for only 45.179 % of the variance of the model below that 50% of common method variance cut off(refer appendix VI). This indicated that the study data did not suffer from common methods bias (shown in Table 4.7). Hence the researcher proceeded to further data analysis, (Appendix VI).

Table 4.8: Total Variance Explained

Total Variance Explained						
Component	Initial Eigenvalues			Extraction Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	52.859	45.179	45.179	52.859	45.179	45.179
2	5.511	4.711	49.890	5.511	4.711	49.890
3	3.100	2.649	52.539	3.100	2.649	52.539
4	2.583	2.208	54.747	2.583	2.208	54.747
5	2.373	2.029	56.775	2.373	2.029	56.775
6	2.138	1.828	58.603	2.138	1.828	58.603
7	1.847	1.578	60.181	1.847	1.578	60.181
8	1.545	1.320	61.502	1.545	1.320	61.502
9	1.394	1.191	62.693	1.394	1.191	62.693
10	1.274	1.089	63.782	1.274	1.089	63.782
11	1.210	1.035	64.816	1.210	1.035	64.816
12	1.193	1.020	65.836	1.193	1.020	65.836
13	1.154	.986	66.822	1.154	.986	66.822
14	1.116	.954	67.776	1.116	.954	67.776
15	1.042	.891	68.667	1.042	.891	68.667
16	1.032	.882	69.550	1.032	.882	69.550
. . .	. . .	. . .	. . .	. . .	. . .	. . .
99	.053	.045	100.000			
Extraction Method: Principal Component Analysis.						

4.6 Normality, Linearity and Multicollinearity

4.6.1 Testing for Non-normality of Data

According to Hair *et al*. (2017) , multivariate skewness and Kurtosis should be conducted to confirm if data are non-normal to continue to employ Smart PLS. PLS-SEM testing requires nonnormality data for analysis; however, the data in Table 4.8 shows that the data were nonnormally distributed because of data range between +2 to

-2. Negative skew is the right-leaning; positive skew is left-leaning (Cain *et al.*, 2016). The normality data requires kurtosis to range +1 to -1. Thus confirm the data can be analyzed though PLS-SEM.

"Skewness assesses the extent to which a variable's distribution is symmetrical. If the distribution of responses for a variable stretches toward the right or left tail of the distribution, then the distribution is referred to as skewed. Kurtosis is a measure of whether the distribution is too peaked (a very narrow distribution with most of the responses in the center)." (Hair *et al.*, 2017: 61).

"When both skewness and kurtosis are zero (a situation that researchers are very unlikely to ever encounter), the pattern of responses is considered a non-normal distribution. A general guideline for skewness is that if the number is greater than +1 or lower than –1, this is an indication of a substantially skewed distribution. For kurtosis, the general guideline is that if the number is greater than +1, the distribution is too peaked(For example in Table 4.8, indicator BSQ_3,4 and 5). This confirmed that analysis could be done through PLS-SEM. Likewise, a kurtosis of less than –1 indicated a distribution that was too flat. Distributions exhibiting skewness and/or kurtosis that exceed these guidelines were considered nonnormal." (Hair *et al.*, 2017:61). which implied that there was no violation of the non-normality assumptions of the collected data. Details report refers to appendix XIII.

4.6.2 Model Unidimensional and Validation

This section was examined to ensure that the proposed variable structures were indeed consistent with the gathered field data. The usefulness of this section emanated from the fact that the conceptual framework was proposed by the researcher based on the review of available literature and theories. Based on the above argument, it was important to evaluate how well the proposed factor structure fitted the collected data through the process of exploratory factor analysis and consequently Structural Equation Modelling (SEM).

For instance, the researcher applied both exploratory factor analysis (EFA), PLS measurement and structural model analysis to make certain that the constructs were aligned with their indicator variables. Even though the measurement instrument was adopted from previous studies, the context in which it was applied differed hence necessitating EFA before PLS measurement and structural analysis.

4.6.2.1 Multicollinearity Test for the First Order

Multicollinearity between items is a critical issue in PLS-SEM because they influence the estimation of outer loadings, weights, and their statistical significance. Particularly, multicollinearity increases the standard errors and therefore, affects the ability to differentiate the outer loading estimate to be different from zero. Also, multicollinearity causes the outer loading to be incorrectly estimated and may also reverse their sign. Thus, causes reverse to the weaker items, become more correlated with the appropriate latent constructs (Hair, *et al.*,2014: 124).

If two or more exogenous variables have a high correlation between them, it leads to a complication in determining the impact of each exogenous variable (Hair, *et al*, 2014). Hair, *et al*., (2017) claimed that if the level of collinearity value of a tolerance value is 0.20 or lower and a VIF value of 5 or more, the researcher should consider to eliminate one of corresponding measured variable or combine the collinear measured variables into a one or new composite measured variable or an index.

Table 4.9: Collinearity Statistics for the Outer Model First Model

No	Indicators	VIF	No	Indicators	VIF	No	Indicators	VIF
1	BSQ_1	1.6	42	FFPQ_2	1.4	83	OGDPHQ_5	2.3
2	BSQ_2	1.6	43	FFPQ_3	1.5	84	OGDPHQ_6	1.8
3	BSQ_3	1.8	44	FFPQ_4	1.4	85	OGDPHQ_7	1.8
4	BSQ_4	1.6	45	FFPSQ_1	1.8	86	OGDPQ_1	1.4
5	BSQ_5	1.8	46	FFPSQ_2	2.0	87	OGDPQ_2	1.3
6	CDPHQ_2	1.9	47	FFPSQ_4	2.4	88	OGDPQ_3	1.4
7	CustOQ_1	1.8	48	FFPSQ_5	2.0	89	OGDPQ_4	1.3
8	CustOQ_2	2.1	49	FFPSQ_6	1.8	90	OGDPQ_5	1.2
9	CustOQ_3	2.0	50	FFPSQ_7	2.0	91	OGDPSQ_1	1.8
10	CustOQ_4	1.8	51	ICDOQ_1	1.9	92	OGDPSQ_2	1.9
11	CustOQ_5	1.8	52	ICDOQ_2	2.3	93	OGDPSQ_3	1.9
12	CustOQ_6	1.8	53	ICDOQ_3	2.1	94	OGDPSQ_4	2.0
13	CustPHQ_1	1.5	54	ICDOQ_4	2.1	95	OGDPSQ_5	2.0
14	CustPHQ_2	1.6	55	ICDOQ_5	1.9	96	OGDPSQ_6	1.9
15	CustPHQ_3	1.6	56	ICDOQ_6	2.1	97	OGDPSQ_7	2.1
16	CustPHQ_4	1.6	57	ICDPHQ_1	1.6	98	SAOQ_1	1.7
17	CustPHQ_5	1.5	58	ICDPHQ_3	1.9	99	SAOQ_2	2.0
18	CustPQ_1	2.1	59	ICDPHQ_4	1.8	100	SAOQ_3	1.7
19	CustPQ_2	2.9	60	ICDPHQ_5	1.6	101	SAOQ_4	1.8
20	CustPQ_3	2.4	61	ICDPHQ_6	2.0	102	SAOQ_5	1.9
21	CustPQ_4	2.7	62	ICDPQ_1	1.4	103	SAOQ_6	1.7
22	CustPQ_5	2.5	63	ICDPQ_2	1.7	104	SAPHQ_1	1.5
23	CustPQ_6	2.2	64	ICDPQ_3	1.7	105	SAPHQ_2	1.6
24	CustPQ_7	2.2	65	ICDPQ_4	1.6	106	SAPHQ_3	1.2
25	CustPSQ_1	1.8	66	ICDPSQ_1	1.8	107	SAPHQ_4	1.9
26	CustPSQ_2	1.9	67	ICDPSQ_2	2.0	108	SAPHQ_5	1.4
27	CustPSQ_3	1.8	68	ICDPSQ_3	1.5	109	SAPHQ_6	1.8
28	CustPSQ_4	1.9	69	ICDPSQ_4	1.7	110	SAPQ_1	1.5
29	CustPSQ_5	1.8	70	ICDPSQ_5	1.9	111	SAPQ_2	1.5
30	FFOQ_1	1.8	71	ICDPSQ_6	1.7	112	SAPQ_3	1.2
31	FFOQ_2	1.9	72	ICDPSQ_7	1.9	113	SAPQ_4	1.3
32	FFOQ_3	2.1	73	OGDOQ_1	1.8	114	SAPQ_5	1.8
33	FFOQ_4	2.0	74	OGDOQ_2	2.0	115	SAPQ_6	1.5
34	FFOQ_5	2.1	75	OGDOQ_3	1.8	116	SAPQ_7	1.6
35	FFOQ_6	2.0	76	OGDOQ_4	1.9	117	SAPSQ_1	1.7
36	FFPHQ_1	1.6	77	OGDOQ_5	1.8	118	SAPSQ_2	1.9
37	FFPHQ_2	1.2	78	OGDOQ_6	1.8	119	SAPSQ_3	1.6
38	FFPHQ_3	1.6	79	OGDPHQ_1	1.1	120	SAPSQ_4	1.8
39	FFPHQ_4	1.6	80	OGDPHQ_2	2.0	121	SAPSQ_5	2.1
40	FFPHQ_5	1.5	81	OGDPHQ_3	1.6	122	SAPSQ_6	1.6
41	FFPQ_1	1.3	82	OGDPHQ_4	1.8	123	SAPSQ_7	1.8

To be certain that collinearity did not cause a problem to this study outcomes, outer loadings matrix containing all the bivariate loadings were scrutinized and made sure that outer loadings were not greater than 0.90. The researcher also checked for the significance of indicators relative contributions to its latent construct. As demonstrated in Table 4.9 confirm no collinearity problem.

4.6.2.2 Unidimentionality for First-order Latent Constructs

According to Hair *et al*. (2017), to accomplish unidimensionality the study should ensure that all indicators have acceptable outer loadings for their appropriate latent variables as shown in Figure 4.2. Indicator with insufficient outer loadings in PLS-SEM, for example below 0.7 should be deleted(Hair *et al.,* 2017). In this study unidimensionality for the nomological network of the proposed model of the study was achieved as all outer loadings were above 0.7.

This is indicated in Table 4.10, where the minimum standardized outer loadings for the hierarchical component model was 0.709 while the maximum was 0.845 which resulted in single item latent construct. This result opens the door to validity check and reliability. The results of PLS-SEM analysis as shown in table 4.10 give the assurance that the hierarch measurement, sub-constructs, and constructs had sufficient loadings to qualify to be included in the study analysis. Indicators were measured in third-order constructs as the study had three-level of measurement.

Researcher constructed the first-order reflective latent variables (Customs Process OGDs Process, Shipping Process, Terminal, and ICDs process, FF Process) for each latent variable (See Table 4.10). All indicators were measured on a seven-point Likert type scale, ranging from strongly disagree to strongly agree.

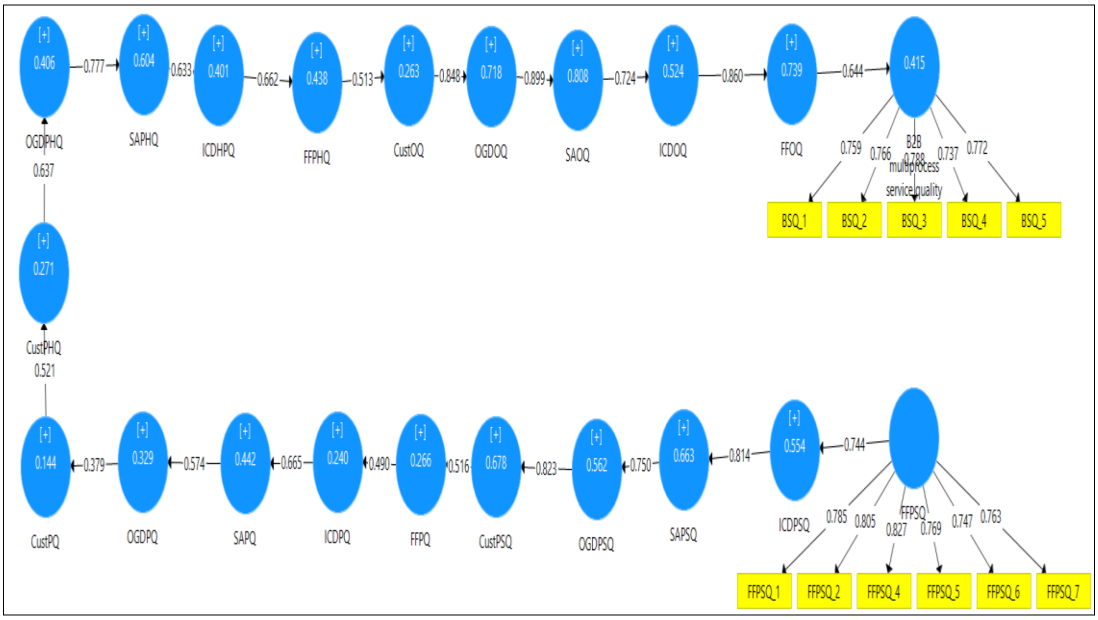

Figure 4.2: Unidimensionality for the First Order

The research employed the 21 first-order latent variables and related them to their respective indicators using reflective in their outer model (See Table 4.10). To evaluate the psychometric properties of the measures, specification of a null model for the first-order latent constructs was made, (Appendix VI). To evaluate the reliability of the measures, the composite reliability values and average variance extracted (AVE) computed.

As indicated in Table 4.10 the composite reliability (CR) was greater than 0.80 and the AVE of all indicators compellingly were greater than cut-off statistics of .50 proposed by Fornell and Larcker (1981), the lowest AVE is 0.525 in the null or first-order latent construct model and the highest was 0.623, conforming Convergent validity.

Table 4.10: Unidimensionality Psychometric Properties in the Null Model for the First Order

No	Construct	Item	Loading	CR	AVE
1	B2B Multi-process service quality	BSQ_1	0.759	0.875	0.584
2		BSQ_2	0.766		
3		BSQ_3	0.788		
4		BSQ_4	0.737		
5		BSQ_5	0.772		
6	Customs output quality	CustOQ_1	0.728	0.884	0.56
7		CustOQ_2	0.727		
8		CustOQ_3	0.739		
9		CustOQ_4	0.756		
10		CustOQ_5	0.761		
11		CustOQ_6	0.784		
12	Customs process hard quality	CustPHQ_1	0.723	0.863	0.557
13		CustPHQ_2	0.735		
.		.	.	.	.
.		.	.	.	.
.		.	.	.	.
17	Customs potential quality	CustPQ_1	0.771	0.93	0.655
116		SAPQ_7	0.737		
117	Shipping agency process soft quality	SAPSQ_1	0.768	0.887	0.568
118		SAPSQ_2	0.795		
119		SAPSQ_3	0.743		
120		SAPSQ_4	0.743		
121		SAPSQ_5	0.75		
122		SAPSQ_6	0.76		
123		SAPSQ_7	0.782		

The validity of first-order reflective constructs

To assess the convergent validity of the first-order reflective latent constructs, it was determined whether the outer loading of each item on the intended construct exceeded 0.70 (see Table 4.10), the recommended cut-off with significant t-values at the 0.05 level or 0.01 level (Hair *et al.,* 2014). However, loadings greater than 0.90 also signal problems on the scale (Netemeyer, *et al.*, 2003). Therefore, the desired loading for each item on its respective construct or dimension should be within 0.70 to 0.90, although any item with a loading higher than 0.90 is acceptable when the indicator's theoretical relevance for the overall abstract latent constructs cannot be deleted (Hair *et al.*, 2017).

4.6.2.1 Outer Weights and Significance

After conducting repeated approach, all items in the second-order latent construct model were retained because the items were formative (Hair *et al*., (2017). Based on the Smart PLS version 3.2.8 outputs Figure 4.3 presents the evidence of adequacy reliability and validity of formative latent constructs. All constructs shown with their respective loading weight and as the figure shows it had turned blue indicated there was no problem of formative reliability and validity (Hair *et al.*, 2017).

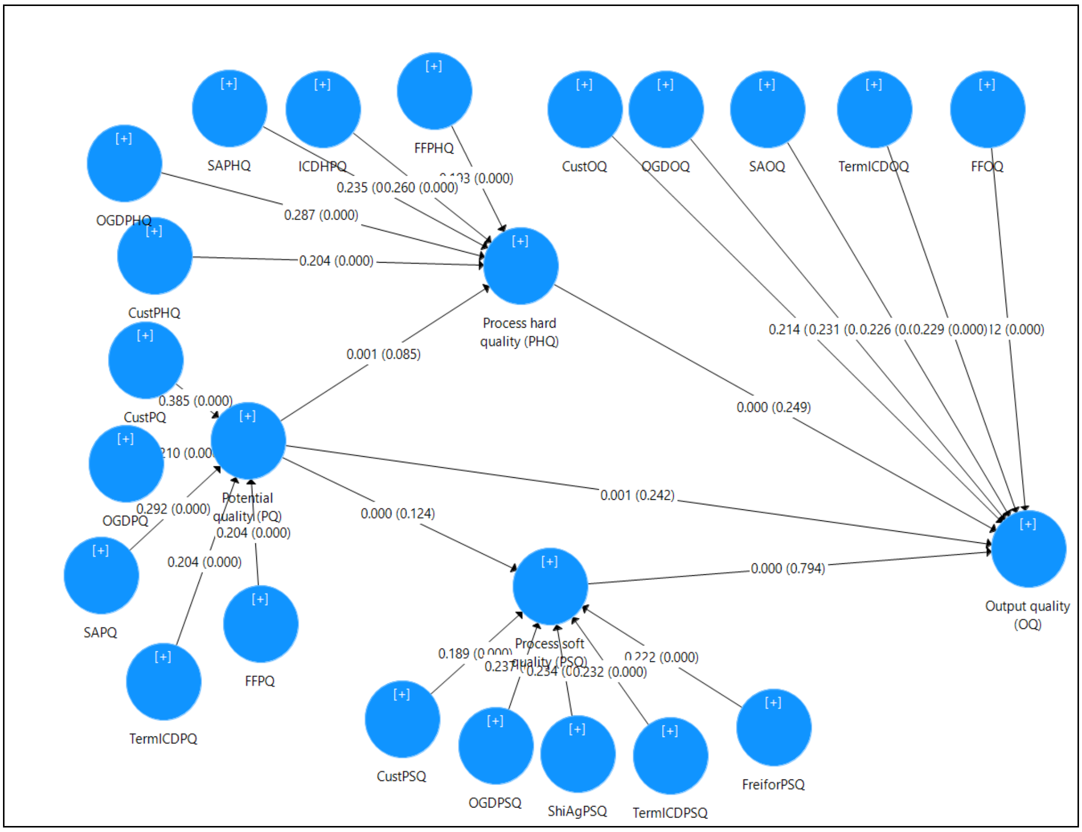

Figure 4.3: Outer Loadings for the First Order

4.6.3 Exploratory Factor Analysis

After data collection from the survey, it was entered in IBM SPSS statistics version 23 and after that placed into a PLS-SEM model in the Smart PLS 3.0 to conduct exploratory factor analysis in order to test validity and reliability of surveyed items related to latent constructs which were measured or tested. With exploratory factor analysis, the latent construct validity of the questionnaire could be examined and tested (Rattray and Jones, 2007). Exploratory factor analysis aimed to detects the latent constructs, are the variables that underlie a dataset based on the correlations between questionnaire items. The variables that explain the highest proportion of the variables share were expected to represent the underlying latent constructs, which enabled to eliminate and filter inadequate variables before proceeding to another step for data analysis. Table 4.11 indicates all latent variables and their indicators before and after data deletion.

In order to examine the dimensions of the construct, EFA was employed to check if the proposed construct structures were consistent with the actual data collected from the field. Exploratory factor analysis (EFA) is a statistical approach which is used to measure interrelationships among numerous variables and to explain them in terms of their common underlying dimensions (Hair, *et al.,* 2015). According to Hair, *et al.*, (2015), the goal of EFA is to find the latent structure of the dataset by revealing common factors through their shared variance (Tabachnick and Fidell, 2019). EFA was conducted by running Smart PLS algorism which produced outer model loadings to help the researcher to evaluate the absolute contributions of the indicators to the definition of its latent construct.

The outer loadings ranged from 0.665 to 0.821 which means that these were the variables which met criteria of retention (Costello and Osbornel, 2005, Hooper, 2012). Those items which do not appear in table 4.11 had been deleted because they did not meet a minimum value of 0.70.

As a rule of thumb, the larger, the outer loadings, the stronger the reliabilty. The measurement model outer loadings are shown in Table 4.11. For a well-fitting model, path loading should be at least 0.70 (Hesenseler, *et al*., 2012). The value 0.70 is the benchmark for minimum outer loadings. Another rule of thumb is that an item with outer loadings of the range of 0.40 and 0.70. should be removed, if such removal enhances composite reliability(Hair *et al.,* 2017).

The results of the exploratory factor analysis ensured the need to drop several variables from the proposed model. The measured variables were used to measure the endogenous and exogenous variable in order to assess the extent of the relationship between latent constructs and measured variables. Loadings for each latent construct were checked. A total number of items dropped were 11 comprising of five items from potential quality, four items from process soft quality and two items from – output quality. EFA results show that 123 items were analyzed and the minimum cut off of outer loading of this study was 0.665, based on these results 112 items were retained for further analysis. Finally, EFA results demonstrated that there were four latent constructs in measuring B2B cargo clearance service quality. The four latent constructs were potential quality, hard quality process, soft quality process, and outcome quality.

The results of the exploratory factor analysis are shown in Table 4.11. To determine how many variables to retain consideration was made on the information provided in the Smart PLS 3.0 output, using outer model loadings' criterion. Interest was only in variables or items that had outer loadings of 0.70 or more. Table 4.11 indicates that 20 latent constructs were selected and analyzed by the PLS-SEM.

Table 4.11: Summary of EFA Output List of Retained Measurement Indicators

S/N	Latent variable	Sub latent variable	Initial	Retained items	Outer loadings ranges
1.	B2B Cargo Clearance Service Quality -Dependent variable	-	5	5	0.74-0.79
2.	Potential Quality (Independent variable)	Customs Process	7	7	0.77- 0.85
		OGDs Process	5	3	0.72-0.75
		Shipping Process	7	4	0.70-0.74
		Terminal and ICDs process	4	4	0.74-0.79
		FF Process	4	4	0.73-0.77
3..	Process Hard Quality (Intervening variable)	Customs Process	5	5	0.72-0.76
		OGDs Process	7	6	0.71-0.83
		Shipping Process	6	4	0.73-0.80
		Terminal and ICDs process	6	6	0.74-0.78
		FF Process	5	4	0.74-0.78
4.	Process Soft Quality (PSQ) (Intervening variable)	Customs Process	5	5	0.79-0.81
		OGDs Process	7	7	0.73-0.77
		Shipping Process	7	6	0.70-0.78
		Terminal and ICDs process	7	6	0.70-0.78
		FF Process	6	6	0.75-0.83
5.	Outcome Quality (dependent variable)	Customs Process	6	6	0.72-0.78
		OGDs Process	6	6	0.75-0.79
		Shipping Process	6	6	0.72-0.78
		Terminal and ICDs process	6	6	0.76-0.83
		FF Process	6	6	0.75-0.79
	Total		**123**	**112**	

Source: Researcher, 2019

In PLS-SEM exploratory factor analysis, an item outer loading is usually considered high if the outer loading is above 0.70 and considered low if the loading is below.70 (Hair, *et al.*,2017). Measured variable outer loading below 0.70 were removed, however, a few measured variable outer loadings were retained, for example, Hard Quality- Terminal and ICDs process; Outcome Quality -Terminal and ICDs process and FF Process. This is mainly due to theoretical necessity.

4.6.4 Latent Variable Correlations Analysis of First Order

The latent variable correlation matrix between the variables was examined to evaluate their interrelationship. Table 4.12 indicates absence of either high correlations or extremely low correlations among the latent variables. The existence of either high correlations or extremely low correlations signify the problems of correlations in the data and the researcher should avoid both of them.

Table 4.12: Intercorrelation of the Variable Correlation Matrix of the First Order

	Sub variable	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21
1	B2B service quality	1																				
2	CustOQ	.58	1																			
3	CustPHQ	.40	.51	1																		
4	CustPQ	.55	.58	.52	1																	
5	CustPSQ	.51	.66	.57	.57	1																
6	FFOQ	.64	.63	.47	.68	.58	1															
7	FFPHQ	.42	.51	.57	.50	.66	.49	1														
8	FFPQ	.29	.44	.65	.44	.52	.43	.59	1													
9	FFPSQ	.52	.87	.56	.61	.70	.64	.55	.52	1												
10	ICDHPQ	.44	.52	.59	.49	.62	.50	.66	.55	.57	1											
11	ICDOQ	.63	.66	.45	.67	.63	.86	.51	.44	.66	.54	1										
12	ICDPQ	.32	.44	.50	.37	.44	.38	.45	.49	.44	.48	.41	1									
13	ICDPSQ	.57	.69	.61	.64	.73	.64	.59	.52	.74	.61	.64	.45	1								
14	OGDOQ	.62	.85	.57	.61	.66	.67	.57	.48	.80	.53	.69	.42	.71	1							
15	OGDPHQ	.38	.51	.64	.46	.55	.46	.61	.57	.57	.65	.53	.46	.56	.57	1						
16	OGDPQ	.30	.44	.51	.38	.40	.41	.43	.52	.44	.48	.44	.48	.47	.51	.54	1					
17	OGDPSQ	.52	.67	.55	.57	.82	.59	.55	.49	.71	.58	.61	.45	.72	.68	.55	.39	1				
18	SAOQ	.63	.87	.58	.61	.68	.72	.57	.48	.82	.56	.72	.46	.72	.90	.55	.50	.68	1			
19	SAPHQ	.36	.51	.56	.47	.59	.45	.63	.54	.55	.63	.53	.46	.59	.54	.78	.52	.53	.53	1		
20	SAPQ	.38	.47	.49	.37	.42	.42	.45	.47	.47	.42	.43	.67	.47	.51	.45	.57	.40	.52	.47	1	
21	SAPSQ	.57	.72	.61	.64	.74	.65	.61	.51	.77	.70	.67	.48	.81	.71	.59	.47	.75	.72	.57	.44	1

4.6.5 Reliability and Validity of First Order Latent Variables

4.6.5.1 Composite Reliability

Composite reliability is a preferred alternative to Cronbach's alpha (see Table 4.13) as a test of reliability in a reflective model. It may be preferred as a measure of reliability because Cronbach's alpha may over- or underestimate scale reliability. For this reason, composite reliability is preferred among researchers in PLS-modeling. Compared to Cronbach's alpha, composite reliability lead to higher estimates of true reliability. The acceptable cutoff for composite reliability is the same as for any measure of reliability, including Cronbach's alpha. Composite reliability varies from 0 to 1, with 1 being perfect estimated reliability.

Table 4.13: Summary of Reliability and Validity Statistics

Latent variable	Composite Reliability	Average Variance Extracted (AVE)
B2B service quality	0.875	0.584
CustOQ	0.884	0.56
CustPHQ	0.863	0.557
CustPQ	0.93	0.655
CustPSQ	0.897	0.634
FFOQ	0.895	0.586
FFPHQ	0.854	0.594
FFPQ	0.839	0.565
FFPSQ	0.905	0.613
ICDHPQ	0.89	0.574
ICDOQ	0.906	0.617
ICDPQ	0.86	0.605
ICDPSQ	0.887	0.566
OGDOQ	0.896	0.589
OGDPHQ	0.881	0.525
OGDPQ	0.792	0.564
OGDPSQ	0.892	0.578
SAOQ	0.886	0.566
SAPHQ	0.868	0.623
SAPQ	0.84	0.57
SAPSQ	0.887	0.568

According to Chin, (1998) composite reliabilities should be equal to or greater than 0.6 while according to Henseler *et al.*, (2012:269), composite reliability should be equal to or greater than .70 and equal to or greater than .80 is considered good. The model composites are greater than 0.70, thus reliability is confirmed (see Table 4.13).

4.6.6 Convergent Validity of First Order

Validity is the extent of the questionnaire to measure what it is intended to measure for the latent variable (Hair, *et al.,* 2017). To conduct PLS-SEM successfully, two types of validity which are convergent and discriminant validity should be established as well as reliability of the constructs (Saunders *et al.,* 2015). As shown in Table 4.10, loadings for all indicators were larger than the recommended value of 0.7 (Hair, *et al.*,2017).

The composite reliability indicates that the latent construct ranged from 0.823 to 1, which exceeded the recommended value of 0.7 (Hair*, et al.,* 2017). Subsequently, AVE of respective constructs were larger than the cut off value of 0.5 recommended by Hair, *et al.,* (2017). Therefore, the nomological network of latent construct achieved the convergent validity for the requirement.

4.6.6.1 Average Variance Extracted (AVE)

AVE may be used as a test of both convergent and divergent validity. AVE reflects the average commonality for each latent factor in a reflective model. In an adequate model, AVE should be greater than .5 (Ringle, *et al.,* 2017) as well as greater than the cross-loadings, which means factors should explain at least half the variance of their respective indicators. AVE below .50 means error variance exceeds explained variance. For the seminal paper on AVE, see Fornell and Larcker (1981). In Table 4.10 the convergent validity of first-order was ensured because all latent variables had AVE greater than 0.50.

4.6.7 Discriminant Validity` for the First Order

Discriminant validity refers to the extent to which a concept differs from other constructs, that is; have low correlation with other constructs (Saunders *et al.*,2015). Accordingly, Kline (2011) adds that a set of variables recognized to measure dissimilar constructs achieves discriminant validity if their inter-correlations are not too high. Likewise, discriminant validity assesses whether indicators of latent constructs that "theoretically should not be related to each other are observed as not related to each other" (Andreev *et al.*,2009:6).

The discriminant validity can be evaluated by using cross-loading of indicator, Fornell and Larcker criterion and Heterotrait-monotrait (HTMT) ratio of correlation. The recent and most used method for discriminant validity is HTMT. This study assessed discriminant validity through HTMT method.

4.6.7.1 Heterotrait-Monotrait Ratio (HTMT) of the First Order

The extra measure for discriminant validity is Heterotrait-monotrait (HTMT) ratio of correlation.

Using the HTMT as a criterion involved comparing it to a predefined threshold. If the value of the HTMT was higher than this threshold, the conclusion was lack of discriminant validity. Kline (2011) suggested a threshold of 0.85. Gold *et al.,* (2001) proposed a value of 0.90. Table 4.14 showed the output from HTMT analysis. The output can easily be calculated using the Smart PLS version 3.2.8. HTMT results in Table 4.14 indicated no discriminant validity problems according to the $HTMT_{0.90}$ criterions.

This implied that the HTMT criterion had not detected collinearity problems among latent variables (multicollinearity). Thus, probably all of the indicators of latent variables were measuring different latent constructs. In other words, the model did not contain the overlapping indicators from respondents perception in the latent constructs.

Henseler *et al*., (2015:121) suggested that cross-loadings and use of the Fornell-Larcker criterion were accepted methods for assessing the discriminant validity of a PLS model, these methods have shortcomings. Thus, they recommended to use HTMT in PLS-SEM, value below 0.90, discriminant validity was established between a given pair of reflective constructs. Gold *et al*., (2001) and Teo *et al*., (2008) also used the .90 cutoff, though Clark and Watson (1995) and Kline (2011) used the more stringent cutoff of .85. HTMT for first order was ensured see Table 4.14.

Table 4.14: Hetrotrait-monotrait (HTMT) for First Order Latent Constructs

No	Latent variable	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21
1	B2B service quality																					
2	CustOQ	.69																				
3	CustPHQ	.50	.62																			
4	CustPQ	.62	.65	.60																		
5	CustPSQ	.61	.77	.69	.63																	
6	FFOQ	.76	.74	.57	.76	.67																
7	FFPHQ	.52	.63	.71	.59	.81	.59															
8	FFPQ	.36	.55	.84	.54	.64	.53	.78														
9	FFPSQ	.62	.52	.67	.68	.81	.73	.67	.64													
10	ICDHPQ	.53	.61	.71	.55	.72	.58	.81	.69	.65												
11	ICDOQ	.74	.77	.54	.75	.72	.79	.62	.54	.75	.62											
12	ICDPQ	.39	.54	.62	.43	.53	.46	.57	.64	.53	.59	.50										
13	ICDPSQ	.67	.82	.74	.72	.85	.75	.72	.65	.86	.72	.75	.55									
14	OGDOQ	.73	.70	.68	.68	.77	.78	.69	.61	.82	.62	.80	.51	.83								
15	OGDPHQ	.45	.61	.78	.53	.65	.54	.75	.72	.66	.77	.61	.58	.66	.66							
16	OGDPQ	.42	.62	.72	.50	.56	.58	.62	.77	.60	.67	.61	.70	.66	.70	.76						
17	OGDPSQ	.62	.78	.67	.63	.86	.69	.68	.61	.82	.68	.71	.55	.84	.79	.65	.55					
18	SAOQ	.75	.03	.70	.68	.80	.84	.70	.60	.76	.66	.84	.56	.85	.75	.65	.69	.80				
19	SAPHQ	.45	.62	.70	.55	.72	.54	.80	.70	.66	.77	.64	.57	.71	.65	.84	.75	.65	.65			
20	SAPQ	.49	.60	.64	.45	.53	.53	.60	.63	.59	.53	.54	.86	.59	.64	.57	.85	.50	.66	.61		
21	SAPSQ	.68	.75	.74	.73	.84	.77	.75	.64	.90	.83	.78	.58	.96	.84	.70	.67	.84	.85	.70	.56	

4.7 Assessment of Hierarchical Component Model

An overview of the hierarchical component model is depicted in Figure 4.2 and 4.3. To embed B2B multi-process service quality in a nomological network it was related to potential quality (PQ), output quality (OQ), process hard quality (HPQ) and process soft quality (PSQ). The relationship between potential quality and B2B multi-process mediated by output quality (OQ), process hard quality (HPQ) and process soft quality (PSQ) was established by conducting nomological validity. Nomological validity, using nomological networks, is another tool for establishing external validity. A nomological network (Campbell and Fiske, 1959) includes a theoretical framework of research objects, an empirical framework of how these objects were measured, and specification of the relationships between these model latent constructs was established by reliability and validity test as they were tested for reflective and formative indicators.

To evaluate the nomological validity of the hierarchical latent constructs model the researcher connected B2B multi-process service quality in a nomological network (see Figure 4.2 and Table 4.9).

4.7.1 Assessing Hierarchical Second-Order Model

The first order measurement models were assessed for adequate validity and unidimensionality before commencing the second-order latent constructs modeling (Hair *et al.*, 2018). For this study, the two-stage approach involving: (1) a detailed assessment of the measurement models at a second-order level as expressed by the relationship between first-order and second-order latent constructs, (2) analysis of the structural relationships. The hierarchical second –order model assessed for validity and reliability through internal consistency (Cronbach’s alpha and composite reliability and convergent validity) indicator reliability and average variance extracted, and collinearity (Hair *et al.*, 2019).

The internal consistency of the measures, i.e., their unidimensionality, indicator reliability and composite reliability, were the first properties to be assessed. Convergent validity for the second-order measures was assessed by running a Smart PLS algorism for each construct under investigation. The analysis was conducted to ensure that measures represent each formative latent construct. This determined if each latent construct could be regarded as unitary.

As the study involved exploring relationships at a higher level of abstraction each second-order measurement model (four measurement models; potential quality, process hard quality, process soft quality, and output quality) were then estimated separately using the two-stage approach, also known as the hierarchical components model suggested by Chin (2003). In essence, second-order latent constructs were directly measured by items for all the first-order latent constructs.

Tests of reliability and validity for a second and third-order factor model should follow the same process that was used to examine the reliability and validity of the first-order latent variable (Chin, 1998). Internal consistency, according to Hair, *et al.*, (2014) asserts that items informative measurement model was likely to represent the latent variable' independent causes and thus do not necessarily correlate highly. It was also assumed that formative items were error-free, it follows that the internal consistency concept was to some extent inappropriate in the formative model. Instead, the researcher focused on establishing content validity before evaluating formative measured constructs. Thus, implied that formative items captured at least major dimensions of the latent constructs. Indeed, the researcher included a comprehensive set of items that fully exhausted the formative latent constructs domain through a literature review.

Cronbach's alpha, the traditional criterion for internal consistency was Cronbach's Alpha, which provides an estimate of the reliability based on the intercorrelations of the observed indicator variable. Coefficient alpha was used as a more conservative measure of items and it estimates the multiple-item scale's reliability. The internal reliability of a construct is said to be achieved when the Cronbach's Alpha value is 0.7 or higher. In Table 4.20, the Cronbach's Alpha was greater than cut off value of 0.7.

4.7.1.1 Results of Multicollinearity for Second-Order

Multicollinearity is an undesirable property in formative models as it causes estimation difficulties (Diamantopoulos *et al.,* 2008:1212). These estimation problems arise because a path coefficient links the formative indicators to the latent construct. Substantial correlations among formative indicators result in unstable estimates for the item coefficients and it becomes difficult to separate the distinct influence of individual item on the latent constructs. Diamantopoulos *et al.,* (2008) further asserted that multicollinearity caused difficulties in assessing item validity based on the magnitude of the parameters. Different approaches for dealing with multicollinearity are proposed. Hair *et al.,* (2017) asserted that items which highly inter-correlate were almost perfect linear combinations and thus quite likely contained redundant information. Accordingly, several authors, for example, Diamantopoulos *et al.*, (2008); Hair *et al*., (2014) recommended items elimination based on the variance inflation factor (VIF), which assessesed the degree of multicollinearity. Some empirical studies on formative measure development, for example, Diamantopoulos *et al.,* (2008) advised the application of the commonly accepted cut-off value of VIF <10. This collinearity examination leads to items elimination purely on statistical basis and leads to the danger of changing the meaning of the latent construct by excluding items. Thus, items deletion by whatever means was not divorced from conceptual considerations when a formative measurement model was conducted (Diamantopoulos *et al.,* 2008).

On the statistical level, formative second-order latent constructs need to be assessed regarding multicollinearity. Multicollinearity presents a serious problem of formative measurement, as it makes it difficult to determine each concept's influence on the overall construct (Diamantopoulos and Winkelhofer, 2001). Multicollinearity in PLS-SEM can be determined by the variance inflation factor (VIF). VIF values of higher than 5 indicate collinearity (Henseler *et al.,* 2009). In formative second-order, latent construct measurement more conservative values are applied, which signify multicollinearity even at values of 3.3 (Roberts and Bennett Thatcher, 2009:18). For this study multicollinearity was determined for the formative second-order latent constructs of the model. Potential quality (PQ), Process soft quality (PSQ), process hard quality (PHQ) and output quality (OQ). It was found that multicollinearity was not a problem in this study. Table 4.15 summarised the VIF values for second-order latent constructs. For details refer to appendix XVI.

Second-order latent variable multicollinearity ranges from 1.08 to 3.27.

Table 4.15: Multicollinearity Results

No	Indicators	VIF	No	Indicators	VIF	No	Indicators	VIF	No	Indicators	VIF	No	Indicators	VIF
1	CustOQ_1	1.8	49	FFOQ_2	1.9	96	ICDOQ_4	2.5	143	OGDOQ_5	1.8	190	SAOQ_3	2.1
2	CustOQ_1	2.4	50	FFOQ_2	2.4	97	ICDOQ_5	1.9	144	OGDOQ_5	2.3	191	SAOQ_4	1.8
3	CustOQ_2	2.1	51	FFOQ_3	2.1	98	ICDOQ_5	2.4	145	OGDOQ_6	1.8	192	SAOQ_4	2.2
4	CustOQ_2	2.4	52	FFOQ_3	2.6	99	ICDOQ_6	2.1	146	OGDOQ_6	2.2	193	SAOQ_5	1.9
5	CustOQ_3	2.0	53	FFOQ_4	2.0	100	ICDOQ_6	2.6	147	OGDPHQ_1	1.1	194	SAOQ_5	2.9
6	CustOQ_3	2.5	54	FFOQ_4	2.4	101	ICDPHQ_1	1.6	148	OGDPHQ_1	1.4	195	SAOQ_6	1.7
7	CustOQ_4	1.8	55	FFOQ_5	2.1	102	ICDPHQ_1	2.0	149	OGDPHQ_2	2.0	196	SAOQ_6	2.3
.														
.														
.														
.														
45	CustPSQ_5	1.8	93	ICDOQ_3	2.1	140	OGDOQ_3	2.4	187	SAOQ_2	2.0	234	SAPSQ_6	2.0
46	CustPSQ_5	2.4	94	ICDOQ_3	2.6	141	OGDOQ_4	1.9	188	SAOQ_2	2.8	235	SAPSQ_7	1.8
47	FFOQ_1	1.8	95	ICDOQ_4	2.1	142	OGDOQ_4	2.4	189	SAOQ_3	1.7	236	SAPSQ_7	2.3
48	FFOQ_1	2.6												

4.7.1.2 Results of Convergent Validity for the Second-Order Latent Constructs (Potential Quality)

Redundancy analysis, is the test to confirm whether the formative measured construct was highly correlated with a reflective measure of the same construct. Accordingly, the strength of the path coefficient linking the constructs was indicative of the validity of the designated set of formative items in tapping latent construct of interest. Convergent validity is the extent to which a measure correlates positively with an alternative measure of the same construct. In examining the convergent validity of a measure in PLS, the average variance extracted (AVE) and item loadings were assessed as shown in Table 4.20.

According to Chin (1998), the value of at least 0.50 is desired. An established rule of thumb is that a latent variable should explain a substantial part of each indicator's variance, usually at least 50%. This means that an indicator's outer loading should be above 0.708 since that number squared (0.7082) equals 0.50. Alternatively, the researcher conducted a redundancy analysis in the following sections. Multicollinearity assessment was done (see Table 4.15). The results of the three steps recommended evaluating a formative construct (second-order) as discussed in this section by using three-step procedures (Hair, *et al.,* 2017).

Step 1: Redundancy analysis for convergent validity

According to Hair, *et al.*, (2017), the convergent validity of a formative construct should be evaluated by checking its correlation with an alternative measure of the same construct, using one or more reflective indicators. Ultimately, “the strength of the path coefficient linking the two constructs is indicative of the validity of the designated set of formative indicators in tapping the construct of interest" (Hair *et al.*, 2014:121). Chin (1998) suggested that the correlation between the constructs should be at least 0.80. As an alternative measure of second-order formative, data collected on four reflective indicators of the first-order latent construct were used to assess this construct's convergent validity.

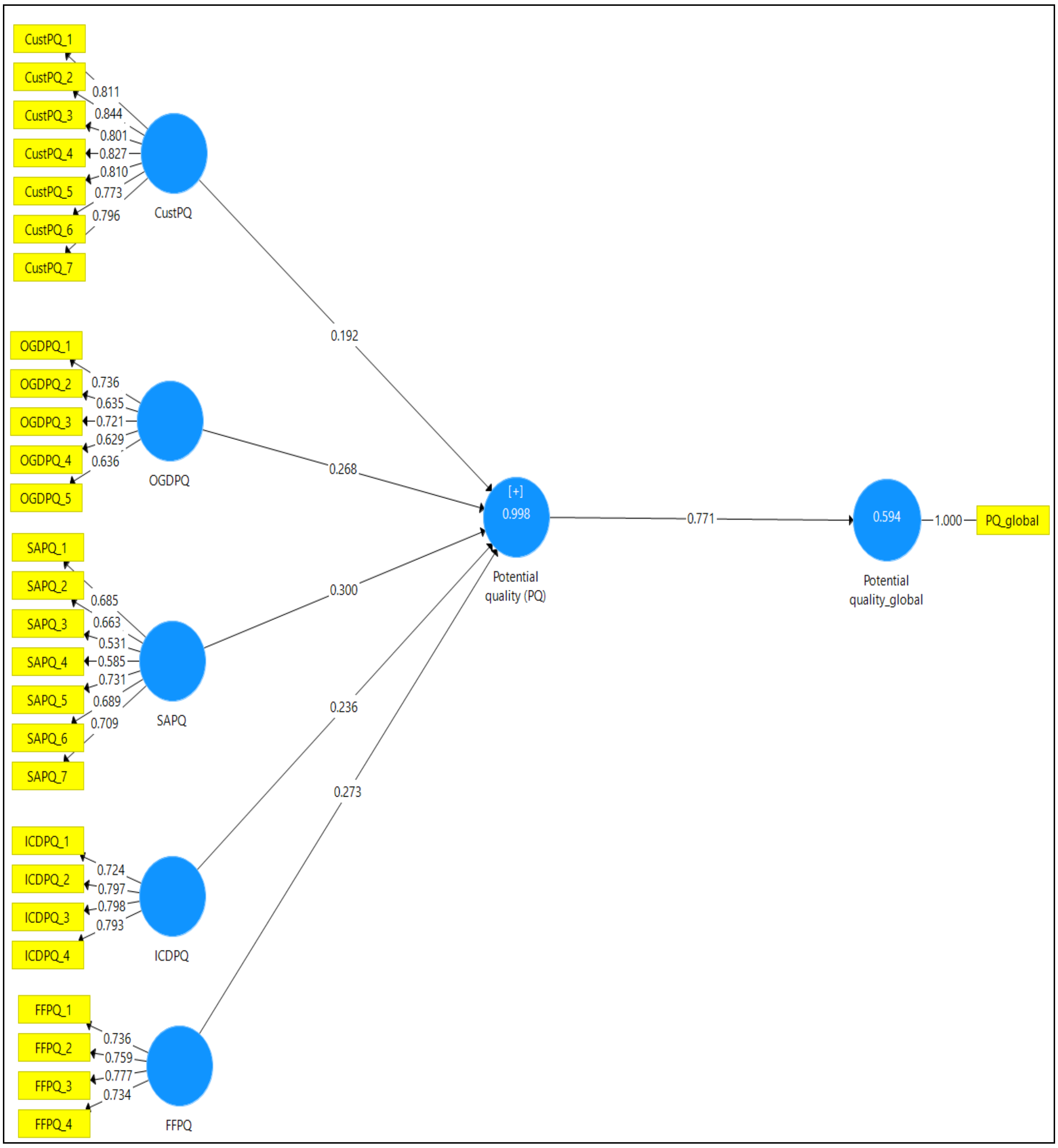

Figure 4.4: Convergent Validity of Potential Quality (PQ) (Repeated Indicator Approach-Mode A)

Table 4.16 (selected results) shows that the strength of the path coefficient between the latent construct (formative) and latent construct (reflective) met the threshold level of 0.50. Thus, one condition was satisfied to claim the validity of latent construct as a second-order latent construct. Figure 4.4 shows the results of the redundancy analysis using the repeated indicator approach (Mode A).

To assess convergent validity, the new model was created as shown in Figure 4.4. Each model was included in B2B service quality. The original formative latent construct is denoted by potential quality (PQ), whereas the global assessment study potential quality using a single -indicator latent construct is labeled with potential quality _ global, the analysis yields in Figure 4.4 produced a path coefficient of 0.771 which was above the suggested cut off of 0.70, thus providing for the formative construct's convergent validity.

Step 2: Assessing formative first-order factors for multicollinearity

As formative indicators may vary in direction and may also potentially co-vary with other constructs, multicollinearity could be quite problematic for the formative scales. Therefore, multicollinearity among indicators (or first-order dimensions) was evaluated using regression and the VIF scores. Ideally, no formative factor or dimension should have a VIF value greater than 5. Hair *et al.,* (2014, 2011) recommended determining the multicollinearity of the constructs before evaluating the structural model and suggested revising the model if any of the VIF values exceeded 5.0. Table 4.16 shows that none of the first-order formative dimensions exceeded the recommended cut-off value 5.0 for VIF.

Table 4.16: VIF Values for First-Order Dimensions of Potential Quality

No	First-order formative Items	VIF		No	Items	VIF
1	CustPQ_1	2.086		29	ICDPQ_4	1.595
2	CustPQ_1	2.724		30	ICDPQ_4	1.837
3	CustPQ_2	2.921		31	OGDPQ_1	1.426
4	CustPQ_2	3.265		32	OGDPQ_1	1.733
5	CustPQ_3	2.393		33	OGDPQ_2	1.27
6	CustPQ_3	2.693		34	OGDPQ_2	1.474
7	CustPQ_4	2.656		35	OGDPQ_3	1.424
8	CustPQ_4	2.812		36	OGDPQ_3	1.619
9	CustPQ_5	2.45		37	OGDPQ_4	1.273
10	CustPQ_5	2.573		38	OGDPQ_4	1.46
11	CustPQ_6	2.191		39	OGDPQ_5	1.239
12	CustPQ_6	2.439		40	OGDPQ_5	1.38
13	CustPQ_7	2.197		41	PQ_global	1
14	CustPQ_7	2.46		42	SAPQ_1	1.49
15	FFPQ_1	1.344		43	SAPQ_1	1.798
16	FFPQ_1	1.546		44	SAPQ_2	1.523
17	FFPQ_2	1.447		45	SAPQ_2	1.743
18	FFPQ_2	1.703		46	SAPQ_3	1.175
19	FFPQ_3	1.492		47	SAPQ_3	1.368
20	FFPQ_3	1.757		48	SAPQ_4	1.283
21	FFPQ_4	1.378		49	SAPQ_4	1.501
22	FFPQ_4	1.567		50	SAPQ_5	1.771
23	ICDPQ_1	1.358		51	SAPQ_5	1.934
24	ICDPQ_1	1.844		52	SAPQ_6	1.53
25	ICDPQ_2	1.659		53	SAPQ_6	1.786
26	ICDPQ_2	1.83		54	SAPQ_7	1.564
27	ICDPQ_3	1.657		55	SAPQ_7	1.84
28	ICDPQ_3	1.885				

No critical level of collinearity value is greater than 0.5

Step 3: Results of the significance and relevance for second-order latent construct (Potential quality)

Hair *et al.*, (2017) recommended evaluating the relative and absolute importance of formative indicators (or first-order dimensions) when assessing a model with formative constructs.

When evaluating the importance of each of the four first-order dimensions of potential quality, the outer weights of the first-order dimensions derived from repeated indicator approach (Mode A and Mode B) were found to be significant.

Table 4.17 shows that each of the formative dimensions of the potential quality second-order latent construct had a significant outer weight, and thus, supports retaining each of the four dimensions for the second-order formative construct (Hair *et al.,* 2017). Extra suggestion by Ringle *et al.* (2012) is to determine whether the indicator weights for the formative construct were roughly equal and all have significant t-values.

As per this guideline, the outer weights of the dimensions obtained from the repeated indicator approach (Mode A was selected for the remaining data analyses) were found to have roughly similar outer weights with significant t-values. For detail refer to appendix VIII.

Table 4.17: Significance Test of Outer Weights of the Second Order of Potential Quality(Potential Quality)

	Original Sample	Sample Mean	Standard Deviation	T Statistics	P Values
CustPQ_1 <- CustPQ	0.209	0.211	0.016	13.454	0.0000
CustPQ_1 -> Potential quality (PQ)	0.063	0.062	0.013	4.805	0.0000
CustPQ_2 <- CustPQ	0.187	0.188	0.012	16.007	0.0000
CustPQ_2 -> Potential quality (PQ)	0.034	0.036	0.013	2.621	0.0090
CustPQ_3 <- CustPQ	0.177	0.177	0.012	15.05	0.0000
CustPQ_3 -> Potential quality (PQ)	0.038	0.037	0.012	3.156	0.0020
CustPQ_4 <- CustPQ	0.181	0.181	0.011	16.2	0.0000
CustPQ_4 -> Potential quality (PQ)	0.044	0.045	0.014	3.063	0.0020
CustPQ_5 <- CustPQ	0.178	0.178	0.012	14.537	0.0000
CustPQ_5 -> Potential quality (PQ)	0.016	0.016	0.011	1.38	0.1680
CustPQ_6 <- CustPQ	0.143	0.143	0.014	10.032	0.0000
CustPQ_6 -> Potential quality (PQ)	0.029	0.028	0.012	2.334	0.0200
CustPQ_7 <- CustPQ	0.16	0.16	0.01	15.389	0.0000
CustPQ_7 -> Potential quality (PQ)	0.011	0.011	0.013	0.898	0.3700
FFPQ_1 <- FFPQ	0.341	0.339	0.022	15.806	0.0000
FFPQ_1 -> Potential quality (PQ)	0.094	0.093	0.013	7.241	0.0000

	Original Sample	Sample Mean	Standard Deviation	T Statistics	P Values
FFPQ_2 <- FFPQ	0.328	0.328	0.025	13.353	0.0000
FFPQ_2 -> Potential quality (PQ)	0.082	0.082	0.014	6.073	0.0000
FFPQ_3 <- FFPQ	0.342	0.341	0.021	15.93	0.0000
.					
.					
.					
SAPQ_4 <- SAPQ	0.188	0.187	0.015	12.427	0.0000
SAPQ_4 -> Potential quality (PQ)	0.076	0.075	0.011	7.118	0.0000
SAPQ_5 <- SAPQ	0.231	0.231	0.016	14.184	0.0000
SAPQ_5 -> Potential quality (PQ)	0.065	0.065	0.013	5.211	0.0000
SAPQ_6 <- SAPQ	0.225	0.224	0.018	12.759	0.0000
SAPQ_6 -> Potential quality (PQ)	0.055	0.054	0.012	4.615	0.0000
SAPQ_7 <- SAPQ	0.234	0.234	0.016	14.267	0.0000
SAPQ_7 -> Potential quality (PQ)	0.056	0.056	0.012	4.742	0.0000

4.7.1.3 Results of Convergent Validity for the Second-Order Latent Constructs (Process Hard Quality)

Step 1: Redundancy Analysis for Convergent Validity of Process Hard Quality

Other procedures remain the same as previous subsection. The original formative latent construct was denoted by process hard quality(PHQ), whereas the global assessment study potential quality using a single -indicator latent construct was labeled with process hard quality _ global , the analysis in Figure 4.5 produced a path coefficient of 0.704 which was above the suggested cut off of 0.70, thus providing for the formative construct's convergent validity.

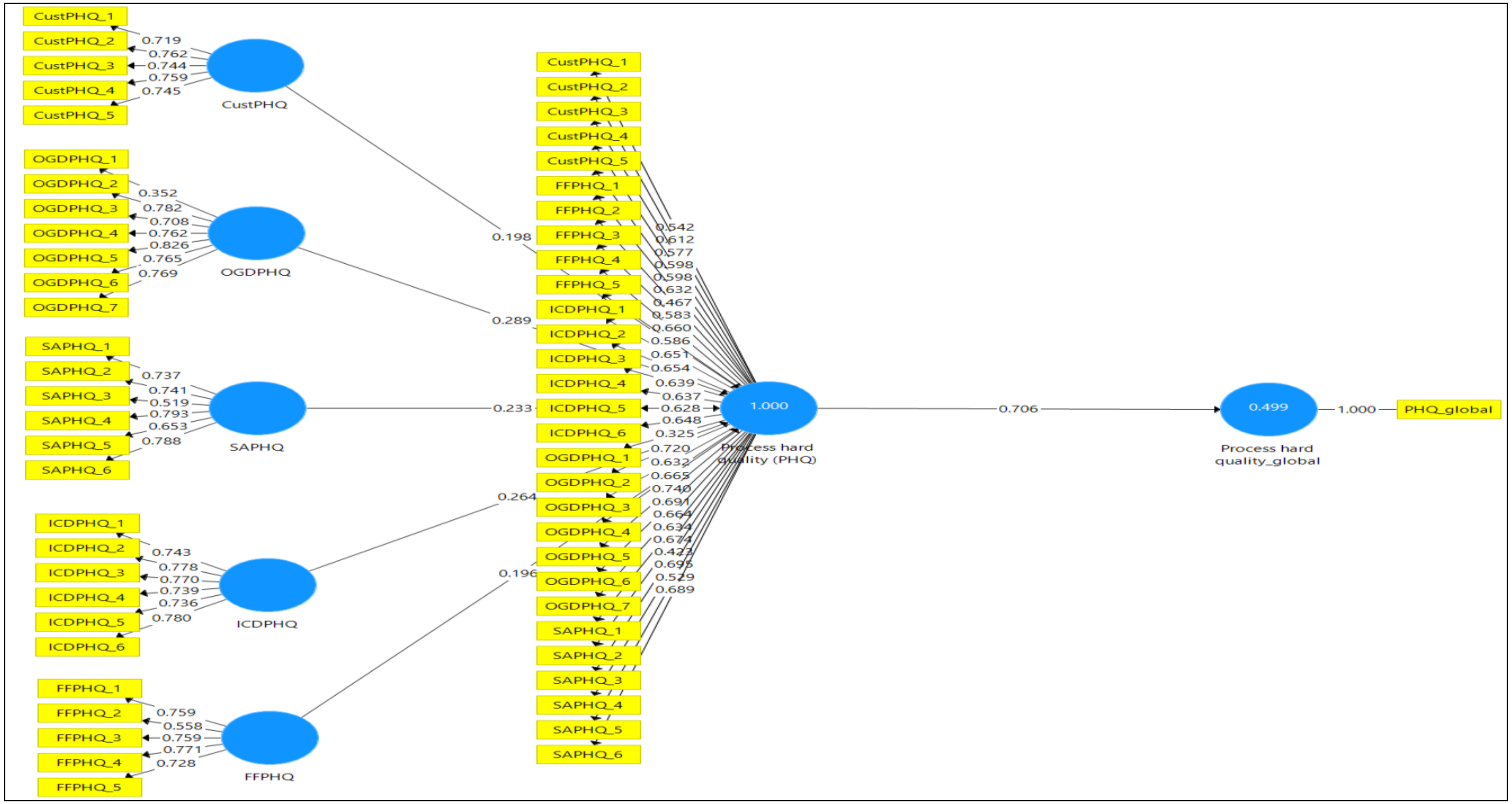

Figure 4.5: Convergent Validity of Formative Process Hard Quality (PHQ) (Repeated Indicators Approach-Mode A)

Step 2: Assessing formative second-order latent construct indicators of process hard quality for multicollinearity

As formative indicators may vary in direction and may also process hard quality co-vary with other constructs, multicollinearity could be quite problematic for the formative scales.

Therefore, multicollinearity among indicators (or first-order dimensions) was evaluated using regression and the VIF scores. Ideally, no formative factor or dimension should have a VIF value greater than 5. Table 4.18 shows that none of the first-order formative dimensions exceeded the recommended cut-off value 5.0 for VIF.

Table 4.18: Collinearity Statistics (VIF) for Process Hard Quality

No	Item	VIF	No	Item	VIF	No	Item	VIF
1	CustPHQ_1	1.5	21	ICDPHQ_1	1.6	41	OGDPHQ_5	2.3
2	CustPHQ_1	1.8	22	ICDPHQ_1	2.0	42	OGDPHQ_5	2.5
3	CustPHQ_2	1.6	23	ICDPHQ_2	1.9	43	OGDPHQ_6	1.8
4	CustPHQ_2	1.9	24	ICDPHQ_2	2.1	44	OGDPHQ_6	2.1
5	CustPHQ_3	1.6	25	ICDPHQ_3	1.9	45	OGDPHQ_7	1.8
6	CustPHQ_3	1.7	26	ICDPHQ_3	2.0	46	OGDPHQ_7	2.1
7	CustPHQ_4	1.6	27	ICDPHQ_4	1.8	47	PHQ_global	1.0
8	CustPHQ_4	1.9	28	ICDPHQ_4	2.0	48	SAPHQ_1	1.5
9	CustPHQ_5	1.5	29	ICDPHQ_5	1.6	49	SAPHQ_1	1.9
10	CustPHQ_5	1.8	30	ICDPHQ_5	1.8	50	SAPHQ_2	1.6
11	FFPHQ_1	1.6	31	ICDPHQ_6	2.0	51	SAPHQ_2	2.0
12	FFPHQ_1	2.0	32	ICDPHQ_6	2.2	52	SAPHQ_3	1.2
13	FFPHQ_2	1.2	33	OGDPHQ_1	1.1	53	SAPHQ_3	1.4
14	FFPHQ_2	1.5	34	OGDPHQ_1	1.4	54	SAPHQ_4	1.9
15	FFPHQ_3	1.6	35	OGDPHQ_2	2.0	55	SAPHQ_4	2.1
16	FFPHQ_3	1.8	36	OGDPHQ_2	2.4	56	SAPHQ_5	1.4
17	FFPHQ_4	1.6	37	OGDPHQ_3	1.6	57	SAPHQ_5	1.5
18	FFPHQ_4	1.9	38	OGDPHQ_3	1.8	58	SAPHQ_6	1.8
19	FFPHQ_5	1.5	39	OGDPHQ_4	1.8	59	SAPHQ_6	2.1
20	FFPHQ_5	1.7	40	OGDPHQ_4	2.1			

Step 3: Assessing the importance of formative process hard quality indicators

The outer weights of the dimensions obtained from the repeated indicator approach (Mode A was chosen for the remaining data analyses) were found to have roughly similar outer weights with significant t-values. The p -values in the reflective and formative model displayed in Table 4.19 were lower than 0.05, thus significant outer weights at a significance level of 5% were established. Detail refer to appendix XIV

Table 4.19: Significance test of the Outer weights of Process hard quality

No	**Path**	**Original Sample**	**Sample Mean (M)**	**Standard Deviation**	**T Statistics**	**P Values**
1	CustPHQ_1 <- CustPHQ	0.252	0.255	0.026	9.604	0.000
2	CustPHQ_1 -> Process hard quality (PHQ)	0.08	0.079	0.012	6.687	0.000
3	CustPHQ_2 <- CustPHQ	0.279	0.279	0.016	17.146	0.000
4	CustPHQ_2 -> Process hard quality (PHQ)	0.058	0.058	0.011	5.001	0.000
5	CustPHQ_3 <- CustPHQ	0.265	0.267	0.016	16.287	0.000
6	CustPHQ_3 -> Process hard quality (PHQ)	0.06	0.061	0.012	5.069	0.000
7	CustPHQ_4 <- CustPHQ	0.272	0.272	0.016	16.781	0.000
8	CustPHQ_4 -> Process hard quality (PHQ)	0.05	0.05	0.01	4.766	0.000
9	CustPHQ_5 <- CustPHQ	0.272	0.271	0.016	16.635	0.000
10	CustPHQ_5 -> Process hard quality (PHQ)	0.051	0.05	0.011	4.652	0.000
11	FFPHQ_1 <- FFPHQ	0.297	0.299	0.017	17.201	0.000
12	FFPHQ_1 -> Process hard quality (PHQ)	0.067	0.067	0.012	5.698	0.000
13	FFPHQ_2 <- FFPHQ	0.221	0.222	0.022	10.192	0.000
14	FFPHQ_2 -> Process hard quality (PHQ)	0.059	0.059	0.011	5.444	0.000
15	FFPHQ_3 <- FFPHQ	0.278	0.278	0.016	17.351	0.000
16	FFPHQ_3 -> Process hard quality (PHQ)	0.078	0.077	0.012	6.414	0.000
17	FFPHQ_4 <- FFPHQ	0.308	0.31	0.021	14.463	0.000
18	FFPHQ_4 -> Process hard quality (PHQ)	0.066	0.068	0.013	5.108	0.000
19	FFPHQ_5 <- FFPHQ	0.278	0.278	0.015	18.307	0.000
20	FFPHQ_5 -> Process hard quality (PHQ)	0.082	0.081	0.01	8.117	0.000
21	ICDPHQ_1 <- ICDPHQ	0.222	0.223	0.012	18.018	0.000
22	ICDPHQ_1 -> Process hard quality (PHQ)	0.051	0.051	0.011	4.55	0.000
23	ICDPHQ_2 <- ICDPHQ	0.223	0.224	0.013	16.839	0.000
24	ICDPHQ_2 -> Process hard quality (PHQ)	0.058	0.057	0.013	4.596	0.000
38	OGDPHQ_3 -> Process hard quality (PHQ)	0.042	0.042	0.009	4.828	0.000
39	OGDPHQ_4 <- OGDPHQ	0.204	0.204	0.012	17.292	0.000
. . .	. . .	. . .	. . .	. . .	. . .	. . .
51	SAPHQ_2 -> Process hard quality (PHQ)	0.043	0.044	0.011	3.771	0.000
52	SAPHQ_3 <- SAPHQ	0.161	0.16	0.016	10.261	0.000
57	SAPHQ_5 -> Process hard quality (PHQ)	0.043	0.043	0.009	4.704	0.000
58	SAPHQ_6 <- SAPHQ	0.264	0.264	0.017	15.288	0.000
59	SAPHQ_6 -> Process hard quality (PHQ)	0.07	0.07	0.012	5.884	0.000

Reliability and validity of Process hard quality latent construct

In order to evaluate the internal consistency reliability of the constructs (both reflective and formative), the composite reliability scores and Cronbach's alphas must exceed the recommended minimum 0.70 (Nunnally and Bernstein, 1994). The results presented in Table 4.20 show that the reliability scores of each construct exceeded the recommended threshold of 0.70.

Table 4.20: Reliability measures and AVE Scores of the Process Hard Quality Constructs

Latent variable	Cronbach's Alpha	rho_A	Composite Reliability	Average Variance Extracted (AVE)
CustPHQ	0.801	0.802	0.863	0.557
FFPHQ	0.763	0.775	0.841	0.518
ICDPHQ	0.852	0.852	0.89	0.574
OGDPHQ	0.839	0.864	0.881	0.525
Process hard quality (PHQ)	0.941	0.945	0.947	0.384
Process hard quality_ global	1.000	1.000	1.000	1.000
SAPHQ	0.801	0.819	0.858	0.506

4.7.1.4 Results of Convergent Validity for the Second-Order Latent Constructs (Process Soft Quality)

Step 1: Redundancy analysis for convergent validity for process soft quality

The original formative latent construct was denoted with process soft quality (PSQ), whereas the global assessment study process soft quality using a single -indicator latent construct was labeled with process soft quality _ global , the analysis yields in Figure 4.6 produced a path coefficient of 0.812 which was above the suggested cut off of 0.70, thus providing for the formative construct's convergent validity.

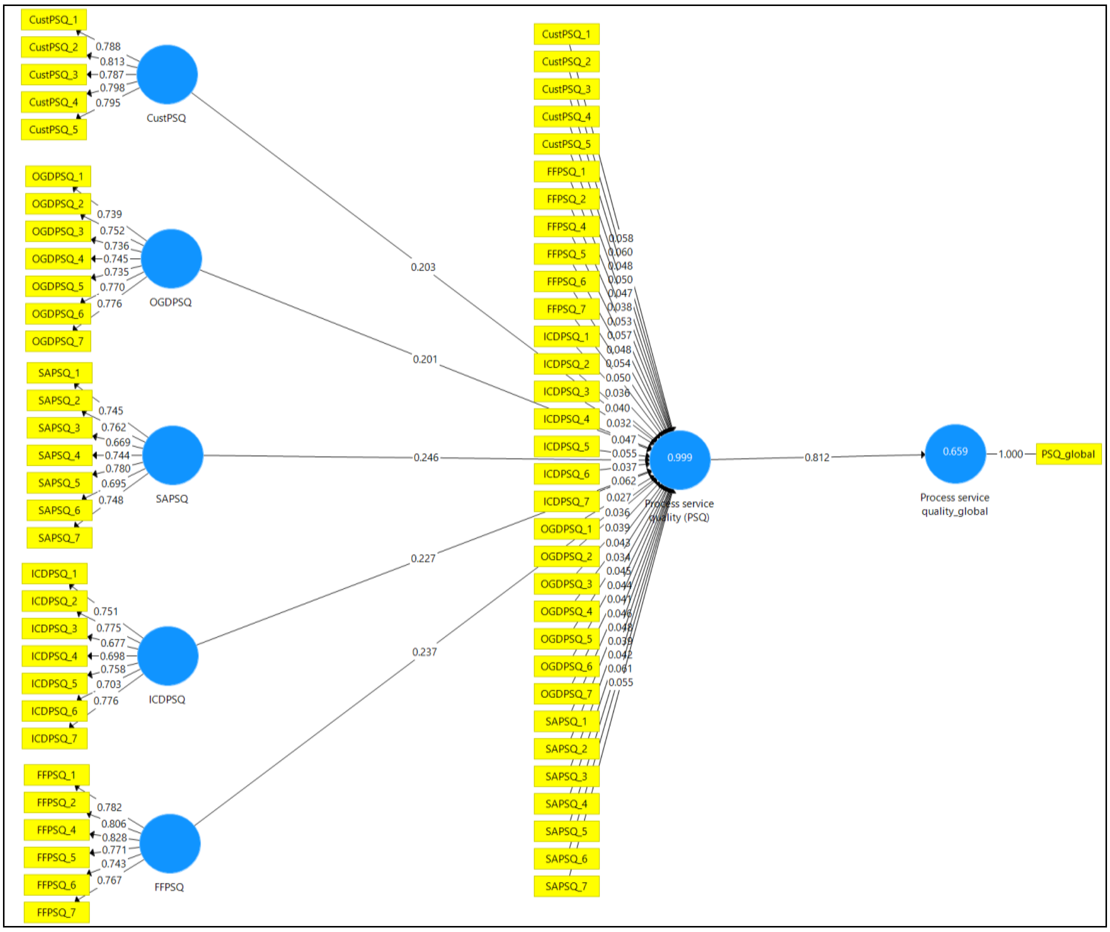

Figure 4.6: Convergent validity for the Second-Order Latent Constructs (Process Soft Quality)

Figure 4.6 shows that process soft quality as second order latent construct had no problem of convergent validity. The score through redundancy analysis had 0.999 while global was 0.659.

Step 2: Assessing formative second-order process soft quality for multicollinearity

The process soft quality also was tested for multicollinearity where VIF value ranged from1.0 to 2.8. Table 4.21 shows that none of the first-order formative dimensions exceeded the recommended cut-off value 5.0 for VIF.

Table 4.21: VIF Values for Second-Order Items of Process Soft Quality

No	Items	VIF	No	Items	VIF	No	Items	VIF
1	CustPSQ_1	1.8	23	ICDPSQ_1	1.8	45	OGDPSQ_5	2.0
2	CustPSQ_1	2.8	24	ICDPSQ_1	2.4	46	OGDPSQ_5	2.2
3	CustPSQ_2	1.9	25	ICDPSQ_2	2.0	47	OGDPSQ_6	1.9
4	CustPSQ_2	2.3	26	ICDPSQ_2	2.3	48	OGDPSQ_6	2.2
5	CustPSQ_3	1.8	27	ICDPSQ_3	1.5	49	OGDPSQ_7	2.1
6	CustPSQ_3	2.1	28	ICDPSQ_3	1.7	50	OGDPSQ_7	2.4
7	CustPSQ_4	1.9	29	ICDPSQ_4	1.7	51	PSQ_global	1.0
8	CustPSQ_4	2.4	30	ICDPSQ_4	1.8	52	SAPSQ_1	1.7
9	CustPSQ_5	1.8	31	ICDPSQ_5	1.9	53	SAPSQ_1	2.3
10	CustPSQ_5	2.4	32	ICDPSQ_5	2.3	54	SAPSQ_2	1.9
11	FFPSQ_1	1.8	33	ICDPSQ_6	1.7	55	SAPSQ_2	2.4
12	FFPSQ_1	2.8	34	ICDPSQ_6	2.0	56	SAPSQ_3	1.6
13	FFPSQ_2	2.0	35	ICDPSQ_7	1.9	57	SAPSQ_3	1.7
14	FFPSQ_2	2.6	36	ICDPSQ_7	2.3	58	SAPSQ_4	1.8
15	FFPSQ_4	2.4	37	OGDPSQ_1	1.8	59	SAPSQ_4	2.0
16	FFPSQ_4	2.7	38	OGDPSQ_1	2.3	60	SAPSQ_5	2.1
17	FFPSQ_5	2.0	39	OGDPSQ_2	1.9	61	SAPSQ_5	2.6
18	FFPSQ_5	2.2	40	OGDPSQ_2	2.5	62	SAPSQ_6	1.6
19	FFPSQ_6	1.8	41	OGDPSQ_3	1.9	63	SAPSQ_6	2.0
20	FFPSQ_6	2.1	42	OGDPSQ_3	2.4	64	SAPSQ_7	1.8
21	FFPSQ_7	2.0	43	OGDPSQ_4	2.0	65	SAPSQ_7	2.3
22	FFPSQ_7	2.2	44	OGDPSQ_4	2.4			

Step 3: Assessing importance of second order process soft quality

The outer weights of the dimensions obtained from the repeated indicator approach (Mode A was chosen for the remaining data analyses) were found to have roughly similar outer weights with significant t-values. The p -values in the reflective and formative model displayed in Table 4.22 were lower than 0.05, thus significant outer weights at a significance level of 5% were established.

Table 4.22: Outer Weight For Second Order Process Soft Quality

No	Path	Original Sample	Sample Mean	Standard Deviation	T Statistics	P Values
1	CustPSQ_1 <- CustPSQ	0.26	0.26	0.01	20.54	0.00
2	CustPSQ_1 -> Process service quality (PSQ)	0.06	0.06	0.01	6.08	0.00
3	CustPSQ_2 <- CustPSQ	0.25	0.25	0.01	20.87	0.00
4	CustPSQ_2 -> Process service quality (PSQ)	0.06	0.06	0.01	7.26	0.00
5	CustPSQ_3 <- CustPSQ	0.24	0.24	0.01	23.89	0.00
6	CustPSQ_3 -> Process service quality (PSQ)	0.05	0.05	0.01	6.28	0.00
7	CustPSQ_4 <- CustPSQ	0.26	0.26	0.01	21.45	0.00
8	CustPSQ_4 -> Process service quality (PSQ)	0.05	0.05	0.01	5.57	0.00
9	CustPSQ_5 <- CustPSQ	0.26	0.26	0.01	20.26	0.00
10	CustPSQ_5 -> Process service quality (PSQ)	0.05	0.05	0.01	4.50	0.00
11	FFPSQ_1 <- FFPSQ	0.22	0.22	0.01	20.43	0.00
12	FFPSQ_1 -> Process service quality (PSQ)	0.04	0.04	0.01	3.63	0.00
13	FFPSQ_2 <- FFPSQ	0.22	0.22	0.01	21.97	0.00
14	FFPSQ_2 -> Process service quality (PSQ)	0.05	0.05	0.01	4.80	0.00
15	FFPSQ_4 <- FFPSQ	0.22	0.22	0.01	23.33	0.00
16	FFPSQ_4 -> Process service quality (PSQ)	0.06	0.06	0.01	5.21	0.00
17	FFPSQ_5 <- FFPSQ	0.21	0.21	0.01	18.92	0.00
18	FFPSQ_5 -> Process service quality (PSQ)	0.05	0.05	0.01	4.54	0.00
19	FFPSQ_6 <- FFPSQ	0.20	0.20	0.01	19.63	0.00
20	FFPSQ_6 -> Process service quality (PSQ)	0.05	0.06	0.01	5.60	0.00
. . .	. . .	. . .	. . .	. . .	. . .	. . .
61	SAPSQ_5 -> Process service quality (PSQ)	0.04	0.04	0.01	3.54	0.00
62	SAPSQ_6 <- SAPSQ	0.19	0.19	0.01	17.74	0.00
63	SAPSQ_6 -> Process service quality (PSQ)	0.06	0.06	0.01	5.71	0.00
64	SAPSQ_7 <- SAPSQ	0.20	0.20	0.01	17.48	0.00
65	SAPSQ_7 -> Process service quality (PSQ)	0.06	0.06	0.01	5.23	0.00

Step 4: Assessing reliability of second order process soft quality

The study assessed reliability of second –order process quality. The results were shown in Table 4.23 all measured of reliability were found in acceptable level.

Table 4.23: Second Order Reliability and AVE Scores of Process Service Quality

Latent construct	Cronbach's Alpha	Composite Reliability	Average Variance Extracted (AVE)
CustPSQ	0.856	0.897	0.634
FFPSQ	0.874	0.905	0.613
ICDPSQ	0.858	0.891	0.540
OGDPSQ	0.871	0.900	0.563
Process service quality (PSQ)		1.000	
Process service quality_ global	1.000	1.000	1.000
SAPSQ	0.858	0.892	0.541

Source : SmartPLS version 3.2.8 (Ringle *et al*., 2019)

4.7.1.5 Results of Convergent Validity for the Second Order Latent Constructs (Output Quality)

Step 1: Redundancy analysis for convergent validity for Output quality

The original formative latent construct was denoted by output quality (OQ), whereas the global assessment study output quality using a single -indicator latent construct was labeled with output quality _ global , the analysis yields in Figure 4.7 produced a path coefficient of 0.756 which is above the suggested cut off of 0.70, thus providing for the formative construct's convergent validity.

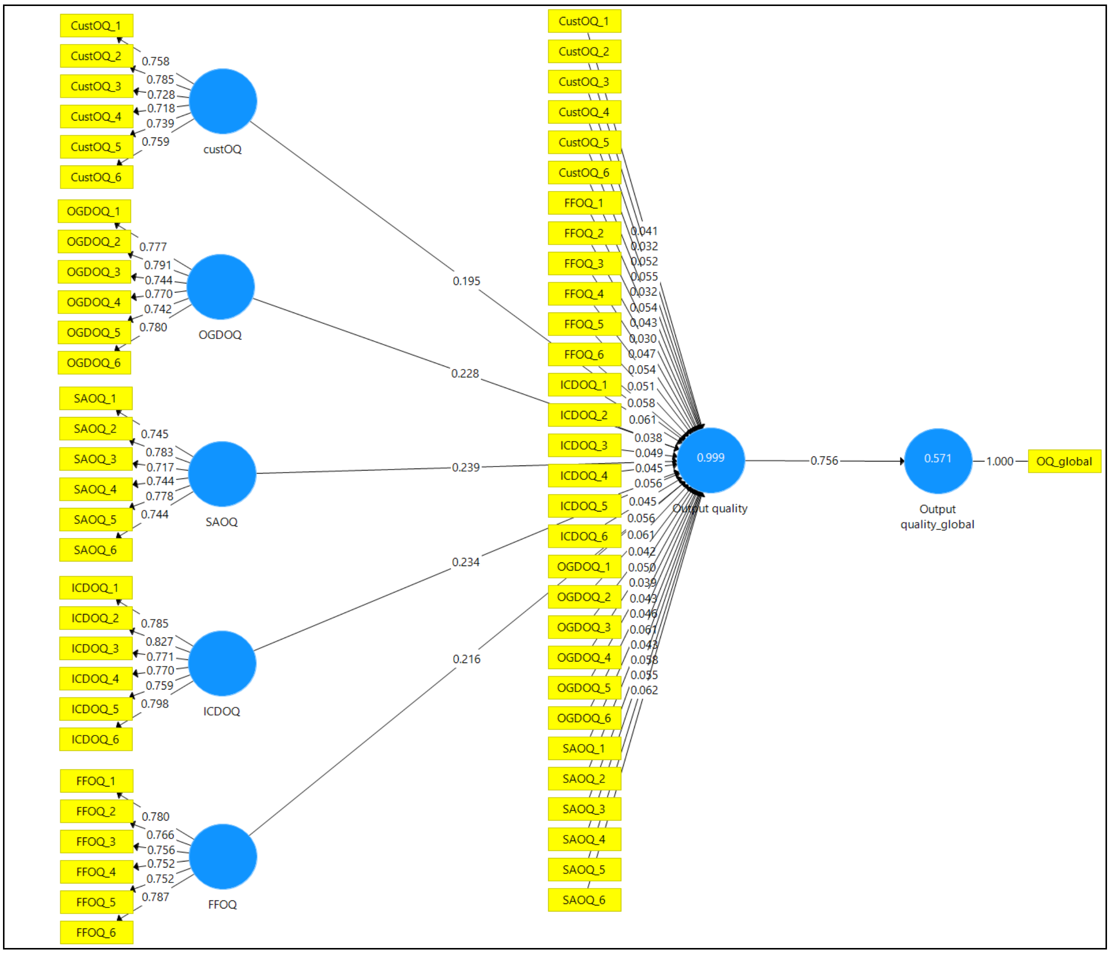

Figure 4.7: Convergent Validity for the Second Order Latent Constructs (Output Quality)

Step 2: Assessing formative second-order output quality for multicollinearity

Table 4.24 indicated VIF values for second-order indicators, with values ranging from 1.5 to 2.8, thus, It was found that multicollinearity was not a problem in second-order item correlations. Hair *et al.*, (2014, 2011) recommended determining the multicollinearity of the constructs before evaluating the structural model and suggested revising the model if any of the VIF values which exceeded 5.0. Table 4.24 shows that none of the first-order formative dimensions exceeded the recommended cut-off value 5.0 for VIF.

Table 4.24: VIF Values for Second-Order Indicators for Output Quality

No	Item	VIF		No	Item	VIF		No	Item	VIF
1	CustOQ_1	1.8		22	FFOQ_5	2.6		42	OGDOQ_3	2.4
2	CustOQ_1	2.4		23	FFOQ_6	2.0		43	OGDOQ_4	1.9
3	CustOQ_2	2.1		24	FFOQ_6	2.2		44	OGDOQ_4	2.4
4	CustOQ_2	2.4		25	ICDOQ_1	1.9		45	OGDOQ_5	1.8
5	CustOQ_3	2.0		26	ICDOQ_1	2.6		46	OGDOQ_5	2.3
6	CustOQ_3	2.5		27	ICDOQ_2	2.3		47	OGDOQ_6	1.8
7	CustOQ_4	1.8		28	ICDOQ_2	2.8		48	OGDOQ_6	2.2
8	CustOQ_4	2.4		29	ICDOQ_3	2.1		49	OQ_global	1.0
9	CustOQ_5	1.8		30	ICDOQ_3	2.6		50	SAOQ_1	1.7
10	CustOQ_5	2.3		31	ICDOQ_4	2.1		51	SAOQ_1	2.4
11	CustOQ_6	1.8		32	ICDOQ_4	2.5		52	SAOQ_2	2.0
12	CustOQ_6	2.2		33	ICDOQ_5	1.9		53	SAOQ_2	2.8
13	FFOQ_1	1.8		34	ICDOQ_5	2.4		54	SAOQ_3	1.7
14	FFOQ_1	2.6		35	ICDOQ_6	2.1		55	SAOQ_3	2.1
15	FFOQ_2	1.9		36	ICDOQ_6	2.6		56	SAOQ_4	1.8
16	FFOQ_2	2.4		37	OGDOQ_1	1.8		57	SAOQ_4	2.2
17	FFOQ_3	2.1		38	OGDOQ_1	2.4		58	SAOQ_5	1.9
18	FFOQ_3	2.6		39	OGDOQ_2	2.0		59	SAOQ_5	2.9
19	FFOQ_4	2.0		40	OGDOQ_2	2.4		60	SAOQ_6	1.7
20	FFOQ_4	2.4		41	OGDOQ_3	1.8		61	SAOQ_6	2.3
21	FFOQ_5	2.1								

Step 3 : Assessing the importance of second order output quality

The outer weights of the dimensions obtained from the repeated indicator approach (Mode A was chosen for the remaining data analyses) were found to have roughly similar outer weights with significant t-values. The p -values in the reflective and formative model displayed in Table 4.25 were lower than 0.05, and significant outer weights at a significance level of 5% were established.

Table 4.25: Significance test of Outer Weights of Second Order Dimensions for Output Quality

No	Path	Original Sample (O)	Sample Mean (M)	Standard Deviation (STDEV)	T Statistics (|O/STDEV|)	P Values
1	CustOQ_1 <- custOQ	0.22	0.22	0.01	16.09	0.00
2	CustOQ_1 -> Output quality	0.04	0.04	0.01	4.19	0.00
3	CustOQ_2 <- custOQ	0.23	0.23	0.01	16.08	0.00
4	CustOQ_2 -> Output quality	0.03	0.03	0.01	3.15	0.00
5	CustOQ_3 <- custOQ	0.22	0.22	0.01	17.39	0.00
6	CustOQ_3 -> Output quality	0.05	0.05	0.01	5.58	0.00
7	CustOQ_4 <- custOQ	0.23	0.23	0.01	17.58	0.00
8	CustOQ_4 -> Output quality	0.06	0.06	0.01	5.91	0.00
9	CustOQ_5 <- custOQ	0.21	0.22	0.01	18.94	0.00
10	CustOQ_5 -> Output quality	0.03	0.03	0.01	3.28	0.00
11	CustOQ_6 <- custOQ	0.23	0.23	0.02	15.67	0.00
12	CustOQ_6 -> Output quality	0.05	0.05	0.01	5.47	0.00
13	FFOQ_1 <- FFOQ	0.23	0.23	0.01	16.64	0.00
14	FFOQ_1 -> Output quality	0.04	0.04	0.01	4.64	0.00
15	FFOQ_2 <- FFOQ	0.22	0.22	0.01	17.47	0.00
16	FFOQ_2 -> Output quality	0.03	0.03	0.01	3.66	0.00
17	FFOQ_3 <- FFOQ	0.22	0.22	0.01	17.28	0.00
18	FFOQ_3 -> Output quality	0.05	0.05	0.01	4.55	0.00
19	FFOQ_4 <- FFOQ	0.21	0.21	0.01	17.78	0.00
20	FFOQ_4 -> Output quality	0.05	0.06	0.01	5.02	0.00
. . .	. . .	. . .	. . .	. . .	. . .	. . .
5.5	SAOQ_3 -> Output quality	0.04	0.04	0.01	3.88	0.00
56.	SAOQ_4 <- SAOQ	0.22	0.22	0.01	18.36	0.00
57	SAOQ_4 -> Output quality	0.06	0.06	0.01	4.98	0.00
58	SAOQ_5 <- SAOQ	0.24	0.24	0.02	16.19	0.00
59	SAOQ_5 -> Output quality	0.06	0.06	0.01	3.93	0.00
60	SAOQ_6 <- SAOQ	0.22	0.22	0.01	21.20	0.00
61	SAOQ_6 -> Output quality	0.06	0.06	0.01	6.50	0.00

Step 4: Assessing the reliability of second-order output quality

Composite reliability

With the formative model, if composite indicators are strongly correlated with each other, it is difficult to distinguish the effect that each item has on the latent constructs. See Table 4.26.

Table 4.26: Reliability and AVE Values of Output Quality Latent Constructs

Latent variable	Cronbach's Alpha	Composite Reliability	Average Variance Extracted (AVE)
FFOQ	0.859	0.895	0.586
ICDOQ	0.875	0.906	0.617
OGDOQ	0.86	0.896	0.589
Output quality		1.000	1.000
Output quality_global	1.000	1.000	1.000
SAOQ	0.846	0.886	0.566
custOQ	0.842	0.884	0.56

These results validate the claim that B2B multiprocess service quality was indeed a reflective-formative third-order multidimensional construct. The five latent constructs identified in the conceptualization formatively constituted the third -order construct. The validity assessment of the items and measures of the twenty first-order reflective dimensions.

4.7.1.6 The Results of Repeated Indicators Approach

To carry out the repeated approach to the reflective-formative model, the author first designed the model with 20 lower-order constructs of CustOQ, CustPHQ, CustPQ, CustPSQ, FFOQ, FFPHQ, FFPQ, FFPSQ, ICDHPQ, ICDOQ, ICDPQ, ICDPSQ,

OGDOQ, OGDPHQ, OGDPQ,OGDPSQ, SAOQ,SAPHQ, SAPQ and SAPSQ (Figure 4.8) and applied repeated approach by defining these latent constructs as formative constructs affecting potential quality, process hard quality , process soft quality and output quality.

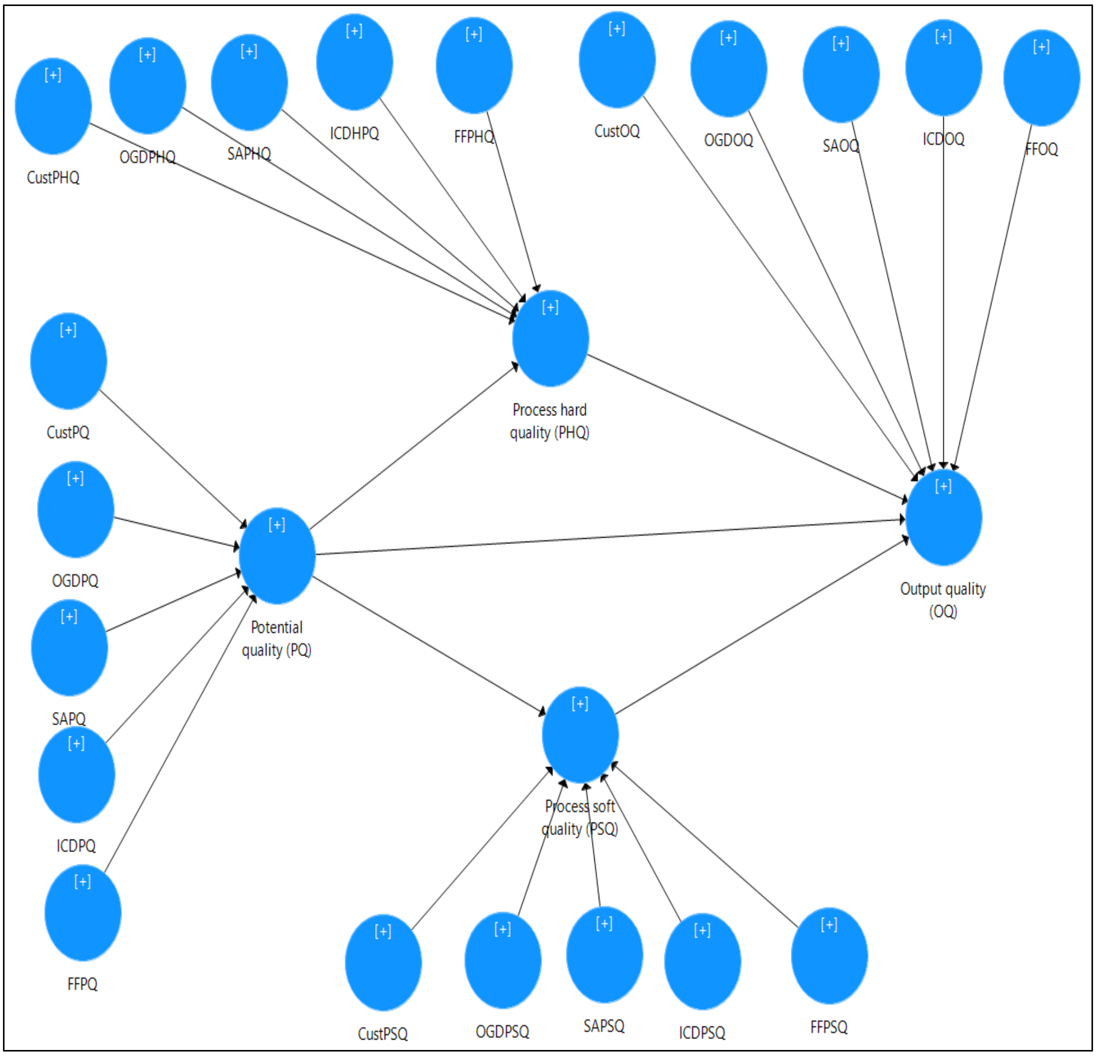

Figure 4.8: Hierarchical Component Model Design Second-Order Using Repeated Indicators

Lohmöller(1987) suggested a procedure for the case of hierarchical constructs, the so-called Hierarchical Component Model or Repeated Indicators Approach which is the most popular approach when estimating higher-order latent constructs through PLS-SEM. a second-order latent construct was directly measured by items for all the first-order latent constructs. While this approach repeats the number of indicators used, the model was estimated by the standard PLS algorithm in Smart PLS version 3.2.8.

The items, measuring each first-order latent construct, were simply repeated to represent the higher-order construct. For example, if a second-order latent construct consisted of two underlying first-order latent constructs, each with six items, the second-order latent construct was specified using all the items of the underlying first-order latent constructs, and thus the second-order latent construct was formed by twelve items.

The advantage of the **repeated indicators approach** was its ability to estimate all constructs simultaneously instead of estimating lower-order and higher-order dimensions separately. Thus, it takes the whole nomological network, not only the lower level or the higher-level model, into account, thereby avoiding interpretational confounding (Hair *et al.,* 2017). The standard approach for repeated indicators on a higher-order construct model is to use Mode B (reflective- formative model).

In this manner, the second-order latent construct model accounts for the hierarchical component of the model and resulted in the R^2 of the higher-order latent construct of the unit. Hence, this was done by repeating the same indicators of the underlying first-order latent constructs, that is the potential quality (PQ)-Output quality (OQ) latent constructs (See Figure 4.9).

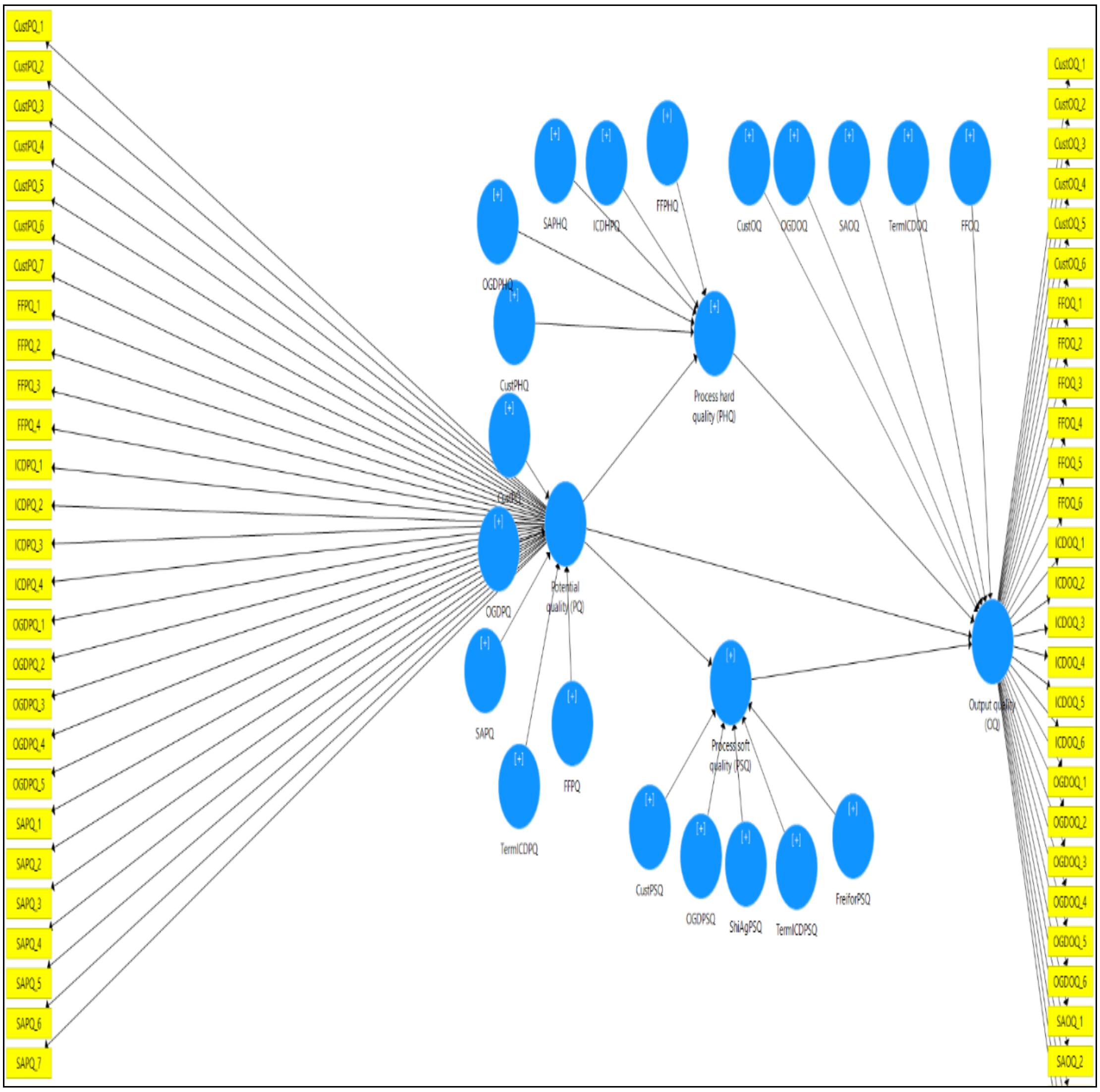

Figure 4.9: Estimating Second-Order Latent Constructs Using Repeated Approach Measures

The PLS-SEM results indicate in Figure 4.10 for the model with repeated items indicates an adjusted R^2 of 1.000 for the second-order latent constructs. Wong, (2013), suggested that when specifying a hierarchical model using repeated indicators the R^2 should yield 1.000 as indicated in Figure 4.10. Thus, based on this PLS-SEM estimate results, the validity of the potential quality-output quality latent constructs models as the second-order latent construct was demonstrated. This is the PLS-SEM tests.

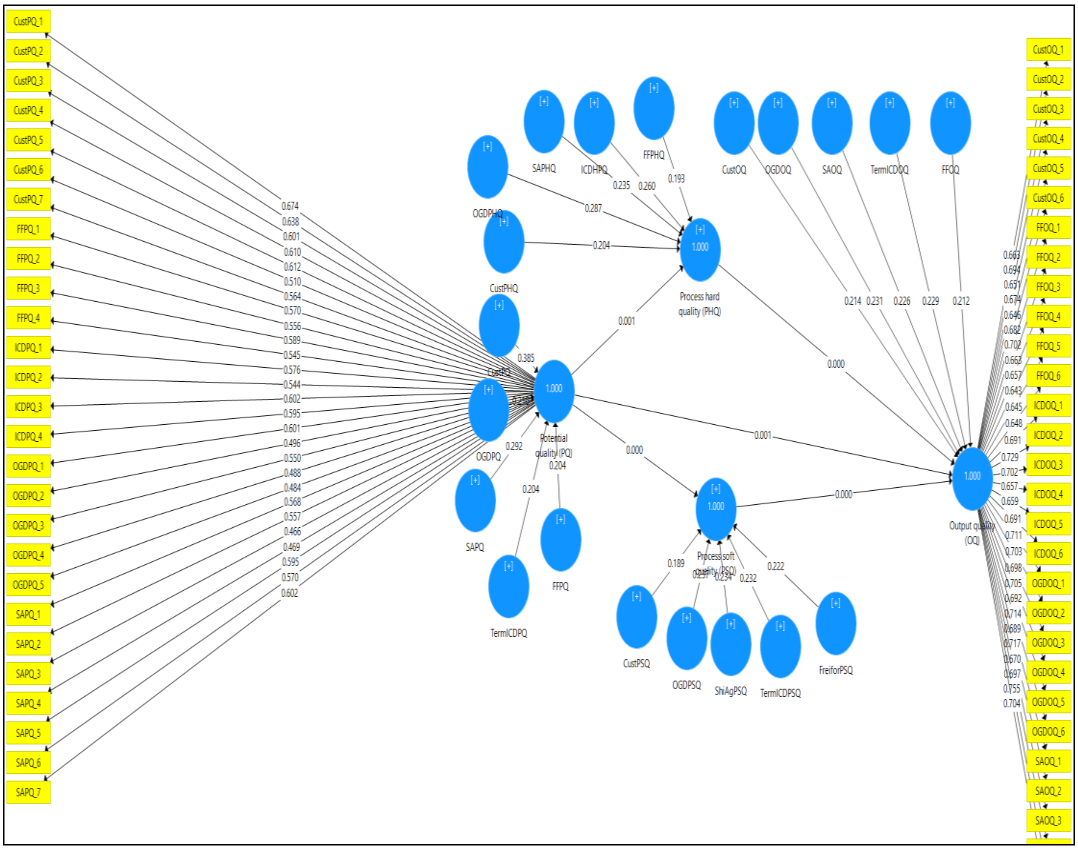

Figure 4.10: The Results of Estimating Second-Order Latent Constructs

4.7.1.7 Model Fit for Second-Order Latent Construct

Garson (2016:68) defined SRMR as a measure of the approximate fit of the researcher's model. It measures the difference between the observed correlation matrix and the model-implied correlation matrix. Put another way, the SRMR reflected the average magnitude of such differences, with lower SRMR being a better fit. By convention, a model has a good fit when SRMR was less than .08 (Hu and Bentler, 1998). Some use more lenient cutoff of less than 0.10.

This study also calculates the overall model fit through standardized root-mean-square residual (SRMR) as the root mean square discrepancy between the observed correlation and the model implied correlations. This study followed Henseler *et al.*

(2013) and refers to the Standardized Root Mean square Residual (SRMR) as an index for model validation. Scholars generally consider values below 0.08 as favorable. The model estimation with PLS-SEM revealed an SRMR value of 0.045, which confirms the overall fit of PLS path model (Hair *et al.*,2017). See Table 4.27.

Table 4.27: Model Fit Statistics

	Saturated Model	**Estimated Model**
SRMR	0.045	0.047

4.7.1.8 Nomological Validity

Construct validity, including nomological validity, can be established for formative second-order constructs (Diamantopoulos *et al.,* 2008). Nomological validity was established by examining the construct's relation to other related constructs in the model and examined its significance. The theoretical relationship of the respective constructs was based on prior studies (Henseler *et al.,* 2009). To determine nomological validity and at the same time identify the formative second-order latent construct, each latent construct was related to the outcome parameters of the model: output quality (OQ) and B2B multi-process service quality (BSQ). All formative second-order latent constructs: potential quality (PQ), process hard quality (PHQ) and process soft quality were shown to be significantly related to the two outcome parameters, output quality (OQ) and B2B multi-process service quality (BSQ), which demonstrate nomological validity. Based on the literature and empirical validation, the first-order latent construct, second-order latent construct, and third-order latent constructs fitted within the context of the model and behave as expected and within the net of hypotheses. Table 4.28 summarises the path coefficients between the constructs and the outcomes parameters, the t-values and the respective significance levels (refer to Appendix VIII).

Table 4.28: Establishing Nomological Validity for Formative Second Order Latent Constructs

Variables	Path coefficient	T Statistics	P Values
CustPHQ_5 <- Process hard quality(PHQ)	0.657	11.633	0.000
CustPHQ_5 <- Output quality(OQ)	0.658	11.589	0.000
CustPHQ_6 <- Process hard quality(PHQ)	0.697	14.323	0.000
CustPHQ_6 <- Output quality(OQ)	0.691	13.795	0.000
CustPQ_1 <- Potential quality (PQ)	0.684	11.165	0.000
CustPQ_1 <- Output quality(OQ)	0.636	9.361	0.000
CustPSQ_1 <- Process soft quality(PSQ)	0.765	27.536	0.000
CustPSQ_2 <- Process soft quality(PSQ)	0.755	20.675	0.000
CustPSQ_3 <- Process soft quality(PSQ)	0.665	16.599	0.000
CustPSQ_4 <- Process soft quality(PSQ)	0.717	17.061	0.000
. . .			
TermICDPQ_5 <- Output quality(OQ)	0.623	10.407	0.000

Note: t-values were generated via bootstrapping in SmartPLS 3.2.8 (Ringle *et al.*, 2019); t-values > 1.96 were consdered to be significant at 0.05 level (*) for a two-tailed test (n=364)

The section provided an assessment of second-order formative latent constructs measurement models, reliability and validity for the second-order measurement model confirmed. The next section continued the analysis and focus on the third-order latent construct or structural model that represent the underlying INDSERV theory or concepts of the path model. Evaluation of the third-order construct model results enabled the researcher to answer the research questions and to determine the model capability to predict and measure the B2B multi-process service quality which was the target construct.

4.7.1.9 Summary of reliability and validity of the second-order latent construct

Summary of the reliability and validity of the second -order latent construct are shown in Table 4.29, where all constructs pass the relianbility and validity test.

Table 4.29: Summary of Reliability and Validity for Second-Order Latent Constructs

Second-order latent constructs	Cronbach's Alpha	rho_A	Composite Reliability	Average Variance Extracted (AVE)
Output quality(OQ)	0.954	0.957	0.958	0.564
Potential quality (PQ)	0.903	0.905	0.919	0.510
Process hard quality(PHQ)	0.929	0.935	0.938	0.594
Process soft quality(PSQ)	0.970	0.97	0.972	0.541

4.7.2 Assessment of Structural Model or Third-Order Latent Constructs

The first and second-order measurement models assessment indicators had satisfactory quality as shown in previous sections. After ensuring that that all the latent construct measures were reliable and valid, the next step was that to do the assessment of the third-order latent constructs, which was also called structural model in this study. This step involved measuring and examining the structural model‘s predictive capabilities and the relationships between the latent constructs.

Thus, in this section, the structural model that fitted all five latent constructs was developed from the conceptual framework of this study and assessed. The structural model comprised of the five constructs, that were made up of potential quality (Exogenous/independent variable), process hard quality (mediator/intervening variable), process soft quality (mediator/intervening variable), output quality (mediator/intervening variable) and B2B multi-process service quality (endogenous/dependent variable).

Prior to starting model analysis, the researcher checked the structural model for multicollinearity. This was conducted because, the estimation of structural model path coefficients was based on Ordinary Least Squares (OLS) regression of each endogenous latent construct on its corresponding predecessor latent constructs (Hair *et al*, 2017). Multicollinearity test, wasn't conducted, the path coefficients might be biased if the estimation of parameters was influenced by critical levels of multicollinearity among exogenous latent constructs.

Figure 4.8 presents proposed second-order latent construct model. In PLS-SEM, the structural model assessment includes path coefficients to evaluate the significance and relevance of structural model relationships, R^2 value to evaluate the model's predictive accuracy, Q^2 to evaluate the model's predictive relevance and f^2 to evaluate the substantial impact of the exogenous variable on an endogenous variable. The research model in Figure 4.8 shows that all latent constructs were pointing to B2B multi-process service quality latent construct (endogenous). Thus structural model should be assessed based on formative approach(Hair *et al.*, 2019).

4.7.1.1 Path Coefficients

In the structural model, a 'path analysis' approach is applied to analyze the parameters (Mateos-Aparicio, 2011), so the values that appeared on the paths between each of the Latent Variables in the structural model are called 'path coefficients'. A path coefficient is the direct effect of one exogenous Latent Variable on another endogenous Latent Variable, i.e. it is the amount of change (increase/decrease) in the endogenous Latent Variable when the exogenous Latent Variable increases by 1 standard deviation (assuming standardized data). For example, if a particular path coefficient was P, this means that an increase of 1 Standard Deviation in the exogenous Latent Variable would result in an increase of P in the Standard Deviation of the dependent variable (Har *et al*., 2019).

Since potential quality, process hard quality, process soft quality and output quality, in our model, are all aspects of or form the perceived B2B multi-process service quality (BSQ), then the third-order latent constructs were assessed in the same process as was employed for formative first and second-order latent variables (or a measurement model). In such cases, the typical issues of assessments that were looked at were related to (a)The Nomological'" validity" such that the formative index was supposed to behave within a set of hypotheses as expected (Henseler *et al.,* 2009).

(b)The weights of each indicator that resulted from the PLS algorithm which reflected the importance of each indicator to the latent variable (Henseler *et al.,* 2009). (c)The indicator validity by testing the significance of the correlation between a latent variable and its indicators which were tested by using the bootstrap procedure, as explained earlier. Significant weights mean that there was empirical support to keep all indicators (Henseler *et al.*, 2009, Hair *et al.*, 2017). (d) Multicollinearity between the latent variables, which means that there was a higher correlation between indicators than that between indicators and their corresponding latent variable (Hair *et al.*, 2017).

A common test used for such issues was the Variance Inflation Factor (VIF) which provided an index that measured how much the variance (the square of the estimate's standard deviation) of an estimated regression coefficient increased because of collinearity, or "how much of an indicator's variance was explained by the other indicators of the same construct" (Urbach and Ahlemann, 2010:20).

Some researchers suggest a threshold of 10 for VIF (Urbach and Ahlemann, 2010) while others were more conservative and suggested that the VIF should not exceed the threshold of 5 (Hair *et al.*, 2017), otherwise, the measurement model should be questioned or reconsidered. A VIF that was higher than 5 could cause indicators to be insignificant (Hair *et al.*, 201la). It was worth noting that insignificant indicators should not be discarded based on the statistical results as this may lead to a change of meaning (Urbach and Ahlernann, 2010): rather, they might be considered if they are theoretically and conceptually justified (Henseler *et al.*, 2009).

The structural model with indicators as in the model, all indicators associated with B2B enclosed in the rectangular pattern were hidden in measurement model of BSQ (Figure 4.12) so that the modeling of third-order endogenous latent construct would be more clearly and orderly.

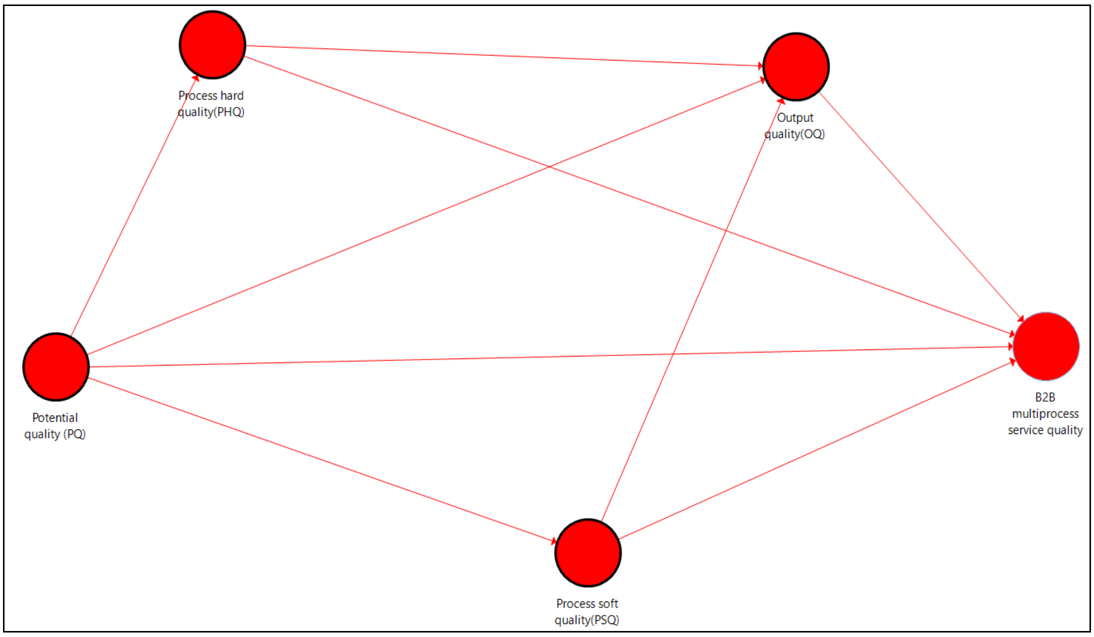

Figure 4.11: Research Model

PLS-SEM through Smart PLS version 3.2.8 indicated a powerful analysis when this application was conducted to hide or unhide the indicators in the latent constructs as evidenced in the B2B multi-process service quality in Figure 4.8. The third order latent construct was now constructed by setting outer model consisting of the blocks of items of second-order latent variables. This variable passed through similar tests for multicollinearity, reliability and convergent validity and discriminant validity. Finally, tested for psychometric properties in the model in third-order latent constructs, in order to assess the measures which were included in the structural relationships. To evaluate the reliability of the measure, research computed the composite scale reliability (CR) (Chin, 1998; Hair *et al.*,2017) and average variance extracted (AVE) (Fornell and Larcker, 1981) in Table 4.29. Table 4.30 show the significance of path coefficients with t-statistics and p-values. Only one path PHQ to OQ had insignificant coefficient with T-statistics of 1.837 and p-values of 0.067 cut point was 0.05.

Table 4.30: Significance Path Coefficients

Path	Original Sample (O)	Sample Mean	Standard Deviation	T - Statistics	P - Values	Comment
Output quality (OQ) -> B2B Multi-process service quality	0.300	0.292	0.044	6.762	0.000	Significant
Potential quality (PQ) -> B2B Multi-process service quality	0.150	0.140	0.026	5.686	0.000	Significant
Potential quality (PQ) -> Output quality (OQ)	0.133	0.127	0.048	2.775	0.006	Significant
Potential quality (PQ) -> Process hard quality (PHQ)	0.485	0.497	0.075	6.465	0.000	Significant
Potential quality (PQ) -> Process soft quality (PSQ)	0.689	0.701	0.055	12.537	0.000	Significant
Process hard quality (PHQ) -> B2B Multiprocess service quality	0.245	0.239	0.023	10.611	0.000	Significant
Process hard quality (PHQ) -> Output quality (OQ)	0.105	0.119	0.057	1.837	0.067	Insignificant
Process soft quality (PSQ) -> B2B Multiprocess service quality	0.416	0.428	0.036	11.423	0.000	Significant
Process soft quality (PSQ) -> Output quality (OQ)	0.684	0.684	0.062	11.112	0.000	Significant

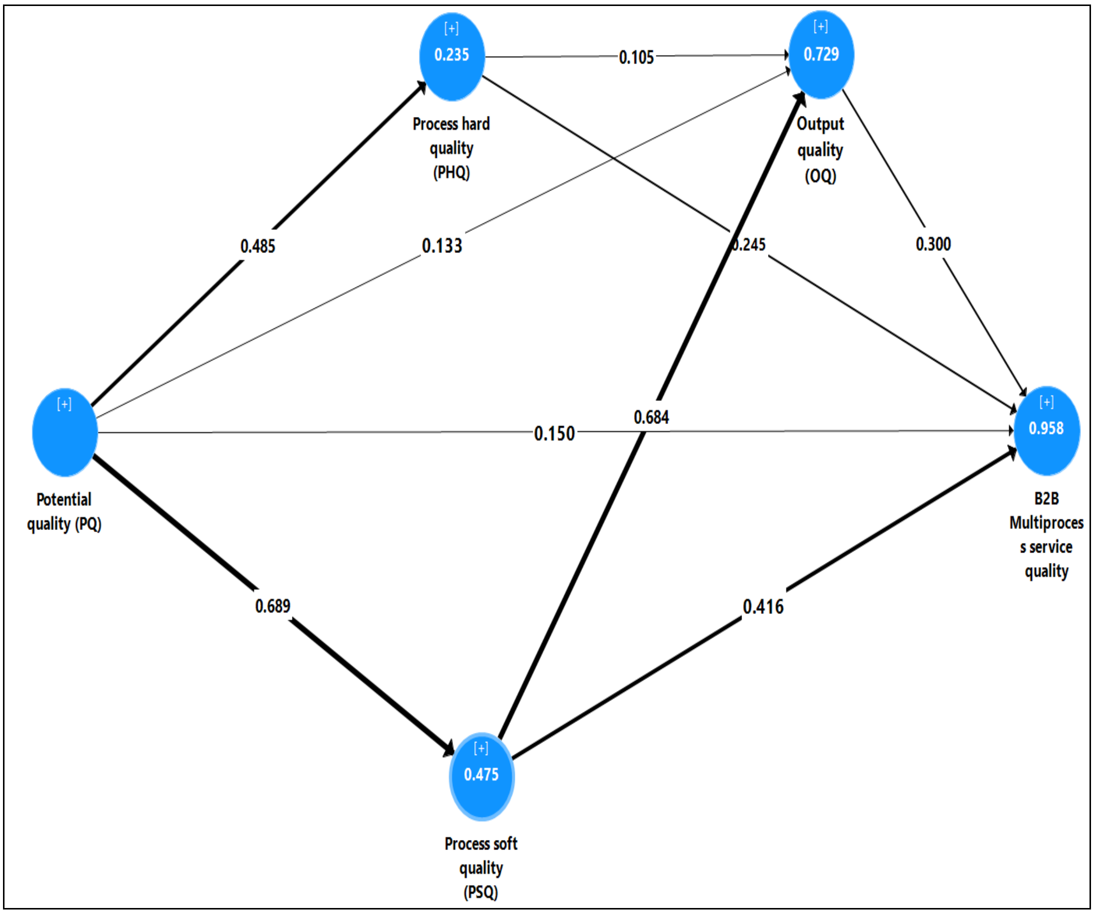

Figure 4.12: Structural Model (Third-order) Latent Constructs

4.7.2.1 Results of Multicollinearity Assessment

Data was tested for multicollinearity. Multicollinearity was not a problem as the highest variance inflation factor was 3.582, which was well below the suggested cutoff of 5.00 indicating the best third-order latent construct model. In this study, the researcher used Smart PLS version 3.2.8 (Ringle *et al.*, 2019) to obtain the multicollinearity statistics for B2B multi-process service quality in order to accomplish the criterion for the structural model(See Table 4.31).

Table 4.31: Multicollinearity Statistics Results

Latent variable	B2B Multiprocess service quality	Output quality (OQ)	Potentia l quality (PQ)	Process hard quality (PHQ)	Process soft quality (PSQ)
B2B Multi-process service quality					
Output quality (OQ)	3.237				
Potential quality (PQ)	1.819	1.737			
Process hard quality (PHQ)	1.728	1.687	1		
Process soft quality (PSQ)	3.582	2.245	1	1	

4.7.2.2 Results of Model Fit

Tenenhaus *et al.*; (2004) proposed the GoF as a means to validate a PLS path model globally by using SRMR and RMS_{theta} index. According to Henseler *et al.*, (2015), SRMR ≤ 0.08 indicates good model fit (See Table 4.32). Thus, after ensuring that the structural model fit the data, the researcher run the analysis using the PLS algorithm and bootstrapping procedure to provide statistics which helped further analysis. Statistics which were provided included the t-studentized and p-values. A t-ratio and p-values were most important for this study to determine research hypothesis on alpha error rate. Indeed, a value greater than 1.96 supposed to be significant and contrary non-significant.

Table 4.32: Model Fit Statistics

	Saturated Model	Estimated Model
SRMR	0.055	0.07
RMS_{Theta}	0.123	0.123

4.7.2.3 Results of Internal Consistency for Third-Order Latent Construct

The Internal consistency reliability is measured using Composite Reliability (for Dillon Goldstein's Rho) and Cronbach's alpha. The composite reliability assesses whether all of the indicators measured the same latent variable. The values ranged from 0 to 1, and the minimum acceptable threshold value should be 0 .7 to indicate internal consistency (Nunnally 1978). Results of internal consistency are shown in Table 4.33 which indicated that all composite reliability was greater than 0.70, thus internal consistency in the third-order latent construct was ensured.

Table 4.33: Third Order Composite Reliability

Latent variable	Composite Reliability
B2B Multi.process service quality	0.875
Output quality (OQ)	0.94
Potential quality (PQ)	0.93
Process hard quality (PHQ)	0.916
Process soft quality (PSQ)	0.945

4.7.2.4 Results of Convergent Validity for Third-Order Latent Construct

Validity refers to the extent of the accuracy of the assessment which the nominated assessment measurement items corresponds to a particular construct as predicted by theory. To assess the validity of the third-order inner model the convergent and discriminant validity were tested. Convergent validity is concerned with testing the degree of correlation between those items that are supposed to be 'theoretically' related with each other(Henseler *et al.* 2009).

Convergent validity for third-order is measured by the Average Variance Extracted (AVE), which reflects the proportion of the explained variance that is captured for a particular Latent Variable in relation to the amount of variance due to measurement error. AVE ranges between 0 and 1, and is considered acceptable at a minimum cut off of 0.5 (Henseler *et al.,* 2009). AVE above 0.5 means that, on average, a Latent variable is able to explain more than half of the variance of its indicators (Henseler *et al.,* 2009). If the AVE is less than 0.5, then the variance due to measurement error is greater than the variance due to the construct. The convergent validity of the construct, in this case, is questionable. AVE values in the Table 4.34 were all above threshold values of 0.50, thus convergent valid for latent construct for third-order ensured.

Table 4.34: Results of Convergent Validity Statistics Third Latent Constructs

	Average Variance Extracted (AVE)
B2B Multi-process service quality	0.584
Output quality (OQ)	0.547
Potential quality (PQ)	0.655
Process hard quality (PHQ)	0.576
Process soft quality (PSQ)	0.518

4.7.2.5 Test of Discriminant Validity For Third-Order Latent Construct

Discriminant validity, on the other hand, refers to the level of correlation between measurement items of one construct with measurement items of other unrelated constructs (s), which theoretically should not be correlated with one another. This test shows how much the variance was attributed to a block of constructs where two "conceptually different" constructs should be sufficiently different to one another (Henseler *et al*. 2009). Discriminant validity determines whether the factor loadings were well established. There are three ways for testing the discriminant validity, the HTMT and Fornell-Larcker-Criterion and cross-loadings where the former is performed on the construct level while the latter is performed on the indicator (measurement item) level (Henseler *et al.* 2009). This study uses HTMT to test Discriminant validity. Literature gives practically no recommendations on how to assess the discriminant validity of formative measured constructs (Henseler *et al.* 2015). However, considering the poor performance of cross-loadings and the Fornell-Larcker criterion in Henseler's study, the current study, used formative measurement models.

Fornell and Larcker criterion and the assessment of the cross-loadings are inadequately sensitive to detect discriminant validity when compared with Heterotrait-monotrait (HTMT) criterion. Thus, the use of HTMT criterion was adopted for this purpose so that the interpretation of the causal effect in the modeling analysis was not misleading. Despite its strictest procedure (HTMT compared to Fornell and Larcker criterion), the measurement model was free from any problems besides creating good quality measurement tool through the items in the developed questionnaire. In conclusion, HTMT criterion had high sensitivity and specificity in detecting discriminant validity problems and more empirical evidence was needed to use this approach (Hair *et al.,* 2017). In Table 4.35 none of the HTMT criteria indicated discriminant validity issues for inter-latent construct correlations of 0.869 or less. This outcome of our specificity analysis was important, as it showed that neither approach pointed to discriminant validity problems at comparably low levels of inter-latent construct correlations.

Table 4.35: HTMT Results of the Third-Order Latent Construct

Latent variable	B2B Multi-process service quality	Output quality (OQ)	Potential quality (PQ)	Process hard quality (PHQ)
B2B Multi-process service quality				
Output quality (OQ)	0.716			
Potential quality (PQ)	0.619	0.674		
Process hard quality (PHQ)	0.431	0.646	0.519	
Process soft quality (PSQ)	0.676	0.869	0.688	0.686

4.7.2.6 Results of the Path Significance Third-Order Latent Construct or Structural Model

The path significance of the structural model was estimated by using the Bootstrapping procedure, which was a re-sampling technique that provided information about the point estimates and confidence intervals for all parameter estimates which included an estimate of the shape, spread, and bias of the sampling distribution of a specific statistic (Henseler *et al.,* 2009). The bootstrap procedure produced t-values for each path in the model. During the bootstrap procedure, it created a large number of samples, treating each 'recreated' sample as if it represented the population. This was done by randomly drawing cases from the original sample (Henseler *et al.,* 2009). Therefore, ideally, the pre-specified number of samples for the bootstrap should be equivalent to the number of cases (observations) of the original sample (Henseler *et al*., 2009).

Generally, the larger the number of resampling, the better and more reliable the T-statistics were. Path coefficients between the Latent Variables were analyzed in terms of their significance (using t-values produced by bootstrap), algebraic sign (to know if the relationship between latent variables was positive or negative), and magnitude.

4.7.2.7 Results of the Coefficient of Determination (R^2 Value) for Third-Order latent constructs. R^2 (Coefficient of determination or an estimation of the explained variance) value was employed to assess the structural model. This coefficient measured the predictive accuracy of the model and was calculated as the squared correlation between actual and predictive values of a specified endogenous latent construct. The R^2 values represented the exogenous variables' combined effects on the endogenous latent variables and it also represented the amount of variance in the endogenous constructs explained by all of the exogenous constructs associated to it (Hair *et al.*, 2017).

However, the explained variance enclosed in B2B multi-process latent construct indicated 0.958 of the total variation. This signified that the total variation that had been explained from other latent constructs, for example, exogenous variables were approximately 100%.

The endogenous variables namely output quality, process hard quality, and process soft quality had R^2 value 0.73, (substantial), 0.235 (moderate) and 0.475 (substantial) respectively. This reflected the fact the structural model was developed in this study had predictive relevance. Further, the examination of the endogenous variables' predictive power had high R^2 values (refer Table 4.36). The explanatory power for

B2B multi-process service quality, (this is our focal latent construct) is substantial (0.959) and therefore provides good support for nomological validity of the proposed research model. It measures the explained variance of an endogenous latent variable relative to its total variance. Values of approximately0 .73, 0.235, and 0.475 are considered substantial, moderate, and substantial, respectively.

Table 4.36: Results of R^2 for Third-Order Latent Constructs

	R Square	R Square Adjusted	
B2B Multi-process service quality	0.959	0.958	substantial,
Output quality (OQ)	0.73	0.727	substantial,
Process hard quality (PHQ)	0.235	0.233	moderate
Process soft quality (PSQ)	0.475	0.474	substantial,

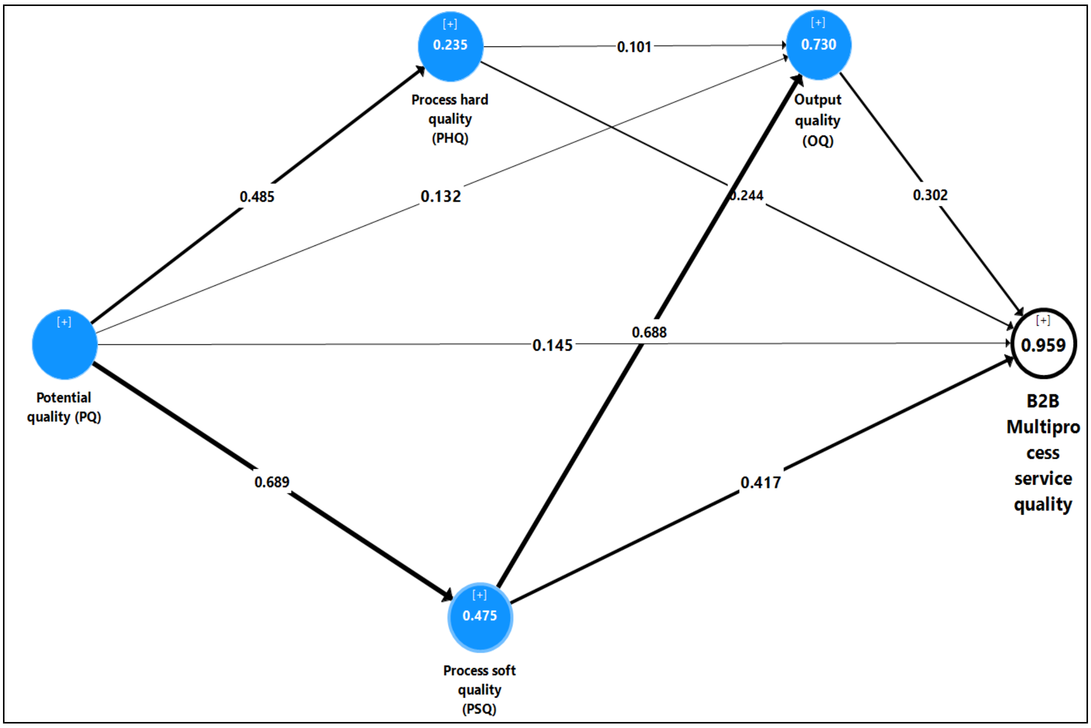

Figure 4.13: Results of R^2 for Third-Order Latent Constructs

4.7.2.7 Results of Effect Size f^2

Effect size f^2 was used to assess whether an omitted predictor latent construct had a substantive impact on the endogenous latent construct (Hair *et al.,* 2017). The effect sizes for assessing the predictive relevance of each exogenous latent construct are indicated in Table 4.37. The f –square effect size values is another description of the R^2 change effect. The f^2 describes how large a proportion of unexplained variance is accounted for by R-square change (Hair *et al.*, 2014).

Normally coefficient of determination value should be high. To obtain effect size, the R^2 value of the overall model including all exogenous latent construct is used (R^2 included), Then, R^2 is determined for the reduced model by not incorporating the exogenous latent construct whose effect is to be determined (R^2 excluded). Therefore, the following formula was applied to determine f^2 (Hair *et al.,* 2017). Hair *et al., (*2014) recommended that R^2 should be higher than 0.75.

$$f^2 = \frac{R^2_{(Included-}R^2_{(excluded)}}{1-R^2_{(included)}}$$

Where R^2_{included} and R^2_{excluded} are the R^2 values of endogenous latent variables when a selected exogenous variable is included or excluded from the model (Hair *et al*., 2017). f^2 effect size shows the impact of a specific predictor latent variable on a specific endogenous variable as shown in table 4.37. In this study, f^2 effect size varies from small to large for all the exogenous variables in explaining the potential quality, process hard quality, process soft quality and outcome quality.

f^2 effect sizes were used to assess whether an omitted exogenous or predictor latent construct had a substantive effect on the endogenous latent variable (Hair *et al.,* 2017). The effect sizes for evaluating the predictive importance of each exogenous latent construct are illustrated in Table 4.37. f^2 effect sizes ensure that B2B multi processes service quality is mainly explained (Directly) by potential quality. Measures whether an independent Latent Variable has a significant impact on a dependent Latent Variable. The predictor variable's values of 0.174, 0.338, 0.137 and 0.340 reflect a medium, medium small, mediam effect respectively, in the structural model or third-order latent variable model.

Table 4.37: Results of Effect Size f^2

Endogenous latent construct (DV)	**Exogenous variable (IV)**	**f^2**	**Effect size**
B2B multi-process service quality			
	Output quality (OQ)	0.174	Medium
	Potential quality (PQ)	0.338	Medium
	Process hard quality (PHQ)	0.137	Small
	Process soft quality (PSQ)	0.340	Medium

Small: 0.0 < f^2 effect size < 0.15; Medium: 0.15 < f^2 effect size < 0.35; Large: f^2effect size > 0.35.

4.7.2.8 Results of Predictive Relevance Q2 for Third-Order Latent Constructs

To assess predictive relevance of the overall model of inner model paths to the endogenous variable, also known as Stone-Geisser. Q^2 values are greater than 0; it indicates that the PLS-SEM model was predictive of the respective endogenous latent variable under scrutiny. By the same procedures, Q^2 values with a zero (0) value or negative indicated that the model was predictive irrelevant of the given endogenous latent variable (Garson, 2016). The Q^2 Measures the predictive relevance of a block of items (using the blindfolding technique). The proposed threshold value for a tested model was $Q^2 > 0$, where higher Q^2 reflected a higher predictive relevance. Predictive relevance values of .02, .15, and .35 were considered small, medium, or large, respectively. Any modifications to a model may be evaluated by comparing the Q^2 values. The Stone –Geisser procedures was employed using the blindfolding test in PLS-SEM (Hair *et al.*, 2017). But, the stone-Geisser test can be used to the endogenous latent construct with a reflective measurement model (Hair *et al.*, 2017). The targeting construct or endogenous latent construct for this study was B2B service quality, and this latent variable was represented by a reflective measured indicator, that met the requirement for the Stone-Geisser test Q^2.

Additionally, the predictive relevance of constructs was reflected by Q^2 values larger than zero (Hair *et al.*, 2017). Q^2 values were obtained by applying the blindfolding procedure for an omission distance D=7. Table 4.38 shows that Q^2 values for both, Output quality (OQ), Potential quality (PQ), Process hard quality (PHQ) and Process soft quality (PSQ) were larger than zero, suggesting that the models had predictive relevance for B2B multi-process service quality latent constructs.

Table 4.38: Predictive Relevance (Q^2)

Endogenous latent construct (DV)	**Exogenous variable (IV)**	**Q^2**	**Effect size**
B2B multi-process service quality			
	Output quality (OQ)	0.397	Large
	Potential quality (PQ)	0.432	Large
	Process hard quality (PHQ)	0.338	Medium
	Process soft quality (PSQ)	0.319	Medium

Small: 0.15 < f2 effect size < 0.15; Medium: 0.15 < f2 effect size < 0.35; Large: f^2 effect size > 0.35.

4.7.2.9 Results of Total Effect for Third-Order Latent Constructs

Table 4.39 shows the total effects, that is the direct plus indirect effects, for the focal construct B2B multi-process service quality. The total effect indicated the relative importance of a construct in explaining other constructs in the structural model (Hair *et al.,* 2014). Output quality (β=0.373), potential quality (β=0.861), process hard quality (β=0.184) and process soft quality (β=0.703) had significant total effects on B2B multi-process service quality.

Since the direct effect of potential quality on B2B multi-process service quality was 0.184 (shown in Table 4.39), it was concluded that the effect of potential quality on B2B multi-process service quality was mostly indirect (0.861-0.184 =0.677), being mediated by process soft quality, process hard quality and output quality. This finding suggested partial mediation for the potential quality – B2B multi-process service quality link.

Table 4.39: Significance Testing Results of the Total Effects

Path	**Total effects**	**Sample Mean**	**Standard Deviation**	**T - Statistics**	**P - Values**
Output quality (OQ) -> B2B multi-process service quality	0.373	0.374	0.018	20.809	0.000
Potential quality (PQ) -> B2B multi-process service quality	0.861	0.859	0.036	23.693	0.000
Process hard quality (PHQ) -> B2B multi-process service quality	0.184	0.187	0.027	6.712	0.000
Process soft quality (PSQ) -> B2B multi-process service quality	0.703	0.699	0.039	17.998	0.000

4.7.2.7 Results of Structural Model Path Coefficients and Hypothesis Testing

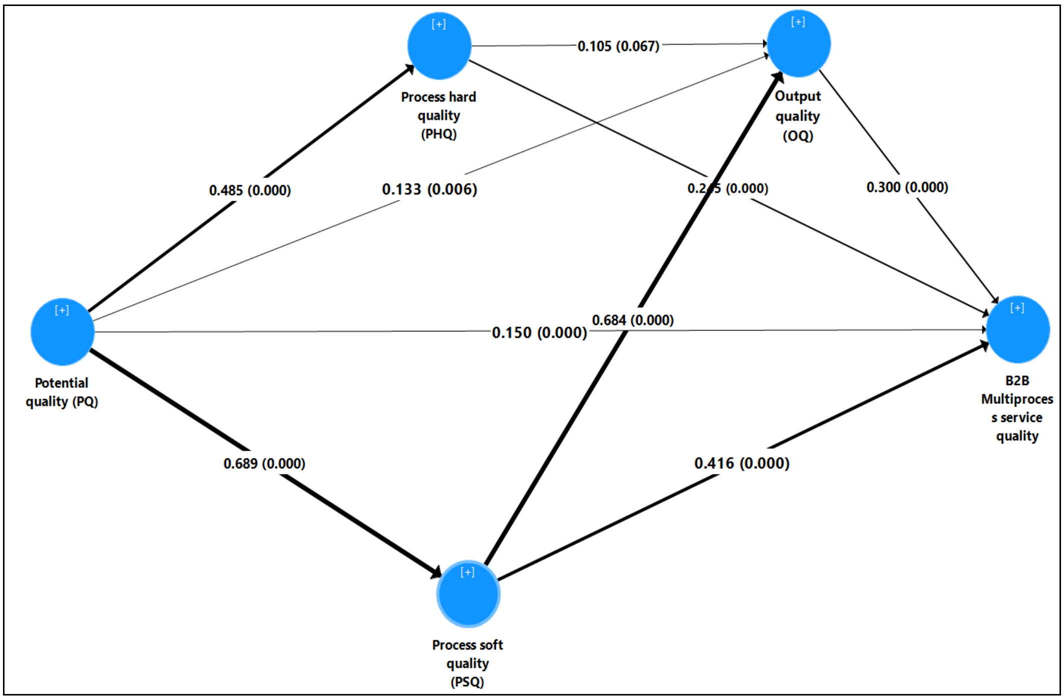

Figure 4.14: Structural Model Path Coefficient for Third-Order Latent Construct

Table 4.40: Path Coefficients for Third Order Latent Construct

Path	Original Sample (O)	Sample Mean (M)	Standard Deviation (STDEV)	T Statistics (|O/STDEV|)	P Values	Comment
Output quality (OQ) -> B2B Multi-process service quality	0.425	0.411	0.134	3.171	0.002	Significant
Potential quality (PQ) -> B2B Multi-process service quality	0.22	0.204	0.138	1.599	0.111	Nonsignificant
Potential quality (PQ) -> Output quality (OQ)	0.145	0.141	0.049	2.975	0.003	Significant
Potential quality (PQ) -> Process hard quality (PHQ)	0.479	0.488	0.075	6.405	0.000	Significant
Potential quality (PQ) -> Process soft quality (PSQ)	0.692	0.702	0.051	13.637	0.000	Significant
Process hard quality (PHQ) -> B2B Multi-process service quality	-0.083	-0.082	0.065	1.272	0.204	Nonsignificant
Process hard quality (PHQ) -> Output quality (OQ)	0.127	0.148	0.052	2.422	0.016	Significant
Process soft quality (PSQ) -> B2B Multi-process service quality	0.155	0.189	0.12	1.285	0.199	Nonsignificant
Process soft quality (PSQ) -> Output quality (OQ)	0.656	0.653	0.06	10.966	0	Significant

4.7.2.8 Results of Path Coefficients

Table 4.39, Figure 4.13 and 4.14 show the overall results of the third-order latent construct model. Structural path coefficients (loadings) were indicated in the path diagram after computation, where the path weights connecting the latent variables to each other. The loadings of the direct paths connecting latent variables were standardized regression coefficients.

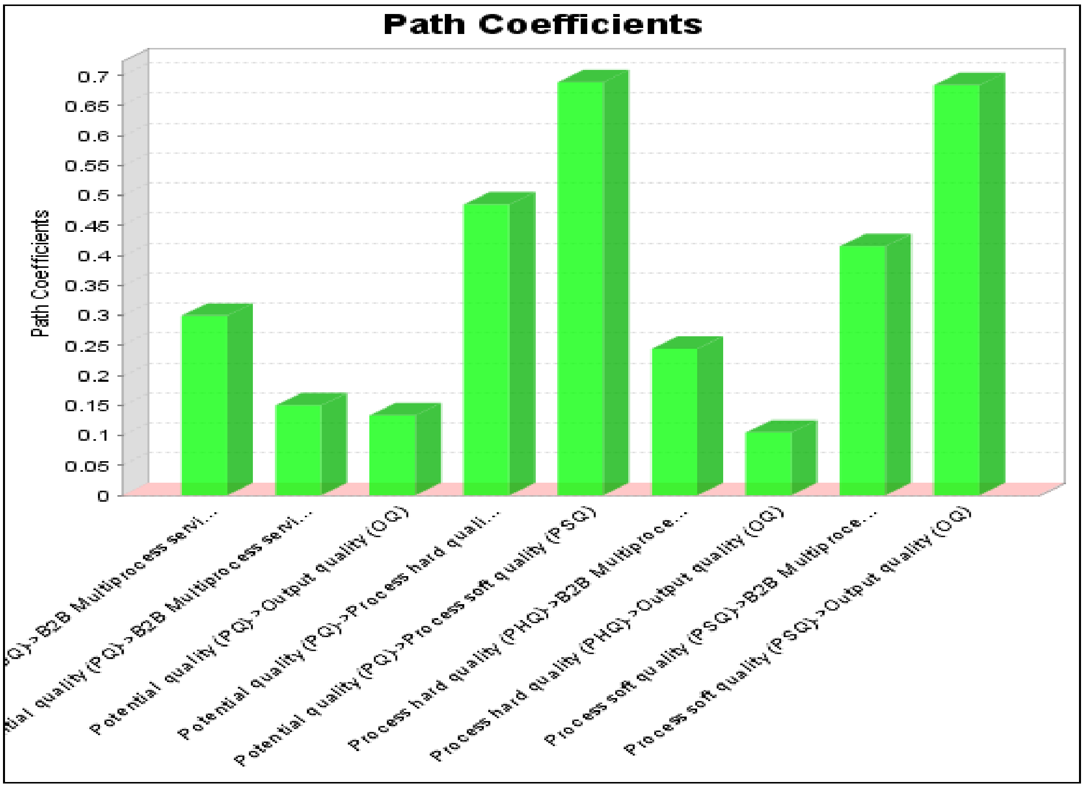

Figure 4.15: Histogram of Path Coefficients for Third-Order Latent Constructs

The path coefficients are always standardized path coefficients; thus, path coefficients vary from +1 to -1(Ken, 2013). Weights closest to absolute 1 reflect the most robust paths. While weight closest to 0 indicate the weak paths. In histogram in Figure 4.15, the path weights of 0.300 show that outcomes quality had positive effects on B2B multi-process service quality.

Table 4.41: Direct Significance Analysis of Path Coefficients for 3rd Order Latent Constructs without the Mediators

Path	Original Sample	Sample Mean	Standard Deviation	T Statistics	P Values	Comment
Potential quality (PQ) -> B2B Multi-process service quality-**H1**	0.150	0.140	0.026	5.686	0.000	Significant
Process hard quality (PHQ) -> B2B Multi-process service quality-**H2**	0.245	0.239	0.023	10.611	0.000	Significant
Process soft quality (PSQ) -> B2B Multi-process service quality-**H3**	0.416	0.428	0.036	11.423	0.000	Significant
Output quality (OQ) -> B2B Multi-process service quality-**H4**	0.300	0.292	0.044	6.762	0.000	Significant
Potential quality (PQ) -> Output quality (OQ) -> B2B Multiprocess service quality-**H5**	0.040	0.038	0.018	2.249	0.025	Significant
Potential quality (PQ) -> Process hard quality (PHQ) -> B2B Multi-process service quality-**H6**	0.119	0.119	0.022	5.412	0.000	Significant
Potential quality (PQ) -> Process soft quality (PSQ) -> B2B Multi-process service quality-**H7**	0.286	0.300	0.032	8.847	0.000	Significant
Potential quality (PQ) -> Output quality (OQ)-**H8**	0.133	0.127	0.048	2.775	0.006	Significant
Potential quality (PQ) -> Process hard quality (PHQ)-**H9**	0.485	0.497	0.075	6.465	0.000	Significant
Potential quality (PQ) -> Process soft quality (PSQ)-**H10**	0.689	0.701	0.055	12.537	0.000	Significant
Process hard quality (PHQ) -> Output quality (OQ)-**H11**	0.105	0.119	0.057	1.837	0.067	Insignificant
Process soft quality (PSQ) -> Output quality (OQ)-**H12**	0.684	0.684	0.062	11.112	0.000	Significant

Potential quality at 0.15 to B2B multi-process service quality, potential quality at 0.133 to outcomes quality, potential quality at 0.485 to process hard quality, potential quality at 0.689 to process soft quality had strongest impact and process hard quality at 0.245 to B2B multi-process service quality, process hard quality at 0.105 to output quality has the weakest positive effects, process soft quality at 0.416 to B2B multi-process service quality and process soft quality at 0.684 to output quality.

Table 4.41 presented the estimates of the structural model path coefficient results and respective T statistics, p-values and confidence intervals. Researcher found the path coefficient from Potential quality to process soft quality had the highest direct impact process hard quality ($\beta = 0.689$, $t = 12.537$, $p < 0.05$), followed by process soft quality to output quality $\beta = 0.373$, $t = 21.401$, $p < 0.05$) and Potential quality (PQ) to B2B multi-process service quality ($\beta = 0.684$; $t = 11.112$, $p < 0.05$). These estimates were related to the focus latent variable of the study. All hypothesized paths were statistically significant, with two exceptions: the path from potential quality to output quality and process hard quality to Output quality latent constructs.

4.8 Testing Research Hypothesis

This section aimed to describe the Structural Equation Modeling (SEM) techniques used to test the study hypotheses and to report the results of the hypotheses tests. The hypothesized relationships were examined against various coefficients and scores obtained from the analysis. In this study the hypotheses were tested based on the direction, the strength of th**e** standardized paths coefficient (βs), T -Statistics, and significance level (p-value).

But also, in the stage of hypothesis testing, the validity of hypothesized path was checked by assessing the statistical significance of each structural path value. **P-value test**. To conduct a test of the hypothesis that $\beta > 0$, at the 0.05 significance level (i.e., 1-95%), the two-tailed P-value associated with the path coefficient was calculated. If $P \leq 0.05$ the hypothesis is accepted, otherwise it was rejected. The **T-ratio test** can be seen as a variation of this test, where the T-ratio sometimes named as t-statistic or T-statistic or P-value was used against a threshold of 1.96.

Confidence interval test: To conduct the same test using a 95% confidence interval, calculation of the lower and upper limits of the confidence interval was done. These were given respectively by $\beta - 1.96\sigma$ and $\beta + 1.96\sigma$. If the value 0 (zero) did not fall within this interval (i.e., $0 \notin CI$) the hypothesis was accepted, otherwise (i.e., $0 \in CI$) was rejected. The analysis was based on both hypotheses with their respective hierarchal path analysis and the results were shown in the Table 4.41 and Table 4.42.

Table 4.42 Hypothesis Testing Result for H1 to H12 and Its Hierarchal Path Testing

Hypothesis and hierarchal path testing	**Beta**	**Mean (M)**	**STDEV**	**T values**	**P-Value**	**Results**
H1: There is a positive effect of potential quality on Measuring B2B multi-process	0.150	0.140	0.026	5.686	0.000	Sign
Hierarchal path analysis for hypothesis H1						
H1a:Cust PQ -> potential quality(PQ)	0.099	0.108	0.078	1.278	0.1010	NS
HIb: OGD PQ -> potential quality(PQ)	0.101	0.105	0.054	1.869	0.0310	Sign
H1c:FF PQ -> potential quality(PQ)	0.226	0.222	0.08	2.811	0.0030	Sign
H1d: SAPQ -> potential quality(PQ)	0.552	0.53	0.125	4.411	0.0000	Sign
H1e:ICDPPQ -> potential quality(PQ)	0.138	0.145	0.069	2.01	0.0230	Sign
H2: There is a positive effect of hard quality on measuring B2B multi—process cargo clearance	0.245	0.239	0.023	10.611	0.000	Sign
Hierarchal path analysis for hypothesis H2						
H2a: Cust PH Q -> Process hard quality(PHQ)	0.31	0.309	0.089	3.472	0.0000	Sign
H2b: OGD PHQ -> Process hard quality(PHQ)	-0.038	-0.028	0.119	0.32	0.3740	NS
H2c: FF HQ -> Process hard quality(PHQ)	0.382	0.371	0.135	2.837	0.0020	Sign
H2d: ICDHQ -> Process hard quality(PHQ)	0.171	0.154	0.096	1.792	0.0370	Sign
SaHQ -> H2e: Process hard quality(PHQ)	0.266	0.247	0.096	2.765	0.0030	Sign
H3: There is a positive effect of soft quality on measuring B2B multi-process cargo clearance	0.416	0.428	0.036	11.423	0.000	Sign
Hierarchal path analysis for hypothesis H3						
H3a:CustPSQ -> Process soft Quality(PSQ)	0.047	0.038	0.074	0.637	0.2620	NS
H3b:OGDPSQ -> Process soft Quality(PSQ)	0.17	0.18	0.099	1.725	0.0430	Sign
H3c:FFPSQ ->Process soft Quality(PSQ)	0.317	0.278	0.103	3.071	0.0010	Sign
H3d:FFPSQ -> Process soft Quality(PSQ)	0.317	0.278	0.103	3.071	0.0010	Sign
H3e:SAPSQ -> Process soft Quality(PSQ)	0.243	0.272	0.12	2.035	0.0210	Sign
H4: There is a positive effect of output quality on measuring B2B multi—process cargo clearance	0.300	0.292	0.044	6.762	0.000	Sign
Hierarchal path analysis for hypothesis H4						
H4a:Customs OQ ->output quality(OQ)	0.124	0.103	0.092	1.345	0.0900	NS
H4b:OGD OQ -> output quality (OQ)	0.115	0.105	0.131	0.876	0.1910	NS
H4c:FF OQ -> output quality(OQ)	0.433	0.428	0.124	3.496	0.0000	Sign
H4d:ICD OQ -> output quality(OQ)	0.191	0.198	0.117	1.642	0.0510	NS

Hypothesis and hierarchal path testing	**Beta**	**Mean (M)**	**STDEV**	**T values**	**P-Value**	**Results**
H4d:SAOQ -> output quality(OQ)	0.199	0.188	0.107	1.858	0.0320	Sign
H5: (PQ -> OQ -> B2B multi process cargo clearance)	0.040	0.038	0.018	2.249	0.025	Sign
Hierarchal path analysis for hypothesis H5						
H5a:Path c_PQ -> B2B multi process cargo clearance	0.658	0.68	0.064	10.294	0.000	sign
H5 b:Path a_PQ -> OQ	0.788	0.81	0.047	16.692	0.000	Sign
H5c:Path b_OQ -> B2B multi process cargo clearance	0.755	0.793	0.068	11.163	0.000	Sign
H5d:path c'_PQ -> B2B multi process cargo clearance	0.054	0.021	0.072	0.74	0.459	Insign
H6: (HQ)(PPQ -> PHQ -> B2B Service quality)	0.119	0.119	0.022	5.412	0.000	Sign
Hierarchal path analysis for hypothesis H6						
H6a: Path c_PQ -> B2B multi process cargo clearance	0.667	0.683	0.064	10.414	0.000	Sign.
H6b:Path a_PQ -> PHQ	0.894	0.898	0.02	44.374	0.0000	Sign
H6c: Path b_HQ -> B2B Service quality	0.362	0.379	0.114	3.186	0.0020	Sign
H6d:Path c'_PQ -> B2B Service quality	0.326	0.325	0.117	2.777	0.0060	Sign
H7:(SQ)(PQ -> SQ ->B2B multi-process cargo clearance	0.286	0.300	0.032	8.847	0.000	Sign.
Hierarchal path analysis for hypothesis H7						
H7a: Path c_PQ -> B2B multi process cargo clearance	0.667	0.683	0.064	10.414	0.000	Sign.
H7b:Path a_PQ -> PSQ	0.861	0.873	0.026	32.98	0.0000	Sign
H7c: Path b_SQ -> B2B multi process cargo clearance	0.63	0.658	0.117	5.387	0.0000	Sign
H7 d_Path c'_PQ -> B2B multi process cargo clearance	0.133	0.119	0.125	1.067	0.287	Insign
H8:PQ-> OQ -Potential quality to output quality	0.133	0.127	0.048	2.775	0.006	sign
H9:PQ-> PHQ- Potential quality to process hard quality	0.485	0.497	0.075	6.465	0.000	sign
H10:PQ-> PSQ -Potential quality to process soft quality	0.689	0.701	0.055	12.537	0.000	sign
H11:PHQ-> OQ –Process hard quality to output quality	0.105	0.119	0.057	1.837	0.067	insign
H12:PSQ-> OQ	0.684	0.684	0.062	11.112	0.000	sign

4.10.1 Relationship between Potential Quality and B2B Multi-Process Cargo Clearance

This study argued in chapter two that there was a positive relationship between potential quality and B2B multi-process cargo clearance. Thus, the first postulated relationship of this study hypothesized a positive and significant relationship between potential quality and B2B multi-process cargo clearance as stated hereunder:

H1: *There is a positive effect of potential quality on measuring B2B multi-process cargo clearance*.

The path leading from potential quality to B2B multi-process cargo clearance in Table 4.41 and Table 4.42. was used to examine the hypothesized relationship (H1) that there was a positive relationship between potential quality on measuring B2B multi-process cargo clearance. The test for this hypothesis showed that potential quality was positively related to B2B multi-process cargo clearance ($\beta = 0.150$; T Statistics = 5.686; $p = 0.000$), meaning that when potential quality goes up by 1 standard deviation, B2B multi-process cargo clearance goes up by 0.150 standard deviations. Thus, the study showed that a higher level of potential quality would result in a greater level of B2B multi-process cargo clearance. Thus, **the H1 of the study was supported**

4.10.2 Relationship between Process Hard Quality and B2B Multi-Process Cargo Clearance

This study had asserted in chapter two that there was a positive association between process hard quality and B2B multi-process cargo clearance. Thus, the second postulated hypothesis of this study was that:

H2: *There is a positive effect of process hard quality on measuring B2B multi-process cargo clearance.*

The path leading from process hard quality to B2B multi-process cargo clearance in Table 4.41 and Table 4.42. were used to examine the hypothesized relationship (H2) that there was a positive relationship between process hard quality on measuring B2B multi-process cargo clearance. The test for this hypothesis showed that process hard quality was positively related to B2B multi-process cargo clearance (β= 0.245; T Statistics = 10.611; p = 0.000), meaning that when process hard quality goes up by 1 standard deviation, B2B multi-process cargo clearance goes up by 0.181 standard deviation. Thus, the study showed that a higher level of process hard quality would result in a greater level of B2B multi-process cargo clearance. Thus, **the H2 of the study was supported.**

4.10.3 Relationship between Process Soft Quality and B2B Multi-Process Cargo Clearance

This study had asserted in chapter two that there is a positive relationship between a process soft quality and B2B multi-process cargo clearance. Thus, the third postulated hypothesis of this study was that:

H3: *There is a positive effect of process soft quality on measuring B2B multi-process cargo clearance.*

The path leading from process soft quality to B2B multi-process cargo clearance in Table 4.41 and Table 4.42 was used to examine the hypothesized relationship (H3) that there was a positive relationship between process soft quality on measuring B2B multi-process cargo clearance. The test for this hypothesis showed that process soft quality was positively related to B2B multi-process cargo clearance (β= 0.416; T Statistics = 11.423; p = 0.000), meaning that when process soft quality goes up by 1 standard deviation, B2B multi-process cargo clearance goes up by 0.416 standard deviation. Thus, the study showed that a higher level of process soft quality would result in a greater level of B2B multi-process cargo clearance. Thus, **the H3 of the study was supported.**

4.10.4 Relationship between Output Quality and B2B Multi-Process Cargo Clearance

This study had asserted in chapter two that there is a positive relationship between an output quality and B2B multi-process cargo clearance. Thus, the fourth postulated hypothesis of this study was that:

H4: *There is a positive effect of output quality on measuring B2B multi-process cargo clearance*.

The path leading from output quality to B2B multi-process cargo clearance in Table 4.41 and Table 4.42 was used to examine the hypothesized relationship (H4) that there was a positive relationship between output quality on measuring B2B multi-process cargo clearance. The test for this hypothesis showed that output quality was positively related to B2B multi-process cargo clearance (β= 0.300; T Statistics = 6.762; p = 0.000), meaning that when output quality goes up by 1 standard deviation, B2B multi-process cargo clearance goes up by 0.300 standard deviation. Thus, the study showed that a higher level of output quality would result in a greater level of B2B multi-process cargo clearance. Thus, **the H4 of the study was supported.**

Table 4.43: Specific Indirect Effect

Potential quality (PQ) -> Output quality (OQ) -> B2B Multiprocess service quality-**H5**	0.040	0.038	0.018	2.249	0.025
Potential quality (PQ) -> Process hard quality (PHQ) -> B2B Multiprocess service quality-**H6**	0.119	0.119	0.022	5.412	0.000
Potential quality (PQ) -> Process soft quality (PSQ) -> B2B Multiprocess service quality-**H7**	0.286	0.300	0.032	8.847	0.000

4.10.5 Relationship between Potential Quality and B2B Multi-Process Service Quality Mediated by Output Quality

This study had asserted in chapter two that there is a positive relationship between potential quality and B2B multi-process cargo clearance mediated by output quality. Thus, the fifth postulated hypothesis of this study was that:

H5: There is a positive relationship between potential quality and B2B multi-process service quality mediated by output quality

The path leading from output quality to B2B multi-process cargo clearance in Table 4.43 was used to examine the hypothesized relationship (H5) that there was a positive relationship between potential quality on measuring B2B multi-process cargo clearance mediated by output quality. The test for this hypothesis showed that potential quality was positively related to B2B multi-process cargo clearance but not mediated by output quality (β= 0.040; T Statistics = 2.249; p = 0.0.025), meaning that when potential quality goes up by 1 standard deviation, B2B multi-process cargo clearance will go up by 0.040 standard deviation. Thus, the study showed that a higher level of potential quality would result into significant effect on B2B multi-process cargo clearance. Thus, **the H5 of the study was supported**

4.10.6 Relationship between Potential Quality and B2B Multi-Process Service Quality Mediated by Process Hard Quality

This study had asserted in chapter two that there is a positive relationship between potential quality and B2B multi-process cargo clearance mediated by process hard quality. Thus, the sixth postulated hypothesis of this study was that:

H6: *There is a positive relationship between potential quality and B2B multi-process service quality mediated by process hard quality.*

The path leading from output quality to B2B multi-process cargo clearance in Table 4.43 was used to examine the hypothesized relationship (H6) that there is a positive relationship between potential quality on measuring B2B multi-process cargo clearance mediated by process hard quality. The test for this hypothesis showed that potential quality was positively related to B2B multi-process cargo clearance but not mediated by output quality (β= 0. 119; T Statistics = 5.412; p = 0.000), meaning that when potential quality goes up by 1 standard deviation, B2B multi-process cargo clearance will go up by 0.119 standard deviation. Thus, the study showed that a higher level of potential quality would result from higher effect level of B2B multi-process cargo clearance. Thus, **the H6 of the study supported.**

4.10.7 Relationship between Potential Quality and B2B Multi-Process Service Quality Mediated By Process Soft Quality

This study had asserted in chapter two that there is a positive relationship between potential quality and B2B multi-process cargo clearance mediated by process soft quality. Thus, the seventh postulated hypothesis of this study was that:

H7: There is a positive relationship between potential quality and B2B multi-process service quality mediated by process soft quality.

The path leading from output quality to B2B multi-process cargo clearance in Table 4.42 and Table 4.43 was used to examine the hypothesized relationship (H7) that there is a positive relationship between potential quality on measuring B2B multi-process cargo clearance mediated by process soft quality. The test for this hypothesis showed that potential quality was positively related to B2B multi-process cargo clearance but mediated by process soft quality (β= 0. 286; T Statistics = 8.847; p = 0.000), meaning that when potential quality goes up by 1 standard deviation, B2B multi-process cargo clearance will go up by 0.286 standard deviation. Thus, the study showed that a higher level of potential quality would result from higher effect level of B2B multi-process cargo clearance. Thus, **the H7 of the study was supported.**

4.10.8 Relationship between Potential Quality and Output Quality

This study had argued in chapter two that there is a positive relationship between the potential quality and output quality. Thus, the first postulated relationship of this study hypothesized a positive and significant relationship of potential quality and output quality as stated as follows:

H8: There is a positive relationship between potential quality and output quality in measuring B2B multi-process service quality

The path leading from potential quality to output quality in measuring B2B multi-process cargo clearance in Table 4.42 and Table 4.43 was used to examine the hypothesized relationship (H8) that there is a positive relationship between potential quality on output quality in measuring B2B multi-process cargo clearance. The test for this hypothesis showed that potential quality is positively related to output quality (β= 0.133; T Statistics = 2.775; p = 0.000), meaning that when potential quality goes up by 1 standard deviation, output goes up by 0.133 standard deviation. Thus, the study showed that a higher level of potential quality would result in a greater level of output quality. Thus, **the H8 of the study was supported.**

4.10.9 Relationship between Potential Quality and Process Hard Quality

This study had observed in chapter two that there is a positive relationship between the potential quality and process hard quality. Thus, the first postulated relationship of this study hypothesized a positive and significant relationship of potential quality and process hard quality in measuring B2B multi-process cargo clearance follows:

H9: There is a positive relationship between potential quality and process hard quality in measuring B2B multi-process service quality

The path leading from potential quality to process hard quality Table 4.42 and Table 4.44 was used to examine the hypothesized relationship (H9) that there is a positive relationship between potential quality and process hard quality. The test for this hypothesis showed that potential quality was positively related to process hard quality (β= 0.485; T Statistics = 6.465; p = 0.000), meaning that when potential quality goes up by 1 standard deviation, process hard quality goes up by 0.485 standard deviations. Thus, the study showed that a higher level of potential quality would result in a greater level of process hard quality. Thus, **the H9 of the study was supported.**

4.10.10 Relationship between Potential Quality and Process Soft Quality

This study had argued in chapter two that there is a positive relationship between the potential quality and process soft quality. Thus, the first postulated relationship of this study hypothesized a positive and significant relationship of potential quality and process soft quality in measuring B2B multi-process cargo clearance as follows:

H10: There is a positive relationship between potential quality and process soft quality in measuring B2B multi-process service quality

The path leading from potential quality to process hard quality Table 4.42 and Table 4.44 was used to examine the hypothesized relationship (H10) that there is a positive relationship between potential quality and process soft quality. The test for this hypothesis showed that potential quality was positively related to process soft quality (β= 0.689; T Statistics = 12.537; p = 0.000), meaning that when potential quality goes up by 1 standard deviation, process soft quality goes up by 0.689 standard deviation. Thus, the study showed that a higher level of potential quality would result in a greater level of process soft quality. Thus, **the H10 of the study was supported.**

4.10.11 Relationship between Process Hard Quality and Output Quality

This study had argued in chapter two that there is a positive relationship between the process hard quality and output quality. Thus, the first postulated relationship of this study hypothesized a positive and significant relationship of process hard quality and output quality as follows:

H11: There is a positive relationship between process hard quality and output quality in measuring B2B multi-process service quality

The path leading from process hard quality and output quality in Table 4.42 and Table 4.44 was used to examine the hypothesized relationship (H11) that there is a positive relationship between process hard quality on output quality in measuring B2B multi-process cargo clearance. The test for this hypothesis showed that process potential quality was positively related to output quality (β= 0.105; T Statistics = 1.837; p = 0.067), meaning that when process hard quality goes up by 1 standard deviation, output quality goes up by 0.105 standard deviation. Thus, the study showed that a no significant relationship between process hard quality that would result in a greater level of output quality. Thus, **the H11 of the study was not supported.**

4.10.12 Relationship between Process Soft Quality and Output Quality

This study had argued in chapter two that there is a positive relationship between the process soft quality and output quality. Thus, the first postulated relationship of this study hypothesized a positive and significant relationship of process soft quality and output quality as follows:

H12: There is a positive relationship between process soft quality and output quality in measuring B2B multi-process service quality

The path leading from process soft quality and output quality in Table 4.42 and Table 4.44 were used to examine the hypothesized relationship (H12) that there is a positive relationship between process soft quality on output quality in measuring B2B multi-process cargo clearance. The test for this hypothesis showed that process soft quality was positively related to output quality (β= 0.684; T Statistics = 11.112; p = 0.000), meaning that when process soft quality goes up by 1 standard deviation, output quality goes up by 0.684 standard deviation. Thus, the study showed that a higher level of process soft quality would result in a greater level of output quality. Thus, **the H12 of the study was supported.**

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Table 4.44: Hypothesis Testing Results

Hypothesis	Path	β(estimate)	Std. error	T statistics	P-value	Remarks
H1	PQ-> BSQ	0.150	0.026	5.686	0.000	Supported
H2	PHQ -> BSQ	0.245	0.023	10.611	0.000	Supported
H3	PSQ -> BSQ	0.416	0.036	11.423	0.000	Supported
H4	OQ -> BSQ	0.300	0.044	6.762	0.000	Supported
H5	PQ-> OQ -> BSQ	0.040	0.018	2.249	0.025	supported
H6	PQ-> PHQ -> BSQ	0.119	0.022	5.412	0.000	Supported
H7	PQ-> PSQ -> BSQ	0.286	0.032	8.847	0.000	Supported
H8	PQ-> OQ	0.133	0.048	2.775	0.006	supported
H9	PQ-> PHQ	0.485	0.075	6.465	0.000	supported
H10	PQ-> PSQ	0.689	0.055	12.537	0.000	supported
H11	PHQ-> OQ	0.105	0.057	1.837	0.067	Not supported
H12	PSQ-> OQ	0.684	0.062	11.112	0.000	supported

4.10 Mediation analysis

The mediating variables were conceptualized to transmit the effect of the exogenous variable on the endogenous variable (Valente *et al.*, 2016).

The single mediator model was depicted by three linear regression equations:

$$Y=i_1+ cX + e_1 \qquad (1)$$

$$M= i_2+ aX + e_1 \qquad (2)$$

$$Y= i_3+cX +bM + e_1 \ldots\ldots (3)$$

The parameters in equation (2) and (3) were estimated simultaneously.

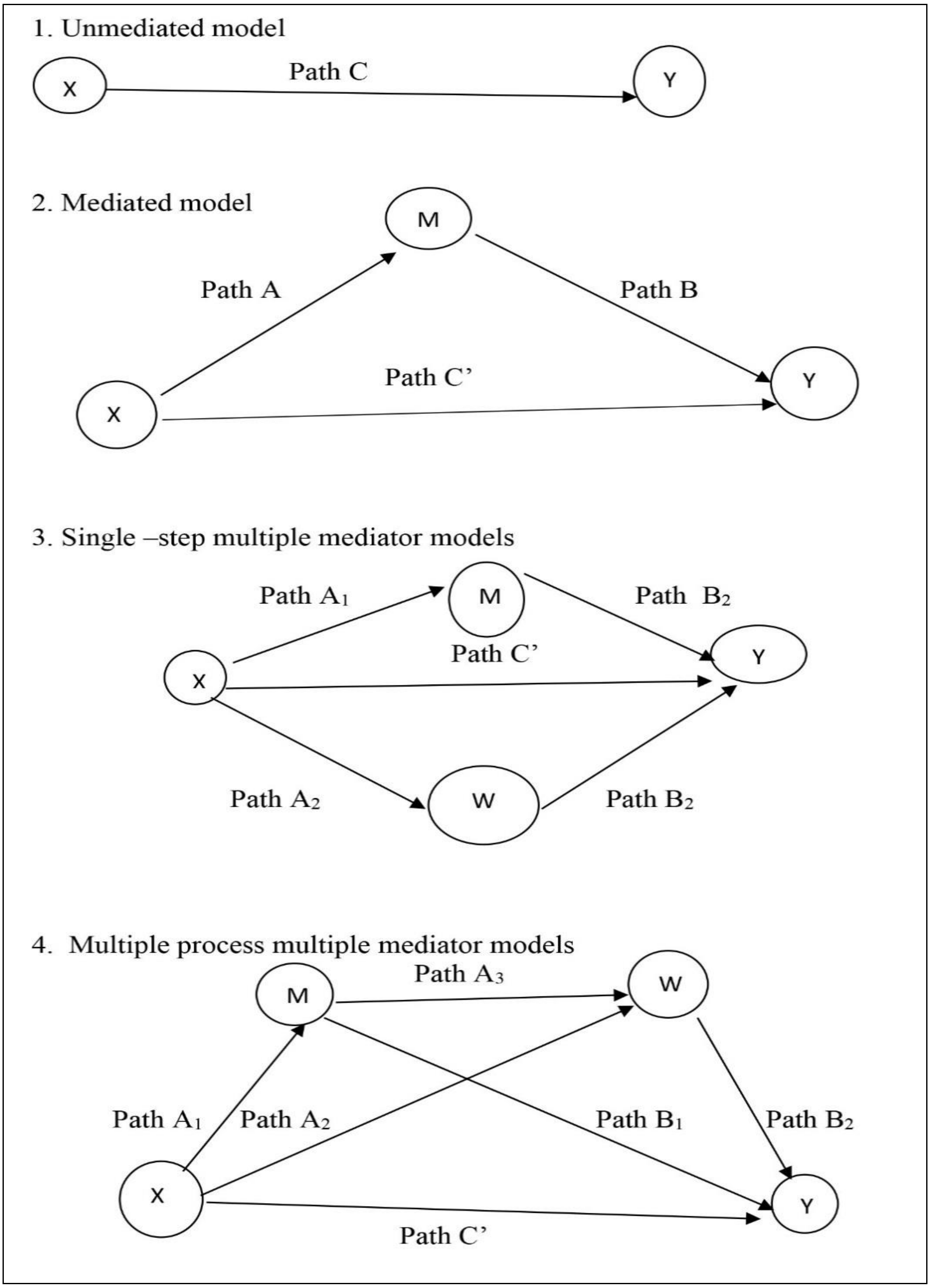

Figure 4.16: Schematic of a Mediation Model

The total effect of X on Y(1), a simple mediation model(2), a single-step multiple mediator models (3), and a multiple process multiple mediator models (4).

In Figure 4.16 the mediating variable(M) called intervening or process variable, Path C is in model 1 and path C' in model 2 were called direct effect are known as the direct effect. The direct effect is the coefficient of C and measures the magnitude to which Y changes when X increases by one unit. Thus, the top portion C of figure 4.9 shows the total effects of the exogenous variable to endogenous variable, whereas the bottom portion shows the introduction of the mediator (Hair *et al*., 2017). In figure 4.6, C represents the total effects of exogenous to an endogenous variable (i.e., an unstandardized slope of the regression of endogenous on the exogenous variable), whereas C' represents the direct effects of exogenous to the endogenous variable after controlling for the proposed mediator.

A represents the effect of the exogenous variable on the mediator A, and the effect of the mediator on the endogenous variable, controlling for the exogenous variable, is described by B. Therefore, the indirect effect on the product. While the indirect effect is the multiplication of path A coefficient and path B coefficient, this determined the magnitude to which Y changes when X holds fixed and M changes by the amount it would have changed had X increased by one unit (Namazi and Namazi, 2016). In assessing the effect of the path, A, B, C, and C', PLS-SEM or Multiple regression techniques (OLS) was employed; thus PLS-SEM was used instead of Multiple regression. The procedures proposed by Baron and Kenny(2016) were followed:

Step 1: determine if X correlated with Y. Thus Y was regressed on X-path C. Therefore, mediator tests were assessed only if the relation between X and Y was significant. Baron and Kenny (1986) argue that a critical starting point for mediation analysis was a substantial relationship between exogenous and endogenous variables. From this point of view, a significant C coefficient could be seen as a necessary condition for testing mediation (Hair, *et al.*, 2011). This total effect, interpreted as the expected magnitude by which two cases that differ by one unit on x were expected to differ on Y, may appear via several forces both direct and indirect (Ringe, *et al*., 2018).

Step 2: determine if X is correlated with M. Thus regress M on X –Path A;

In the model 2, Path A was the coefficient for X in a model predicting M from X, and path B and C' are the coefficient in a model predicting Y from both M and X respectively. Thus C' quantified the direct effects of X, whereas the product of A and B quantified the indirect effect of X on Y via M. If all three parameters are observed, then C=C' +AB.

Step 3: determine if M affects Y, when controlling for X, thus regress Y on both X and M-path B.

The significance of exogenous to endogenous variable was employed after the total effect had been established to be significant and a proposed mediator was introduced and statistically controlled, in which exogenous to endogenous was termed as the direct effect and represented by C'. After establishing a significant indirect effect, if there was no significant direct effect of exogenous to endogenous, it was concluded that the mediator fully mediated the exogenous to endogenous variable effect.

In figure 3, the total effect was equal to the direct effect of X on Y plus a sum of indirect effect through M and the Indirect effect through W, Thus, C= C' = A_1B_1 +

A_2B_2. In Figure 4.16, the total effect of X on Y was in a similar manner divided into indirect and direct effects. Thus, $C=C' + A_1B_2 + A_2B_2 + A_1A_3B_2$ (Hayes, 2009). Thus, $A_1A_3B_2$ is known as a specific indirect effect.

Finally, exogenous variable and an endogenous variable measured by the inclusion of third explanatory mediator variables (Hair *et al.,* 2017). In PLS-SEM, the bootstrapping approach is suitable for mediation analysis because bootstrapping makes no assumption about the sampling distribution of the statistics and can be applied to small sample sizes (Hair *et al.,* 2013). To carry out the mediation analysis in PLS-SEM, the first step was to assess the direct effect of the exogenous variable on the endogenous variable, which should be significant if the mediator was not included (Zait and Berted., 2011).

The research model was a partially mediated model in that it did predict direct effects of potential quality on B2B multi-process service quality. However, prior research found such direct effects (Lee, 2011:3183). Therefore, the effects of the independent variables on B2B multi-process service quality was tested and found to be partially mediated by the research model.

Baron and Kenny (1986) provided a causal procedure for determining mediation. First, the exogenous variable must significantly influence the outcome (path c). Second, the exogenous variable must significantly influence the mediator (path a). Third, the mediator should significantly affect the outcome variable (path b) controlling the effect of the independent variable on the outcome (path c’). In this latter step, if c” is nonsignificant full mediation exists, and if c’ is significant partial mediation exists.

Whereas the Baron and Kenny (1986) method had traditionally been employed to check for mediation effects, another more statistically advanced approach has been suggested for testing mediation in more complex models with multiple mediators (Hair, *et al.,* 2017). This approach tests the total indirect effects of the independent variable on the outcome via all the mediators (the total of all ab path combinations), controlling for the direct effect of the independent variable on the outcome (path c'). Mediation exists if the total indirect effects are significant.

Further, as in the Baron and Kenny (1986) approach, if path c' is significant partial mediation exists, and if it is not significant full mediation exists. Because the model had multiple mediators the researcher used this more advanced approach. Specifically, the model was tested with all the hypothesized mediated paths and the direct paths from potential quality to B2B multi-process service quality. The researcher found that in this model the total indirect effects from potential quality to B2B multi-process service quality was significant, meaning mediation existed (Table 4.43). Further, c' (the direct path in this model) was significant for the paths to B2B multi-process service quality, indicating these variables were partially mediated.

4.10.1 Mediation Hypothesis Testing

The research model was partially mediated model in that it did not predict any direct effects of potential quality to B2B multi-process service quality. Therefore, the researcher tested whether the effects of these independent variables were fully or partially mediated by the study model. Table 4.45 show indirect effect for various model path.

Table 4.45: Specific Indirect Effect

Path	Original Sample	Sample Mean	Standard Deviation	T Statistics	P Values
Potential quality (PQ) -> Output quality (OQ) -> B2B Multiprocess service quality	0.040	0.038	0.018	2.249	0.025
Process hard quality (PHQ) -> Output quality (OQ) -> B2B Multiprocess service quality	0.031	0.035	0.018	1.721	0.086
Potential quality (PQ) -> Process hard quality (PHQ) -> Output quality (OQ) -> B2B Multiprocess service quality	0.015	0.017	0.010	1.553	0.121
Process soft quality (PSQ) -> Output quality (OQ) -> B2B Multiprocess service quality	0.205	0.199	0.032	6.339	0.000
Potential quality (PQ) -> Process soft quality (PSQ) -> Output quality (OQ) -> B2B Multiprocess service quality	0.141	0.140	0.026	5.505	0.000
Potential quality (PQ) -> Process hard quality (PHQ) -> B2B Multiprocess service quality	0.119	0.119	0.022	5.412	0.000
Potential quality (PQ) -> Process soft quality (PSQ) -> B2B Multiprocess service quality	0.286	0.300	0.032	8.847	0.000
Potential quality (PQ) -> Process hard quality (PHQ) -> Output quality (OQ)	0.051	0.060	0.031	1.642	0.101
Potential quality (PQ) -> Process soft quality (PSQ) -> Output quality (OQ)	0.4720	0.4800	0.0570	8.2190	0.0000

4.11 Results of an Importance -Performance Matrix Analysis (IPMA)

IMPA is a simple and useful analysis for identifying those attributes of a service or product that are most in need of improvement or that are candidates for the possible cost-saving condition without significant jeopardizing to overall service quality (Abalo, *et al.,* 2007). The IPMA technique identifies satisfaction as the utility of two elements: the importance of a product or service to a customer and the performance of an organization in providing that service (Martilla and James 1977). Accordingly, Silva and Fernandes (2010) argued that IPMA evaluates not only the performance of an item but also the importance of that item as a defining factor in satisfaction to the customer. Abalo *et al*. (2007) suggested that IPMA aims to facilitate identification of service attributes for which, given their importance, the service underperforms or over-performs. This implies that the IPMA graphical tool is a useful approach for unearthing an essential service attributes in terms of their need for managerial decisions and for developing effective and multi-process cargo clearance service quality programs to achieve an advantage over rivals and serve customers profitably, as well.

4.11.1 Constructs IPMA Results

The researcher performed an Importance-Performance Matrix Analysis (IPMA) to contrast the structural model total effects and the average values of the latent variable scores. In this way, the management activities that generate the largest impact on B2B multi-processes service quality were identified (Hair *et al.,* 2017). When a construct's importance is high, but performance is low, there is the need for improvement. Table 4.46 presents the results of the total effects (importance) and the average values of the latent variable scores (performance) used for our Importance-Performance Matrix Analysis. The IPMA graphical representation is shown in Figure 4.17. The analysis shows that potential quality is of primary importance for establishing B2B multi-process service quality. Other constructs are of considerably lower importance such as Process hard quality (PHQ) and output quality or considerably higher performance.

It is evident from the IMPA analysis in Table 4.46 that the three highest performances belong to output quality (OQ), process hard quality (PHQ), and B2B multi-process service quality (BSQ). Meanwhile, the variables with the highest importance are different, as the top three highest importance service quality dimensions are Potential quality (PQ), Process soft quality (PSQ), and Output quality (OQ). However, the B2B cargo clearance service quality is displaying superb performance on output quality. Therefore, by further investigating into the path analysis using the IMPA, practical insights into the dimensions of service quality that require improvement have been discovered. It is revealed that the service dimension with relatively high importance is receiving a relatively low performance by the B2B cargo clearance service quality.

Table 4.46: Data for the IPMA of the Latent Variable B2B Multi-Process Service Quality

	Importance	**Performance**
B2B multi-process service quality		76.582
Output quality (OQ)	0.37	78.302
Potential quality (PQ)	0.86	73.346
Process hard quality (PHQ)	0.18	77.261
Process soft quality (PSQ)	0.70	75.133

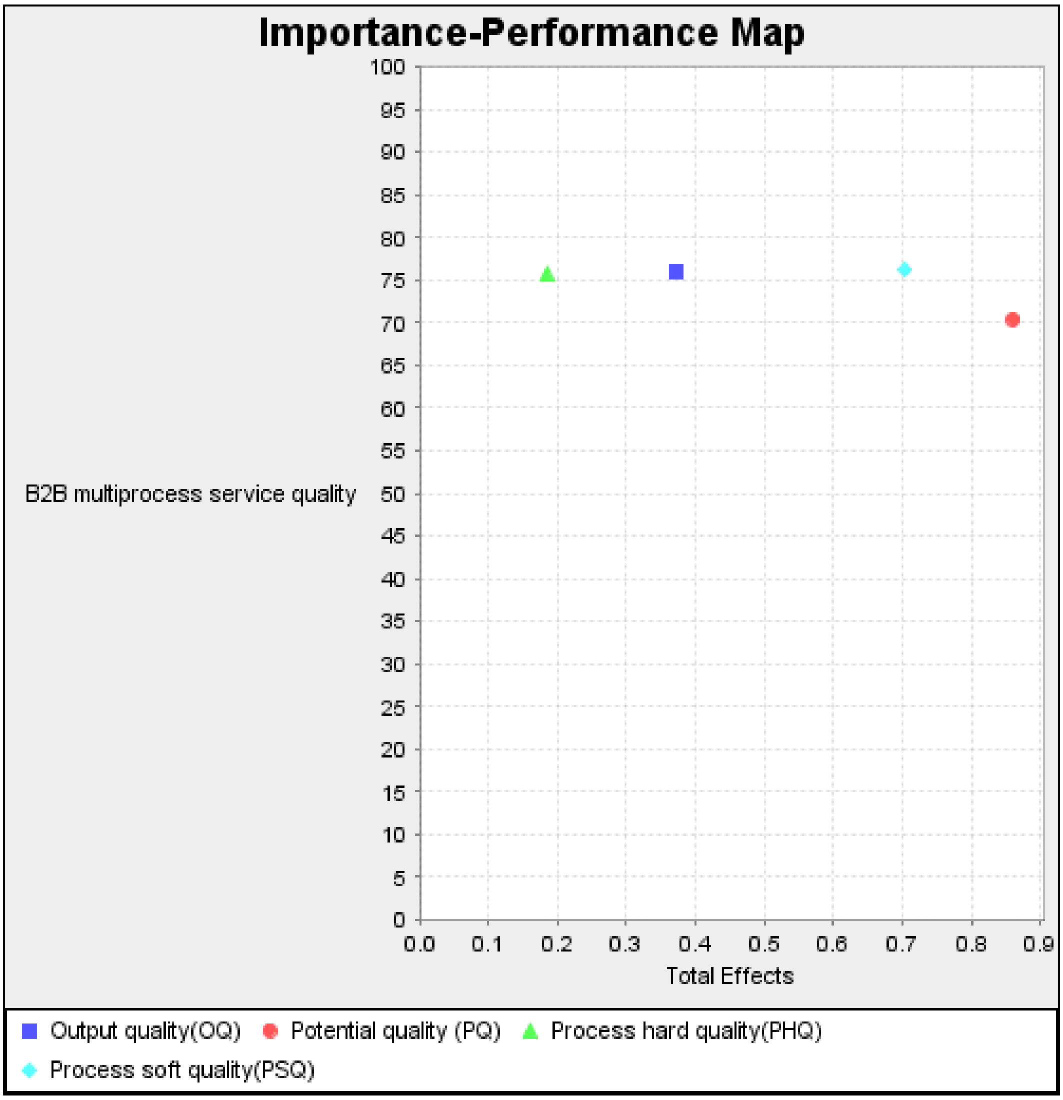

Figure 4.17: Importance -Performance Matrix Analysis (IPMA) of the B2B Multi-Process Cargo Clearance Service Quality

The IPMA analysis indicated that managerial activities to improve the B2B multi-process service quality should focus on potential quality. Graphical presentation of IPMA results does not display the R^2 values of the endogenous latent variables, and the results signify the performance values of each latent variable as a percentage (see Figure 4.17); additionally, the IPMA results indicate the unstandardized and rescaled outer loadings of the measurement models.

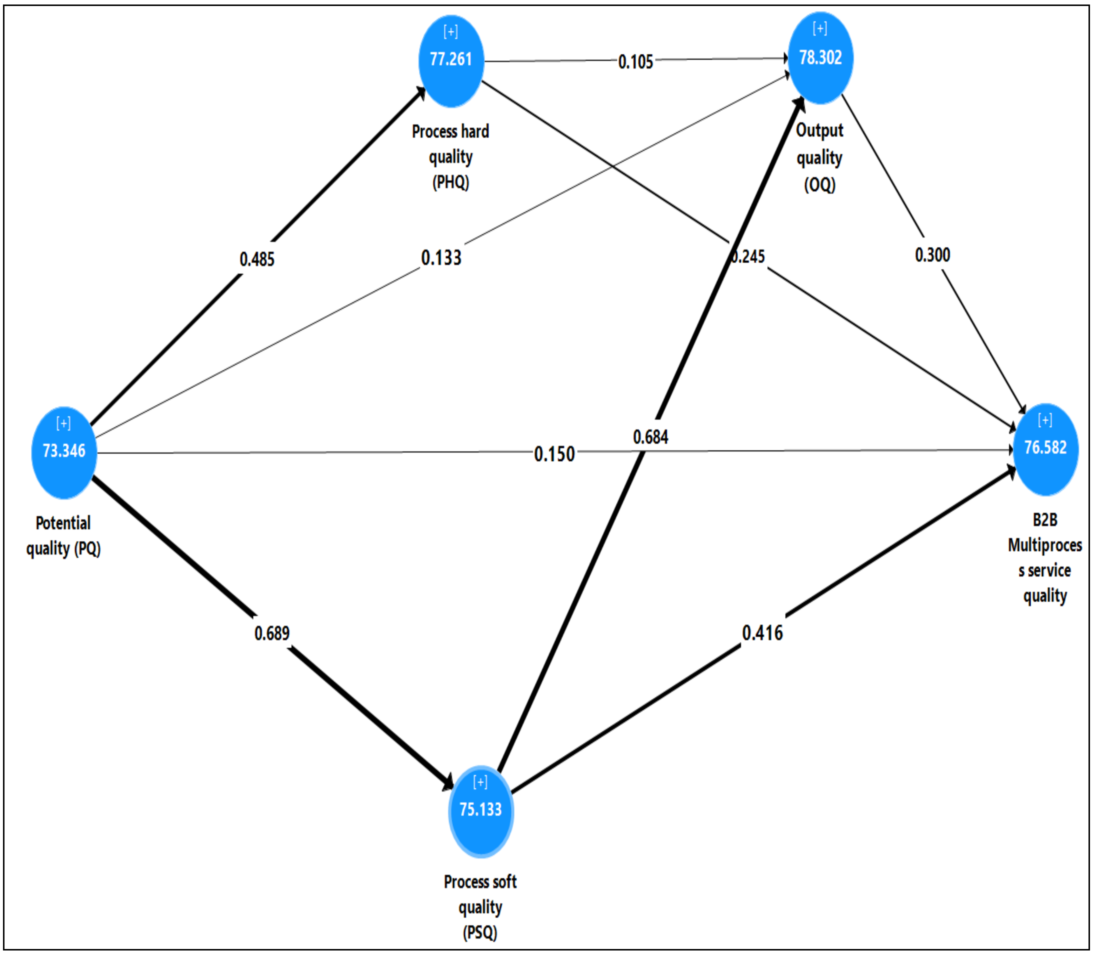

Figure 4.18: Latent Constructs Performance Latent Construct Values

4.11.2 Indicator level IPMA Analysis Results

The research analysis is not limited to latent variables only, it employs an IPMA on the measured variable level to find the relevant and even specific area of improvement. The analysis yields important values of measured indicators of 60.852, 64.606, and 81.136, 81, 731 and 82.051. CustPOQ_4, CustPOQ_5.

CustPOQ_6. TermICDPOQ_5, TermICDPOQ_6 and TermICDPOQ_Global yield importance of values from smallest to highest respectively which is shown in an importance-performance map as shown in Table 4.47 (refer appendix IX).

Table 4.47: Total Effect of Indicators' Performance Map

Indicator	MV Performances	Indicator	MV Performances
CustPOQ_3	76.145	FFPSQ_3	75.366
CustPOQ_4	78.434	FFPSQ_4	78.068
CustPOQ_5	78.297	FFPHQ_1	68.544
CustPOQ_6	80.632	FFPHQ_4	76.328
CustPOQ_Global	78.297	OGDPHQ_6	77.335
CustPPQ_1	64.606	OGDPHQ_Global	76.832
CustPPQ_Global	75.458	OGDPOQ_1	65.614
CustPSQ_1	65.018	OGDPOQ_2	77.427
CustPSQ_2	75.549	OGDPOQ_3	75.183
-			
-			
-			
-			
-			
SAPSQ_1	66.941	ICDPOQ_6	81.136
SAPSQ_2	75.275	ICDPOQ_Global	79.991
SAPSQ_5	66.804	ICD_1	66.712
SAPSQ_7	74.679	ICD_5	76.786
SAPSQ_Global	73.26	ICD_Global	75.549

Graphic representation of measurement Indicators IPA results are as shown in figure 4.19. The figure presents all hierarchal indicators MV performance and areas for improvement in cargo clearances. From Table 4.38 with details in appendix 8, Overall Shipping Agency Process Potential Quality(SAG) has the most significant importance of B2B cargo clearance service quality, followed by Shipping agencyPPQ_2, ICDPSQ_2, shipping agencyPPQ_7 compared to the less important like other measured variables, for example, OGDPSQ_4, OGDPSQ_5, customs PSQ_3, customs PSQ_7, OGDPSQ_7, and SAPSQ_1.Policy strategy should, therefore, prioritize overall Shipping Agency Process Potential Quality, Shipping agencyPPQ_2, TerminalICDPSQ_2, shipping agencyPPQ_7 which can be achieved by focusing on the measured variable like Freight forwadersPSQ_1, Customs PSQ_3, Shipping agency POQ_5, Shipping agency PHQ_1, OGD PSQ_1 and OGD POQ_2. Addressing these measured variables are particularly useful as these indicator weights show that they are the most important for enhancing respondents who have perceived the quality of these variables.

The results of IPMA indicators provide basic foundations for better evaluation and discussion for how to enhance B2B cargo clearance service quality.

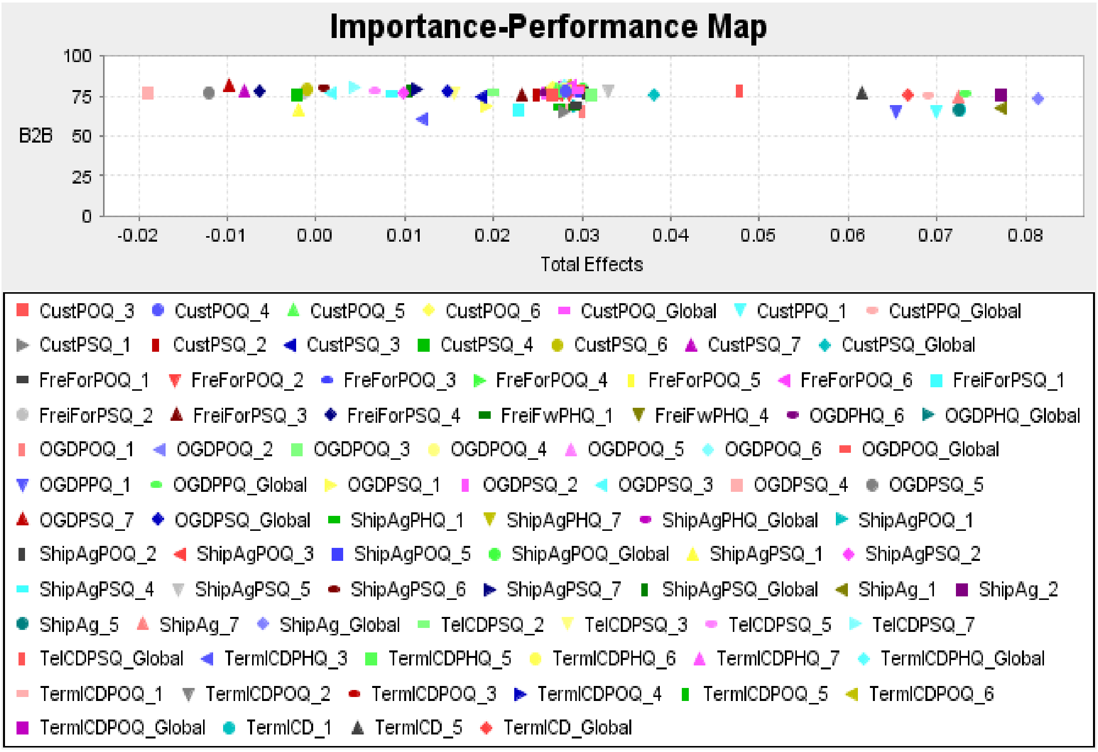

Figure 4.19: Importance –Performance Map Matrix (Indicator Level)

4.11 Measurement Invariance

Measurement model invariance determines how constructs in the inner model are measured. Thus the measurement of the outer model determines the meaning of the hierarchical latent constructs in the inner models. This procedure is used to determine if the model is different or the same between or among groups. For this study, the model was tested between females and males. The group was selected due to the fact that Table 4.1 shows that gender compositions were male 62.4 and female 37.6 percent hence there is a possibility that the male dominance might be the cause of those results. Testing measurement invariance was considered a necessary condition for performing multi group analysis (Garson, 2016).

In PLS-SEM using Smart PLS 3.0, a test of invariance employs procedure known as MICOM. The PLS-SEM measurement invariance assessment procedure (MICOM) is used to indicate if significant inter-group differences are due to intergroup differences in variables. Henseler *et al.* (2015) have proposed the measurement invariance composite models (MICOM), which have three steps: Step 1-configural invariance, step 2- compositional invariance, and step 3-equality of composite mean values and variances. If step 1 and step 2, do support measurement invariance, the results and differences of the multi-group analysis are valid. Confimation of step 1 and 2 indiceted that configure and composition invariance are confirmed and established, and partial measurement invariance is confirmed (Hair *et al*., 2017).

Permutation test of significant results for PLS-SEM models contrasting the male and female groups shown in Table 4.48. The permutation test outcomes confirm the non-significant difference between Male and Female groups for the hierarchical structural model, as signified by all permutation p-values in the last column of Table 4.48 are more than the .05 threshold. The statesticts mean that for our data there was no difference between male and female in responding to the research quastions. Thus the resuts obtained in this study does not caused by male dominance.

Table 4.48: Path Coefficient Comparison Male and Female

	Path Coefficients (male)	Path Coefficients (female)	Path Coefficients Difference (male - female)	Path Coefficients Mean Difference (male - female)	0.025	0.975	p-Values	Invariance established
CustPHQ -> B2B	0.113	0.124	-0.011	0	-0.23	0.226	0.928	Yes
CustPOQ -> B2B	0.061	0.207	-0.147	-0.016	-0.404	0.358	0.461	Yes
CustPQ -> B2B	0.037	0.051	-0.015	0.008	-0.183	0.213	0.903	Yes
CustPSQ -> B2B	-0.057	-0.046	-0.011	-0.005	-0.309	0.28	0.941	Yes
FFPHQ -> B2B	0.1	0.102	-0.002	0.013	-0.243	0.267	0.984	Yes
FFPQ -> B2B	-0.084	0.1	-0.184	-0.002	-0.226	0.238	0.115	Yes
FFPSQ -> B2B	-0.244	-0.049	-0.194	-0.009	-.419	0.419	0.369	Yes
FFPOQ -> B2B	0.368	0.411	-0.043	-0.027	-.468	0.385	0.867	Yes
OGDPHQ -> B2B	-0.081	-0.11	0.029	-0.001	-0.23	0.253	0.815	Yes
OGDPOQ -> B2B	0.202	-0.02	0.222	0.017	-0.44	0.455	0.359	Yes
OGDPQ -> B2B	0.065	0.036	0.029	-0.001	-0.19	0.193	0.765	Yes
OGDPSQ -> B2B	0.078	0.022	0.056	0.001	-0.29	0.283	0.693	Yes
SAPHQ -> B2B	0.084	-0.048	0.132	-0.007	-0.26	0.24	0.321	Yes
SAPOQ -> B2B	-0.019	0.147	-0.165	0.011	-0.36	0.365	0.399	Yes
SAPQ -> B2B	0.085	0.008	0.077	-0.009	-0.27	0.261	0.531	Yes
SAPSQ -> B2B	0.037	0.029	0.008	0.02	-0.291	0.347	0.962	Yes
ICDPHQ -> B2B	-0.145	-0.03	-0.115	0.003	-0.201	0.229	0.337	Yes
ICDPOQ -> B2B	0.19	0.016	0.174	0.001	-0.418	0.466	0.449	Yes
ICDPQ -> B2B	-0.041	-0.046	0.005	-0.001	-0.208	0.176	0.959	Yes
ICDPSQ -> B2B	0.127	0.151	-0.024	0.008	-0.30	0.301	0.877	Yes

4.11.1 Measurement Invariance (MICOM) Test

The invariance test procedure is employed to test that the measurement (outer) model is the same between groups (Putnick and Borsnstein, 2016, Milfont and Fischer, 2016). The researcher conducted Smart PLS 3.0 in three steps as shown below:

Step 1: this step establishes configural invariance to ensure that a composite has been specified equally for all the groups and emerges as a unidimensional entity in the same nomological net across the entire group. This test will ensure that each group has the same number of variables in the inner model and the corresponding measured variables in the measurement models or outer model as shown in Table 4.49 (refer appendix X).

Table 4.49: Test of Measurement Invariance

	Outer Loadings Original (male)	**Outer Loadings Original (female)**	**Outer Loadings Original Difference (male - female)**	**Outer Loadings Permutation Mean Difference (male - female)**	**2.50%**	**97.50%**	**Permutation p-Values**
B2BCargoSQ_1 <- B2B	0.86	0.703	0.157	0	-0.127	0.127	0.019
B2BCargoSQ_2 <- B2B	0.858	0.688	0.169	0.004	-0.122	0.142	0.016
B2BCargoSQ_3 <- B2B	0.857	0.826	0.032	0.002	-0.084	0.098	0.464
B2BCargoSQ_5 <- B2B	0.903	0.753	0.149	0.001	0.087	0.1	0.007
B2BCargoSQ_Global <- B2B	0.694	0.775	0.081	0.009	-0.285	0.36	0.601
CustPHQ_5 <- CustPHQ	0.843	0.802	0.041	0	-0.101	0.115	0.447
CustPHQ_6 <- CustPHQ	0.851	0.724	0.127	0.001	-0.123	0.147	0.064
CustPHQ_Global <- CustPHQ	0.843	0.812	0.031	0.006	-0.165	0.235	0.733
CustPOQ_1 <- CustPOQ	0.772	0.751	0.021	0.003	-0.136	0.172	0.794
CustPOQ_2 <- CustPOQ	0.825	0.822	0.002	0.001	-0.107	0.131	0.969
CustPOQ_3 <- CustPOQ	0.824	0.746	0.078	0.007	-0.112	0.156	0.213
CustPOQ_4 <- CustPOQ	0.784	0.765	0.02	0.002	-0.128	0.162	0.774
CustPOQ_5 <- CustPOQ	0.799	0.83	-0.031	0.005	-0.107	0.142	0.608
CustPOQ_6 <- CustPOQ	0.84	0.806	0.034	0.005	-0.104	0.135	0.579
-							
-							
-							
-							
ICDPOQ_G <-ICDPOQ	0.777	0.822	-0.045	0.014	-.215	0.309	0.718
ICD_1 <- ICDPQ	0.867	0.821	0.046	-0.001	-.089	0.103	0.368
ICD_5 <- ICDPQ	0.816	0.789	0.027	0.005	-.128	0.176	0.675
ICD_Global <- ICDPQ	0.807	0.628	0.179	0.008	-.197	0.264	0.12

Step 2: Compositional invariance

In Table 4.50, the results are non –significant implying that compositional invariance was assumed and confirmed. This was achieved when the correlations are not significant and were below 1 (Paul and Gomes, 2017) as shown in Table 4.50. The researcher has confirmed step 1 and 2, then configural and compositional invariance was assumed to be established. Basing on the results partial measurements invariance was established and confirmed.

Table 4.50: MICOM Step 2 Output

Composite	Correlation	5.% quartile of the empirical distribution	p-Values	Compositional invariance established
B2B	0.999	0.996	0.491	Yes
CustPHQ	0.999	0.992	0.613	Yes
CustOQ	0.998	0.997	0.209	Yes
CustPSQ	0.999	0.997	0.284	Yes
FFPQ	0.997	0.994	0.187	Yes
FFPSQ	0.999	0.998	0.357	Yes
FFPOQ	0.999	0.998	0.212	Yes
OGDPHQ	0.998	0.994	0.261	Yes
OGDPOQ	0.999	0.998	0.442	Yes
OGDPQ	0.963	0.972	0.028	Yes
OGDPSQ	0.999	0.997	0.669	Yes
SAPOQ	0.999	0.998	0.184	Yes
SAPQ	0.998	0.996	0.266	Yes
SAPSQ	0.999	0.998	0.394	Yes
ICDPHQ	0.999	0.989	0.671	Yes
ICDPOQ	0.998	0.998	0.684	Yes
ICDPQ	0.993	0.976	0.343	Yes
ICDPSQ	0.999	0.997	0.374	Yes

Step 3: Equality of means and variance

Scalar invariance is established if at least two indicators of a construct have equal loadings across the groups, in which case, there is a full measurement invariance (Garson, 2016).

In Table 4.51 ICDPQ, ICDPSQ, SAPSQ, ICDPHQ, CustPSQ, and FFPHQ have equal means; thus, there is full measurement invariance in this study.

Table 4.51: MICOM Step 3 Equality of Composite Means and Variance

	Mean - Difference (male - female)	Mean Difference (male - female)	2.5%	97.5%	p-Values	Equal mean values	Variance - Original Difference (male - female)	Variance - Permutation Mean Difference (male - female)	2.5%	97.5%	p-Values	Equal variance established
B2B	0.082	-0.003	-0.221	0.201	0.444	**Yes**	0.459	0.017	-0.651	0.702	0.178	**Yes**
CustPHQ	-0.001	0.003	-0.200	0.205	0.993	**Yes**	0.282	0.008	-0.671	0.721	0.456	**Yes**
CustPOQ	0.033	-0.003	-0.217	0.206	0.752	**Yes**	0.056	0.025	-0.600	0.732	0.867	**Yes**
CustPQ	0.014	0.001	-0.217	0.224	0.895	**Yes**	0.543	0.006	-0.544	0.587	0.065	**Yes**
CustPSQ	-0.001	0.000	-0.216	0.197	0.994	**Yes**	0.306	0.003	-0.618	0.711	0.364	**Yes**
FFPHQ	0.051	0.000	-0.224	0.202	0.650	**Yes**	0.194	0.014	-0.614	0.673	0.560	**Yes**
FFPQ	0.061	0.005	-0.196	0.203	0.552	**Yes**	0.454	0.005	-0.639	0.679	0.167	**Yes**
FFPSQ	0.043	-0.001	-0.217	0.215	0.678	**Yes**	0.282	0.025	-0.631	0.754	0.421	**Yes**
FFPOQ	0.078	-0.005	-0.211	0.200	0.483	**Yes**	-0.004	0.023	-0.599	0.758	0.992	**Yes**
OGDPHQ	0.059	0.004	-0.209	0.209	0.594	**Yes**	0.083	0.004	-0.554	0.630	0.812	**Yes**
OGDPOQ	0.053	-0.006	-0.215	0.202	0.636	**Yes**	0.050	0.027	-0.620	0.695	0.889	**Yes**
OGDPQ	-0.002	0.002	-0.199	0.222	0.983	**Yes**	0.390	0.008	-0.525	0.545	0.171	**Yes**
OGDPSQ	-0.118	0.001	-0.210	0.201	0.273	**Yes**	0.607	0.011	-0.666	0.743	0.091	**Yes**
SAPHQ	0.190	0.001	-0.203	0.223	0.085	**Yes**	0.188	0.006	-0.517	0.535	0.528	**Yes**
SAPOQ	0.040	-0.003	-0.206	0.205	0.719	**Yes**	0.047	0.022	-0.606	0.659	0.882	**Yes**
SAPQ	-0.017	0.002	-0.214	0.199	0.890	**Yes**	0.357	0.009	-0.624	0.694	0.310	**Yes**
SAPSQ	0.047	0.000	-0.215	0.216	0.675	**Yes**	0.337	0.015	-0.663	0.753	0.343	**Yes**
ICDPHQ	0.174	0.000	-0.204	0.205	0.100	**Yes**	-0.158	0.013	-0.631	0.740	0.671	**Yes**
ICDPOQ	0.052	-0.004	-0.223	0.209	0.611	**Yes**	0.044	0.031	-0.601	0.783	0.898	**Yes**
ICDPQ	-0.001	0.000	-0.217	0.222	0.995	**Yes**	0.541	0.009	-0.572	0.632	0.077	**Yes**
ICDPSQ	-0.038	0.000	-0.218	0.218	0.750	**Yes**	0.477	0.011	-0.684	0.731	0.165	**Yes**

4.12 Multi-Group Analysis

PLS multi-group analysis is a nonparametric test used to evaluate if the PLS model significantly differs between groups. When PLS-SEM is employed, researchers assume that the data come from one homogenous population, which is sometimes unrealistic, thus failing to consider the heterogeneity of data (Hair *et al.,* 2017). Therefore, it is useful in this study to identify, evaluate and if found to treat heterogeneity in the data.

There are two categories of heterogeneity, which are observed and unobserved. Observed heterogeneity relates to the difference in data group from observed features such as age and gender. Unobserved heterogeneity does not depend on prior characteristics, which are identified by the procedure known as latent class techniques (Hair *et al*., 2017). Multi-Group analysis was used to test the null hypothesis, H_0, which signified that the model path coefficients are not significantly different. While, the corresponding alternative hypothesis H_1, is that the model path coefficients were different.

Table 4.52 provides outer loadings separately for the female and male groups together with bootstrap-estimated standard deviations, t-values, and significance p- values and confidence interval as well. All paths in the measurement model from observed variable to endogenous variable B2B multi-process service quality were significant for males and females as indicated in p-values columns.

Table 4.52: Outer Loadings Bootstrapping MGA Results

Path	Original (female)	Original (male)	Mean (female)	Mean (male)	STDEV (female)	STDEV (male)	t-Values (female)	t-Values (male)	p-Values (female)	p-Values (male)
B2BCargoSQ_1 <- B2B	0.703	0.860	0.700	0.858	0.085	0.028	8.314	30.334	0.000	0.000
B2BCargoSQ_2 <- B2B	0.688	0.858	0.667	0.856	0.090	0.028	7.676	30.612	0.000	0.000
B2BCargoSQ_3 <- B2B	0.826	0.857	0.824	0.856	0.039	0.028	21.318	30.740	0.000	0.000
B2BCargoSQ_5 <- B2B	0.753	0.903	0.750	0.902	0.075	0.019	9.999	47.671	0.000	0.000
CustPHQ_5 <- CustPHQ	0.802	0.843	0.805	0.841	0.065	0.034	12.417	24.609	0.000	0.000
CustPHQ_Global <- CustPHQ	0.812	0.843	0.755	0.836	0.181	0.055	4.494	15.450	0.000	0.000
CustPOQ_1 <- CustPOQ	0.751	0.772	0.742	0.767	0.069	0.052	10.912	14.963	0.000	0.000
CustPOQ_2 <- CustPOQ	0.822	0.825	0.815	0.821	0.049	0.035	16.716	23.660	0.000	0.000
CustPOQ_5 <- CustPOQ	0.830	0.799	0.821	0.794	0.046	0.044	18.208	18.280	0.000	0.000
ICDPOQ_Global <- ICDPOQ	0.822	0.777	0.806	0.773	0.090	0.075	9.172	10.328	0.000	0.000
ICD_1 <- ICDPQ	0.821	0.867	0.772	0.866	0.174	0.021	4.713	40.505	0.000	0.000
ICD_5 <- CDPQ	0.789	0.816	0.735	0.811	0.162	0.038	4.874	21.352	0.000	0.000
ICD_Global <- ICDPQ	0.628	0.807	0.519	0.801	0.316	0.055	1.986	14.595	0.048	0.000

All paths in the measurement model from observed variable to endogenous variable B2B multi-process service quality were significant for males and females as indicated in confidence interval columns as shown in Table 4.53(refer appendix XII). The results show that the zeros were not within the confidence limits of Females and Males in the Confidence interval columns.

Table 4.53: Outer Loadings Confidence Interval

	2.5% (female)	**97.5% (female)**	**2.5% (male)**	**97.5% (male)**
B2BCargoSQ_1 <- B2B	0.460	0.811	0.793	0.903
B2BCargoSQ_2 <- B2B	0.481	0.802	0.785	0.899
B2BCargoSQ_3 <- B2B	0.722	0.877	0.794	0.899
B2BCargoSQ_5 <- B2B	0.516	0.839	0.857	0.930
B2BCargoSQ_Global <- B2B	0.431	0.906	0.481	0.852
CustPHQ_5 <- CustPHQ	0.584	0.880	0.767	0.887
CustPHQ_6 <- CustPHQ	0.286	0.832	0.775	0.891
CustPHQ_Global <- CustPHQ	0.280	0.912	0.687	0.912
CustPOQ_1 <- CustPOQ	0.586	0.844	0.642	0.846
CustPOQ_2 <- CustPOQ	0.708	0.888	0.750	0.877
CustPOQ_3 <- CustPOQ	0.534	0.838	0.744	0.872
CustPOQ_4 <- CustPOQ	0.603	0.860	0.689	0.844
ICDPOQ_6 <- ICDPOQ	0.765	0.911	0.782	0.897
ICDPOQ_Global <- ICDPOQ	0.593	0.925	0.596	0.884
ICD_1 <- ICDPQ	0.413	0.961	0.806	0.896
ICD_5 <- ICDPQ	0.467	0.952	0.732	0.875
ICD_Global <- ICDPQ	-0.242	0.857	0.677	0.883

Source: SmartPLS version 3.2.8 (Ringle *et al.*, 2019)

CHAPTER FIVE

DISCUSSION OF FINDINGS

5.1 Overview

This chapter presents a discussion of the findings. It describes the information developed in the foregoing chapter relating to data analysis and compares and contrasts the current results with what has been found out in empirical studies. This assists to develop an in-depth understanding of the measuring B2B multi-process service quality a study of Dar es Salaam port cargo clearance.

5.2 Measurement Model

In this study, the researcher modelled the conceptual latent variables as hierarchical factors. Therefore, the researcher has chosen a measurement model with reflective indicators in the construct of the first-order latent variables and related them to their appropriate reflective block of measured variables, and the loadings represented as an estimate of the measurement without second-order composite. Then for the second and third-order latent constructs, these were modelled as formative. The results of measurement model first, second-order composite and third-order latent construct were also found to be valid and reliable according to the guidelines (Hair *et al.*, 2017, Ringle, *et al.*, 2015).

A second and related observation, from findings into the 'reliability scale', is that the twenty-dimensional service quality constructs showed high reliability as well as good convergent validity (shown in Table 4.13). First, high reliability is evidenced by a high coefficient of reliability for all twenty service quality dimensions indicating good convergent validity. Third, good validity is evidenced by high average within-dimension correlations indicating good convergent validity, also shown in Table 4.13 and a lower average cross-variable correlation (indicating good discriminant validity) for all 88 service quality attributes. The results supported by (Hair *et al.,* 2017; Ringle, *et al.,* 2016; and Zait and Bertea, 2011).

5.3 Hierarchical Structural Model

The endogenous latent constructs achieved an adjusted coefficient of determination values in the range of 0.958, 0.730, 0.235 and 0.475 for B2B cargo clearance service quality, output quality (OQ), process hard quality (PHQ), potential quality(PQ) and process soft quality(PSQ). These values are considered to be substantial (Hair *et al*., 2017, Hossaina *et al.,* 2014). The predictive relevance of structural or theoretical models was evaluated by employing the cross-validated redundancy index (Q^2) for endogenous latent constructs. All predictive relevance were more than zero, and of the predictive evidence of the model was supported. In that model, there was no predictive relevance less than zero. The finding concurred with Riel *et al,* (2017) and Ringle *et al., (*2018).

5.4 Measuring B2B Multi-Process Service Quality

Building on existing research and this study, it is argued that service quality of business to business services was to be evaluated using service quality determinants (potential quality, process hard quality, process soft quality, and output quality). These study findings led to a decision to extend INDSERV model from output "hygiene" to B2B multi-process service quality as an endogenous variable. Although the study has extended B2B multi-process service quality as a consequence instead of output quality in INDSERV in business to- business in cargo clearance, there are indeed similarities to empirical findings by Lee (2011); and Galahitiyawe and Musa, (2015). Moreover, the total variance in overall B2B multi-process service quality well explained by the four B2B service quality with around ninety six percent. However, one important issue should be noted. First, as the B2B multi-process service quality latent constructs identified explain seventy three percent of the overall variance in output quality, process hard quality and process soft quality there may be other determinants and/or items important to B2B multi-process service quality. This issue noticeably highlights the need for further research.

5.5 Relationship between the Potential Quality and B2B Multi-Process Service Quality

PLS-SEM was used for data analysis in this study, to assess the effect of the potential quality on B2B multi-process service quality. The test results supported hypothesis H1. This involves the third-order latent construct which was B2B multi-process constructed by relating it to the second-order latent constructs which were potential quality (PPQ).

It was observed that potential quality significantly affected B2B multi-process service quality. Potential quality being clearance service elements that the service providers must have in place to provide clearance adequately such as update technology, modern equipment, competent professional personnel, communication equipment, etc. The results indicate that those elements are important in measuring B2B multi-process cargo clearance service quality. The hierarchal path analysis for the potential quality indicates that four sub-constructs are significant in predicting B2B service quality.

The relationship of the smallest beta coefficient between latent variables represents the most important latent construct in terms of influencing B2B multi-process service quality. It concurred with the findings by Lee (2011) and Jasmine and Liz, (2013) that the relationship between potential quality and B2B multi-process service quality was significant.

5.6 Relationship between Process Hard Quality and B2B Multi-Process Service Quality

The test results supported hypothesis H2. This involves the third-order latent construct which was B2B multi-process constructed by relating it to the second-order latent construct which was process hard quality (PHQ). It was observed that the process hard quality significantly affected B2B multi-process service quality with second-order, and third-order latent constructs respectively. Hard process quality being clearance service quality includes what is being performed during the clearance process. Cargo clearance service plan, clearance procedures, documentation and timely delivery of service. The results indicate that those elements are important in measuring B2B multi-process cargo clearance service quality. The hierarchal path analysis for the process hard quality indicate that four sub-constructs are significant in predicting B2B service quality.

The relationship of the small beta coefficient between latent variables represents the important latent construct in terms of influencing B2B multi-process service quality.

The next largest beta coefficient signified the second most important latent variable. The process hard qualitywas the third important latent variable after output quality. Process hard quality third-order latent construct accounted for around twenty three percent of the explained variance in overall B2B multi-process service quality. Thus, it indicates that around ninety six percent of overall B2B multi-process service quality was explained by other constructs, other than the process hard quality construct.

In terms of the relationship between the process hard quality and B2B multi-process, the study suggested that process hard quality latent variable explained about a quarter of the variance in B2B multi-process service quality. The findings with concurred to the findings by Lee (2011), Gounaris (2005) that the relationship between process hard quality and B2B multi-process service quality was significant and strong.

5.7 The Relationship Between Process Soft Quality and B2B Multi-Process Service Quality

The test results supported hypothesis H_3. This involved the third-order latent construct which was B2B multi-process construct by relating it to the second-order latent construct which was process soft quality (PSQ). It was observed that process soft quality significantly affected B2B multi-process service quality. Process soft quality being clearance service elements related to how the service was performed during the clearance. The cargo clearance front –line staff and the interactions evolve with the service users. The results indicated that those elements were important in measuring B2B multi-process cargo clearance service quality. The construct is significant and the hierarchal path analysis for the process soft quality indicates that four sub-constructs were significant. The result concurred with Lee, (2011); Garahitiyale and Musa, (2005); and Ramaseshan, (2013).

The relationship of the largest beta coefficient between latent variables represents the most important latent construct in terms of influencing B2B multi-process service quality. The beta coefficient signified the most important latent variable. The process soft quality is the last important latent variable. It accounted for 47.4 percent of the explained variance in overall B2B multi-process service quality. Thus, it indicates that 61.9 percent of overall B2B multi-process service quality was explained by other constructs, other than the process soft quality construct. In terms of the relationship between the process hard quality and B2B multi-process, the adjusted R^2 was statistically significant. Suggested that process soft quality latent variable explained 70 percent of the variance in B2B multi-process service quality. This result concurred with the findings of Galahitiyawe and Musa (2015); Ramaseshan, (2013), and Gounaris, (2005) who found that some items of process hard quality were excluded in the INDSERV manifest variable because they were developed in the Western context which was different to developing country, the case of Sri Lanka, Galahitiyawe and Musa (2015).

5.8 Relationship between Output Quality and B2B Multi-Process Service Quality

The test results supported hypothesis H4. This involved the third-order latent construct which was B2B multi-process construct by relating it to the second-order latent construct which was output quality (OQ). It was observed that potential quality significantly affected B2B multi-process service quality. Output quality being clearance service effects that the solution offered created for the service users after it has been implemented. The results indicated that those elements were important in measuring B2B multi-process cargo clearance service quality. The hierarchal path analysis for the output quality indicated that only two sub-constructs were significant in predicting B2B service quality and these were freight forwarding output quality and shipping output quality. Three sub-constructs were not significant that is Customs output quality, OGDs output quality; and terminal and ICDs output quality.

The relationship of the second-largest beta coefficient between latent variables represents the second most important latent construct in terms of influencing B2B multi-process service quality. This is the largest beta coefficient signifying the most important latent variable. The process hard quality was second important latent variable after output quality. In terms of the relationship between the output quality and B2B multi-process, the adjusted R^2 was statistically significant. Suggested that output quality latent variable explained 73% of the variance in B2B multi-process service quality.

The findings concurred with Lee (2011) and Banazic and Dosen, 2012) that the relationship between output quality and B2B multi-process service quality was significant and strong. Additional observation, from further investigation into ‘causal directions’, is that output quality seems to be an antecedent of B2B multi-process service, this observation was significant and supported.

5.9 Relationship between Potential Quality and B2B Multi-Process Service Quality is Mediated by Output Quality

According to empirical findings of this study, potential quality and output quality are unassociated with B2B multi-process service quality. In this hypothesis, the output quality was not posted to be mediator or intervening variable of potential quality. Thus, this relationship is of interest to the researcher that closely investigated the relationship between output quality and B2B multi-process service quality. The more the potential quality, the more is the output quality because the hypothesis was not supported. This study has found that output quality does not mediate relationship B2B multi-process service quality, this may be because the potential quality has significant direct effects on output quality. This was supported by findings (Lee, 2011) in his findings.

This relationship is the indirect relationship between three third-order latent variables, potential quality and output quality with third-order latent variable B2B multi-process cargo clearance. This clarifies that the potential quality of second-order construct affected output quality second-order construct and finally does affect B2B multi-process service quality. Thus, the study suggested that potential quality is a better predictor for output quality and should be intervened by output quality.

In the partial mediation model, the test results supported hypotheses of between potential quality and B2B multi-process service quality is mediated by output quality (H5). Potential and B2B multi-process cargo clearance (and Potential quality and between potential quality and B2B multi-process service quality is mediated by output quality (H5) were significant. The results indicated that potential quality and

B2B multi-process cargo clearance (H5) was significant. The results concurred with the findings of, Galahitiyawe and Musa(2015), Lee, (2011), and Yeo *et al.,* 2015.

5.10 Relationship between Potential Quality(PQ) and B2B Multi-Process Service Quality Mediated by the Process Hard Quality

There was indirect relationship between two second-order latent variables, process potential quality and process hard quality with third-order latent variable B2B multi-process cargo clearance. This justifed that potential quality of second-order construct affected process hard quality second-order construct and finally affected B2B multi-process cargo clearance third-order latent constructs. The results concurred with the findings of Galahitiyawe and Musa(2015); Hair *et al.,* 2017; Lee, (2011); and Ringle *et al.,* (2018).

5.11 Relationship between Potential Quality(PQ) and B2B Multi-Process Service Quality Mediated by the Process Hard Quality

In the mediation model, the test results supported hypotheses of between potential quality and B2B service quality is mediated by process hard quality (H6). Potential quality and between potential quality and B2B service quality is mediated by process hard quality (H6) were significant. Thus, potential quality affected B2B multi-process service quality positively. The test results show that potential quality affects third-order latent construct significantly, which illustrates that a B2B organization whose objective is to enhance B2B multi-process service quality in an inter-organizational context cannot ignore potential quality development.

On other hand, an organization with the greater capacity to fit potential quality and B2B multi-process service quality across B2B partners will enhance service quality.

This category of mediation is referred to as partial mediation. The results concurred with finding of Baron and Kenny, (1986); Galahitiyawe and Musa(2015), Lee, (2011) and Zait and Berted, (2011).

5.12 Relationship between Potential Quality and B2B Service Quality is Mediated by the Process Soft Quality

There indirect relationship between two-second order latent variables, potential quality and process soft quality with third-order latent variable B2B multi-process cargo clearance. This clarifies that potential quality of second-order construct affected process soft quality second-order construct and finally affected B2B multi-process cargo clearance third-order constructs.

In the mediation model, the test results supported hypotheses between potential quality and B2B service quality is mediated by process soft quality (H7), potential and B2B multi-process service quality. Thus, potential quality affected B2B multi-process service quality positively. The test results show that potential quality affects third-order latent construct significantly, which illustrates that a B2B organization whose objective is to enhance B2B multi-process service quality in an inter-organizational context cannot ignore potential quality development. In other hands, an organization with the greater capacity to fit potential quality and B2B multi-process cargo clearance across B2B partners will enhance service quality. This category of mediation is referred to as partial mediation. The results concurred with finding of Galahitiyawe and Musa(2015); Hair *et al.*, 2017; Lee, (2011); Ringle *et al.*, (2018).

5.13 Relationship between Potential Quality and Output Quality

The test results supported hypothesis H8. This involved the second-order latent construct which was output quality by relating it to the second-order latent construct which was potential quality (PQ).

It was observed that potential quality significantly affected output quality. The relationship of the small beta coefficient of 0.133 between latent variables represents the important latent construct in term of influencing output quality. The small beta coefficient signified the second most important latent variable was smallto in much influencing the output quality. The potential quality was not important latent variable predicting output quality. The relationship between the potential quality and output quality was statistically insignificant.

The result suggested that potential quality latent variable despite its influence on B2B multi-process cargo clearance had insignificant influence on output quality. The situation might happen because cargo clearance output much depend on procedures and processes which fall under process hard quality and process soft quality . The result concurred with findings of Baluch and Edwards, (2010) that potential quality on its own does not influence cargo clearance unless the process quality support them. Further the study finding concurred with findinds of Lee, (2011).

5.14 Relationship between Potential Quality and Process Hard Quality

The test results supported hypothesis H9. This involved the second-order latent construct which was the potential quality by relating it to the second-order latent construct which was process hard quality.

It was observed that potential quality significantly affected the process hard quality. The relationship of the large beta coefficient between latent variables represented large importance of latent construct in terms of influencing process hard quality. The potential quality was an important latent variable in predicting process hard quality. The relationship between potential quality and process hard quality was statistically significant. Now, it can be suggested that potential quality influences both B2B multi-process cargo clearance process hard quality and process soft quality. It concurred to the findings by Lee (2011) that the relationship between potential quality, process hard quality and process soft quality was significant and strong. The situation happens because B2B multi-process cargo clearance much depend on procedures and processes which fall under process hard quality and process soft quality (Baluch and Edwards, 2010).

5.15 Relationship between Potential Quality and Process Soft Quality

The test results supported hypothesis H10. This involved the second-order latent construct which was the potential quality by relating it to the second-order latent construct which was process soft quality. It was observed that potential quality significantly affected process soft quality. The relationship of the large beta coefficient between latent variables represents large importance of the latent construct in terms of influencing process soft quality. Potential quality was important latent variable in predicting process soft quality. The relationship between potential quality and process soft quality was statistically significant. The study results suggested that potential quality influenced both B2B multi-process cargo clearance process hard quality and process soft quality. It concurred to the findings by Lee

(2011) that the relationship between potential quality, process hard quality and process soft quality was significant and strong. The situation happens because B2B multi-process cargo clearance much depends on procedures and processes which fall under process hard quality and process soft quality (Baluch and Edwards, 2010).

5.16 Relationship between Process Hard Quality And Output Quality

The test results supported hypothesis H11. This involved the second-order latent construct which was process hard quality by relating it to the second-order latent construct which was output quality.

It was observed that process hard quality did not significantly affect output quality. The relationship of the small beta coefficient between latent variables it represents hence the latent construct process hard quality does not significantly influence on output quality. The relationship between output quality and process hard quality was statistically insignificant. The study suggested that process hard quality latent variable despite its influence on B2B multi-process cargo clearance, had insignificant influence on output quality. The situation had happened due to the fact that B2B multi-process cargo clearance much depended on procedures and processes which fall under process hard quality and process soft quality rather than output (Baluch and Edwards, 2010).

5.17 Relationship between Process Soft Quality and Output Quality

The test results supported hypothesis H12. This involved the second-order latent construct which was process soft quality by relating it to the second-order latent construct which was output quality. It was observed that process soft quality significantly affected output quality.

The relationship of the large beta coefficient between latent variables represents large importance of the latent construct in influencing output quality. The process soft quality is one of important latent variable predicting output quality. The relationship between the process soft quality and output quality was statistically significant. The study suggested that process soft quality influenced both B2B multi-process cargo clearance and output quality. It concurred with the findings of Gounari, (2005); and Lee (2011) that the relationship between process soft quality and output quality are significant and strong. The situation happens due to the fact that B2B multi-process cargo clearance much depend on procedures and processes which fell under process hard quality and process soft quality (Baluch and Edwards, 2010).

5.18 Final Model of the Study

Having gone through the results of the test of factor analysis, measurement model, hierarchal model, structural model, and the study hypotheses; the study final model is shown in figure 5.1 with Table 5.1 Summary of overall results of hypothesis testing in final 3^{rd} Order constructs.

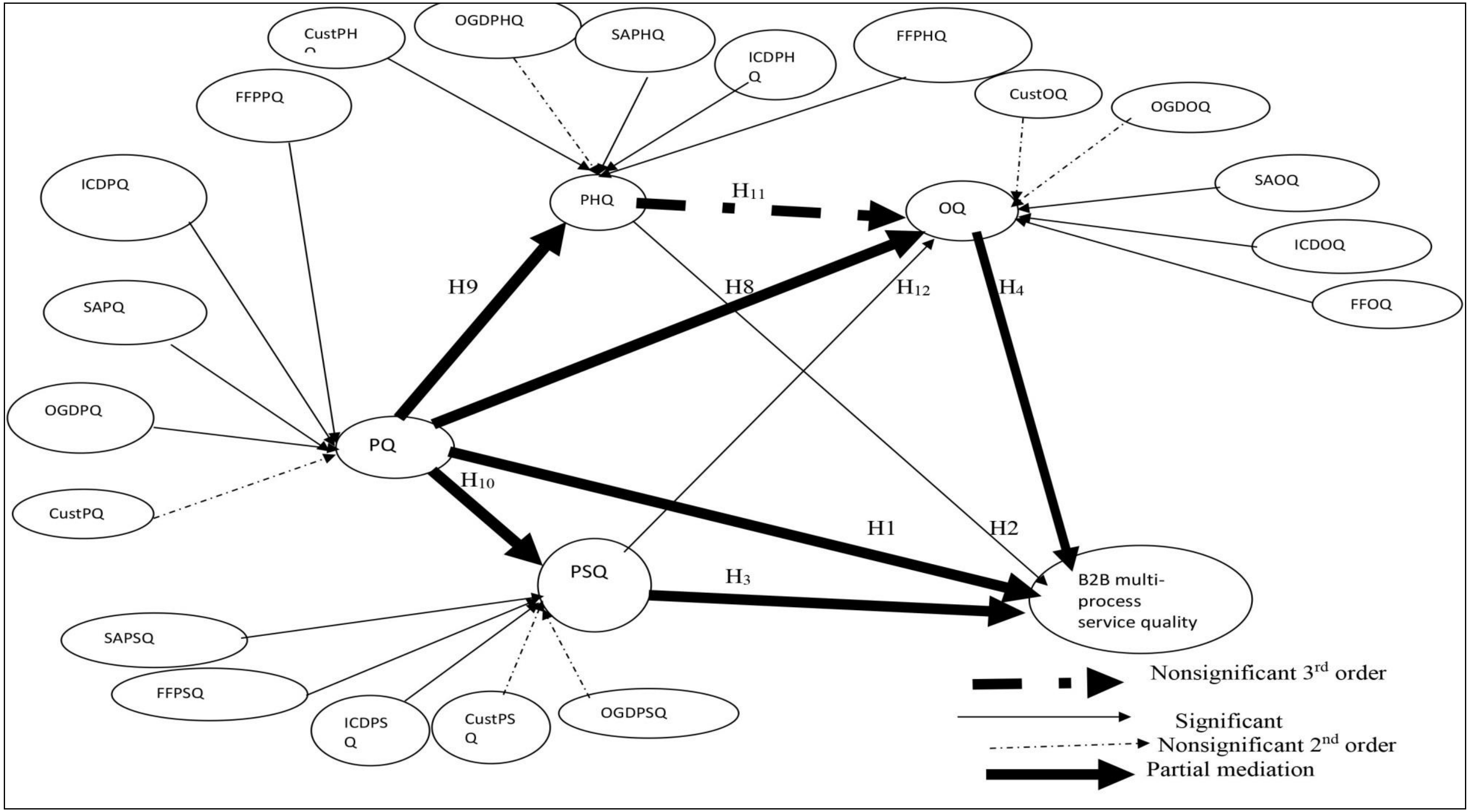

Figure 5.1: PLS SEM Final Model of the Current Study

Table 5.1: Summary of Overall Results of Hypothesis Testing in Final 3Rd Order Constructs

Hypothesis	**Path**	**Effects**	**Support**
H1	PQ-> BSQ	Direct	Supported
H2	PHQ -> BSQ	Direct	Supported
H3	PSQ -> BSQ	Direct	supported
H4	OQ -> BSQ	Direct	supported
H5	PQ-> OQ -> BSQ	Indirect	supported
H6	PQ-> PHQ -> BSQ	Indirect	supported
H7	PQ-> PSQ -> BSQ	Indirect	supported
H8	PQ-> OQ	Direct	supported
H9	PQ-> PHQ	Direct	supported
H10	PQ-> PSQ	Direct	supported
H11	PHQ-> OQ	Direct	No supported
H12	PSQ-> OQ	Direct	supported

As is evident from Figure 5.1, PLS SEM results provide strong support for hypotheses 1,2,3,4, 6, 7,9,10 and 12 which were essentially drawn from INDSERV model (Lee, 2011). Hypothesis 11 was not supported. Also See Table 5.1

CHAPTER SIX

CONCLUSION, RECOMMENDATIONS AND AREA FOR FURTHER RESEARCH

6.1 Overview

The study proposes and tests the measurement of B2Bmulti-process cargo clearance service quality in Dar es Salaam port. It tested the INDSERV constructs in measuring B2B multi-process service quality and established the relationship between constructs and sub constructs. Determining the effects of hierarchal sub-constructs namely customs process, QGDs process, shipping agency process, Terminal and ICDs process, and freight forwarding process.

Further the study tested the mediation relationship of a hard process, soft process through output quality in predicting B2B multi-process service quality. This study is one of the first, to the researcher's knowledge, to assess twenty types of B2B multi-process service quality in first-order hierarchical. Additionally, four-second order constructs of types of B2B multi-process service quality namely potential quality, process soft quality, process hard quality, and output quality and third order construct of INDSERV B2B multi-process service quality. The study aimed at determining the effects of those constructs directly or indirectly on B2B multi-process cargo clearance service quality.

The results of this study were based on 364 samples obtained from cargo clearance service providers and users in Dar es Salaam. The final chapter presents the key conclusion, recommendations, and suggestions for further research. The same chapter provide the implication of the study by addressing the theoretical, practical, policy and managerial implications of the results as well as the contribution of this study to the body of knowledge. Finally, the limitation of the study has been highlighted.

6.2 Conclusion

The general objective of the study was to assess the variables for measuring the B2B multi-process cargo clearance service quality in Dar es Salaam port. The five study objectives were analyzed and discussed. The study adopted INDSERV model to assess the relationship between a set of service quality variable in hierarchal order and the dependent variable B2B multi-process cargo clearance and ascertain the role of B2B multi-process cargo clearance. Thus, in order to be able to come up with a better informative understanding of these complex hierarchical relationships in Dar es Salaam port environment, the multi processes among these INDSERV variables required special consideration.

More specifically, this study combined three forms of variables which were first order variable, second order and third order variables. Consequently, the mediation model was used in this research as it assumed INDSERV variables were theoretically related and were thought to be more appropriate with the objectives of the study. The partial and full mediation effects were abserved in the study. Full mediation is achieved when variables such as independent and dependent variables no longer contributed to the prediction of B2B multi-process cargo clearance when the mediator was introduced. While partial mediation was achieved when independent variables contributed to the prediction of B2B multi-process cargo clearance.

6.2.1 The Effect of Hard Quality on Measuring B2B Multi-Process Cargo Clearance

The first research objective was to assess the effect of hard quality on measuring B2B multi-process cargo clearance. This objective was assessed via hypothesis H1 and hierarchal path , H1a, H1b, H1c, H1d, and results showed that hard quality had a significant effect on B2B multi-process cargo clearance. Among the major findings of this study is that; in order to improve the port B2B, multi-process service quality players must improve hard process service quality. For the B2B multi-process service quality it is more valuable to pay attention to five sub-constructs of process hard quality that are; customs process hard quality, OGDs process hard quality, shipping agency process hard quality, terminal process hard quality and freight forwarding process hard quality. The study has therefore addressed an important verity in the B2B service quality literature by showing that players needed to take full consideration on process hard quality because it has a high contribution on improving B2B multi-process cargo clearance service quality.

The results justify the importance of technical quality in measuring service quality. Overall, the findings suggest that improving cargo clearance service providers hard process quality is not only a matter of choice, but the dimensions are strategically important on improving B2B multi-process service quality. All players need to improve their hard process as each of them had a positive relationship on measuring B2B multi-process service quality. The study justified the rationale for improving each sub-construct measures of multi-process hard quality since it was revealed that each dimension affected highly on B2B multi-process service quality varying degree of intensity.

6.2.2 The Effect of Soft Quality on Measuring B2B Multi-Process Cargo Clearance

The second objective of the study assessed the effect of soft quality on measuring B2B multi-process cargo clearance. This objective was studied and assessed, through hypotheses H2, and its sub hierachal path H2a, H2b, H2c, and H2d and findings indicated that the soft quality had a positive and significant influence on measuring B2B multi-process cargo clearance. Among the latent variable in the model soft process quality (PSQ) had the highest contribution to INDSERV on measuring B2B multi-process cargo clearance. Among the major findings of this study is that; in order to improve the port B2B multi-process service quality players should improve soft process service quality. For the B2B multi-process service quality it is more valuable to pay attention to five sub-constructs of process soft quality that are; customs process soft quality, OGDs process soft quality, shipping agency process soft quality, terminal process soft quality and freight forwarding process soft quality.

The study has therefore addressed an important verity in the service quality literature by showing that players needed to take full consideration on process soft quality in improving B2B multi-process service quality. The results justify the importance of technical aspects of service as the quality in measuring service quality. Overall, the findings suggest that improving cargo clearance service providers soft process quality is not only a matter of choice, but the dimensions are important for improving B2B multi-process service quality. All players need to improve their soft process as each of them had a strong positive relationship on measuring B2B multi-process service quality. The study justified the rationale for improving each sub-construct measures of multi-process soft quality since it was revealed that each dimension affected B2B multi-process service quality with varying degree of intensity.

6.2.3 To Assess the Effect of Potential Quality on Measuring B2B Multi-Process Cargo Clearance

The third research objective of this study was to assess the effect of potential quality on measuring B2B multi-process cargo clearance. Findings indicated that the potential quality had a positive and nonsignificant influence on measuring B2B multi-process cargo clearance. Among the latent variable in the model potential quality (PQ) shows the lowest contribution to INDSERV on measuring B2B multi-process cargo clearance. Among the major findings of this study is that; the contribution of potential quality on itself does not significantly improve the port B2B multi-process service quality. Yet for the B2B multi-process service quality it is more valuable to pay attention to five sub-constructs of process potential quality that are; customs process potential quality, OGDs process potential quality, shipping agency process potential quality, terminal process potential quality and freight forwarding process potential quality. The study has therefore addressed an important verity in the B2B service quality literature by showing that players needed to consider potential quality in conjunction with other INDSERV constructs instead of assessing itself as most of the port service providers do. The degree of potential quality impact on improving B2B multi-process service quality is weak supported.

Overall, the findings suggest that improving cargo clearance service quality service providers should not only focus on potential process quality but also consider other INDSERV constructs. It’s only the combination of construct improving B2B multi-process service quality. All players need to improve all INDSERV constructs with its subcontracts as each of them had a positive relationship on measuring B2B multi-process service quality. The study justified the rationale for improving constructs as the INDSERV internal structure second –order latent constructs suggested in improving port cargo clearance B2B multi-process service quality since it was revealed that each dimension affects B2B multi-process service quality with varying degree of intensity.

6.2.4 To Assess the Effect of Output Quality on Measuring B2B Multi-Process Cargo Clearance

The fourth research objective was to assess the effect of output quality in measuring B2B multi-process cargo clearance. Findings indicated that the output quality had a positive and significant influence on measuring B2B multi-process cargo clearance. Therefore among the latent variable in the model process output quality (POQ) shows the third contribution to INDSERV on measuring B2B multi-process cargo clearance.

Among the major findings of this study is that; in order to improve the port B2B, multi-process service quality players should improve output quality. For the B2B multi-process service quality it is more valuable to pay attention to five sub-constructs of output quality that are; customs process output quality, OGDs process output quality, shipping agency process output quality, terminal process output quality and freight forwarding process output quality.

The study has therefore addressed an important verity in the B2B service quality literature by showing that players needed to take full consideration of process output quality in improving B2B multi-process service quality as it has strongly supported in the result of the study. The results justify the importance of output quality in measuring service. Overall, the findings suggest that improving cargo clearance service provider's output quality is not only a matter of choice, but the dimensions are important for improving B2B multi-process service quality.

All players need to improve their output quality as each of them had a positive impact on measuring B2B multi-process service quality. The study justified the rationale for improving each sub-construct measures of multi-process output quality since it revealed that each dimension affects B2B multi-process service quality with varying degree of intensity.

6.2.5 To Assess Mediation Effect of Potential Quality, Hard Process, a Soft Process Quality on Output Quality in Measuring B2B Multi-Process Cargo Clearance

The fifthy research objective of this study was to assess the mediation effect of hard quality, soft quality and output quality on measuring B2B multi-process cargo clearance. This objective was studied and assessed, though hypotheses H5, H6, H7, and findings indicated that both mediation had significant influence on measuring B2B multi-process cargo clearance.

Therefore, among the latent variable in the model outputs quality (OQ) shows the third contribution to INDSERV on measuring B2B multi-process cargo clearance. Results from mediation analysis in this study points out that to improve the B2B service quality potential process quality must be mediated by hard process quality and soft process quality to improve both output quality and B2B service quality. Once we need to have improvement in B2B service quality, the focus should not be only on separate INDSERV constructs but rather the mediation effect of other constructs on potential process quality should be adopted in measuring B2B multi-process service quality.

Cargo clearance service providers must make moves to ensure they are operating within the INDSERV internal structure second –order latent constructs model to support the service. The strength of the relationship between constructs depends not only on the relationship between constructs with the B2B multi-process service quality but also on the way the construct are mediated to produce better results.

As one would expect potential process quality found more support of the B2B multi-process but the relationship was weak supported which call for assessing the influence of mediation on potential quality by hard process quality and soft process quality in producing output quality.

6.2.5.1 To Assess the Relationship Between Potential Quality and B2B Multi-Process Mediated by Output Quality

The study through hypotheses H5, and hierarchal path H5a, H5b, H5c, and H5d found that there are direct positive relationships between potential quality (PQ) and B2B multi-process service quality mediated by output quality (OQ). Both paths except path c are significant. The results shows the need to consider both potential quality and out put quality in improving B2B cargo clearance service quality.

6.2.5.2 To Assess the Relationship Between Potential Quality and B2B Multi-Process Mediated by Process Hard Quality

The study through hypotheses H6, and hierarchal path H6a, H6b, H6c, and H6d found that there are direct positive relationships between potential quality (PQ) and B2B multi-process service quality mediated by process hard quality (PSQ). Both paths c are significant. The result indicate the importance of considering both potential quality and process hard quality to achive better B2B cargo clearance service quality.

6.2.5.3 To Assess the Relationship between Potential Quality and B2B Multi-Process Mediated by Soft Process Quality

The study through hypothesesH7, and hierarchal path H7a, H7b, H7c, and H7d found that there are direct positive relationships between potential quality (PQ) and B2B multi-process service quality mediated by hard process quality (POQ). Both paths except path c were significant.

The study concluded that, just as it was advocated by B2B service quality measurement theory, the internal structure and second-order variable model and hierarchal service quality model were useful in measuring B2B multi-process cargo clearance service quality.

The constructs of INDSERV and the sub-constructs accurately predicted B2B multi-process cargo clearance service quality as most of the constructs were statistically significant in measuring the service. Table 6.1 presents a summary of the study findings and conclusion.

Table 6.1: Summary of the Study Conclusion

S/N	Study Objective	Major Finding(s)	Conclusion
i.	To assess the effect of hard quality on B2B multi-process cargo clearance service quality	Hard quality had a significant positive effect on measuring B2B multi-process cargo clearance service quality	Players needed to take full consideration on process hard quality as it had a high contribution in improving B2B multi-process cargo clearance service quality. The results justify the importance of technical quality in measuring service quality.
ii.	To assess the effect of soft quality on B2B multi-process cargo clearance service quality	soft quality had a positive and significant influence on measuring B2B multi-process cargo clearance.	The findings suggest soft process quality dimensions are importance in improving B2B multi-process service quality. All players need to improve their soft process as each of them had a strong positive relationship on measuring B2B multi-process service quality.
iii.	To assess the effect of potential quality on m B2B multi-process cargo clearance service quality	findings indicated that the potential quality had a positive and nonsignificant influence on measuring B2B multi-process cargo clearance	For the improvement of cargo clearance service quality, service providers should not only focus on potential process quality despite its importance but consider other INDSERV constructs as potential quality only had nonsignificant influence in improving B2B multi-process service quality.
iv.	To assess the effect of output quality on B2B multi-process cargo clearance service quality	output quality had a positive and significant influence on measuring B2B multi-process cargo clearance.	All players need to improve their output quality as each of them had a positive relationship on measuring B2B multi-process service quality.
v.	To assess the mediation effect of process soft quality, hard process quality and potential quality on output quality on B2B multi-process cargo clearance service quality	findings indicated that both mediations had significant influence on measuring B2B multi-process cargo clearance	Cargo clearance service providers must make moves to ensure they are operating within the INDSERV internal structure second order latent construct to support the service. The strength of the relationship between constructs depends not only on the relationship between construct with the B2B multi-process service quality but also on the way the constructs are mediated to produce better results

6.3 Study Recommendations

This study argues that for B2B multi-process service quality to be measured appropriately there is a need to use the proper B2B service quality measurement model such as INDSERV in a manner that it takes care of the particular business settings. The cargo clearance business setting suggests for the hierarchal model because it is multi-level nature. The measurements should consider the critical contribution of each construct and sub-constructs in the overall prediction of B2B multi-process service quality. That is, some of the INDSERV dimensions may or may not be critical for B2B multi-process performance in cargo clearance setting. This study recommends that it would be beneficial for the cargo clearance service providers, Government and other stakeholder to change attitudes of focusing on single constructs which are potential process quality and few processes such as terminals and ICDs in solving dwell time and port congestion problem.

The tendency of looking on a few processes or constructs in its isolation causes the reoccurrence of service quality problems in various ports despite various efforts to solve them. The study shows that there are a lot of mediation effects of hard process quality, soft process quality and output quality in predicting B2B multi-process service quality. This study recommends further that, service providers, government and cargo clearance stakeholders should look on sub-constructs contribution to the constructs in designing the cargo clearance service settings. The study indicated the need to enhance inter-process hard and soft process quality as it has both a direct effect on the B2B multi-process service quality and mediating effect on potential quality and output quality.

Academicians and policymakers should focus on the way to improve overall service quality rather than single process service quality or specific constructs. Over the years studies propose for improvement of port infrastructures and space only without looking on hard process quality, soft process quality, and output quality. That is why despite the introduction of ICDs and improving terminal handling equipment the cargo clearance service quality still suffers delays costs in terms of demurrage, storage, customs warehouse rent and removal charges. No wonder the logistics cost of this region is higher compared to the rest of the world, it is common to see terminals and ICDs competing to obtain penalty costs which to a greater extent is the reward of the inefficiency of cargo clearance services. To improve the country's products competitiveness in the international market, proper addresses of challenges of cargo clearance service quality are paramount. It is high time the country could use the proposed B2B multi-process service quality measurement model to address the port of Dar es Salaam cargo clearance inefficiency.

The cargo clearance service users and consumers are the most affected victim’s since they pay for the port inefficiency and tackling the issue as the study model suggests to improve our economy and livelihood of our people. It is also evident from this study that over emphasis on potential quality is a zero-sum game as it will not yield any meaningful benefit for the cargo clearance. The reason is that potential quality on its own has a low effect on B2B multi-process service quality. The significant effect on B2B multi-process service quality depends on hard process quality, soft process quality, and how they mediate the potential quality in predicting B2B service quality.

6.4 Study Implications

6.4.1 Theoretical Implications

Research theoretical gap identified in the literture was lack of existing mesurement tool for B2B multi- process service quality. The use of a INDSERV model in measuring B2B multi-process service quality was new area in research. Further the use of hierarchial model for estimating hierarchical multi- process constructs was noted as new area in research. This study managed to develop a model to measure

B2B multi-process service quality. This study on measuring multi-process B2B service quality as cargo clearance in the port is a complex multi-process and involves many service providers and service users The use of a hierarchical model for estimating hierarchical constructs using PLS-SEM on multi processes in B2B through INDSERV is a new theoretical development in the research. Further, the study managed to show how INDSERV model fit in a multi-process B2B setting.

The study also identified a specific set of service quality dimensions potential quality, hard process quality, soft process quality and output quality with its sub constructs customs, OGDs, terminal and ICDs, shipping agent and freight forwarding) fit in cargo clearance. Further examined how the dimensions match B2B multi-process cargo clearance. The mediation effects of output quality, soft process quality and hard process quality was noted as important tools in measuring B2B multi-process cargo clearance service quality. Further the study developed and tested hierarchical construct model in cargo clearance multi-process. The contribution of each construct and interrelationship between the higher order multi-process constructs namely customs process, shipping agent process, terminal and ICDs process, OGDs process and freight forwarding process using, causal path model measured.

6.4.2 Practical Implications

The study is crucial from both a scientific and practical relevance for scholars and researchers' in B2B multi-process service quality with particular emphasis on some selected stakeholders. These stakeholders include: Ministry of Transport and Communication, Ministry of Finance and Planning, Ministry of Trade, TASAC, ports a, shipping line, freight forwarding and other stakeholders in Tanzania. The study provided the important data and insights on cargo clearance current situation and practice and the best way of measuring its service quality. This study has reaffirmed the applicability of INDSERV model through hierarchal sub-constructs to capture multi-level B2B multi-process service quality. The existence of different organizations being both government organizations and private entities into B2B service quality create needs for a hierarchal model to measure the vertical B2B service quality.

Further the mediation effects of hard process quality, soft process quality and output quality on potential quality bring in the importance of studying how those constructs depend on each other for the improvement of B2B multi-process service quality. This, undoubtedly provided a better understanding for and be a reference point for further research. The cargo service dimensions IPMA results identified management activities that generate the large impact on B2B multi-process cargo clearance service quality.

It further indicated that in order to improve Dar es salaam port cargo clearance focus should be on potential quality and process soft quality as it has higher importance and performance. The study went further to perform indicators IPMA results which show area for management focus in different cargo clearance organizations to improve B2B multi-process service quality. The study managed to indicate that there is no measurement invariance between male and female in Dar es salaam port cargo clearance. The measurement was the same between male and female.

6.4.3 Policy Implications

This study argues that in order to measure B2B multi-process cargo clearance it was paramount to consider how processes were set in terms of potential quality, hard process quality, soft process quality, and output quality. The sub constructs customs, OGDs, Terminal and ICDs , shipping agent and freight forwarding are essential area to study in predicting cargo clearance service quality. B2B multi-process service quality classify service quality in terms of technical quality, function quality and outcome quality. The policy set by the government should take into account the proposed measures of B2B multi-process service quality in order to have a meaningful impact on port efficiency. Failure to consider the contribution of each construct and sub-constructs minimize the benefit of those policies. The study proposed model gives a clear picture of how best resources should be focused to improve port cargo clearance service quality.

Further, the IPMA analysis showed that managerial activities to improve performance should focus on potential quality as it had the most significant importance for B2B cargo clearance service quality compared to other two process hard qualities and process soft quality. A managerial strategy should, therefore, focus and prioritize enhancing process output quality and potential quality. These will be achieved by the process of soft quality. The study shows that it is useful to all three components of B2B multi-process and is able to prioritize in case of an inadequate budget.

6.5 Study Limitation and Areas for Future Research

This study is subject to several limitations. The results showed that process hard quality is a fundamental latent construct in improving B2B multi-process service quality. The model included second-order latent constructs such as potential quality, process soft quality, process hard quality and output quality as drivers for B2B multi-process service quality. The less than one combined confficienct of multiple determination for B2B Multi-process cargo clearance shows that there are other variables at stake that possibly impact B2B multi-process service quality.

Another limitation comes from measurement of B2B multi-process service quality, which was based on hierarchical specific observed variables. The observed variables include customs, OGDs, shipping agency, terminal and inland container depots, and freight forwarders agents. The OGDs, shipping agency and terminals involved different players in those category, there is a need to study each player contribution to the performance of those categories.

This may justify the presence of relatively less than one combined confficienct of multiple determination for B2B multi-process service quality and non-significant relationships between process hard quality and B2B multi-process service quality. Thus, future research may incorporate those individual players services quality. The study employed B2B multi-process service quality category based on Dar es salaam port only. The study warrant further explanation and exploration for transferrable and representation of B2B cargo clearance within other Tanzania ports.

The study didn't consider the inter-process network as a way to improve B2Bmulti-process service quality. Future studies should look into inter-process networking to improve B2B multi-process based on the social capital theory. Social capital is the aggregate of the actual or potential resources linked to possession of durable network of more or less institutionalized relationship. Cargo clearance service providers need to study the best way they can adopt the social capital in improving their service and speed up clearance process.

The academic and practical value to be gained from further research in this area would be tremendous given the increasing importance of the port service quality to the country competitiveness in international market as well as port logistical cost to the end user products price.

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APPENDICES

Appendix I: Questionnaire for Cargo Clearance Service user and Providers

The purpose of this study is to collect information on measuring business to business cargo clearance in the port of Dar es Salaam. You are humbly requested to complete this questionnaire which is central to the success of this study and should take only a short time to complete.

(Please choose one or more answer as applicable to your company/organization and tick the appropriate cell).

A: General Questions

1. What is your gender Male ☐ Female ☐

2. What type of organization do you belong to

    a. Customs Authority ( )
    b. OGDS ( )
    c. Shipping Agency ( )
    d. Consolidators ( )
    e. Inland Container Deports ( )
    f. Freight forwarding agent ( )
    g. Importer and exporter ( )

3. What identifies your firm among the following?

    a. Government institution ( )
    b. Pure Locally owned ( )
    c. Pure Foreign owned but based in Tanzania ( )
    d. Joint Venture Between Foreign and Local investors ( )
    e. Multinational company operating in Tanzania ( )

4. How long have you been in the cargo clearance operations

    a. Less than one year ( )
    b. Between 2 and 5 years ( )
    c. Over 5 – 10 years ( )
    d. Over 10 – 20 years ( )
    e. Over 20 years ( )

5. What is your education level?

    a. Standard seven ( )
    b. O' Level secondary education ( )
    c. A' Level secondary education ( )
    d. Diploma level ( )
    e. First degree level ( )

f. Post graduate level ( )

6. What is your age group?

a. 20 to -30 years ( )

b. 31 to 40 years ( )

c. 41 to 50 years ( )

d. 51 to 60 years ( )

e. Over 60 years ( )

B: **Potential quality items:**Clearance service quality elements that service providers must have in place in order to provide clearance adequately, adequate staff, facilities, and management philosophy.

B1: Customs Process Potential Quality

S/N		**1 – Strongly disagree and 7- Strongly agree**						
		1	***2***	***3***	***4***	***5***	***6***	***7***
7	Customs Authority use up to date technology for cargo clearance							
8	Customs Authority has sufficient modern equipment for cargo clearance							
9	Customs Authority has comptent professional personnel to handle cargo clearance							
10	Customs Authority has sufficient equipment to comunicate with its clients							
11	Customs Authority has speed and reliable network connection all the time							
12	Customs Authority employee work as a team							
13	Customs Authority tariffs are affordable , predictable and ease to pay							

B2: OGDs Process Potential Quality

S/N		1 – Strongly disagree and 7-Strongly agree						
		1	**2**	**3**	**4**	**5**	**6**	**7**
14	OGDS use up to date technology for cargo clearance							
15	OGDS have sufficient modern equipment for cargo clearanc							
16	OGDS have competent professional personnel to handle cargo clearance							
17	OGDS have sufficient equipment to comunicate with its clients							
18	OGDS have speed and reliable network conection all the time							
19	OGDS employee work as a team							
20	OGDS tariffs are affordable , predictable and ease to pay							

B3: Shipping Agency Process Potential Quality

S/N		1 – Strongly disagree and 7-Strongly agree						
		1	**2**	**3**	**4**	**5**	**6**	**7**
21	Shipping Agencies use up to date technology for cargo clearance							
22	Shipping Agencies have sufficient modern equipment for cargo clearance							
23	Shipping Agencies have comptent professional personnel to handle cargo clearance							
24	Shipping Agencies have sufficient equipment to comunicate with its clients							
25	Shipping Agencies have speed and reliable network conection all the time							
26	Shipping Agencies employee work as a team							
27	Shipping Agencies tariffs are affordable , predictable and ease to pay							

B4: Terminal and ICDs Process Potential Quality

S/N		1 – Strongly disagree and 7-Strongly agree						
		1	*2*	*3*	*4*	*5*	*6*	*7*
28	Terminal and ICDs use up to date technology for cargo clearance							
29	Terminal and ICDs have sufficient modern equipment for cargo clearanc							
30	Terminal and ICDs has competent professional personnel to handle cargo clearance							
31	Terminal and ICDs have sufficient equipment to comunicate with its clients							
32	Terminal and ICDs have speed and reliable network conection all the time							
33	Terminal and ICDs employee work as a team							
34	Terminal and ICDs tariffs are affordable , predictable and ease to pay							

B5: Freight Forwarding Process Potential Quality

S/N		1 – Strongly disagree and 7-Strongly agree						
		1	*2*	*3*	*4*	*5*	*6*	*7*
35	Freight Forwarders use up to date technology for cargo clearance							
36	Freight Forwarders have sufficient modern equipment for cargo clearanc							
37	Freight Forwarders has competent professional personnel to handle cargo clearance							
38	Freight Forwarders have sufficient equipment to comunicate with its clients							
39	Freight Forwarders have speed and reliable network conection all the time							
40	Freight Forwarders employee work as a team							
41	Freight Forwarders tariffs are affordable , predictable and ease to pay							

C:Hard quality items: Cargo clearance service quality includes what is being performed during the clearance process. Cargo clearance service plan the providers uses, the accuracy with which the service is delivered.

C1: Customs Process hard quality

S/N		1 – Strongly disagree and 7-Strongly agree						
		1	*2*	*3*	*4*	*5*	*6*	*7*
42	Customs procedures are well designed, clear, detailed enough, known and easy to conform							
43	Customs timely and effectively perform cargo clearance							
44	Customs honor its claims and financial obligations timely							
45	Customs adherence to client cargo clearance schedule							
46	Customs have systerm for transfering documents to other service providers on time							
47	Customs are located near by to facilitate cargo clearance							
48	Customs understand the client's needs well							

C2: OGDs Process hard quality

S/N		1 – Strongly disagree and 7-Strongly agree						
		1	*2*	*3*	*4*	*5*	*6*	*7*
49	OGDs procedures are well designed, clear, detailed enough, known and easy to conform							
50	OGDs timely and effectively perform cargo clearance							
51	OGDs honor its claims and financial obligations timely							
52	OGDs adherence to client cargo clearance schedule							
53	OGDs have systerm for transfering documents to other service providers on time							
54	OGDs are located near by to facilitate cargo clearance							
55	OGDs understand the client's needs well							

C3: Shipping Agency Process hard quality

S/N		1 – Strongly disagree and 7-Strongly agree						
		1	*2*	*3*	*4*	*5*	*6*	*7*
56	Shipping agencies procedures are well designed, clear, detailed enough, known and easy to conform							
57	Shipping agencies timely and effectively perform cargo clearance							
58	Shipping agencies honor its claims and financial obligations timely							
59	Shipping agencies adherence to client cargo clearance schedule							
60	Shipping agencies have systerm for transfering documents to other service providers on time							
61	Shipping agencies are located near by to facilitate cargo clearance							
62	Shipping agencies understand the client's needs well							

C4: Terminal and ICDs Process hard quality

S/N		1 – Strongly disagree and 7- Strongly agree						
		1	*2*	*3*	*4*	*5*	*6*	*7*
63	Terminal and ICDs procedures are well designed, clear, detailed enough, known and easy to conform							
64	Terminal and ICDs timely and effectively perform cargo clearance							
65	Terminal and ICDs honor its claims and financial obligations timely							
66	Terminal and ICDs adherence to client cargo clearance schedule							
67	Terminal and ICDs have systerm for transfering documents to other service providers on time							
68	Terminal and ICDs are located near by to facilitate cargo clearance							
69	Terminal and ICDs understand the client's needs well							

C5: Freight Forwarding Process hard quality

S/N		1 – Strongly disagree and 7- Strongly agree						
		1	*2*	*3*	*4*	*5*	*6*	*7*
70	Freight Forwarding procedures are well designed, clear, detailed enough, known and easy to conform							
71	Freight Forwarding timely and effectively perform cargo clearance							
72	Freight Forwarding honor its claims and financial obligations timely							
73	Freight Forwarding adherence to client cargo clearance schedule							
74	Freight Forwarding have systerm for transfering documents to other service providers on time							
75	Freight Forwarding are located near by to facilitate cargo clearance							
76	Freight Forwarding understand the client's needs well							

D: **Soft quality items: C**argo clearance service quality related to how the service is performed during the clearance process .cargo clearance front-line staff and the interactions involved with the service users.

D1: Customs Process Soft Quality

S/N		1 – Strongly disagree and 7- Strongly agree						
		1	*2*	*3*	*4*	*5*	*6*	*7*
77	Customs Authority accepts responsibility once caused delay on cargo clearance							
78	Customs Authority does not change frequently its procedures and tariffs							
79	Customs Authority listens to client							
80	Customs Authority personnel request for bribe in oder to pass documents							
81	Customs Authority has competent and pleasants personnel							
82	Customs Authority encourage active involvement of their clients on providing their service							
83	Customs Authority and its personel take interest of client at heart							

D2: OGDs Process Soft Quality

S/N		1 – Strongly disagree and 7- Strongly agree						
		1	*2*	*3*	*4*	*5*	*6*	*7*
84	OGDs accepts responsibility once caused delay on cargo clearance							
85	OGDs does not change frequently its procedures and tariffs							
86	OGDs listens to client							
87	OGDs personnel request for bribe in oder to pass documents							
88	OGDs has competent and pleasants personnel							
89	OGDs encourage active involvement of their clients on providing their service							
90	OGDs and its personnel take interest of client at heart							

D3: Shipping Agency Process Soft Quality

S/N		1 – Strongly disagree and 7- Strongly agree						
		1	*2*	*3*	*4*	*5*	*6*	*7*
91	Shipping agencies accepts responsibility once caused delay on cargo clearance							
92	Shipping agencies does not change frequently its procedures and tariffs							
93	Shipping agencies listen to client							
94	Shipping agencies personnel request for bribe in oder to pass documents							
95	Shipping agencies has competent and pleasants personel							
96	Shipping agencies encourage active involvement of their clients on providing their service							
97	Shipping agencies and its personnel take interest of client at heart							

D4: Terminal and ICDs Process Soft Quality

S/N		1 – Strongly disagree and 7- Strongly agree						
		1	*2*	*3*	*4*	*5*	*6*	*7*
98	Terminal and ICDs accept responsibility once caused delay on cargo clearance							
99	Terminal and ICDs does not change frequently its procedures and tariffs							
100	Terminal and ICDs listens to client							
101	Terminal and ICDs personnel request for bribe in oder to pass documents							
102	Terminal and ICDs has competent and pleasants personel							
103	Terminal and ICDs encourage active involvement of their clients on providing their service							
104	Terminal and ICDs and its personnel take interest of client at heart							

D5: Freight Forwarder Process Soft Quality

S/N		1 – Strongly disagree and 7- Strongly agree						
		1	*2*	*3*	*4*	*5*	*6*	*7*
105	Freight Forwarders accepts responsibility once caused delay on cargo clearance							
106	Freight Forwarders does not change frequently its procedures and tariffs							
107	Freight Forwarders listens to client							
108	Freight Forwarders personnel request for bribe in oder to pass documents							
109	Freight Forwarders has competent and pleasants personel							
110	Freight Forwarders encourage active involvement of their clients on providing their service							
111	Freight Forwarders and its personnel take interest of client at heart							

E: **Output quality items: this are** cargo clearance effects that the solution offered by service provider created for the service users, after it has been implemented/ or offered.

E1: Customs Process Output Quality

S/N		1 – Strongly disagree and 7-Strongly agree						
		1	*2*	*3*	*4*	*5*	*6*	*7*
112	Customs Authority clear documents accurately on time							
113	Customs Authority service delivery reduce cargo clearance cost							
114	Customs Authority service delivery contribute to positive port cargo clearance image							
115	Customs Authority service delivery simplify and facilitate international trade							
116	Customs Authority procedures are compatible with other service providers procedures							
117	Customs Authority are timely offered							

E2: OGDs Process Output Quality

S/N		1 – Strongly disagree and 7-Strongly agree						
		1	*2*	*3*	*4*	*5*	*6*	*7*
118	OGDs clear documents accurately on time							
119	OGDs service delivery reduce cargo clearance cost							
120	OGDs service delivery contribute to positive port cargo clearance image							
121	OGDs service delivery simplify and facilitate international trade							
122	OGDs procedures are compatible with other service providers procedures							
123	OGDs are timely offered							

E3: Shipping Agency Process Output Quality

S/N		1 – Strongly disagree and 7-Strongly agree						
		1	*2*	*3*	*4*	*5*	*6*	*7*
124	Shipping agencies clear documents accurately on time							
125	Shipping agencies service delivery reduce cargo clearance cost							
126	Shipping agencies service delivery contribute to positive port cargo clearance image							
127	Shipping agencies service delivery simplify and facilitate international trade							
128	Shipping agencies procedures are compatible with other service providers procedures							
129	Shipping agencies service are timely offered							

E4: Terminals and ICDs Process Output Quality

S/N		1 – Strongly disagree and 7- Strongly agree						
		1	*2*	*3*	*4*	*5*	*6*	*7*
130	Terminal and ICDs clear documents accurately on time							
131	Terminal and ICDs service delivery reduce cargo clearance cost							
132	Terminal and ICDs service delivery contribute to positive port cargo clearance image							
133	Terminal and ICDs service delivery simplify and facilitate international trade							
134	Terminal and ICDs procedures are compatible with other service providers procedures							
135	Terminal and ICDs service are timely offered							

E5: Freight Forwarder Process Output Quality

S/N		1 – Strongly disagree and 7- Strongly agree						
		1	*2*	*3*	*4*	*5*	*6*	*7*
136	Freight forwarders clear documents accurately on time							
137	Freight forwarders service delivery reduce cargo clearance cost							
138	Freight forwarders service delivery contribute to positive port cargo clearance image							
139	Freight forwarders service delivery simplify and facilitate international trade							
140	Freight forwarders procedures are compatible with other service providers procedures							
141	Freight forwarders service are timely offered							

G: B2B Cargo clearance service quality

S/N		1 – Strongly disagree and 7- Strongly agree						
		1	*2*	*3*	*4*	*5*	*6*	*7*
142	Cargo clearance service providers provide their services concurrent							
143	Cargo clearance service providers have efficient communication between each other							
144	Cargo clearance service providers are electronically connected							
145	Cargo clearance service provider(s) have harmonized procedures							
146	Cargo clearance service providers have one clearance platform							

Appendix II: Research Clearance Letters

THE OPEN UNIVERSITY OF TANZANIA

DIRECTORATE OF POSTGRADUATE STUDIES

P.O. Box 23409
Dar es Salaam, Tanzania
http://www.openuniversity.ac.tz

Tel: 255-22-2668992/2668445
ext.2101
Fax: 255-22-2668759
E-mail: dpgs@out.ac.tz

Our Ref: PG201504436

Date: 05th June, 2018

Director General,
Tanzania Shipping Agency Corporation,
P o Box 3093,
Dar es salaam.

RE: RESEARCH CLEARANCE

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

To facilitate and to simplify research process therefore, the act empowers the Vice Chancellor of the Open University of Tanzania to issue research clearance, on behalf of the Government of Tanzania and Tanzania Commission for Science and Technology, to both its staff and students who are doing research in Tanzania. With this brief background, the purpose of this letter is to introduce to you **Mr. Walter Kissimbo Eliakunda, Reg No: PG201504436** pursuing Doctor of Philosophy **(PhD).**We here by grant this clearance to conduct a research titled ***"Measuring Business to Business multiprocess quality study of Dar es salaam Port Cargo clearance." He*** will collect his data in Dar es Salaam region from 06th June 2018 to 30th July 2018.

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

Yours sincerely,

Prof. Hossea Rwegoshora
For: VICE CHANCELLOR
THE OPEN UNIVERSITY OF TANZANIA

THE OPEN UNIVERSITY OF TANZANIA

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Tel: 255-22-2668992/2668445
ext.2101
Fax: 255-22-2668759
E-mail: dpgs@out.ac.tz

Our Ref: PG201504436

Date: 05th June, 2018

Chief Executive Officer,
Tanzania International Container Terminal,
P o Box 7442,
Dar es salaam.

RE: RESEARCH CLEARANCE

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

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ext.2101
Fax: 255-22-2668759
E-mail: dpgs@out.ac.tz

Our Ref: PG201504436

Date: 05th June, 2018

Chief Chemistry,
Government Chemistry Laboratory Authority,
P o Box 164,
Dar es salaam.

RE: RESEARCH CLEARANCE

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

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ext.2101
Fax: 255-22-2668759
E-mail: dpgs@out.ac.tz

Our Ref: PG201504436

Date: 05th June, 2018

Managing Director,
Confederation of Tanzania Industry,
P o Box 71783,
Dar es salaam.

RE: RESEARCH CLEARANCE

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

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ext.2101
Fax: 255-22-2668759
E-mail: dpgs@out.ac.tz

Our Ref: PG201504436

Date: 05th June, 2018

PRESIDENT,
Tanzania Freight Forwarders Association,
P o Box 7997,
Dar es salaam.

RE: RESEARCH CLEARANCE

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

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THE OPEN UNIVERSITY OF TANZANIA

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Fax: 255-22-2668759
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Our Ref: PG201504436

Date: 05th June, 2018

Director General,
Tanzania Bureau of Standards,
P o Box 9524,
Dar es salaam.

RE: RESEARCH CLEARANCE

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Fax: 255-22-2668759
E-mail: dpgs@out.ac.tz

Our Ref: PG201504436

Date: 05th June, 2018

Commissioner of Customs &Excise
Tanzania Revenue Authority,
P o Box 9053,
Dar es salaam.

RE: RESEARCH CLEARANCE

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

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For: VICE CHANCELLOR
THE OPEN UNIVERSITY OF TANZANIA

THE UNITED REPUBLIC OF TANZANIA
MINISTRY OF WORKS, TRANSPORT AND COMMUNICATION
TANZANIA SHIPPING AGENCIES CORPORATION
(TASAC)

Telephone: +255-22-2197500/1
+255-22-2197510
+255-22-2197534
Fax: +255-22-2116697

Mawasiliano House,
Ali Hassan Mwinyi Road,
Nkomo Street
P.O. Box 989
DAR ES SALAAM

Ref. No.: AC 59/237/01

Date: 06th July, 2018

TO WHOM IT MAY CONCERN

RE: INTRODUCTION LETTER

Please refer to the above captioned subject.

TASAC has received a letter from the Open University of Tanzania with Ref. No. PG201504436 dated 05th June, 2018 introducing Mr. Walter Kissimbo Eliakunda who is pursuing Doctor of Philosophy (PhD) at the University and thus conducting a research titled ***"Measuring Business to Business multiprocess quality study of Dar es salaam Port Cargo clearance"***.

The Open University of Tanzania requests TASAC to support the candidate successfully conduct the requisite research which entails collection of data and information from the ports and shipping industry players.

The purpose of this letter is to request your organization to accord the candidate your necessary support by providing him with information as required in the questionnaire.

The Candidate has appointed below research assistants to collect data through the questionnaire:-
1. Michael Eliwangu
2. James Mlula
3. Celina Abunuasi Likate
4. Vatilius Chediel Ngowi
5. Benadetha Apolinary
6. Robert Simon Madundo

Kindly cooperate by filling in the questionnaires.

Tanzania Shipping Agencies Corporation-TASAC

Eng. Japhet L. Loisimaye
ACTING DIRECTOR GENERAL

Appendix III: Summary Steps for Data Analysis

Criterion	**Description**	**Results of Key statistics**	**Suggested literature**
Data cleaning:			
Collinearity	Variance inflation factor can be used to test for multicollinearity among observed variables in a formative block. Suggesting that each indicator contribute significantly to its formative block.	VIF < 5 Other VIF < 10 Tolerance > 0.20	Hair et al., (2013)
Common method bias		CMB < 50% of variance	MacKenzie and Podsakoff(2012)
Descriptive analysis:			
Demographic details of respondents			
Frequencies and percentages			
Cross-tabulation and Chi-square distribution			
Measurement model(outer)			
Indicators content validity	Significance at the 0.05 level suggests that an indicator is relevant for constructing formative index and thus demonstrates a sufficient level of validity	Also path coefficients greater than .10 or .200	Assaker et al.(2012)
Indicator weights	The indicator absolute contribution to the construct		
Standard errors Report t-value p-values or standard errors	Significance weights		
Indicator loadings	Indicator absolute contribution to construct		
Redundancy analyses		Greater than .80	
Structural model(Inner)			
Collinearity			
Does the model include **formatively** measured constructs?	Redundancy analysis to test the convergent validity of the formatively measured constructs.	Standardized loading greater than ,70 up to .90 Items are multidimensionality	Chin(2010); Ringle *et al*.(2018)
Predictive relevance:			
Coefficients of determination R^2 - Model validity	Endogenous constructs explained variance	An acceptable level depend on the research context	Hair *et al*.(2013)

Criterion	**Description**	**Results of Key statistics**	**Suggested literature**
Q^2	Predictive relevance	.02 for weak .15 for moderate .35 for strong effect	Hair *et al.*(2013)
PLSpredict			
f^2	Effect size	.02 for weak .15 for moderate .35 for strong effect	Hair et al., (2013)
Structural predictive hypothesis-Path coefficients.	Path coefficient between LV should be analyzed in terms of their algebraic sign, magnitude and significance.	Use bootstrapping to assess significance	Hair *et al.(*2013)
Indicator validity	The reflective measurement model should achieve their relevance in which higher than .60.	Indicator weight 0.60	Chin(1998)
Assessment of heterogeneous data structures			
Cross-validated redundancy			
Relative predicted relevance q2			Ringle *et al.*(2018)
Overall goodness -of-fit	path coefficient-absolute values		
Standardized root mean square residual(SRMR)	SRMR		Dijkstra and Henseler (2015)
The root mean square residual covariance	RMS_{theta}		Dijkstra and Henseler (2015)
The normed fit index(NFI)-The Tucker –Lewis Index	NFI		Dijkstra and Henseler (2015)
The exact model fit test			Dijkstra and Henseler (2015)
Significance levels, t-values, p-values			
Heterogeneity	Observed Unobserved		

Source: Researcher compilation, 2018

Appendix IV: Common Method Variance

Total Variance Explained

Component	Initial Eigenvalues			Extraction Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	52.859	45.179	45.179	52.859	45.179	45.179
2	5.511	4.711	49.890	5.511	4.711	49.890
3	3.100	2.649	52.539	3.100	2.649	52.539
4	2.583	2.208	54.747	2.583	2.208	54.747
5	2.373	2.029	56.775	2.373	2.029	56.775
6	2.138	1.828	58.603	2.138	1.828	58.603
7	1.847	1.578	60.181	1.847	1.578	60.181
8	1.545	1.320	61.502	1.545	1.320	61.502
9	1.394	1.191	62.693	1.394	1.191	62.693
10	1.274	1.089	63.782	1.274	1.089	63.782
11	1.210	1.035	64.816	1.210	1.035	64.816
12	1.193	1.020	65.836	1.193	1.020	65.836
13	1.154	.986	66.822	1.154	.986	66.822
14	1.116	.954	67.776	1.116	.954	67.776
15	1.042	.891	68.667	1.042	.891	68.667
16	1.032	.882	69.550	1.032	.882	69.550
17	.969	.828	70.378			
18	.922	.788	71.166			
19	.915	.782	71.948			
20	.878	.751	72.698			
21	.836	.715	73.413			
22	.818	.699	74.112			
23	.808	.691	74.803			
24	.764	.653	75.456			
25	.733	.627	76.083			
26	.715	.611	76.694			
27	.701	.599	77.293			
28	.685	.586	77.878			
29	.663	.566	78.445			
30	.649	.555	79.000			
31	.638	.545	79.545			
32	.622	.532	80.077			
33	.614	.525	80.602			
34	.599	.512	81.113			
35	.577	.494	81.607			
36	.576	.492	82.099			
37	.550	.471	82.570			
38	.541	.462	83.032			
39	.532	.455	83.487			
40	.531	.454	83.940			
41	.511	.437	84.377			
42	.503	.430	84.807			
43	.492	.420	85.228			
44	.484	.413	85.641			
45	.478	.409	86.050			
46	.471	.403	86.453			
47	.459	.393	86.845			
48	.451	.385	87.230			

49	.443	.379	87.609			
50	.433	.370	87.979			
51	.423	.361	88.341			
52	.415	.355	88.695			
53	.401	.342	89.038			
54	.395	.338	89.375			
55	.389	.332	89.708			
56	.384	.328	90.036			
57	.367	.314	90.349			
58	.360	.307	90.657			
59	.348	.298	90.954			
60	.342	.292	91.246			
61	.339	.290	91.537			
62	.332	.284	91.820			
63	.321	.274	92.095			
64	.314	.268	92.363			
65	.302	.258	92.621			
66	.295	.252	92.873			
67	.293	.250	93.123			
68	.283	.242	93.365			
69	.278	.237	93.602			
70	.277	.237	93.839			
71	.269	.230	94.069			
72	.264	.226	94.295			
73	.260	.222	94.517			
74	.248	.212	94.729			
75	.247	.211	94.941			
76	.244	.208	95.149			
77	.236	.202	95.351			
78	.231	.197	95.548			
79	.224	.191	95.740			
80	.219	.187	95.927			
81	.213	.182	96.109			
82	.208	.178	96.286			
83	.201	.171	96.458			
84	.197	.168	96.626			
85	.191	.163	96.789			
86	.186	.159	96.948			
87	.181	.155	97.103			
88	.174	.149	97.252			
89	.174	.149	97.400			
90	.163	.140	97.540			
91	.159	.136	97.676			
92	.158	.135	97.811			
93	.154	.132	97.943			
94	.148	.127	98.070			
95	.147	.125	98.195			
96	.143	.123	98.318			
97	.133	.114	98.431			
98	.127	.109	98.540			
99	.126	.107	98.647			
100	.114	.098	98.745			
101	.113	.097	98.842			
102	.112	.095	98.937			
103	.109	.093	99.031			
104	.106	.091	99.122			
105	.103	.088	99.209			

106	.100	.086	99.295			
107	.095	.081	99.376			
108	.090	.077	99.453			
109	.088	.075	99.528			
110	.084	.072	99.600			
111	.079	.068	99.668			
112	.078	.067	99.734			
113	.073	.063	99.797			
114	.066	.056	99.853			
115	.061	.052	99.905			
116	.058	.049	99.955			
117	.053	.045	100.000			

Extraction Method: Principal Component Analysis.

Appendix V: Outer Loadings before Deletions

No	Item	B2B service quality	Cust OQ	Cust PHQ	Cust PQ	Cust PSQ	FF OQ	FF PHQ	FF PQ	FF PSQ	ICD HPQ	ICD OQ	ICD PQ	ICD PSQ	OGD OQ	OGD PHQ	OGD PQ	OGD PSQ	SA OQ	SA PHQ	SA PQ	SA PSQ
1	BSQ_4	.74																				
2	BSQ_1	.76																				
3	BSQ_2	.77																				
4	BSQ_5	.77																				
5	BSQ_3	.79																				
6	CDPHQ_2										.78											
7	CustOQ_1		.76																			
8	CustOQ_2		.78																			
9	CustOQ_3		.73																			
10	CustOQ_4		.72																			
11	CustOQ_5		.74																			
12	CustOQ_6		.76																			
13	CustPHQ_1			.72																		
14	CustPHQ_2			.76																		
15	CustPHQ_3			.74																		
16	CustPHQ_4			.76																		
17	CustPHQ_5			.74																		
18	CustPQ_1				.81																	
19	CustPQ_2				.85																	
20	CustPQ_3				.80																	

No	Item	B2B service quality	Cust OQ	Cust PHQ	Cust PQ	Cust PSQ	FF OQ	FF PHQ	FF PQ	FF PSQ	ICD HPQ	ICD OQ	ICD PQ	ICD PSQ	OGD OQ	OGD PHQ	OGD PQ	OGD PSQ	SA OQ	SA PHQ	SA PQ	SA PSQ
21	CustPQ_4				.83																	
22	CustPQ_5				.81																	
23	CustPQ_6				.77																	
24	CustPQ_7				.80																	
25	CustPSQ_1					.79																
26	CustPSQ_2					.81																
27	CustPSQ_3					.79																
28	CustPSQ_4					.80																
29	CustPSQ_5					.80																
30	FFOQ_1						.78															
31	FFOQ_2						.77															
32	FFOQ_3						.76															
33	FFOQ_4						.75															
34	FFOQ_5						.75															
35	FFOQ_6						.79															
36	FFPHQ_1							.77														
37	FFPHQ_2							.53														
38	FFPHQ_3							.76														
39	FFPHQ_4							.78														
40	FFPHQ_5							.74														
41	FFPQ_1								.74													
42	FFPQ_2								.77													
43	FFPQ_3								.76													

No	Item	B2B service quality	Cust OQ	Cust PHQ	Cust PQ	Cust PSQ	FF OQ	FF PHQ	FF PQ	FF PSQ	ICD HPQ	ICD OQ	ICD PQ	ICD PSQ	OGD OQ	OGD PHQ	OGDP Q	OGD PSQ	SA OQ	SA PHQ	SA PQ	SA PSQ
44	FFPQ_4								.73													
45	FFPSQ_1									.79												
46	FFPSQ_2									.80												
47	FFPSQ_4									.83												
48	FFPSQ_5									.77												
49	FFPSQ_6									.75												
50	FFPSQ_7									.76												
51	ICDOQ_1											.78										
52	ICDOQ_2											.83										
53	ICDOQ_3											.77										
54	ICDOQ_4											.77										
55	ICDOQ_5											.76										
56	ICDOQ_6											.80										
57	ICDPHQ_1										.75											
58	ICDPHQ_3										.76											
59	ICDPHQ_4										.74											
60	ICDPHQ_5										.74											
61	ICDPHQ_6										.78											
62	ICDPQ_1												.74									
63	ICDPQ_2												.79									
64	ICDPQ_3												.79									
65	ICDPQ_4												.79									
66	ICDPSQ_1													.75								

No	Item	B2B service quality	Cust OQ	Cust PHQ	Cust PQ	Cust PSQ	FF OQ	FF PHQ	FF PQ	FF PSQ	ICD HPQ	ICD OQ	ICD PQ	ICD PSQ	OGD OQ	OGD PHQ	OGD PQ	OGD PSQ	SA OQ	SA PHQ	SA PQ	SA PSQ
67	ICDPSQ_2													.77								
68	ICDPSQ_3													.68								
69	ICDPSQ_4													.70								
70	ICDPSQ_5													.76								
71	ICDPSQ_6													.70								
72	ICDPSQ_7													.78								
73	OGDOQ_1														.78							
74	OGDOQ_2														.79							
75	OGDOQ_3														.75							
76	OGDOQ_4														.77							
77	OGDOQ_5														.75							
78	OGDOQ_6														.78							
79	OGDPHQ_1															.36						
80	OGDPHQ_2															.78						
81	OGDPHQ_3															.71						
82	OGDPHQ_4															.76						
83	OGDPHQ_5															.83						
84	OGDPHQ_6															.76						
85	OGDPHQ_7															.77						
86	OGDPQ_1																.75					

No	Item	B2B service quality	Cust OQ	Cust PHQ	Cust PQ	Cust PSQ	FFOQ	FFPHQ	FFPQ	FFPSQ	ICDHPQ	ICDOQ	ICDPQ	ICDPSQ	OGDOQ	OGDPHQ	OGDPQ	OGDPSQ	SAOQ	SAPHQ	SAPQ	SAPSQ
87	OGDPQ_2																.62					
88	OGDPQ_3																.72					
89	OGDPQ_4																.62					
90	OGDPQ_5																.64					
91	OGDPSQ_1																	.74				
92	OGDPSQ_2																	.76				
93	OGDPSQ_3																	.74				
94	OGDPSQ_4																	.75				
95	OGDPSQ_5																	.73				
96	OGDPSQ_6																	.77				
97	OGDPSQ_7																	.77				
98	SAOQ_1																		.75			
99	SAOQ_2																		.78			
100	SAOQ_3																		.72			
101	SAOQ_4																		.74			
102	SAOQ_5																		.78			
103	SAOQ_6																		.74			
104	SAPHQ_1																			.73		

No	Item	B2B service quality	Cust OQ	Cust PHQ	Cust PQ	Cust PSQ	FFOQ	FFPHQ	FFPQ	FFPSQ	ICDHPQ	ICDOQ	ICDPQ	ICDPSQ	OGDOQ	OGDPHQ	OGDPQ	OGDPSQ	SAOQ	SAPHQ	SAPQ	SAPSQ
105	SAPHQ_2																			.75		
106	SAPHQ_3																			.51		
107	SAPHQ_4																			.80		
108	SAPHQ_5																			.65		
109	SAPHQ_6																			.79		
110	SAPQ_1																				.68	
111	SAPQ_2																				.66	
112	SAPQ_3																				.52	
113	SAPQ_4																				.57	
114	SAPQ_5																				.74	
115	SAPQ_6																				.70	
116	SAPQ_7																				.72	
117	SAPSQ_1																					.74
118	SAPSQ_2																					.76
119	SAPSQ_3																					.67
120	SAPSQ_4																					.74
12	SAPSQ_5																					.78

No	Item	B2B service quality	Cust OQ	Cust PHQ	Cust PQ	Cust PSQ	FFOQ	FFPHQ	FFPQ	FFPSQ	ICDHPQ	ICDOQ	ICDPQ	ICDPSQ	OGDOQ	OGDPHQ	OGDPQ	OGDPSQ	SAOQ	SAPHQ	SAPQ	SAPSQ
1																						
122	SAPSQ_6																					.70
123	SAPSQ_7																					.75

Appendix VI: Psychometric Properties of First order Latent Construct

No	Construct	Item	Loading	CR	AVE
1	B2B Multi-process service quality	BSQ_1	0.759	0.875	0.584
2		BSQ_2	0.766		
3		BSQ_3	0.788		
4		BSQ_4	0.737		
5		BSQ_5	0.772		
6	Customs output quality	CustOQ_1	0.72	0.884	0.56
7		CustOQ_2	0.727		
8		CustOQ_3	0.739		
9		CustOQ_4	0.756		
10		CustOQ_5	0.76		
11		CustOQ_6	0.784		
12	Customs process hard quality	CustPHQ_1	0.723	0.863	0.557
13		CustPHQ_2	0.735		
14		CustPHQ_3	0.744		
15		CustPHQ_4	0.763		
16		CustPHQ_5	0.764		
17	Customs potential quality	CustPQ_1	0.771	0.93	0.655
18		CustPQ_2	0.798		
19		CustPQ_3	0.799		
20		CustPQ_4	0.81		
21		CustPQ_5	0.813		
22		CustPQ_6	0.826		
23		CustPQ_7	0.845		
24	Customs process soft quality	CustPSQ_1	0.785	0.897	0.634
25		CustPSQ_2	0.79		
26		CustPSQ_3	0.795		
27		CustPSQ_4	0.797		
28		CustPSQ_5	0.814		
29	Freight forwarding agent output quality	FFOQ_1	0.752	0.895	0.586
30		FFOQ_2	0.754		
31		FFOQ_3	0.756		
32		FFOQ_4	0.766		
33		FFOQ_5	0.78		
34		FFOQ_6	0.786		
35	Freight forwarding agent process hard quality	FFPHQ_1	0.529	0.854	0.594
36		FFPHQ_2	0.736		
37		FFPHQ_3	0.755		
38		FFPHQ_4	0.767		
39		FFPHQ_5	0.778		
40	Freight forwarding agent potential quality	FFPQ_1	0.739	0.839	0.565

No	Construct	Item	Loading	CR	AVE
41		FFPQ_2	0.773		
42		FFPQ_3	0.763		
43		FFPQ_4	0.731		
44	Freight forwarding agent process soft quality	FFPSQ_1	0.747	0.905	0.613
45		FFPSQ_2	0.763		
46		FFPSQ_4	0.769		
47		FFPSQ_5	0.786		
48		FFPSQ_6	0.804		
49		FFPSQ_7	0.827		
50	Inland container Output quality	ICDOQ_1	0.761	0.906	0.617
51		ICDOQ_2	0.768		
52		ICDOQ_3	0.773		
53		ICDOQ_4	0.782		
54		ICDOQ_5	0.801		
55		ICDOQ_6	0.826		
56	Inland container process hard quality	ICDPHQ_1	0.737	0.89	0.574
57		ICDPHQ_2	0.78		
58		ICDPHQ_3	0.742		
59		ICDPHQ_4	0.745		
60		ICDPHQ_5	0.763		
61		ICDPHQ_6	0.782		
62	Inland container potential quality	ICDPQ_1	0.738	0.86	0.605
63		ICDPQ_2	0.79		
64		ICDPQ_3	0.791		
65		ICDPQ_4	0.792		
66	Inland container process soft quality	ICDPSQ_1	0.677	0.887	0.566
67		ICDPSQ_2	0.696		
68		ICDPSQ_3	0.703		
69		ICDPSQ_4	0.752		
70		ICDPSQ_5	0.761		
71		ICDPSQ_6	0.773		
72		ICDPSQ_7	0.777		
73	OGDS output quality	OGDOQ_1	0.746	0.896	0.589
74		OGDOQ_2	0.747		
75		OGDOQ_3	0.768		
76		OGDOQ_4	0.775		
77		OGDOQ_5	0.779		
78		OGDOQ_6	0.789		
79	OGDS process hard quality	OGDPHQ_1	0.361	0.881	0.525
80		OGDPHQ_2	0.709		
81		OGDPHQ_3	0.759		
82		OGDPHQ_4	0.764		
83		OGDPHQ_5	0.765		

No	Construct	Item	Loading	CR	AVE
84		OGDPHQ_6	0.783		
85		OGDPHQ_7	0.827		
86	OGDS potential quality	OGDPQ_1	0.62	0.792	0.564
87		OGDPQ_2	0.624		
88		OGDPQ_3	0.644		
89		OGDPQ_4	0.717		
90		OGDPQ_5	0.751		
91	OGDS process soft quality	OGDPSQ_1	0.731	0.892	0.578
92		OGDPSQ_2	0.735		
93		OGDPSQ_3	0.743		
94		OGDPSQ_4	0.746		
95		OGDPSQ_5	0.756		
96		OGDPSQ_6	0.769		
97		OGDPSQ_7	0.772		
98	Shipping agency output quality	SAOQ_1	0.72	0.886	0.566
99		SAOQ_2	0.741		
100		SAOQ_3	0.744		
101		SAOQ_4	0.746		
102		SAOQ_5	0.778		
103		SAOQ_6	0.781		
104	Shipping agency potential quality	SAPHQ_1	0.512	0.868	0.623
105		SAPHQ_2	0.646		
106		SAPHQ_3	0.734		
107		SAPHQ_4	0.746		
108		SAPHQ_5	0.792		
109		SAPHQ_6	0.797		
110	Shipping agency potential quality	SAPQ_1	0.524	0.84	0.57
111		SAPQ_2	0.572		
112		SAPQ_3	0.655		
113		SAPQ_4	0.677		
114		SAPQ_5	0.7		
115		SAPQ_6	0.722		
116		SAPQ_7	0.737		
117	Shipping agency process soft quality	SAPSQ_1	0.668	0.887	0.568
118		SAPSQ_2	0.695		
119		SAPSQ_3	0.743		
120		SAPSQ_4	0.743		
121		SAPSQ_5	0.75		
122		SAPSQ_6	0.76		
123		SAPSQ_7	0.782		

Appendix VII: Cross Loadings for HCM

	COQ	CPHQ	CPQ	CPSQ	FOQ	FPSQ	FPQ	FPHQ	OOQ	OPHQ	OPQ	OPSQ	SOQ	SPHQ	SPQ	SPSQ	TPSQ	TOQ	TPHQ	TPQ
COQ_1	**.78**	.44	.45	.59	.50	.72	.41	.47	.64	.40	.47	.57	.64	.45	.57	.58	.53	.53	.44	.47
COQ_2	**.82**	.55	.40	.67	.59	.78	.48	.56	.69	.53	.45	.66	.68	.50	.57	.70	.66	.59	.53	.50
COQ_3	**.81**	.45	.38	.58	.52	.75	.42	.47	.68	.45	.33	.60	.66	.44	.50	.61	.60	.51	.45	.40
COQ_4	**.78**	.52	.38	.60	.54	.75	.43	.53	.68	.54	.39	0.62	.64	.51	.53	.67	.63	.58	.53	.50
COQ_5	**.83**	.48	.37	.56	.52	.76	.41	.47	.68	.45	.32	.59	.65	.43	.50	.63	.61	.52	.50	.41
COQ_6	**.82**	.49	.35	.61	.55	.76	.44	.53	.68	.50	.31	.59	.63	.44	.52	.67	.58	.55	.50	.43
CPHQ_5	.54	**.88**	.39	.52	.47	.56	.52	.53	.54	.54	.46	.54	.54	.49	.57	.55	.57	.45	.52	.44
CPHQ_6	.49	**.84**	.41	.58	.45	.51	.56	.58	.48	.55	.39	.54	.49	.50	.58	.61	.53	.44	.60	.48
CPQ_1	.48	.47	**1**	.53	.44	.50	.51	.51	.49	.48	.50	.50	.49	.50	.60	.48	.50	.46	.44	.41
CPSQ_1	.65	.54	.57	**.82**	.52	.67	.57	.59	.60	.54	.55	.72	.62	.58	.63	.65	.64	.59	.53	.53
CPSQ_2	.61	.53	.46	**.82**	.55	.64	.54	.63	.57	.60	.38	.70	.55	.57	.64	.66	.62	.56	.58	.51
CPSQ_3	0.55	0.43	0.35	**0.73**	0.46	0.58	0.47	0.52	0.50	0.52	0.35	0.64	0.54	0.47	0.51	0.55	0.54	0.50	0.52	0.41
CPSQ_4	0.56	0.48	0.33	**0.81**	0.51	0.59	0.49	0.58	0.52	0.52	0.37	0.67	0.54	0.51	0.53	0.63	0.58	0.52	0.55	0.49
CPSQ_6	0.62	0.50	0.38	**0.82**	0.54	0.65	0.51	0.60	0.58	0.59	0.38	0.74	0.59	0.51	0.58	0.67	0.65	0.56	0.56	0.45
CPSQ_7	0.60	0.57	0.43	**0.82**	0.56	0.63	0.56	0.59	0.59	0.50	0.43	0.76	0.60	0.50	0.58	0.67	0.66	0.56	0.58	0.50
FOQ_1	0.57	0.47	0.44	0.55	**0.80**	0.59	0.45	0.49	0.62	0.38	0.49	0.54	0.66	0.44	0.54	0.60	0.57	0.72	0.43	0.39
FOQ_2	0.52	0.42	0.35	0.51	**0.81**	0.54	0.42	0.46	0.60	0.43	0.32	0.55	0.62	0.42	0.49	0.59	0.54	0.70	0.43	0.39
FOQ_3	0.54	0.43	0.34	0.53	**0.79**	0.57	0.43	0.49	0.61	0.42	0.35	0.55	0.61	0.41	0.49	0.58	0.55	0.72	0.46	0.39
FOQ_4	0.53	0.41	0.30	0.53	**0.80**	0.52	0.40	0.47	0.58	0.42	0.29	0.55	0.58	0.41	0.44	0.56	0.51	0.72	0.43	0.39

FOQ_5	0.54	0.44	0.34	0.53	**0.79**	0.57	0.44	0.47	0.59	0.40	0.31	0.56	0.59	0.44	0.48	0.58	0.58	0.73	0.43	0.44
FOQ_6	0.53	0.44	0.34	0.52	**0.85**	0.57	0.46	0.46	0.59	0.43	0.36	0.54	0.58	0.45	0.47	0.59	0.56	0.73	0.47	0.38
FPSQ_1	0.73	0.54	0.52	0.66	0.57	**0.81**	0.51	0.56	0.67	0.51	0.53	0.64	0.67	0.52	0.61	0.69	0.66	0.60	0.53	0.47
FPSQ_2	0.76	0.51	0.38	0.67	0.59	**0.82**	0.45	0.53	0.69	0.56	0.39	0.66	0.67	0.50	0.57	0.69	0.65	0.59	0.51	0.45
FPSQ_3	0.66	0.45	0.38	0.56	0.48	**0.73**	0.45	0.52	0.58	0.48	0.34	0.56	0.58	0.50	0.54	0.59	0.60	0.52	0.48	0.45
FPSQ_4	0.78	0.49	0.39	0.65	0.58	**0.83**	0.46	0.54	0.70	0.53	0.40	0.67	0.65	0.49	0.52	0.69	0.65	0.58	0.50	0.45
FPSQ_5	0.77	0.53	0.39	0.63	0.56	**0.82**	0.50	0.53	0.66	0.49	0.38	0.61	0.64	0.49	0.59	0.67	0.63	0.57	0.52	0.50
FPSQ_6	0.76	0.46	0.40	0.61	0.57	**0.78**	0.47	0.53	0.67	0.48	0.39	0.62	0.63	0.45	0.52	0.68	0.65	0.58	0.50	0.46
FPSQ_7	0.76	0.54	0.38	0.63	0.54	**0.82**	0.48	0.53	0.64	0.51	0.36	0.64	0.63	0.50	0.53	0.69	0.63	0.56	0.53	0.46
FPQ_2	0.47	0.48	0.48	0.57	0.48	0.51	**0.82**	0.62	0.46	0.50	0.43	0.53	0.46	0.52	0.57	0.51	0.50	0.48	0.54	0.52
FPQ_4	0.39	0.49	0.38	0.48	0.40	0.43	**0.79**	0.51	0.39	0.51	0.41	0.45	0.38	0.47	0.51	0.43	0.45	0.35	0.48	0.45
FPQ_7	0.44	0.55	0.40	0.54	0.43	0.50	**0.83**	0.57	0.41	0.56	0.40	0.49	0.41	0.48	0.51	0.50	0.48	0.42	0.52	0.43
FPHQ_1	0.51	0.52	0.48	0.60	0.46	0.54	0.53	**0.81**	0.52	0.55	0.53	0.53	0.56	0.58	0.65	0.54	0.54	0.48	0.54	0.52
FPHQ_4	0.46	0.48	0.40	0.55	0.46	0.50	0.55	**0.81**	0.46	0.56	0.34	0.51	0.47	0.48	0.56	0.53	0.52	0.43	0.55	0.47
FPHQ_6	0.52	0.54	0.42	0.62	0.49	0.55	0.57	**0.79**	0.51	0.62	0.41	0.54	0.53	0.55	0.61	0.60	0.55	0.49	0.60	0.51
FPHQ_7	0.52	0.53	0.37	0.60	0.47	0.56	0.58	**0.81**	0.50	0.57	0.35	0.56	0.48	0.53	0.58	0.57	0.57	0.50	0.59	0.47
OOQ_1	0.70	0.48	0.50	0.57	0.61	0.70	0.41	0.51	**0.82**	0.48	0.56	0.58	0.71	0.48	0.58	0.60	0.58	0.60	0.43	0.38

OOQ_2	0.70	0.46	0.38	0.57	0.61	0.69	0.40	0.51	**0.84**	0.51	0.35	0.59	0.69	0.41	0.52	0.63	0.55	0.60	0.47	0.39
OOQ_3	0.69	0.52	0.43	0.58	0.60	0.66	0.44	0.53	**0.82**	0.47	0.36	0.58	0.75	0.47	0.55	0.61	0.59	0.62	0.53	0.43
OOQ_4	0.68	0.46	0.37	0.57	0.61	0.67	0.38	0.53	**0.82**	0.48	0.36	0.59	0.74	0.42	0.51	0.60	0.60	0.64	0.48	0.39
OOQ_5	0.67	0.52	0.34	0.57	0.60	0.65	0.46	0.49	**0.80**	0.43	0.33	0.58	0.74	0.42	0.49	0.63	0.57	0.60	0.51	0.42
OOQ_6	0.67	0.47	0.38	0.57	0.62	0.65	0.43	0.47	**0.82**	0.47	0.40	0.57	0.73	0.42	0.48	0.61	0.56	0.65	0.48	0.42
OPHQ_2	0.53	0.59	0.44	0.60	0.45	0.56	0.58	0.62	0.51	**0.84**	0.45	0.52	0.48	0.60	0.60	0.54	0.49	0.48	0.61	0.48
OPHQ_3	0.45	0.52	0.38	0.52	0.39	0.49	0.53	0.54	0.44	**0.77**	0.36	0.48	0.43	0.57	0.52	0.48	0.48	0.42	0.54	0.45
OPHQ_4	0.47	0.51	0.38	0.56	0.41	0.51	0.49	0.56	0.46	**0.83**	0.35	0.51	0.44	0.58	0.53	0.52	0.49	0.44	0.57	0.42
OPHQ_6	0.48	0.48	0.38	0.55	0.42	0.52	0.52	0.61	0.48	**0.85**	0.36	0.51	0.43	0.63	0.55	0.51	0.48	0.47	0.60	0.44
OGDPQ_1	0.46	0.50	0.50	0.52	0.44	0.50	0.50	0.50	0.48	0.46	**1.00**	0.48	0.48	0.52	0.60	0.49	0.49	0.44	0.41	0.49
OPSQ_1	0.56	0.53	0.45	0.71	0.54	0.59	0.50	0.56	0.55	0.48	0.46	**0.78**	0.57	0.53	0.56	0.61	0.59	0.54	0.48	0.49
OPSQ_2	0.59	0.48	0.43	0.75	0.52	0.62	0.48	0.57	0.55	0.53	0.41	**0.79**	0.56	0.50	0.59	0.62	0.57	0.54	0.53	0.52
OPSQ_3	0.62	0.53	0.37	0.71	0.55	0.63	0.47	0.52	0.59	0.49	0.37	**0.78**	0.60	0.47	0.55	0.64	0.62	0.55	0.52	0.43
OPSQ_4	0.58	0.49	0.35	0.66	0.53	0.61	0.44	0.51	0.55	0.45	0.34	**0.77**	0.56	0.41	0.47	0.66	0.62	0.51	0.45	0.43
OPSQ_5	0.59	0.52	0.37	0.66	0.55	0.62	0.48	0.51	0.58	0.50	0.36	**0.80**	0.57	0.46	0.53	0.63	0.61	0.53	0.50	0.43
OPSQ_7	0.61	0.48	0.40	0.69	0.54	0.64	0.50	0.50	0.57	0.49	0.36	**0.84**	0.54	0.48	0.52	0.64	0.63	0.55	0.50	0.45
SOQ_1	0.67	0.51	0.49	0.62	0.59	0.65	0.41	0.54	0.73	0.46	0.50	0.60	**0.83**	0.44	0.58	0.63	0.56	0.60	0.52	0.45

SOQ_2	0.67	0.51	0.39	0.62	0.62	0.67	0.43	0.53	0.74	0.48	0.40	0.62	**0.82**	0.48	0.58	0.62	0.63	0.61	0.48	0.49
SOQ_3	0.65	0.49	0.41	0.54	0.58	0.63	0.42	0.49	0.71	0.42	0.34	0.53	**0.80**	0.41	0.51	0.56	0.58	0.60	0.44	0.40
SOQ_5	0.69	0.50	0.35	0.60	0.68	0.68	0.43	0.53	0.76	0.45	0.36	0.61	**0.87**	0.46	0.53	0.61	0.60	0.67	0.46	0.38
SPHQ_1	0.48	0.49	0.47	0.57	0.47	0.50	0.50	0.56	0.47	0.60	0.50	0.51	0.51	**0.86**	0.59	0.51	0.48	0.52	0.51	0.50
SPHQ_7	0.52	0.53	0.42	0.58	0.47	0.58	0.56	0.61	0.47	0.68	0.43	0.54	0.46	**0.91**	0.58	0.55	0.54	0.50	0.60	0.52
SPQ_1	0.56	0.52	0.51	0.62	0.51	0.58	0.50	0.59	0.53	0.51	0.57	0.56	0.56	0.52	**0.83**	0.58	0.56	0.52	0.56	0.57
SPQ_2	0.56	0.55	0.48	0.61	0.48	0.58	0.54	0.63	0.54	0.61	0.41	0.60	0.52	0.57	**0.78**	0.56	0.59	0.47	0.60	0.56
SPQ_5	0.50	0.54	0.49	0.53	0.47	0.53	0.52	0.57	0.50	0.50	0.49	0.50	0.53	0.52	**0.81**	0.51	0.54	0.47	0.49	0.60
SPQ_7	0.49	0.55	0.43	0.55	0.45	0.52	0.53	0.59	0.48	0.54	0.44	0.52	0.52	0.51	**0.80**	0.49	0.53	0.43	0.58	0.62
SPSQ_1	0.64	0.52	0.44	0.65	0.54	0.69	0.47	0.55	0.59	0.44	0.48	0.63	0.57	0.48	0.53	**0.79**	0.62	0.57	0.50	0.49
SPSQ_2	0.64	0.48	0.38	0.63	0.58	0.66	0.41	0.53	0.61	0.53	0.35	0.64	0.57	0.45	0.50	**0.81**	0.66	0.57	0.57	0.43
SPSQ_4	0.62	0.53	0.36	0.60	0.55	0.64	0.44	0.54	0.58	0.49	0.36	0.60	0.60	0.45	0.49	**0.80**	0.64	0.55	0.54	0.46
SPSQ_5	0.66	0.62	0.39	0.66	0.58	0.69	0.52	0.61	0.62	0.52	0.41	0.67	0.64	0.49	0.60	**0.81**	0.70	0.58	0.64	0.55
SPSQ_6	0.61	0.49	0.37	0.63	0.56	0.65	0.44	0.51	0.59	0.50	0.32	0.63	0.55	0.47	0.49	**0.75**	0.66	0.58	0.54	0.40
SPSQ_7	0.60	0.57	0.33	0.62	0.62	0.66	0.52	0.56	0.58	0.51	0.38	0.63	0.55	0.51	0.55	**0.80**	0.69	0.58	0.58	0.47
TPSQ_2	0.61	0.54	0.42	0.66	0.61	0.65	0.47	0.59	0.59	0.50	0.38	0.66	0.60	0.50	0.59	0.68	**0.80**	0.57	0.53	0.50
TPSQ_3	0.59	0.48	0.43	0.59	0.51	0.60	0.49	0.50	0.55	0.46	0.39	0.57	0.59	0.45	0.54	0.61	**0.76**	0.52	0.48	0.38

TPSQ_5	0.62	0.58	0.40	0.63	0.55	0.66	0.48	0.53	0.60	0.51	0.39	0.63	0.59	0.49	0.55	0.72	**0.85**	0.57	0.55	0.47
TPSQ_7	0.61	0.50	0.40	0.63	0.56	0.68	0.49	0.56	0.55	0.46	0.44	0.62	0.56	0.46	0.58	0.71	**0.85**	0.55	0.52	0.43
TOQ_1	0.56	0.43	0.44	0.57	0.68	0.59	0.39	0.48	0.61	0.40	0.47	0.54	0.62	0.45	0.52	0.60	0.53	**0.81**	0.45	0.43
TOQ_2	0.58	0.45	0.40	0.61	0.75	0.61	0.43	0.51	0.65	0.54	0.35	0.58	0.65	0.53	0.54	0.59	0.55	**0.86**	0.48	0.47
TOQ_3	0.56	0.43	0.39	0.55	0.73	0.58	0.43	0.46	0.65	0.45	0.33	0.56	0.64	0.46	0.45	0.59	0.58	**0.81**	0.47	0.36
TOQ_4	0.54	0.42	0.35	0.55	0.71	0.57	0.38	0.47	0.59	0.45	0.33	0.55	0.57	0.46	0.46	0.58	0.55	**0.82**	0.44	0.43
TOQ_5	0.53	0.40	0.31	0.55	0.73	0.56	0.44	0.50	0.59	0.45	0.32	0.53	0.61	0.51	0.49	0.59	0.59	**0.80**	0.51	0.46
TOQ_6	0.55	0.43	0.38	0.54	0.78	0.58	0.44	0.47	0.62	0.43	0.36	0.57	0.61	0.42	0.45	0.60	0.54	**0.84**	0.47	0.36
TPHQ_3	0.23	0.20	0.26	0.23	0.22	0.23	0.15	0.18	0.24	0.21	0.22	0.23	0.21	0.22	0.27	0.30	0.20	0.23	0.32	0.20
TPHQ_5	0.53	0.55	0.34	0.58	0.45	0.54	0.52	0.60	0.50	0.61	0.33	0.51	0.48	0.54	0.59	0.59	0.55	0.46	**0.86**	0.48
TPHQ_6	0.51	0.54	0.41	0.60	0.47	0.55	0.52	0.60	0.50	0.61	0.35	0.54	0.50	0.53	0.56	0.59	0.52	0.53	**0.80**	0.49
TPHQ_7	.49	.57	.36	.57	.47	.53	.56	.60	.49	.58	.35	.53	.46	.53	.59	.60	.55	0.47	**0.88**	0.50
TPQ_1	.51	.51	.41	.57	.48	.53	.47	.57	.47	.50	.49	.56	.49	.54	.69	.57	.53	.47	.52	**.86**
TPQ_5	.46	.43	.32	.49	.37	.47	.52	.49	.39	.45	.37	.45	.41	.46	.59	.47	.44	.42	.49	**.88**

Appendix

Appendix VIII: Establishing Nomological Validity for Formative Second order Latent Constructs

Variables	Path coefficient	T Statistics	P Values
CustPHQ_5 <- Process hard quality(PHQ)	0.657	11.633	0.000
CustPHQ_5 <- Output quality(OQ)	0.658	11.589	0.000
CustPHQ_6 <- Process hard quality(PHQ)	0.697	14.323	0.000
CustPHQ_6 <- Output quality(OQ)	0.691	13.795	0.000
CustPQ_1 <- Potential quality (PQ)	0.684	11.165	0.000
CustPQ_1 <- Output quality(OQ)	0.636	9.361	0.000
CustPSQ_1 <- Process soft quality(PSQ)	0.765	27.536	0.000
CustPSQ_2 <- Process soft quality(PSQ)	0.755	20.675	0.000
CustPSQ_3 <- Process soft quality(PSQ)	0.665	16.599	0.000
CustPSQ_4 <- Process soft quality(PSQ)	0.717	17.061	0.000
CustPSQ_6 <- Process soft quality(PSQ)	0.771	23.779	0.000
CustPSQ_7 <- Process soft quality(PSQ)	0.772	23.66	0.000
FreiForPSQ_1 <- Process soft quality(PSQ)	0.761	25.799	0.000
FreiForPSQ_2 <- Process soft quality(PSQ)	0.766	18.725	0.000
FreiForPSQ_3 <- Process soft quality(PSQ)	0.665	15.186	0.000
FreiForPSQ_4 <- Process soft quality(PSQ)	0.763	21.583	0.000
FreiForPSQ_5 <- Process soft quality(PSQ)	0.737	19.396	0.000
FreiForPSQ_6 <- Process soft quality(PSQ)	0.732	16.323	0.000
FreiForPSQ_7 <- Process soft quality(PSQ)	0.749	19.864	0.000
FreiForwPQ_2 <- Potential quality (PQ)	0.728	16.39	0.000
FreiForwPQ_2 <- Output quality(OQ)	0.692	13.812	0.000
FreiForwPQ_4 <- Potential quality (PQ)	0.655	12.503	0.000
FreiForwPQ_4 <- Output quality(OQ)	0.626	10.864	0.000
FreiForwPQ_7 <- Potential quality (PQ)	0.65	11.168	0.000
FreiForwPQ_7 <- Output quality(OQ)	0.661	11.208	0.000
FreiFwPHQ_1 <- Process hard quality(PHQ)	0.717	18.872	0.000
FreiFwPHQ_1 <- Output quality(OQ)	0.727	19.209	0.000
FreiFwPHQ_4 <- Process hard quality(PHQ)	0.697	14.208	0.000
FreiFwPHQ_4 <- Output quality(OQ)	0.682	12.846	0.000
FreiFwPHQ_6 <- Process hard quality(PHQ)	0.746	20.14	0.000
FreiFwPHQ_6 <- Output quality(OQ)	0.733	18.534	0.000
FreiFwPHQ_7 <- Process hard quality(PHQ)	0.715	14.62	0.000
FreiFwPHQ_7 <- Output quality(OQ)	0.7	13.721	0.000
OGDPHQ_2 <- Process hard quality(PHQ)	0.773	25.777	0.000
OGDPHQ_2 <- Output quality(OQ)	0.748	22.77	0.000
OGDPHQ_3 <- Process hard quality(PHQ)	0.691	16.468	0.000
OGDPHQ_3 <- Output quality(OQ)	0.665	14.781	0.000
OGDPHQ_4 <- Process hard quality(PHQ)	0.721	16.955	0.000
OGDPHQ_4 <- Output quality(OQ)	0.679	14.247	0.000
OGDPHQ_6 <- Process hard quality(PHQ)	0.757	20.956	0.000

Variables	Path coefficient	T Statistics	P Values
OGDPHQ_6 <- Output quality(OQ)	0.709	16.212	0.000
OGDPQ_1 <- Potential quality (PQ)	0.696	15.723	0.000
OGDPQ_1 <- Output quality(OQ)	0.635	12.177	0.000
OGDPSQ_1 <- Process soft quality(PSQ)	0.719	19.351	0.000
OGDPSQ_2 <- Process soft quality(PSQ)	0.74	17.902	0.000
OGDPSQ_3 <- Process soft quality(PSQ)	0.737	20.869	0.000
OGDPSQ_4 <- Process soft quality(PSQ)	0.723	17.697	0.000
OGDPSQ_5 <- Process soft quality(PSQ)	0.724	16.054	0.000
OGDPSQ_7 <- Process soft quality(PSQ)	0.746	17.528	0.000
ShipAgPHQ_1 <- Process hard quality(PHQ)	0.695	16.345	0.000
ShipAgPHQ_1 <- Output quality(OQ)	0.695	15.985	0.000
ShipAgPHQ_7 <- Process hard quality(PHQ)	0.755	19.465	0.000
ShipAgPHQ_7 <- Output quality(OQ)	0.732	16.802	0.000
ShipAgPQ_1 <- Potential quality (PQ)	0.759	21.851	0.000
ShipAgPQ_1 <- Output quality(OQ)	0.709	16.444	0.000
ShipAgPQ_2 <- Potential quality (PQ)	0.736	18.007	0.000
ShipAgPQ_2 <- Output quality(OQ)	0.74	17.274	0.000
ShipAgPQ_5 <- Potential quality (PQ)	0.756	23.415	0.000
ShipAgPQ_5 <- Output quality(OQ)	0.697	16.468	0.000
ShipAgPQ_7 <- Potential quality (PQ)	0.75	21.613	0.000
ShipAgPQ_7 <- Output quality(OQ)	0.714	16.642	0.000
ShipAgPSQ_1 <- Process soft quality(PSQ)	0.735	19.651	0.000
ShipAgPSQ_2 <- Process soft quality(PSQ)	0.738	15.683	0.000
ShipAgPSQ_4 <- Process soft quality(PSQ)	0.714	14.789	0.000
ShipAgPSQ_5 <- Process soft quality(PSQ)	0.767	21.333	0.000
ShipAgPSQ_6 <- Process soft quality(PSQ)	0.719	16.237	0.000
ShipAgPSQ_7 <- Process soft quality(PSQ)	0.736	17.482	0.000
TeICDPSQ_2 <- Process soft quality(PSQ)	0.742	19.121	0.000
TeICDPSQ_3 <- Process soft quality(PSQ)	0.673	14.021	0.000
TeICDPSQ_5 <- Process soft quality(PSQ)	0.746	16.752	0.000
TeICDPSQ_7 <- Process soft quality(PSQ)	0.745	17.909	0.000
TermICDPHQ_3 <- Process hard quality(PHQ)	0.279	4.285	0.000
TermICDPHQ_3 <- Output quality(OQ)	0.282	4.526	0.000
TermICDPHQ_5 <- Process hard quality(PHQ)	0.736	17.886	0.000
TermICDPHQ_5 <- Output quality(OQ)	0.707	15.242	0.000
TermICDPHQ_6 <- Process hard quality(PHQ)	0.726	15.766	0.000
TermICDPHQ_6 <- Output quality(OQ)	0.699	13.74	0.000
TermICDPHQ_7 <- Process hard quality(PHQ)	0.738	17.85	0.000
TermICDPHQ_7 <- Output quality(OQ)	0.717	15.539	0.000
TermICDPQ_1 <- Potential quality (PQ)	0.744	17.379	0.000
TermICDPQ_1 <- Output quality(OQ)	0.695	14.326	0.000
TermICDPQ_5 <- Potential quality (PQ)	0.682	14.096	0.000
TermICDPQ_5 <- Output quality(OQ)	0.623	10.407	0.000

Appendix IX: Total effect of Indicators' Performance Map

Indicator	MV Performances	Indicator	MV Performances
CustPOQ_3	76.145	FreiForPSQ_3	75.366
CustPOQ_4	78.434	FreiForPSQ_4	78.068
CustPOQ_5	78.297	FreiFwPHQ_1	68.544
CustPOQ_6	80.632	FreiFwPHQ_4	76.328
CustPOQ_Global	78.297	OGDPHQ_6	77.335
CustPPQ_1	64.606	OGDPHQ_Global	76.832
CustPPQ_Global	75.458	OGDPOQ_1	65.614
CustPSQ_1	65.018	OGDPOQ_2	77.427
CustPSQ_2	75.549	OGDPOQ_3	75.183
CustPSQ_3	74.084	OGDPOQ_4	78.892
CustPSQ_4	75.962	OGDPOQ_5	78.342
CustPSQ_6	78.709	OGDPOQ_6	81.731
CustPSQ_7	77.839	OGDPOQ_Global	79.35
CustPSQ_Global	76.145	OGDPPQ_1	64.789
FreForPOQ_1	68.864	OGDPPQ_Global	76.74
FreForPOQ_2	75.824	OGDPSQ_1	68.086
FreForPOQ_3	76.877	OGDPSQ_2	76.786
FreForPOQ_4	78.709	OGDPSQ_3	76.603
FreForPOQ_5	77.701	OGDPSQ_4	76.419
FreForPOQ_6	80.998	OGDPSQ_5	77.244
FreiForPSQ_1	65.934	OGDPSQ_7	82.051
FreiForPSQ_2	76.969	OGDPSQ_Global	77.564
ShipAgPHQ_1	67.582	TeICDPSQ_2	77.93
ShipAgPHQ_7	79.853	TeICDPSQ_3	76.557
ShipAgPHQ_Global	77.289	TeICDPSQ_5	78.388
ShipAgPOQ_1	68.132	TeICDPSQ_7	80.907
ShipAgPOQ_2	76.877	TeICDPSQ_Global	78.48
ShipAgPOQ_3	76.19	TermICDPHQ_3	60.852
ShipAgPOQ_5	78.205	TermICDPHQ_5	76.328
ShipAgPOQ_Global	79.121	TermICDPHQ_6	78.755
ShipAgPSQ_1	66.071	TermICDPHQ_7	79.762
ShipAgPSQ_2	77.198	TermICDPHQ_Global	76.969
ShipAgPSQ_4	76.648	TermICDPOQ_1	67.582
ShipAgPSQ_5	78.205	TermICDPOQ_2	75.87
ShipAgPSQ_6	80.22	TermICDPOQ_3	75.916
ShipAgPSQ_7	79.075	TermICDPOQ_4	79.212
ShipAgPSQ_Global	78.068	TermICDPOQ_5	77.427
ShipAg_1	66.941	TermICDPOQ_6	81.136
ShipAg_2	75.275	TermICDPOQ_Global	79.991
ShipAg_5	66.804	TermICD_1	66.712
ShipAg_7	74.679	TermICD_5	76.786
ShipAg_Global	73.26	TermICD_Global	75.549

Appendix X: Outer Loadings Bootstrapping MGA Results

Path	Original (female)	Original (male)	Mean (female)	Mean (male)	STDEV (female)	STDEV (male)	t-Values (female)	t-Values (male)	p-Values (female)	p-Values (male)
B2BCargoSQ_1 <- B2B	0.703	0.860	0.700	0.858	0.085	0.028	8.314	30.334	0.000	0.000
B2BCargoSQ_2 <- B2B	0.688	0.858	0.667	0.856	0.090	0.028	7.676	30.612	0.000	0.000
B2BCargoSQ_3 <- B2B	0.826	0.857	0.824	0.856	0.039	0.028	21.318	30.740	0.000	0.000
B2BCargoSQ_5 <- B2B	0.753	0.903	0.750	0.902	0.075	0.019	9.999	47.671	0.000	0.000
B2BCargoSQ_Global <- B2B	0.775	0.694	0.757	0.685	0.120	0.102	6.447	6.837	0.000	0.000
CustPHQ_5 <- CustPHQ	0.802	0.843	0.805	0.841	0.065	0.034	12.417	24.609	0.000	0.000
CustPHQ_6 <- CustPHQ	0.724	0.851	0.715	0.849	0.117	0.029	6.167	29.254	0.000	0.000
CustPHQ_Global <- CustPHQ	0.812	0.843	0.755	0.836	0.181	0.055	4.494	15.450	0.000	0.000
CustPOQ_1 <- CustPOQ	0.751	0.772	0.742	0.767	0.069	0.052	10.912	14.963	0.000	0.000
CustPOQ_2 <- CustPOQ	0.822	0.825	0.815	0.821	0.049	0.035	16.716	23.660	0.000	0.000
CustPOQ_3 <- CustPOQ	0.746	0.824	0.726	0.820	0.081	0.034	9.213	24.595	0.000	0.000
CustPOQ_4 <- CustPOQ	0.765	0.784	0.752	0.780	0.070	0.041	10.946	19.143	0.000	0.000
CustPOQ_5 <- CustPOQ	0.830	0.799	0.821	0.794	0.046	0.044	18.208	18.280	0.000	0.000
CustPOQ_6 <- CustPOQ	0.806	0.840	0.795	0.836	0.058	0.033	13.826	25.241	0.000	0.000
CustPOQ_Global <- CustPOQ	0.826	0.765	0.835	0.764	0.055	0.076	15.027	10.065	0.000	0.000
CustPPQ_1 <- CustPQ	0.937	0.902	0.908	0.902	0.139	0.018	6.728	50.718	0.000	0.000
CustPPQ_Global <- CustPQ	0.711	0.907	0.551	0.906	0.357	0.021	1.993	44.025	0.047	0.000
CustPSQ_1 <- CustPSQ	0.745	0.839	0.735	0.839	0.069	0.023	10.855	36.333	0.000	0.000
CustPSQ_2 <- CustPSQ	0.788	0.824	0.771	0.820	0.063	0.042	12.448	19.758	0.000	0.000
CustPSQ_3 <- CustPSQ	0.697	0.721	0.679	0.721	0.080	0.047	8.753	15.504	0.000	0.000
CustPSQ_4 <- CustPSQ	0.733	0.817	0.720	0.815	0.068	0.038	10.717	21.323	0.000	0.000
CustPSQ_6 <- CustPSQ	0.761	0.832	0.743	0.830	0.073	0.033	10.363	25.178	0.000	0.000
CustPSQ_7 <- CustPSQ	0.833	0.842	0.834	0.840	0.036	0.030	23.075	27.647	0.000	0.000
CustPSQ_Global <- CustPSQ	0.890	0.763	0.887	0.759	0.024	0.077	36.568	9.855	0.000	0.000

Path	Original (female)	Original (male)	Mean (female)	Mean (male)	STDEV (female)	STDEV (male)	t-Values (female)	t-Values (male)	p-Values (female)	p-Values (male)
FreForPOQ_1 <- FreiForPOQ	0.743	0.832	0.730	0.831	0.069	0.025	10.758	32.839	0.000	0.000
FreForPOQ_2 <- FreiForPOQ	0.829	0.780	0.820	0.776	0.045	0.041	18.448	19.188	0.000	0.000
FreForPOQ_3 <- FreiForPOQ	0.798	0.788	0.792	0.783	0.051	0.047	15.738	16.890	0.000	0.000
FreForPOQ_4 <- FreiForPOQ	0.776	0.797	0.757	0.793	0.073	0.041	10.565	19.680	0.000	0.000
FreForPOQ_5 <- FreiForPOQ	0.803	0.783	0.799	0.778	0.047	0.038	16.945	20.355	0.000	0.000
FreForPOQ_6 <- FreiForPOQ	0.828	0.854	0.815	0.850	0.054	0.030	15.345	28.327	0.000	0.000
FreForPOQ_Global <- FreiForPOQ	0.815	0.763	0.799	0.759	0.089	0.080	9.159	9.526	0.000	0.000
FreiForPSQ_1 <- FFPSQ	0.699	0.853	0.685	0.852	0.078	0.021	8.957	40.412	0.000	0.000
FreiForPSQ_2 <- FFPSQ	0.814	0.809	0.806	0.802	0.053	0.051	15.249	15.946	0.000	0.000
FreiForPSQ_3 <- FFPSQ	0.745	0.718	0.727	0.716	0.077	0.046	9.701	15.715	0.000	0.000
FreiForPSQ_4 <- FFPSQ	0.792	0.850	0.783	0.847	0.055	0.029	14.462	29.515	0.000	0.000
FreiForPSQ_5 <- FFPSQ	0.776	0.832	0.765	0.829	0.062	0.032	12.533	25.865	0.000	0.000
FreiForPSQ_6 <- FFPSQ	0.750	0.801	0.736	0.795	0.069	0.040	10.825	20.243	0.000	0.000
FreiForPSQ_7 <- FFPSQ	0.756	0.850	0.740	0.846	0.076	0.030	9.881	28.499	0.000	0.000
FreiForPSQ_Global <- FFPSQ	0.796	0.805	0.795	0.805	0.080	0.066	9.964	12.134	0.000	0.000
FreiForw_2 <- FFPQ	0.792	0.816	0.790	0.812	0.066	0.042	12.061	19.472	0.000	0.000
FreiForw_4 <- FFPQ	0.814	0.773	0.806	0.770	0.058	0.048	14.014	16.109	0.000	0.000
FreiForw_7 <- FFPQ	0.693	0.842	0.649	0.841	0.153	0.038	4.535	22.120	0.000	0.000
FreiForw_Global <- FFPQ	0.840	0.867	0.811	0.863	0.094	0.046	8.899	18.825	0.000	0.000
FreiFwPHQ_1 <- FFPHQ	0.703	0.846	0.674	0.846	0.111	0.024	6.328	35.265	0.000	0.000
FreiFwPHQ_4 <- FFPHQ	0.835	0.779	0.827	0.775	0.062	0.046	13.453	16.957	0.000	0.000
FreiFwPHQ_6 <- FFPHQ	0.749	0.793	0.715	0.794	0.129	0.037	5.789	21.645	0.000	0.000
FreiFwPHQ_7 <- FFPHQ	0.796	0.811	0.772	0.808	0.081	0.037	9.785	21.939	0.000	0.000
FreiFwPHQ_Global <- FFPHQ	0.827	0.837	0.837	0.830	0.061	0.059	13.529	14.224	0.000	0.000
OGDPHQ_2 <- OGDPHQ	0.821	0.812	0.803	0.811	0.113	0.037	7.247	22.062	0.000	0.000

Path	Original (female)	Original (male)	Mean (female)	Mean (male)	STDEV (female)	STDEV (male)	t-Values (female)	t-Values (male)	p-Values (female)	p-Values (male)
OGDPHQ_3 <- OGDPHQ	0.754	0.764	0.717	0.761	0.137	0.042	5.508	18.064	0.000	0.000
OGDPHQ_4 <- OGDPHQ	0.809	0.812	0.795	0.811	0.123	0.041	6.598	19.807	0.000	0.000
OGDPHQ_6 <- OGDPHQ	0.799	0.830	0.758	0.829	0.147	0.028	5.421	29.417	0.000	0.000
OGDPHQ_Global <- OGDPHQ	0.784	0.727	0.770	0.719	0.120	0.077	6.532	9.432	0.000	0.000
OGDPOQ_1 <- OGDPOQ	0.775	0.841	0.767	0.838	0.051	0.028	15.304	29.955	0.000	0.000
OGDPOQ_2 <- OGDPOQ	0.764	0.852	0.748	0.847	0.072	0.031	10.643	27.612	0.000	0.000
OGDPOQ_3 <- OGDPOQ	0.813	0.816	0.800	0.813	0.052	0.027	15.549	30.318	0.000	0.000
OGDPOQ_4 <- OGDPOQ	0.779	0.825	0.766	0.819	0.062	0.037	12.656	22.518	0.000	0.000
OGDPOQ_5 <- OGDPOQ	0.775	0.808	0.769	0.805	0.053	0.032	14.709	25.165	0.000	0.000
OGDPOQ_6 <- OGDPOQ	0.814	0.851	0.804	0.848	0.051	0.029	15.891	28.998	0.000	0.000
OGDPOQ_Global <- OGDPOQ	0.838	0.769	0.833	0.769	0.053	0.073	15.756	10.490	0.000	0.000
OGDPPQ_1 <- OGDPQ	0.637	0.891	0.583	0.893	0.266	0.025	2.397	35.513	0.017	0.000
OGDPPQ_Global <- OGDPQ	0.939	0.851	0.879	0.844	0.224	0.050	4.183	17.065	0.000	0.000
OGDPSQ_1 <- OGDPSQ	0.673	0.829	0.671	0.828	0.076	0.032	8.886	26.025	0.000	0.000
OGDPSQ_2 <- OGDPSQ	0.710	0.823	0.694	0.818	0.091	0.038	7.823	21.788	0.000	0.000
OGDPSQ_3 <- OGDPSQ	0.655	0.807	0.632	0.805	0.107	0.035	6.131	23.146	0.000	0.000
OGDPSQ_4 <- OGDPSQ	0.693	0.800	0.690	0.798	0.078	0.037	8.879	21.829	0.000	0.000
OGDPSQ_5 <- OGDPSQ	0.688	0.812	0.675	0.808	0.089	0.045	7.748	18.064	0.000	0.000
OGDPSQ_7 <- OGDPSQ	0.782	0.861	0.755	0.857	0.105	0.032	7.458	26.492	0.000	0.000
OGDPSQ_Global <- OGDPSQ	0.835	0.791	0.828	0.786	0.057	0.070	14.648	11.325	0.000	0.000
ShipAgPHQ_1 <- ShipAgPHQ	0.649	0.856	0.586	0.857	0.209	0.024	3.102	36.090	0.002	0.000
ShipAgPHQ_7 <- ShipAgPHQ	0.844	0.860	0.815	0.859	0.115	0.029	7.330	29.792	0.000	0.000
ShipAgPHQ_Global <- ShipAgPHQ	0.852	0.807	0.866	0.796	0.054	0.067	15.901	12.003	0.000	0.000
ShipAgPOQ_1 <- ShipAgPOQ	0.779	0.848	0.767	0.847	0.061	0.025	12.721	33.842	0.000	0.000

Path	Original (female)	Original (male)	Mean (female)	Mean (male)	STDEV (female)	STDEV (male)	t-Values (female)	t-Values (male)	p-Values (female)	p-Values (male)
ShipAgPOQ_2 <- ShipAgPOQ	0.809	0.826	0.797	0.824	0.048	0.031	16.750	26.578	0.000	0.000
ShipAgPOQ_3 <- ShipAgPOQ	0.768	0.791	0.761	0.786	0.053	0.039	14.395	20.421	0.000	0.000
ShipAgPOQ_5 <- ShipAgPOQ	0.780	0.869	0.769	0.866	0.064	0.025	12.105	34.187	0.000	0.000
ShipAgPOQ_Global <- ShipAgPOQ	0.795	0.739	0.790	0.735	0.068	0.076	11.711	9.728	0.000	0.000
ShipAgPSQ_1 <- ShipAgPSQ	0.698	0.810	0.686	0.808	0.086	0.031	8.081	25.922	0.000	0.000
ShipAgPSQ_2 <- ShipAgPSQ	0.745	0.836	0.732	0.831	0.081	0.042	9.247	19.856	0.000	0.000
ShipAgPSQ_4 <- ShipAgPSQ	0.771	0.800	0.758	0.796	0.069	0.039	11.249	20.406	0.000	0.000
ShipAgPSQ_5 <- ShipAgPSQ	0.761	0.825	0.749	0.823	0.067	0.032	11.294	26.123	0.000	0.000
ShipAgPSQ_6 <- ShipAgPSQ	0.689	0.758	0.663	0.750	0.104	0.050	6.653	15.077	0.000	0.000
ShipAgPSQ_7 <- ShipAgPSQ	0.800	0.823	0.791	0.819	0.053	0.034	15.227	24.552	0.000	0.000
ShipAgPSQ_Global <- ShipAgPSQ	0.766	0.821	0.767	0.820	0.088	0.061	8.709	13.548	0.000	0.000
ShipAg_1 <- ShipAgPQ	0.667	0.840	0.638	0.840	0.124	0.026	5.377	32.934	0.000	0.000
ShipAg_2 <- ShipAgPQ	0.653	0.806	0.612	0.802	0.147	0.039	4.442	20.812	0.000	0.000
ShipAg_5 <- ShipAgPQ	0.788	0.806	0.771	0.803	0.096	0.034	8.246	23.465	0.000	0.000
ShipAg_7 <- ShipAgPQ	0.840	0.815	0.829	0.814	0.088	0.036	9.572	22.714	0.000	0.000
ShipAg_Global <- ShipAgPQ	0.870	0.844	0.862	0.843	0.086	0.031	10.143	27.547	0.000	0.000
TeICDPSQ_2 <- TermICDPSQ	0.725	0.818	0.713	0.812	0.078	0.036	9.281	22.572	0.000	0.000
TeICDPSQ_3 <- TermICDPSQ	0.677	0.784	0.668	0.778	0.084	0.044	8.062	17.844	0.000	0.000
TeICDPSQ_5 <- TermICDPSQ	0.707	0.862	0.695	0.858	0.096	0.030	7.400	28.688	0.000	0.000
TeICDPSQ_7 <- TermICDPSQ	0.784	0.881	0.759	0.879	0.089	0.023	8.845	37.662	0.000	0.000
TeICDPSQ_Global <- TermICDPSQ	0.805	0.833	0.796	0.837	0.075	0.050	10.705	16.506	0.000	0.000
TermICDPHQ_3 <-	0.285	0.389	0.241	0.385	0.199	0.082	1.431	4.760	0.153	0.000

Path	Original (female)	Original (male)	Mean (female)	Mean (male)	STDEV (female)	STDEV (male)	t-Values (female)	t-Values (male)	p-Values (female)	p-Values (male)
TermICDPHQ										
TermICDPHQ_5 <- TermICDPHQ	0.843	0.793	0.821	0.789	0.097	0.041	8.734	19.340	0.000	0.000
TermICDPHQ_6 <- TermICDPHQ	0.790	0.788	0.772	0.782	0.082	0.045	9.630	17.632	0.000	0.000
TermICDPHQ_7 <- TermICDPHQ	0.890	0.872	0.865	0.871	0.097	0.023	9.164	38.387	0.000	0.000
TermICDPHQ_Global <- TermICDPHQ	0.848	0.872	0.829	0.866	0.107	0.054	7.927	16.164	0.000	0.000
TermICDPOQ_1 <- TermICDPOQ	0.728	0.844	0.714	0.842	0.071	0.024	10.267	34.506	0.000	0.000
TermICDPOQ_2 <- TermICDPOQ	0.840	0.851	0.833	0.846	0.046	0.029	18.435	29.380	0.000	0.000
TermICDPOQ_3 <- TermICDPOQ	0.799	0.813	0.791	0.810	0.052	0.031	15.242	26.297	0.000	0.000
TermICDPOQ_4 <- TermICDPOQ	0.814	0.794	0.803	0.789	0.057	0.038	14.348	20.817	0.000	0.000
TermICDPOQ_5 <- TermICDPOQ	0.746	0.818	0.737	0.814	0.060	0.031	12.404	26.186	0.000	0.000
TermICDPOQ_6 <- TermICDPOQ	0.855	0.848	0.846	0.842	0.041	0.031	21.070	26.935	0.000	0.000
TermICDPOQ_Global <- TermICDPOQ	0.822	0.777	0.806	0.773	0.090	0.075	9.172	10.328	0.000	0.000
TermICD_1 <- TermICDPQ	0.821	0.867	0.772	0.866	0.174	0.021	4.713	40.505	0.000	0.000
TermICD_5 <- TermICDPQ	0.789	0.816	0.735	0.811	0.162	0.038	4.874	21.352	0.000	0.000
TermICD_Global <- TermICDPQ	0.628	0.807	0.519	0.801	0.316	0.055	1.986	14.595	0.048	0.000

Appendix XI: Outer Loadings Confidence Interval

Confidence Intervals (Bias Corrected)				
	2.5% (female)	**97.5% (female)**	**2.5% (male)**	**97.5% (male)**
B2BCargoSQ_1 <- B2B	0.460	0.811	0.793	0.903
B2BCargoSQ_2 <- B2B	0.481	0.802	0.785	0.899
B2BCargoSQ_3 <- B2B	0.722	0.877	0.794	0.899
B2BCargoSQ_5 <- B2B	0.516	0.839	0.857	0.930
B2BCargoSQ_Global <- B2B	0.431	0.906	0.481	0.852
CustPHQ_5 <- CustPHQ	0.584	0.880	0.767	0.887
CustPHQ_6 <- CustPHQ	0.286	0.832	0.775	0.891
CustPHQ_Global <- CustPHQ	0.280	0.912	0.687	0.912
CustPOQ_1 <- CustPOQ	0.586	0.844	0.642	0.846
CustPOQ_2 <- CustPOQ	0.708	0.888	0.750	0.877
CustPOQ_3 <- CustPOQ	0.534	0.838	0.744	0.872
CustPOQ_4 <- CustPOQ	0.603	0.860	0.689	0.844
CustPOQ_5 <- CustPOQ	0.715	0.884	0.695	0.864
CustPOQ_6 <- CustPOQ	0.672	0.882	0.765	0.889
CustPOQ_Global <- CustPOQ	0.675	0.905	0.562	0.875
CustPPQ_1 <- CustPQ	0.808	1.000	0.850	0.926
CustPPQ_Global <- CustPQ	-0.301	0.901	0.853	0.936
CustPSQ_1 <- CustPSQ	0.583	0.841	0.780	0.874
CustPSQ_2 <- CustPSQ	0.658	0.863	0.717	0.884
CustPSQ_3 <- CustPSQ	0.509	0.808	0.601	0.790
CustPSQ_4 <- CustPSQ	0.571	0.834	0.716	0.876
CustPSQ_6 <- CustPSQ	0.593	0.850	0.739	0.877
CustPSQ_7 <- CustPSQ	0.710	0.880	0.762	0.884
CustPSQ_Global <- CustPSQ	0.823	0.923	0.574	0.878
FreForPOQ_1 <- FreiForPOQ	0.582	0.833	0.773	0.869
FreForPOQ_2 <- FreiForPOQ	0.724	0.894	0.697	0.852
FreForPOQ_3 <- FreiForPOQ	0.673	0.871	0.677	0.857
FreForPOQ_4 <- FreiForPOQ	0.601	0.861	0.693	0.853
FreForPOQ_5 <- FreiForPOQ	0.680	0.869	0.686	0.840
FreForPOQ_6 <- FreiForPOQ	0.700	0.895	0.778	0.898
FreForPOQ_Global <- FreiForPOQ	0.595	0.916	0.573	0.887
FreiForPSQ_1 <- FFPSQ	0.535	0.814	0.798	0.887
FreiForPSQ_2 <- FFPSQ	0.673	0.881	0.692	0.881
FreiForPSQ_3 <- FFPSQ	0.575	0.848	0.617	0.788
FreiForPSQ_4 <- FFPSQ	0.667	0.867	0.776	0.893
FreiForPSQ_5 <- FFPSQ	0.630	0.862	0.758	0.881
FreiForPSQ_6 <- FFPSQ	0.569	0.847	0.713	0.861
FreiForPSQ_7 <- FFPSQ	0.560	0.853	0.781	0.897
FreiForPSQ_Global <- FFPSQ	0.558	0.891	0.623	0.898
FreiForw_2 <- FFPQ	0.616	0.889	0.711	0.875
FreiForw_4 <- FFPQ	0.660	0.884	0.650	0.840

Confidence Intervals (Bias Corrected)				
	2.5% (female)	**97.5% (female)**	**2.5% (male)**	**97.5% (male)**
FreiForw_7 <- FFPQ	0.335	0.859	0.740	0.900
FreiForw_Global <- FFPQ	0.624	0.918	0.736	0.923
FreiFwPHQ_1 <- FFPHQ	0.447	0.830	0.784	0.883
FreiFwPHQ_4 <- FFPHQ	0.725	0.895	0.661	0.842
FreiFwPHQ_6 <- FFPHQ	0.385	0.853	0.706	0.850
FreiFwPHQ_7 <- FFPHQ	0.617	0.875	0.722	0.862
FreiFwPHQ_Global <- FFPHQ	0.684	0.915	0.661	0.907
OGDPHQ_2 <- OGDPHQ	0.675	0.889	0.723	0.866
OGDPHQ_3 <- OGDPHQ	0.602	0.864	0.669	0.832
OGDPHQ_4 <- OGDPHQ	0.667	0.898	0.705	0.871
OGDPHQ_6 <- OGDPHQ	0.621	0.885	0.765	0.875
OGDPHQ_Global <- OGDPHQ	0.568	0.887	0.528	0.845
OGDPOQ_1 <- OGDPOQ	0.649	0.848	0.778	0.886
OGDPOQ_2 <- OGDPOQ	0.575	0.860	0.769	0.893
OGDPOQ_3 <- OGDPOQ	0.696	0.881	0.753	0.861
OGDPOQ_4 <- OGDPOQ	0.622	0.868	0.749	0.879
OGDPOQ_5 <- OGDPOQ	0.647	0.854	0.733	0.856
OGDPOQ_6 <- OGDPOQ	0.698	0.891	0.780	0.892
OGDPOQ_Global <- OGDPOQ	0.692	0.909	0.589	0.878
OGDPPQ_1 <- OGDPQ	-0.177	0.925	0.826	0.927
OGDPPQ_Global <- OGDPQ	0.547	1.000	0.723	0.912
OGDPSQ_1 <- OGDPSQ	0.473	0.782	0.746	0.874
OGDPSQ_2 <- OGDPSQ	0.487	0.832	0.730	0.875
OGDPSQ_3 <- OGDPSQ	0.407	0.795	0.728	0.860
OGDPSQ_4 <- OGDPSQ	0.483	0.804	0.704	0.852
OGDPSQ_5 <- OGDPSQ	0.465	0.813	0.704	0.879
OGDPSQ_7 <- OGDPSQ	0.484	0.872	0.787	0.909
OGDPSQ_Global <- OGDPSQ	0.659	0.898	0.620	0.900
ShipAgPHQ_1 <- ShipAgPHQ	0.074	0.831	0.791	0.893
ShipAgPHQ_7 <- ShipAgPHQ	0.570	0.925	0.788	0.904
ShipAgPHQ_Global <- ShipAgPHQ	0.566	0.907	0.645	0.906
ShipAgPOQ_1 <- ShipAgPOQ	0.619	0.854	0.790	0.884
ShipAgPOQ_2 <- ShipAgPOQ	0.704	0.873	0.762	0.870
ShipAgPOQ_3 <- ShipAgPOQ	0.653	0.854	0.676	0.842
ShipAgPOQ_5 <- ShipAgPOQ	0.631	0.869	0.810	0.908
ShipAgPOQ_Global <- ShipAgPOQ	0.611	0.887	0.550	0.858
ShipAgPSQ_1 <- ShipAgPSQ	0.472	0.824	0.734	0.855
ShipAgPSQ_2 <- ShipAgPSQ	0.556	0.865	0.731	0.890
ShipAgPSQ_4 <- ShipAgPSQ	0.595	0.866	0.707	0.858
ShipAgPSQ_5 <- ShipAgPSQ	0.586	0.852	0.745	0.872
ShipAgPSQ_6 <- ShipAgPSQ	0.459	0.826	0.615	0.826

Confidence Intervals (Bias Corrected)				
	2.5% (female)	**97.5% (female)**	**2.5% (male)**	**97.5% (male)**
ShipAgPSQ_7 <- ShipAgPSQ	0.662	0.868	0.743	0.873
ShipAgPSQ_Global <- ShipAgPSQ	0.508	0.880	0.651	0.902
ShipAg_1 <- ShipAgPQ	0.379	0.798	0.775	0.877
ShipAg_2 <- ShipAgPQ	0.254	0.811	0.704	0.858
ShipAg_5 <- ShipAgPQ	0.658	0.875	0.727	0.859
ShipAg_7 <- ShipAgPQ	0.753	0.910	0.721	0.865
ShipAg_Global <- ShipAgPQ	0.767	0.926	0.773	0.893
TeICDPSQ_2 <- TermICDPSQ	0.547	0.827	0.733	0.869
TeICDPSQ_3 <- TermICDPSQ	0.454	0.792	0.671	0.847
TeICDPSQ_5 <- TermICDPSQ	0.447	0.831	0.786	0.904
TeICDPSQ_7 <- TermICDPSQ	0.542	0.871	0.821	0.914
TeICDPSQ_Global <- TermICDPSQ	0.595	0.893	0.688	0.904
TermICDPHQ_3 <- TermICDPHQ	-0.339	0.510	0.207	0.545
TermICDPHQ_5 <- TermICDPHQ	0.742	0.907	0.683	0.850
TermICDPHQ_6 <- TermICDPHQ	0.601	0.876	0.679	0.848
TermICDPHQ_7 <- TermICDPHQ	0.769	0.934	0.810	0.902
TermICDPHQ_Global <- TermICDPHQ	0.624	0.921	0.713	0.931
TermICDPOQ_1 <- TermICDPOQ	0.581	0.825	0.787	0.881
TermICDPOQ_2 <- TermICDPOQ	0.730	0.898	0.783	0.893
TermICDPOQ_3 <- TermICDPOQ	0.677	0.874	0.750	0.860
TermICDPOQ_4 <- TermICDPOQ	0.655	0.884	0.710	0.851
TermICDPOQ_5 <- TermICDPOQ	0.607	0.840	0.753	0.874
TermICDPOQ_6 <- TermICDPOQ	0.765	0.911	0.782	0.897
TermICDPOQ_Global <- TermICDPOQ	0.593	0.925	0.596	0.884
TermICD_1 <- TermICDPQ	0.413	0.961	0.806	0.896
TermICD_5 <- TermICDPQ	0.467	0.952	0.732	0.875
TermICD_Global <- TermICDPQ	-0.242	0.857	0.677	0.883

Appendix XII: Test of Measurement Invariance

	Outer Loadings Original (male)	**Outer Loadings Original (female)**	**Outer Loadings Original Difference (male - female)**	**Outer Loadings Permutation Mean Difference (male - female)**	**2.50%**	**97.50 %**	**Permutation p-Values**
B2BCargoSQ_1 <- B2B	0.86	0.703	0.157	0	-0.127	0.127	0.019
B2BCargoSQ_2 <- B2B	0.858	0.688	0.169	0.004	-0.122	0.142	0.016
B2BCargoSQ_3 <- B2B	0.857	0.826	0.032	0.002	-0.084	0.098	0.464
B2BCargoSQ_5 <- B2B	0.903	0.753	0.149	0.001	-0.087	0.1	0.007
B2BCargoSQ_Global <- B2B	0.694	0.775	-0.081	0.009	-0.285	0.36	0.601
CustPHQ_5 <- CustPHQ	0.843	0.802	0.041	0	-0.101	0.115	0.447
CustPHQ_6 <- CustPHQ	0.851	0.724	0.127	0.001	-0.123	0.147	0.064
CustPHQ_Global <- CustPHQ	0.843	0.812	0.031	0.006	-0.165	0.235	0.733
CustPOQ_1 <- CustPOQ	0.772	0.751	0.021	0.003	-0.136	0.172	0.794
CustPOQ_2 <- CustPOQ	0.825	0.822	0.002	0.001	-0.107	0.131	0.969
CustPOQ_3 <- CustPOQ	0.824	0.746	0.078	0.007	-0.112	0.156	0.213
CustPOQ_4 <- CustPOQ	0.784	0.765	0.02	0.002	-0.128	0.162	0.774
CustPOQ_5 <- CustPOQ	0.799	0.83	-0.031	0.005	-0.107	0.142	0.608
CustPOQ_6 <- CustPOQ	0.84	0.806	0.034	0.005	-0.104	0.135	0.579
CustPOQ_Global <- CustPOQ	0.765	0.826	-0.06	0.002	-0.209	0.242	0.593
CustPPQ_1 <- CustPQ	0.902	0.937	-0.035	0.001	-0.068	0.083	0.356
CustPPQ_Global <- CustPQ	0.907	0.711	0.196	0.003	-0.096	0.15	0.009
CustPSQ_1 <- CustPSQ	0.839	0.745	0.094	-0.001	-0.09	0.11	0.065
CustPSQ_2 <- CustPSQ	0.824	0.788	0.036	0.002	-0.12	0.156	0.606
CustPSQ_3 <- CustPSQ	0.721	0.697	0.024	-0.002	-0.164	0.179	0.768
CustPSQ_4 <- CustPSQ	0.817	0.733	0.084	0.003	-0.124	0.163	0.241
CustPSQ_6 <-	0.832	0.761	0.071	0.001	-0.116	0.145	0.263

	Outer Loadings Original (male)	**Outer Loadings Original (female)**	**Outer Loadings Original Difference (male - female)**	**Outer Loadings Permutation Mean Difference (male - female)**	**2.50%**	**97.50 %**	**Permutation p-Values**
CustPSQ							
CustPSQ_7 <- CustPSQ	0.842	0.833	0.009	-0.001	-0.096	0.11	0.868
CustPSQ_Global <- CustPSQ	0.763	0.89	-0.127	0.001	-0.201	0.238	0.281
FreForPOQ_1 <- FreiForPOQ	0.832	0.743	0.089	0.002	-0.101	0.117	0.101
FreForPOQ_2 <- FreiForPOQ	0.78	0.829	-0.049	0.002	-0.127	0.143	0.452
FreForPOQ_3 <- FreiForPOQ	0.788	0.798	-0.009	0.004	-0.131	0.164	0.894
FreForPOQ_4 <- FreiForPOQ	0.797	0.776	0.021	0.005	-0.119	0.156	0.748
FreForPOQ_5 <- FreiForPOQ	0.783	0.803	-0.02	0.001	-0.122	0.157	0.762
FreForPOQ_6 <- FreiForPOQ	0.854	0.828	0.027	0.004	-0.093	0.133	0.589
FreForPOQ_Global <- FreiForPOQ	0.763	0.815	-0.052	0.01	-0.218	0.287	0.68
FreiForPSQ_1 <- FFPSQ	0.853	0.699	0.154	0.004	-0.092	0.123	0.006
FreiForPSQ_2 <- FFPSQ	0.809	0.814	-0.005	0.004	-0.143	0.178	0.958
FreiForPSQ_3 <- FFPSQ	0.718	0.745	-0.027	0.002	-0.139	0.17	0.73
FreiForPSQ_4 <- FFPSQ	0.85	0.792	0.059	0.005	-0.096	0.133	0.277
FreiForPSQ_5 <- FFPSQ	0.832	0.776	0.056	0.002	-0.11	0.134	0.34
FreiForPSQ_6 <- FFPSQ	0.801	0.75	0.051	0.007	-0.122	0.173	0.453
FreiForPSQ_7 <- FFPSQ	0.85	0.756	0.094	0.004	-0.104	0.136	0.117
FreiForPSQ_Global <- FFPSQ	0.805	0.796	0.008	0.002	-0.197	0.245	0.947
FreiForw_2 <- FFPQ	0.816	0.792	0.024	0.001	-0.126	0.15	0.747
FreiForw_4 <- FFPQ	0.773	0.814	-0.041	0	-0.139	0.166	0.554
FreiForw_7 <- FFPQ	0.842	0.693	0.149	0.001	-0.143	0.181	0.069
FreiForw_Global <- FFPQ	0.867	0.84	0.027	0.003	-0.118	0.173	0.74
FreiFwPHQ_1 <- FFPHQ	0.846	0.703	0.143	0.002	-0.095	0.124	0.017
FreiFwPHQ_4	0.779	0.835	-0.056	0.005	-0.128	0.16	0.423

	Outer Loadings Original (male)	Outer Loadings Original (female)	Outer Loadings Original Difference (male - female)	Outer Loadings Permutation Mean Difference (male - female)	2.50%	97.50 %	Permutation p-Values
<- FFPHQ							
FreiFwPHQ_6 <- FFPHQ	0.793	0.749	0.044	0.004	-0.122	0.157	0.492
FreiFwPHQ_7 <- FFPHQ	0.811	0.796	0.015	0.001	-0.118	0.143	0.801
FreiFwPHQ_Global <- FFPHQ	0.837	0.827	0.01	0.004	-0.166	0.218	0.934
OGDPHQ_2 <- OGDPHQ	0.812	0.821	-0.009	0	-0.104	0.127	0.874
OGDPHQ_3 <- OGDPHQ	0.764	0.754	0.009	0	-0.121	0.149	0.909
OGDPHQ_4 <- OGDPHQ	0.812	0.809	0.003	-0.001	-0.117	0.133	0.961
OGDPHQ_6 <- OGDPHQ	0.83	0.799	0.031	0.003	-0.092	0.126	0.542
OGDPHQ_Global <- OGDPHQ	0.727	0.784	-0.057	0.005	-0.198	0.274	0.61
OGDPOQ_1 <- OGDPOQ	0.841	0.775	0.065	0.003	-0.083	0.104	0.181
OGDPOQ_2 <- OGDPOQ	0.852	0.764	0.088	0.002	-0.113	0.139	0.156
OGDPOQ_3 <- OGDPOQ	0.816	0.813	0.002	0.004	-0.092	0.105	0.961
OGDPOQ_4 <- OGDPOQ	0.825	0.779	0.046	0.004	-0.117	0.152	0.499
OGDPOQ_5 <- OGDPOQ	0.808	0.775	0.033	0.004	-0.112	0.135	0.576
OGDPOQ_6 <- OGDPOQ	0.851	0.814	0.037	0.003	-0.102	0.116	0.523
OGDPOQ_Global <- OGDPOQ	0.769	0.838	-0.069	0.003	-0.18	0.224	0.514
OGDPPQ_1 <- OGDPQ	0.891	0.637	0.254	-0.001	-0.12	0.149	0.001
OGDPPQ_Global <- OGDPQ	0.851	0.939	-0.088	0.006	-0.144	0.22	0.256
OGDPSQ_1 <- OGDPSQ	0.829	0.673	0.156	0.002	-0.113	0.147	0.024
OGDPSQ_2 <- OGDPSQ	0.823	0.71	0.113	0.002	-0.137	0.168	0.121
OGDPSQ_3 <- OGDPSQ	0.807	0.655	0.152	0	-0.125	0.138	0.03
OGDPSQ_4 <- OGDPSQ	0.8	0.693	0.107	0.005	-0.128	0.172	0.146
OGDPSQ_5 <- OGDPSQ	0.812	0.688	0.125	0.003	-0.143	0.183	0.129

	Outer Loadings Original (male)	**Outer Loadings Original (female)**	**Outer Loadings Original Difference (male - female)**	**Outer Loadings Permutation Mean Difference (male - female)**	**2.50%**	**97.50 %**	**Permutation p-Values**
OGDPSQ_7 <- OGDPSQ	0.861	0.782	0.079	0	-0.113	0.139	0.2
OGDPSQ_Global <- OGDPSQ	0.791	0.835	-0.045	0.003	-0.185	0.241	0.703
ShipAgPHQ_1 <- ShipAgPHQ	0.856	0.649	0.207	0.001	-0.119	0.139	0.006
ShipAgPHQ_7 <- ShipAgPHQ	0.86	0.844	0.016	-0.002	-0.08	0.084	0.704
ShipAgPHQ_ Global <- ShipAgPHQ	0.807	0.852	-0.044	0.005	-0.177	0.252	0.686
ShipAgPOQ_1 <- ShipAgPOQ	0.848	0.779	0.069	0.003	-.095	0.113	0.194
ShipAgPOQ_2 <- ShipAgPOQ	0.826	0.809	0.017	0.004	-0.095	0.108	0.736
ShipAgPOQ_3 <- ShipAgPOQ	0.791	0.768	0.023	0.003	-.121	0.16	0.716
ShipAgPOQ_5 <- ShipAgPOQ	0.869	0.78	0.089	0.002	-0.105	0.129	0.129
ShipAgPOQ_ Global <- ShipAgPOQ	0.739	0.795	-0.056	0.004	-0.211	0.27	0.629
ShipAgPSQ_1 <- ShipAgPSQ	0.81	0.698	0.112	0.002	-0.114	0.142	0.082
ShipAgPSQ_2 <- ShipAgPSQ	0.836	0.745	0.091	0.001	-0.138	0.166	0.254
ShipAgPSQ_4 <- ShipAgPSQ	0.8	0.771	0.03	0.003	-0.121	0.159	0.677
ShipAgPSQ_5 <- ShipAgPSQ	0.825	0.761	0.063	0.002	-0.109	0.125	0.261
ShipAgPSQ_6 <- ShipAgPSQ	0.758	0.689	0.069	0.007	-.162	0.214	0.429
ShipAgPSQ_7 <- ShipAgPSQ	0.823	0.8	0.023	-0.001	-0.11	0.132	0.671
ShipAgPSQ_Global <- ShipAgPSQ	0.821	0.766	0.055	0.001	-.184	0.244	0.642
ShipAg_1 <- ShipAgPQ	0.84	0.667	0.173	0.001	-.122	0.14	0.01
ShipAg_2 <- ShipAgPQ	0.806	0.653	0.154	0.003	-.156	0.199	0.079
ShipAg_5 <- ShipAgPQ	0.806	0.788	0.019	0.001	-.116	0.141	0.769
ShipAg_7 <- ShipAgPQ	0.815	0.84	-0.025	0.001	-.109	0.127	0.661
ShipAg_Global <- ShipAgPQ	0.844	0.87	-0.026	0	-.098	0.111	0.635

	Outer Loadings Original (male)	Outer Loadings Original (female)	Outer Loadings Original Difference (male - female)	Outer Loadings Permutation Mean Difference (male - female)	2.50%	97.50 %	Permutation p-Values
TeICDPSQ_2 <- TermICDPSQ	0.818	0.725	0.092	0.002	-0.13	0.158	0.167
TeICDPSQ_3 <- TermICDPSQ	0.784	0.677	0.106	0.001	-.156	0.198	0.208
TeICDPSQ_5 <- TermICDPSQ	0.862	0.707	0.155	0.003	-.122	0.159	0.032
TeICDPSQ_7 <- TermICDPSQ	0.881	0.784	0.097	0.001	-.087	0.106	0.04
TeICDPSQ_Global <- TermICDPSQ	0.833	0.805	0.028	0.004	-.151	0.2	0.768
TermICDPHQ_3 <- TermICDPHQ	0.389	0.285	0.103	0.002	-.282	0.33	0.488
TermICDPHQ_5 <- TermICDPHQ	0.793	0.843	-0.05	0	-.104	0.141	0.382
TermICDPHQ_6 <- TermICDPHQ	0.788	0.79	-0.001	0.003	-.121	0.161	0.989
TermICDPHQ_7 <- TermICDPHQ	0.872	0.89	-0.018	0.002	-.066	0.08	0.604
TermICDPHQ_Global <- TermICDPHQ	0.872	0.848	0.024	0.005	-.137	0.202	0.791
TermICDPOQ_1 <- TermICDPOQ	0.844	0.728	0.117	0.005	-.092	0.12	0.036
TermICDPOQ_2 <- TermICDPOQ	0.851	0.84	0.011	0.004	-.089	0.115	0.807
TermICDPOQ_3 <- TermICDPOQ	0.813	0.799	0.014	0.003	-.098	0.121	0.808
TermICDPOQ_4 <- TermICDPOQ	0.794	0.814	-0.019	0.006	-.114	0.149	0.753
TermICDPOQ_5 <- TermICDPOQ	0.818	0.746	0.072	0.003	-.102	0.139	0.218
TermICDPOQ_6 <- TermICDPOQ	0.848	0.855	-0.006	0.005	-.089	0.127	0.9
TermICDPOQ	0.777	0.822	-0.045	0.014	-.215	0.309	0.718

	Outer Loadings Original (male)	Outer Loadings Original (female)	Outer Loadings Original Difference (male - female)	Outer Loadings Permutation Mean Difference (male - female)	2.50%	97.50 %	Permutation p-Values
_G <- TermICDPOQ							
TermICD_1 <- TermICDPQ	0.867	0.821	0.046	-0.001	-.089	0.103	0.368
TermICD_5 <- TermICDPQ	0.816	0.789	0.027	0.005	-.128	0.176	0.675
TermICD_Global <- TermICDPQ	0.807	0.628	0.179	0.008	-0.197	0.264	0.12

Appendix XIII: Indicators Means and Standard Deviations, Kurtosis and Skewness

	No.	Missing	Mean	Median	Min	Max	Standard Deviation	Excess Kurtosis	Skewness
Gender	1	0	1.376	1	1	2	0.484	-1.747	0.512
Organization	2	0	5.365	6	1	7	1.831	0.648	-1.345
Form_type	3	0	2.22	2	1	5	0.932	2.051	1.55
Firm_Exp	4	0	3.135	3	1	5	0.727	0.689	-0.514
Education	5	0	4.203	4	1	6	0.837	1.841	-0.85
Age_Group	6	0	2.505	2	1	7	0.81	1.825	0.48
CustPQ_1	7	0	5.025	5	1	7	1.263	2.678	-1.344
CustPQ_2	8	0	5.624	6	1	7	1.188	5.346	-2.045
CustPQ_3	9	0	5.607	6	1	7	1.3	3.41	-1.579
CustPQ_4	10	0	5.745	6	1	7	1.235	4.701	-1.894
CustPQ_5	11	0	5.67	6	1	7	1.306	3.373	-1.633
CustPQ_6	12	0	5.714	6	1	7	1.205	4.835	-1.879
CustPQ_7	13	0	5.81	6	1	7	1.26	3.756	-1.69
OGDPQ_1	14	0	5.519	6	1	7	1.009	1.424	-0.841
OGDPQ_2	15	0	5.563	6	1	7	1.15	2.146	-1.047
OGDPQ_3	16	0	5.723	6	1	7	1.052	3.164	-1.288
OGDPQ_4	17	0	5.665	6	1	7	1.176	2.558	-1.24
OGDPQ_5	18	0	5.72	6	1	7	1.084	2.299	-1.077
SAPQ_1	19	0	5.113	5	1	7	1.1	2.04	-0.747
SAPQ_2	20	0	5.618	6	1	7	0.992	1.623	-0.89
SAPQ_3	21	0	5.536	6	1	7	1.11	3.026	-1.137
SAPQ_4	22	0	5.695	6	2	7	0.919	1.383	-0.874
SAPQ_5	23	0	5.093	5	1	7	1.098	2.389	-0.836
SAPQ_6	24	0	5.514	6	1	7	0.985	3.248	-1.261
SAPQ_7	25	0	5.569	6	1	7	1.164	2.671	-1.227
ICDPQ_1	26	0	5.091	5	1	7	1.141	2.641	-1.148
ICDPQ_2	27	0	5.679	6	1	7	1.114	2.549	-1.15
ICDPQ_3	28	0	5.67	6	1	7	1.175	2.894	-1.286
ICDPQ_4	29	0	5.75	6	1	7	1.245	2.912	-1.43
FFPQ_1	30	0	5.203	5	1	7	1.06	3.203	-0.969
FFPQ_2	31	0	5.53	6	1	7	1.18	3.593	-1.554
FFPQ_3	32	0	5.668	6	1	7	1.18	2.912	-1.347
FFPQ_4	33	0	5.673	6	1	7	1.204	3.733	-1.595
CustPHQ_1	34	0	5.181	5	1	7	1.163	2.768	-1.242
CustPHQ_2	35	0	5.566	6	1	7	1.162	3.634	-1.485
CustPHQ_3	36	0	5.555	6	1	7	1.404	2.726	-1.505
CustPHQ_4	37	0	5.753	6	1	7	1.176	4.066	-1.645

	No.	Missing	Mean	Median	Min	Max	Standard Deviation	Excess Kurtosis	Skewness
CustPHQ_5	38	0	5.717	6	1	7	1.234	4.252	-1.732
OGDPHQ_1	39	0	4.415	5	1	7	1.671	-0.079	-0.841
OGDPHQ_2	40	0	5.558	6	1	7	1.209	2.361	-1.368
OGDPHQ_3	41	0	5.415	6	1	7	1.335	2.635	-1.348
OGDPHQ_4	42	0	5.577	6	1	7	1.27	3.324	-1.568
OGDPHQ_5	43	0	5.602	6	1	7	1.304	3.068	-1.544
OGDPHQ_6	44	0	5.703	6	1	7	1.262	2.549	-1.386
OGDPHQ_7	45	0	5.703	6	1	7	1.282	2.982	-1.483
SAPHQ_1	46	0	5.118	5	1	7	1.234	2.321	-1.108
SAPHQ_2	47	0	5.478	6	1	7	1.217	2.992	-1.382
SAPHQ_3	48	0	4.986	5	1	7	1.763	0.057	-1.01
SAPHQ_4	49	0	5.569	6	1	7	1.19	3.481	-1.476
SAPHQ_5	50	0	5.357	6	1	7	1.595	1.812	-1.459
SAPHQ_6	51	0	5.857	6	1	7	1.21	4.03	-1.66
ICDPHQ_1	52	0	5.066	5	1	7	1.154	2.231	-0.905
CDPHQ_2	53	0	5.569	6	1	7	1.096	2.648	-1.244
ICDPHQ_3	54	0	5.61	6	1	7	1.156	3.554	-1.533
ICDPHQ_4	55	0	5.632	6	1	7	1.156	3.423	-1.357
ICDPHQ_5	56	0	5.775	6	1	7	1.15	3.625	-1.574
ICDPHQ_6	57	0	5.841	6	1	7	1.226	3.592	-1.599
FFPHQ_1	58	0	5.162	5	1	7	1.15	2.01	-1.006
FFPHQ_2	59	0	4.997	5	1	7	1.857	-0.119	-0.945
FFPHQ_3	60	0	5.629	6	1	7	1.182	3.348	-1.502
FFPHQ_4	61	0	5.651	6	1	7	1.223	2.618	-1.38
FFPHQ_5	62	0	5.843	6	1	7	1.153	2.959	-1.396
CustPSQ_1	63	0	4.953	5	1	7	1.184	2.059	-0.877
CustPSQ_2	64	0	5.582	6	1	7	1.163	3.103	-1.484
CustPSQ_3	65	0	5.604	6	1	7	1.312	3.241	-1.59
CustPSQ_4	66	0	5.777	6	1	7	1.217	3.223	-1.551
CustPSQ_5	67	0	5.72	6	1	7	1.244	3.624	-1.648
OGDPSQ_1	68	0	5.135	5	1	7	1.165	2.479	-1.069
OGDPSQ_2	69	0	5.657	6	1	7	1.141	4.41	-1.692
OGDPSQ_3	70	0	5.646	6	1	7	1.275	2.655	-1.399
OGDPSQ_4	71	0	5.637	6	1	7	1.245	3.004	-1.457
OGDPSQ_5	72	0	5.69	6	1	7	1.249	3.122	-1.477
OGDPSQ_6	73	0	5.788	6	1	7	1.248	3.624	-1.664

	No.	Missing	Mean	Median	Min	Max	Standard Deviation	Excess Kurtosis	Skewness
OGDPSQ_7	74	0	5.978	6	1	7	1.197	3.892	-1.77
SAPSQ_1	75	0	5.019	5	1	7	1.244	2.183	-1.061
SAPSQ_2	76	0	5.681	6	1	7	1.138	3.466	-1.533
SAPSQ_3	77	0	5.695	6	1	7	1.333	3.021	-1.53
SAPSQ_4	78	0	5.648	6	1	7	1.154	3.602	-1.511
SAPSQ_5	79	0	5.745	6	1	7	1.204	3.519	-1.539
SAPSQ_6	80	0	5.863	6	1	7	1.197	2.933	-1.501
SAPSQ_7	81	0	5.788	6	1	7	1.178	3.048	-1.408
ICDPSQ_1	82	0	5.154	5	1	7	1.215	2.236	-1.017
ICDPSQ_2	83	0	5.723	6	1	7	1.13	3.222	-1.468
ICDPSQ_3	84	0	5.646	6	1	7	1.233	2.06	-1.199
ICDPSQ_4	85	0	5.684	6	1	7	1.216	3.94	-1.693
ICDPSQ_5	86	0	5.75	6	1	7	1.276	3.598	-1.66
ICDPSQ_6	87	0	5.72	6	1	7	1.208	3.407	-1.531
ICDPSQ_7	88	0	5.904	6	1	7	1.251	3.857	-1.753
FFPSQ_1	89	0	5.003	5	1	7	1.237	1.699	-0.88
FFPSQ_2	90	0	5.67	6	1	7	1.142	3.98	-1.664
FFPSQ_4	91	0	5.717	6	1	7	1.258	3.541	-1.625
FFPSQ_5	92	0	5.772	6	1	7	1.236	2.862	-1.505
FFPSQ_6	93	0	5.808	6	1	7	1.187	3.485	-1.575
FFPSQ_7	94	0	5.841	6	1	7	1.228	3.449	-1.607
CustOQ_1	95	0	5.129	5	1	7	1.23	1.697	-0.888
CustOQ_2	96	0	5.676	6	1	7	1.158	4.244	-1.734
CustOQ_3	97	0	5.659	6	1	7	1.174	2.432	-1.195
CustOQ_4	98	0	5.791	6	1	7	1.16	3.418	-1.546
CustOQ_5	99	0	5.788	6	1	7	1.187	3.424	-1.515
CustOQ_6	100	0	5.92	6	1	7	1.219	3.322	-1.639
OGDOQ_1	101	0	5.027	5	1	7	1.195	1.829	-0.868
OGDOQ_2	102	0	5.739	6	1	7	1.158	3.149	-1.546
OGDOQ_3	103	0	5.574	6	1	7	1.21	1.546	-1.024
OGDOQ_4	104	0	5.813	6	1	7	1.126	3.659	-1.623
OGDOQ_5	105	0	5.764	6	1	7	1.186	3.309	-1.461
OGDOQ_6	106	0	5.975	6	1	7	1.194	4.128	-1.849
SAOQ_1	107	0	5.168	5	1	7	1.198	2.386	-1.057
SAOQ_2	108	0	5.67	6	1	7	1.132	2.797	-1.357

	No.	Missing	Mean	Median	Min	Max	Standard Deviation	Excess Kurtosis	Skewness
SAOQ_3	109	0	5.632	6	1	7	1.205	2.55	-1.22
SAOQ_4	110	0	5.786	6	1	7	1.206	3.271	-1.564
SAOQ_5	111	0	5.745	6	1	7	1.217	3.827	-1.658
SAOQ_6	112	0	5.951	6	1	7	1.118	2.964	-1.477
ICDOQ_1	113	0	5.115	5	1	7	1.27	1.872	-1.042
ICDOQ_2	114	0	5.613	6	1	7	1.122	3.472	-1.548
ICDOQ_3	115	0	5.613	6	1	7	1.212	2.47	-1.261
ICDOQ_4	116	0	5.805	6	1	7	1.219	3.651	-1.649
ICDOQ_5	117	0	5.706	6	1	7	1.273	2.837	-1.435
ICDOQ_6	118	0	5.934	6	1	7	1.175	4.375	-1.791
FFOQ_1	119	0	5.192	5	1	7	1.28	1.991	-1.113
FFOQ_2	120	0	5.61	6	1	7	1.234	3.183	-1.566
FFOQ_3	121	0	5.67	6	1	7	1.205	3.487	-1.53
FFOQ_4	122	0	5.786	6	1	7	1.208	3.317	-1.581
FFOQ_5	123	0	5.723	6	1	7	1.217	3.093	-1.44
FFOQ_6	124	0	5.923	6	1	7	1.158	3.43	-1.631
BSQ_1	125	0	5.121	5	1	7	1.113	3.068	-1.129
BSQ_2	126	0	5.56	6	1	7	1.109	4.783	-1.773
BSQ_3	127	0	5.684	6	1	7	1.207	3.776	-1.518
BSQ_4	128	0	5.654	6	1	7	1.082	6.253	-1.967
BSQ_5	129	0	5.808	6	1	7	1.135	3.698	-1.509

Appendix XIV: Significance of Second order Output

No	Path	Original Sample (O)	Sample Mean (M)	Standard Deviation (STDEV)	T Statistics (|O/STDEV|)	P Values
1	CustOQ_1 <- custOQ	0.22	0.22	0.01	16.09	0.00
2	CustOQ_1 -> Output quality	0.04	0.04	0.01	4.19	0.00
3	CustOQ_2 <- custOQ	0.23	0.23	0.01	16.08	0.00
4	CustOQ_2 -> Output quality	0.03	0.03	0.01	3.15	0.00
5	CustOQ_3 <- custOQ	0.22	0.22	0.01	17.39	0.00
6	CustOQ_3 -> Output quality	0.05	0.05	0.01	5.58	0.00
7	CustOQ_4 <- custOQ	0.23	0.23	0.01	17.58	0.00
8	CustOQ_4 -> Output quality	0.06	0.06	0.01	5.91	0.00
9	CustOQ_5 <- custOQ	0.21	0.22	0.01	18.94	0.00
10	CustOQ_5 -> Output quality	0.03	0.03	0.01	3.28	0.00
11	CustOQ_6 <- custOQ	0.23	0.23	0.02	15.67	0.00
12	CustOQ_6 -> Output quality	0.05	0.05	0.01	5.47	0.00
13	FFOQ_1 <- FFOQ	0.23	0.23	0.01	16.64	0.00
14	FFOQ_1 -> Output quality	0.04	0.04	0.01	4.64	0.00
15	FFOQ_2 <- FFOQ	0.22	0.22	0.01	17.47	0.00
16	FFOQ_2 -> Output quality	0.03	0.03	0.01	3.66	0.00
17	FFOQ_3 <- FFOQ	0.22	0.22	0.01	17.28	0.00
18	FFOQ_3 -> Output quality	0.05	0.05	0.01	4.55	0.00
19	FFOQ_4 <- FFOQ	0.21	0.21	0.01	17.78	0.00
20	FFOQ_4 -> Output quality	0.05	0.06	0.01	5.02	0.00
21	FFOQ_5 <- FFOQ	0.21	0.21	0.01	17.30	0.00
22	FFOQ_5 -> Output quality	0.05	0.05	0.01	4.72	0.00
23	FFOQ_6 <- FFOQ	0.22	0.22	0.01	18.41	0.00
24	FFOQ_6 -> Output quality	0.06	0.06	0.01	6.88	0.00
25	ICDOQ_1 <- ICDOQ	0.21	0.22	0.01	24.08	0.00
26	ICDOQ_1 -> Output quality	0.06	0.06	0.01	6.84	0.00
27	ICDOQ_2 <-	0.22	0.23	0.01	18.55	0.00

No	Path	Original Sample (O)	Sample Mean (M)	Standard Deviation (STDEV)	T Statistics (|O/STDEV|)	P Values
	ICDOQ					
28	ICDOQ_2 -> Output quality	0.04	0.04	0.01	3.32	0.00
29	ICDOQ_3 <- ICDOQ	0.22	0.22	0.01	21.22	0.00
30	ICDOQ_3 -> Output quality	0.05	0.05	0.01	4.26	0.00
31	ICDOQ_4 <- ICDOQ	0.20	0.20	0.01	20.69	0.00
32	ICDOQ_4 -> Output quality	0.05	0.05	0.01	4.02	0.00
33	ICDOQ_5 <- ICDOQ	0.20	0.21	0.01	20.47	0.00
34	ICDOQ_5 -> Output quality	0.06	0.06	0.01	5.38	0.00
35	ICDOQ_6 <- ICDOQ	0.21	0.21	0.01	22.03	0.00
36	ICDOQ_6 -> Output quality	0.05	0.05	0.01	4.44	0.00
37	OGDOQ_1 <- OGDOQ	0.22	0.22	0.01	20.46	0.00
38	OGDOQ_1 -> Output quality	0.06	0.06	0.01	6.06	0.00
39	OGDOQ_2 <- OGDOQ	0.22	0.22	0.01	22.58	0.00
40	OGDOQ_2 -> Output quality	0.06	0.06	0.01	5.75	0.00
41	OGDOQ_3 <- OGDOQ	0.21	0.22	0.01	18.55	0.00
42	OGDOQ_3 -> Output quality	0.04	0.04	0.01	4.64	0.00
43	OGDOQ_4 <- OGDOQ	0.22	0.22	0.01	22.54	0.00
44	OGDOQ_4 -> Output quality	0.05	0.05	0.01	4.63	0.00
45	OGDOQ_5 <- OGDOQ	0.21	0.21	0.01	18.51	0.00
46	OGDOQ_5 -> Output quality	0.04	0.04	0.01	4.07	0.00
47	OGDOQ_6 <- OGDOQ	0.22	0.22	0.01	21.79	0.00
48	OGDOQ_6 -> Output quality	0.04	0.04	0.01	4.32	0.00
49	OQ_global <- Output quality_global	1.00	1.00	0.00		
50	SAOQ_1 <- SAOQ	0.22	0.22	0.01	18.82	0.00
51	SAOQ_1 -> Output quality	0.05	0.05	0.01	4.54	0.00
52	SAOQ_2 <- SAOQ	0.23	0.23	0.01	18.70	0.00
53	SAOQ_2 -> Output quality	0.06	0.06	0.01	6.18	0.00

No	Path	Original Sample (O)	Sample Mean (M)	Standard Deviation (STDEV)	T Statistics (|O/STDEV|)	P Values
54	SAOQ_3 <- SAOQ	0.21	0.21	0.01	19.68	0.00
55	SAOQ_3 -> Output quality	0.04	0.04	0.01	3.88	0.00
56	SAOQ_4 <- SAOQ	0.22	0.22	0.01	18.36	0.00
57	SAOQ_4 -> Output quality	0.06	0.06	0.01	4.98	0.00
58	SAOQ_5 <- SAOQ	0.24	0.24	0.02	16.19	0.00
59	SAOQ_5 -> Output quality	0.06	0.06	0.01	3.93	0.00
60	SAOQ_6 <- SAOQ	0.22	0.22	0.01	21.20	0.00
61	SAOQ_6 -> Output quality	0.06	0.06	0.01	6.50	0.00

Appendix XV: Significance Test of Outer Weights of the Second order

	Original Sample (O)	**Sample Mean (M)**	**Standard Deviation (STDEV)**	**T Statistics (|O/STDEV|)**	**P Values**
CustPQ_1 <- CustPQ	0.209	0.211	0.016	13.454	0.0000
CustPQ_1 -> Potential quality (PQ)	0.063	0.062	0.013	4.805	0.0000
CustPQ_2 <- CustPQ	0.187	0.188	0.012	16.007	0.0000
CustPQ_2 -> Potential quality (PQ)	0.034	0.036	0.013	2.621	0.0090
CustPQ_3 <- CustPQ	0.177	0.177	0.012	15.05	0.0000
CustPQ_3 -> Potential quality (PQ)	0.038	0.037	0.012	3.156	0.0020
CustPQ_4 <- CustPQ	0.181	0.181	0.011	16.2	0.0000
CustPQ_4 -> Potential quality (PQ)	0.044	0.045	0.014	3.063	0.0020
CustPQ_5 <- CustPQ	0.178	0.178	0.012	14.537	0.0000
CustPQ_5 -> Potential quality (PQ)	0.016	0.016	0.011	1.38	0.1680
CustPQ_6 <- CustPQ	0.143	0.143	0.014	10.032	0.0000
CustPQ_6 -> Potential quality (PQ)	0.029	0.028	0.012	2.334	0.0200
CustPQ_7 <- CustPQ	0.16	0.16	0.01	15.389	0.0000
CustPQ_7 -> Potential quality (PQ)	0.011	0.011	0.013	0.898	0.3700
FFPQ_1 <- FFPQ	0.341	0.339	0.022	15.806	0.0000
FFPQ_1 -> Potential quality (PQ)	0.094	0.093	0.013	7.241	0.0000
FFPQ_2 <- FFPQ	0.328	0.328	0.025	13.353	0.0000
FFPQ_2 -> Potential quality (PQ)	0.082	0.082	0.014	6.073	0.0000
FFPQ_3 <- FFPQ	0.342	0.341	0.021	15.93	0.0000
FFPQ_3 -> Potential quality (PQ)	0.094	0.093	0.014	6.921	0.0000
FFPQ_4 <- FFPQ	0.32	0.319	0.021	15.526	0.0000
FFPQ_4 -> Potential quality (PQ)	0.093	0.094	0.011	8.534	0.0000
ICDPQ_1 <- ICDPQ	0.317	0.319	0.019	17.041	0.0000
ICDPQ_1 -> Potential quality (PQ)	0.067	0.067	0.014	4.916	0.0000
ICDPQ_2 <- ICDPQ	0.309	0.31	0.018	17.348	0.0000
ICDPQ_2 -> Potential quality (PQ)	0.089	0.089	0.013	6.995	0.0000
ICDPQ_3 <- ICDPQ	0.326	0.326	0.017	18.826	0.0000
ICDPQ_3 -> Potential quality (PQ)	0.062	0.063	0.012	5.253	0.0000
ICDPQ_4 <- ICDPQ	0.334	0.334	0.017	20.081	0.0000
ICDPQ_4 -> Potential quality (PQ)	0.094	0.095	0.013	7.443	0.0000
OGDPQ_1 <- OGDPQ	0.33	0.33	0.025	13.001	0.0000
OGDPQ_1 -> Potential quality (PQ)	0.083	0.082	0.013	6.351	0.0000
OGDPQ_2 <- OGDPQ	0.282	0.281	0.022	12.687	0.0000
OGDPQ_2 -> Potential quality (PQ)	0.069	0.067	0.01	6.713	0.0000
OGDPQ_3 <- OGDPQ	0.317	0.317	0.026	11.948	0.0000
OGDPQ_3 -> Potential quality (PQ)	0.085	0.085	0.014	5.965	0.0000
OGDPQ_4 <- OGDPQ	0.279	0.277	0.023	12.277	0.0000

	Original Sample (O)	**Sample Mean (M)**	**Standard Deviation (STDEV)**	**T Statistics (|O/STDEV|)**	**P Values**
OGDPQ_4 -> Potential quality (PQ)	0.088	0.086	0.011	7.998	0.0000
OGDPQ_5 <- OGDPQ	0.274	0.273	0.024	11.51	0.0000
OGDPQ_5 -> Potential quality (PQ)	0.069	0.068	0.012	5.827	0.0000
PQ_global <- Potential quality global	1	1	0		
SAPQ_1 <- SAPQ	0.225	0.224	0.014	16.114	0.0000
SAPQ_1 -> Potential quality (PQ)	0.083	0.083	0.013	6.484	0.0000
SAPQ_2 <- SAPQ	0.22	0.221	0.014	15.319	0.0000
SAPQ_2 -> Potential quality (PQ)	0.053	0.053	0.012	4.494	0.0000
SAPQ_3 <- SAPQ	0.19	0.189	0.017	11.012	0.0000
SAPQ_3 -> Potential quality (PQ)	0.065	0.065	0.011	6.018	0.0000
SAPQ_4 <- SAPQ	0.188	0.187	0.015	12.427	0.0000
SAPQ_4 -> Potential quality (PQ)	0.076	0.075	0.011	7.118	0.0000
SAPQ_5 <- SAPQ	0.231	0.231	0.016	14.184	0.0000
SAPQ_5 -> Potential quality (PQ)	0.065	0.065	0.013	5.211	0.0000
SAPQ_6 <- SAPQ	0.225	0.224	0.018	12.759	0.0000
SAPQ_6 -> Potential quality (PQ)	0.055	0.054	0.012	4.615	0.0000
SAPQ_7 <- SAPQ	0.234	0.234	0.016	14.267	0.0000
SAPQ_7 -> Potential quality (PQ)	0.056	0.056	0.012	4.742	0.0000

Appendix XVI: Multicolliniarity results

No	Indicators	VIF	No	Indicators	VIF	No	Indicators	VIF	No	Indicators	VIF	No	Indicators
1	CustOQ_1	1.8	49	FFOQ_2	1.9	96	ICDOQ_4	2.5	143	OGDOQ_5	1.8	190	SAOQ_3
2	CustOQ_1	2.4	50	FFOQ_2	2.4	97	ICDOQ_5	1.9	144	OGDOQ_5	2.3	191	SAOQ_4
3	CustOQ_2	2.1	51	FFOQ_3	2.1	98	ICDOQ_5	2.4	145	OGDOQ_6	1.8	192	SAOQ_4
4	CustOQ_2	2.4	52	FFOQ_3	2.6	99	ICDOQ_6	2.1	146	OGDOQ_6	2.2	193	SAOQ_5
5	CustOQ_3	2.0	53	FFOQ_4	2.0	100	ICDOQ_6	2.6	147	OGDPHQ_1	1.1	194	SAOQ_5
6	CustOQ_3	2.5	54	FFOQ_4	2.4	101	ICDPHQ_1	1.6	148	OGDPHQ_1	1.4	195	SAOQ_6
7	CustOQ_4	1.8	55	FFOQ_5	2.1	102	ICDPHQ_1	2.0	149	OGDPHQ_2	2.0	196	SAOQ_6
8	CustOQ_4	2.4	56	FFOQ_5	2.6	103	ICDPHQ_2	1.9	150	OGDPHQ_2	2.4	197	SAPHQ_1
9	CustOQ_5	1.8	57	FFOQ_6	2.0	104	ICDPHQ_2	2.1	151	OGDPHQ_3	1.6	198	SAPHQ_1
10	CustOQ_5	2.3	58	FFOQ_6	2.2	105	ICDPHQ_3	1.9	152	OGDPHQ_3	1.8	199	SAPHQ_2
11	CustOQ_6	1.8	59	FFPHQ_1	1.6	106	ICDPHQ_3	2.0	153	OGDPHQ_4	1.8	200	SAPHQ_2
12	CustOQ_6	2.2	60	FFPHQ_1	2.0	107	ICDPHQ_4	1.8	154	OGDPHQ_4	2.1	201	SAPHQ_3
13	CustPHQ_1	1.5	61	FFPHQ_2	1.2	108	ICDPHQ_4	2.0	155	OGDPHQ_5	2.3	202	SAPHQ_3
14	CustPHQ_1	1.8	62	FFPHQ_2	1.5	109	ICDPHQ_5	1.6	156	OGDPHQ_5	2.5	203	SAPHQ_4
15	CustPHQ_2	1.6	63	FFPHQ_3	1.6	110	ICDPHQ_5	1.8	157	OGDPHQ_6	1.8	204	SAPHQ_4
16	CustPHQ_2	1.9	64	FFPHQ_3	1.8	111	ICDPHQ_6	2.0	158	OGDPHQ_6	2.1	205	SAPHQ_5
17	CustPHQ_3	1.6	65	FFPHQ_4	1.6	112	ICDPHQ_6	2.2	159	OGDPHQ_7	1.8	206	SAPHQ_5
18	CustPHQ_3	1.7	66	FFPHQ_4	1.9	113	ICDPQ_1	1.4	160	OGDPHQ_7	2.1	207	SAPHQ_6
19	CustPHQ_4	1.6	67	FFPHQ_5	1.5	114	ICDPQ_1	1.8	161	OGDPQ_1	1.4	208	SAPHQ_6
20	CustPHQ_4	1.9	68	FFPHQ_5	1.7	115	ICDPQ_2	1.7	162	OGDPQ_1	1.7	209	SAPQ_1
21	CustPHQ_5	1.5	69	FFPQ_1	1.3	116	ICDPQ_2	1.8	163	OGDPQ_2	1.3	210	SAPQ_1
22	CustPHQ_5	1.8	70	FFPQ_1	1.5	117	ICDPQ_3	1.7	164	OGDPQ_2	1.5	211	SAPQ_2
23	CustPQ_1	2.1	71	FFPQ_2	1.4	118	ICDPQ_3	1.9	165	OGDPQ_3	1.4	212	SAPQ_2
24	CustPQ_1	2.7	72	FFPQ_2	1.7	119	ICDPQ_4	1.6	166	OGDPQ_3	1.6	213	SAPQ_3
25	CustPQ_2	2.9	73	FFPQ_3	1.5	120	ICDPQ_4	1.8	167	OGDPQ_4	1.3	214	SAPQ_3
26	CustPQ_2	3.3	74	FFPQ_3	1.8	121	ICDPSQ_1	1.8	168	OGDPQ_4	1.5	215	SAPQ_4
27	CustPQ_3	2.4	75	FFPQ_4	1.4	122	ICDPSQ_1	2.4	169	OGDPQ_5	1.2	216	SAPQ_4
28	CustPQ_3	2.7	76	FFPQ_4	1.6	123	ICDPSQ_2	2.0	170	OGDPQ_5	1.4	217	SAPQ_5
29	CustPQ_4	2.7	77	FFPSQ_1	1.8	124	ICDPSQ_2	2.3	171	OGDPSQ_1	1.8	218	SAPQ_5
30	CustPQ_4	2.8	78	FFPSQ_1	2.8	125	ICDPSQ_3	1.5	172	OGDPSQ_1	2.3	219	SAPQ_6

No	Indicators	VIF	No	Indicators	VIF	No	Indicators	VIF	No	Indicators	VIF	No	Indicators
31	CustPQ_5	2.5	79	FFPSQ_2	2.0	126	ICDPSQ_3	1.7	173	OGDPSQ_2	1.9	220	SAPQ_6
32	CustPQ_5	2.6	80	FFPSQ_2	2.6	127	ICDPSQ_4	1.7	174	OGDPSQ_2	2.5	221	SAPQ_7
33	CustPQ_6	2.2	81	FFPSQ_4	2.4	128	ICDPSQ_4	1.8	175	OGDPSQ_3	1.9	222	SAPQ_7
34	CustPQ_6	2.4	82	FFPSQ_4	2.7	129	ICDPSQ_5	1.9	176	OGDPSQ_3	2.4	223	SAPSQ_1
35	CustPQ_7	2.2	83	FFPSQ_5	2.0	130	ICDPSQ_5	2.3	177	OGDPSQ_4	2.0	224	SAPSQ_1
36	CustPQ_7	2.5	84	FFPSQ_5	2.2	131	ICDPSQ_6	1.7	178	OGDPSQ_4	2.4	225	SAPSQ_2
37	CustPSQ_1	1.8	85	FFPSQ_6	1.8	132	ICDPSQ_6	2.0	179	OGDPSQ_5	2.0	226	SAPSQ_2
38	CustPSQ_1	2.8	86	FFPSQ_6	2.1	133	ICDPSQ_7	1.9	180	OGDPSQ_5	2.2	227	SAPSQ_3
39	CustPSQ_2	1.9	87	FFPSQ_7	2.0	134	ICDPSQ_7	2.3	181	OGDPSQ_6	1.9	228	SAPSQ_3
40	CustPSQ_2	2.3	88	FFPSQ_7	2.2	135	OGDOQ_1	1.8	182	OGDPSQ_6	2.2	229	SAPSQ_4
41	CustPSQ_3	1.8	89	ICDOQ_1	1.9	136	OGDOQ_1	2.4	183	OGDPSQ_7	2.1	230	SAPSQ_4
42	CustPSQ_3	2.1	90	ICDOQ_1	2.6	137	OGDOQ_2	2.0	184	OGDPSQ_7	2.4	231	SAPSQ_5
43	CustPSQ_4	1.9	91	ICDOQ_2	2.3	138	OGDOQ_2	2.4	185	SAOQ_1	1.7	232	SAPSQ_5
44	CustPSQ_4	2.4	92	ICDOQ_2	2.8	139	OGDOQ_3	1.8	186	SAOQ_1	2.4	233	SAPSQ_6
45	CustPSQ_5	1.8	93	ICDOQ_3	2.1	140	OGDOQ_3	2.4	187	SAOQ_2	2.0	234	SAPSQ_6
46	CustPSQ_5	2.4	94	ICDOQ_3	2.6	141	OGDOQ_4	1.9	188	SAOQ_2	2.8	235	SAPSQ_7
47	FFOQ_1	1.8	95	ICDOQ_4	2.1	142	OGDOQ_4	2.4	189	SAOQ_3	1.7	236	SAPSQ_7
48	FFOQ_1	2.6											

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Cargo Security in Dar Es Salaam Ports: Challenge for the Implementation WCU Framework of Standards and Commercial Cargo Security

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Abstract

Cargo security in ports is undoubtedly vital due to the immense value of materials handled and risk involved. It involves both securing global trade and particular port commercial security. As such, it's no wonder governments, International Organizations, Ports and all cargo logistics service providers and port stakeholders dealing with cargo movements, have engaged in securing cargo for global trade facilitation. The exercise does not only focus on short-term cost –benefit considerations rather an overall global movement of cargo through all modes of transport.
The paper reviews various World Customs Organization (WCO) frameworks of standard securing global trade and evaluates the extent Dar es Salaam port reached on the implementation of those standards. Further the paper review commercial cargo security in the port of Dar es Salaam. It proved Tanzanian expert views, obtained through experience/executive-survey due to unavailability of data by various organizations that were approached for the purpose. These observations engender imminence of detailed studies for better insights on the subject matter, limiting the results to scruples.
The study leading to this paper lasted for six-month interview from long experience expert, in operating with the port of Dar es Salaam. It covers port terminals, and ICDs in Dare s Salaam port. The study reveals crucial hitches in cargo security systems in the terminals and the resulting economic demerits. The observation suggests needs to rectify cargo security practices and systems in the port of Dar es Salaam to attract more benefits to sponsors stakeholders and the economy at large. There a need to restructure service provision model in the port so as to limit the great number of people entered port area. Currently, all players are allowed to enter port area which is contra to SAFE standards. It is high time for the port of Dar es Salaam to adopt international acceptable operation standards which limit access of port to only Authorized Economic Operators (AEO). Further, it had noted Tanzania community does not ripe most of the trade facilitation under SAFE standards as still cargo clearance and dwell time is very high with all the cargo subjected to double verification i.e. through the scanner and physical verification.

Key Words: *Cargo security, SAFE framework of standards, authorized economic operators, customs to customs, and customs to business*

1. Introductions

Cargo shipments are vulnerable to terrorist threat, theft, loss, and damage no matter how the goods are being transported, and ports, trucks and warehouses are all in risk. With the September 11 terrorist attack in the USA and the great wave of a terrorist threat in the world the importance of securing global trade is vivid. Further billions of dollars worth of cargo lost each year and cargo theft reaching an all-time record high (Honke and Frenandez, 2018).It's more important than ever to reduce the risks and improve security measures to keep good safe especially if you're looking to go for AEO accreditation (WCO, 2015). Strengthening supply chain vulnerabilities is critical not only because of the thief, but to prevent criminals from compromising containers with illegal and illicit materials (Mezzadra and Neilson, 2013). Even as important as having good cargo security practices, is the constant need to evaluate for areas to improve as many supply chains are always vulnerabilities to terrorist and cargo safety threat (WCO,2012). A multi – stakeholders approach such as the SAFE framework of standards pillars is the best in securing global trade. The framework requires all players in cargo supply chain to be certified as Authorized Economic Operator (AEO) after extensive training, proper documentation and finely tuned practices taking advantage of technology.
The reoccurrence episodes in Dar es Salaam port which containers have been cleared without due payment of fees or cargo stolen from within the port premises or from Inland Container Depots (ICDs). In 2016, it was noted that over 3000 containers were missing from the port (Honke and Frenandez, 2018). An audit carried by Ports Authority in 2016 revealed that 11,884 containers and 2019 vehicles had being cleared from ICDs without payment of wharfage. Despite ICDs being in vicinities of the port, security of containers to and from the port is

questionable. Security in the port controversy is mainly revolved around what the system in place for cargo security in that port.
Cargo theft and damage also continues to be growing issue all across the world with numbers reaching an all time high (Honke and Frenandez, 2018). Many reason for the increase in cargo value, more sophisticated thieves and terrorism complicate the issue. Supply- chain security refers to efforts to enhance the security of the supply chain for the world's cargo movement. It combines traditional practices of supply – chain management with the security requirement driven by a threat such as terrorism, piracy, and theft. International organization supply chain screening and validating of the standard include, credentialing of participants in the supply chain, screening and validating of content of cargo being shipped, advance notification of the contents to the destination country, ensuring the security of the cargo while in transit via the use advanced technology and proper chain security management not in place in most of ports.
There is little evidence of documented literature or researches on cargo security and related problems in Tanzania. Those studies such as Honke and Frenandez, (2018), prove that terminal and ICDs operators invest reasonably for the security of good they store often by employing security staff, alarm system, facing and gate constructions. Thus the question isn't whether there exist effort on the security of the cargo in Tanzania port, but rather whether efforts conform to SAFE framework of standards requirements and are appropriate, effective and economical.
The paper is divided into four parts. Part 1 cover abstract, introduction. Problem analysis and study objective, part 2 give literature review of cargo security, part 4 discuss Tanzania standing point on the implementation of SAFE framework of standards and commercial security, and last conclusion and list of selected references given in part 4.

PROBLEM ANALYSIS

Cargo security through securing global supply chain and commercial security of goods in ports has been a problem throughout the world (Cowen, 2014). The significance of security of good to global trade and profitability of ports or ICDs is undoubted. Common security risks that ports face include terrorist threat, theft, burglary, pilferage, and damages /spoilage to goods that occur in the cause of theft and burglary. Supply chain security refers to an effort to enhance the security of the supply chain, the transport and logistics system for the world cargo. It combined traditional practices of supply chain management with security requirements driven by threats such as terrorism, piracy and theft.
The SAFE framework of standards among other things includes three pillars to foster closer cooperation between customs and other cargo movement players in ensuring an efficient and effective response to the challenges of supply chain security. The framework appreciates all of its partners in government and the private sector that are working in close collaboration to maintain the relevance of the SAFE Framework in a changing trade environment. The main task is anchored on Customs authority to make sure all three pillars implemented in the country. The problems are how fast the country had implemented those standards with the revenue collection maximizations undermines the efforts.
Further, research effort about the magnitudes of losses security problem even in developed countries are not far dated. For instance, in the USA it started in the 1970's as a vital step to arrest cargo security risk (OTS, 2015) Theft losses alone in the USA supply chain are estimated to range between USD 4b to 12b per year while total global losses could exceed USD 50B (O, Connell 2015). According to Adams (2005), an average company probably loses around 12 percent of its asset year somewhere in the supply chain in the USA.
Comparable revelations' on Tanzania are lacking, as no existing studies the subject matter in the country, hence the real value of cargo security of goods is hard to recognize. Investigation reveals that Dar es Salaam port and ICDs do not organize data and information about their security problems and/or they do not effectively utilize it in their security plans.
According to Argon, (2005), the best out of cargo security calls for cost–benefit consideration to all stakeholders, which entail comparison between security effort and its impact. This position requires careful thought as Delapaz,(2005) noted difficulty to measure returns' of security efforts though companies must assess their security need and determine what they aim at and can afford to invest in keeping their supply chains safe.
The theoretical perspectives in this paper are aimed highlighting basic benchmarks of the SAFE framework of standards and commercial security of cargo in supply chain system necessary to maximize on cargo security operations so that at the end of the day, a post account from security systems is vivid.

The objective of this Study: is, therefore, to explore the level Tanzania achieved in implementation SAFE framework of standards and eventually spur and commodity security studies in ports in Tanzania perspectives Thus, any feedback to this paper is much welcome.

2. Review Of Cargo Security Literature

2.1 UNDERSTANDING THE ESSENCE OF CARGO SECURITY SYSTEM IN PORT

What Does Cargo Security Means?

Cargo security concerns protection of goods from risk or danger of purposeful man-made incidences that cause loss or damage to cargo. It differs from cargo safety in that it excludes protection against accidents and acts of God. Purposeful incidences include those aimed at direct economic gains like terrorist, theft, burglary, fraud, trafficking of contrabands and those fostering aimed other goals or indirect financial benefits like economic sabotage and terror actions. All prevalence perpetuating cargo insecurity cause economic hazard in ports and ICDs and should be prevented.

Sanders (1994) ideally defined cargo security as the ability achieve very low rates of and damage and thus maintains goods in perfect condition I.e. in practice we should be aim at minimum loss/ damage out of security efforts deployed rather than anticipating total elimination.

Of the same, a question arises as to what should be the acceptable rates of damage/loss due to insecurity prevalence. One may wonder whether there could be a commonly acceptable level of insecurity in the port considering differences terminals' location and communities that surround them.

The scope of this study includes security against terrorism and the likes The challenges of preventing terror actions in recent years has become far beyond the competence of individual ports but has been put under international port security protocols such as SAFE framework of standards for securing international cargo movement. Ordinary security measurement at the level of each port May end- up unveiling terror missions and are considered as part of cargo secured in international cargo movement.

2.1.1 Impact of Cargo Security Risk to the Logistics Sector

A study conducted by the US Department of Transportation in 1999 found a number of devastating effects of cargo theft in the transportation network, the major ones being;

1: Vulnerability to terrorist attack.

2: Disruption of reliable and effacing of good from shippers to receivers: Stolen goods will not reach the intended receiver and thus disrupt his economic operations. This disruption is not relieved even by indemnification by endurance companies since indemnifications always come for several days, if not months, after the planned usage time of goods.

3: Expensive theft-related losses, which include the direct cost of the stolen cargo. This is all about the actual value of good involved in thefts. More often than not, shippers and/or receivers tend to technicalities of trade and reinsurance policies.

5. Additional administrative expense: The US Office of Transportation Security (OTS) (1999), estimated indirect costs, such as filing, investigating, and law enforcement and paying claims, to be two to five times the value of stolen goods.

6: Reduce transportation industry profits. The above costs will apparently impinge on the profits of two to five times the value of stolen goods.

7: Increased prices for consumers: It is usual for the business organization to shift all or lest part of such costs to consumers in the form of increased prices. This way, consumers are made to participate in marking good the losses incurred through cargo insecurity. Firms find it easy to pass on such costs if security incidences are rampant in a given area. i.e if the risks are not a unique case to particular or just a few firms.

2.1.2 Objectives and benefits of cargo Security Systems in Ports

Cargo security in supply Chain may be broken into three periods of time- prior to shipment, during shipment and after shipment. The majority of security risks occur either prior to or after shipment i.e. during storage. Thus, commercial security activities become more vivid in ports and ICDs.

Objective and benefits of commercial security of good in port derive from the meaning of cargo security and are discussed in a few paragraphs below.

i. To safeguard cargo from a risk of terrorist, damage, loss, theft, burglary, sabotage, and the likes activities done to attain this objective depend on the security risk level magnitude of loss in case of security peril, natural and value of cargo at risk, and an environment in which the ICDs is located. Based on this factor, security activities may not include intelligence operations.

ii. To capture information about parties and partners who have security importance to cargo. These enable proper treatment of the parties and consultations for cargo security. Parties with poor security record or even completely strange parties will be treated differently from ordinary parties. Rating of parties may be done periodically or for each transaction depending on the security situation, status of parties and /or cargo sources and destinations. Also, parties who have interests in securing cargo, like Customs department at customs controlled areas may assist in some way to check cargo security perils for the sake of safeguarding tax collections.

iii. To keep a record on security problems for use in security analysis and planning. Proper planning needs sufficient and correct information, which require deliberate efforts to gather. Also, information on cargo security incidences may avail learning risky activities, tactics risk sources, etc and helps advance plans to arrest the situation.

Although the above objectives have been given in general terms, ports need to determine specific and detailed objectives of their security measures in those lines and beyond.

Inventiveness in security responsibilities has become imperative in recent years ensuing from criminal's mind-boggling and creativity thus security officials 'effectiveness rely on their ability to keep abreast with these changes. Hence, fundamentals of cargo security system discussed below only serve the framework and not a total solution to security problems of cargo security problems of cargo in warehouses. Open – minded approach to specific situations of ports for effective systems is vital continuous assessment and improvement to security systems is a necessity.

2.2 Global Trade Security Initiatives

Global trade securing initiatives goes far back early 1940s with both inter governments, multi governments, and international organizations agreement. The list cannot comprehensively be narrated in the paper but as the SAFE framework of standard set, a major milestone on those initiatives below is the list in nutshell on before SAFE framework standard and SAFE framework it is self.

2.2.1 International Initiative before WCO Frame work of standards

Supply chain security initiative global trade before SAFE including : Customs-Trade Partnership Against Terrorist (C-TPAT),a voluntary compliance program for companies to improve the security of their corporate supply chains, Container Security Initiative (CSI) global container Programmer(CCP) Global Trade Exchange, International ship and port security Code (ISPS code),RFID and GPS,.ISO/PAS 28000 Specification for security Management systems for the supply Chain, SO/IEC20243.

2.2.2 SAFE Framework of standards

WCO in June 2005 adopted the SAFE framework of standards to secure and facilitate a global trade which has detailed structure for securing global trade than all prevails one. SAFE Framework act as a deterrent to international terrorism, secure revenue collections and promote trade facilitation worldwide. It has additions sections on 2007 which provide conditions and requirements for Customs and AEOs. The SAFE framework of standard 2015 edition encompasses a new version that includes a new pillar on cooperation between Customs and other Government and Inter-Government agencies.

According to WCO, 2015:2, objectives of the SAFE framework now are: "

i. Establish standards that provide supply chain security and facilitation at a global level to promote certainty and predictability.
ii. Enable integrated and harmonized supply chain management for all modes of transport.
iii. Enhance the role, functions and capabilities of Customs to meet the challenges and opportunities of the 21st Century.
iv. Strengthen co-operation between Customs administrations to improve their capability to detect high-risk consignments.
v. Strengthen co-operation between Customs administrations and other Government agencies involved in international trade and security
vi. Strengthen Customs/Business co-operation.
vii. Promote the seamless movement of goods through secure international trade supply chains.

The SAFE framework consists of four core elements. First, it harmonizes the advance electronic cargo information requirements on inbound, outbound and transit shipments. Second, each country that joins the SAFE Framework commits to employing a consistent risk management approach to address security threats. Third, it requires that at the reasonable request of the receiving nation, based upon a comparable risk targeting methodology, the sending nation's Customs administration will perform an outbound inspection of high-risk cargo and/or transport conveyances, preferably using non-intrusive detection equipment such as large-scale X-ray machines and radiation detectors. Fourth, the SAFE Framework suggests benefits that Customs will provide to businesses that meet minimal supply chain security standard"

It is clear that member countries need to engage in deliberate effort to undertake all three pillars as stipulated by its standards in order to secure global trade as above SAFE objectives stipulate. The implementation of those standards requires full commitment of both customs authority, business community and government authorities in terms of planning, financing and coordination's in agency matter to meet tie framework for executing the framework SAFE established those standards in the spirit that there is agency need to damage the entire global economy and social well being of nations it create strategy to secure the cargo movement in global trade. Its objectives are to establish standards to secure supply chain; enhance customs role function and capabilities to meet securing global trade challenges; strengthen co-operations between custom administrations, customs and other government agency involve in international trade and customs business community; and promote seamless secured movement of goods. Those frameworks have various standards set in order to make sure it pillars fully participate in making sure the global trade chains secured.

2.3 FUNDAMENTALS OF AN EFFECTIVE CARGO SECURITY SYSTEM

Several measures contribute to preventing cargo in ports from theft and other security risks in the supply chain. The importance of involving all players across the global supply chain is a vital tool in securing global trade. Administrative and procedural guidance's for each port area should abide with the SAFE framework of standards guidelines as well as up to date technology for securing goods movement. Some security procedures apply to commodities focus of this study is on securing global trade while others are relevant under only commercial security. Value of cargo in, as well as locations of the port will always influence decisions regarding measures and extent of security efforts taken.

2.3.1 Commonly Overlooked Security Considerations

Cargo security systems of some ports are ineffective as it fails to involve all players as SAFE framework suggest. Below we provide the commonly overlooked security considerations.

1: Failure to secure all chain using three pillars, Customs to customs network arrangement, Customs to business partnerships and Customs to other Government Agencies co-operations.

2: Know and connect trade chain (e.g. Freight Forwarders, ship agents tally companies, etc): Knowing the honest status of trade intermediaries give an indication of the extent of care needed when dealing with each. This does not call for a relaxation of security measure when dealing with poorly rated.

Parties' penalty tariff may be instituted to discourage dishonesty manners and encouraged honesty practices. This consideration should not be construed of stakeholders, but rather it emphasizes the need to recognize the value of honesty practice by the organizations and individual with whom we interact in cargo logistics and storage functions.

3: Secure sensitive cargo chain information: Only practice with a legitimate interest to particular cargo should have access to information about it. Information about types of goods, cargo value and others shipping information can prompt and/ or aid thieves.

In the early 2000s, there was established a fault in publishing shipping information by US customs department without categorization; some information is found to impinge on the competitive position of importers and exporters while others helped criminals to steal cargo from port and terminals, thus secure, but also information pertaining to the goods. A client should also educate of the importance to the secure information of their good in that regard.

4: Pre-receipt security measures: History has shown that many good are vulnerable because security effort is observed only from the point of receipt into ports. However, all per-shipment warehousing, packing, counting, marking and transportation activities must be checked for security information concerns. This is best done through proper documentations connotations as well as recording at changeovers. This is best done through proper documentation a well as recording at changeover stages in the supply chain.

5: Ascertain security status of cargo source and chain: Some place is known of high security actions and practices of the trade. Consideration of this aspect can help check security risks posed to the organization by instituting stringent measures for goods originating from such localities this consideration critical even when dealing with honest and reputable intermediaries.

Although more relevant to the security of goods during transportations, a recent quotation of the direction of International Maritime Bureau (IMB) potting Mukundan, clear verify this consideration. Expressing about risks posed by trade transactions originating from Iran in May 2005 he had this to say:

Many of these secondary transactions appear to be fake, as traded 'good and the vessels said to be shipping them, simply do not exist. In others cases, the cargoes stated on the bills of lading never actually loaded… An IMB investigation indicates that roughly two thirds of such transactions on the secondary forfeiting market were fraudulent''.

6: All time consideration of documentation/security requirement for granting ownership to cargo. An empirical case involved a cargo release by the destination port authority without presentation of lading by consignee simply because the cargo was consigned to a government ministry. Such mishandling of documentation procedures can give rooms to serious security risk.

Effective cargo security systems are founded on administrative, physical and technological measures. The former should include operational procedures while the later involve tangible structures. Below is an emphasis of the position of these measures to cargo security in ports.

2.3.2 Administrative Measures of Cargo Security in terminals and ICDs

To establish an effective cargo security system, Delapaz (2005) recommends starting with the risk assessment to determine the vulnerability of each cargo holding facility. This entails considering things like the type of commodities stored and transported, modes of transportation used, parties who have access to the facilities and cargo destination. Imaginative thinking depending on the local situation is vital e.g. consideration whether or there exists black market for certain products kept in your stockyard, likelihood of given a party or facility to succumb to insecurity actions, etc

Furthermore, it necessary to have documented and publicized security regulations so as arouse awareness and keenness to every person involved in security related duties. Documented and publicized regulations elicit a positive response from pertinent publics more easily than if pushed from a few persons' minds. This emphasizes the importance of people, process, and knowledge, on top of physical structures and technology. Assessment of national and international regulations and procedures and competence of security staff (both within and outside the organization) is thus, of paramount importance.

Administrative measures for cargo security in ports should be in pace but must be in harmony with the SAFE framework of standards.

An effective security system should value organization's need to satisfy customers meet the cost of cargo security through the price and this they pay and gives them the right to be considered. Security check procedures for identifying people seeking entry to premises, administering government security regulations, etc tend to cause delays and inconveniences to customers in the process of serving them. Though inevitable, formalities need to be marketing oriented in their implementation so that customers do not feel mistreated. An easy way to achieve this is to assign a senior official responsible for checking balances between security needs and customer satisfaction. Well- handled higher security measures can become a satisfier to clients. One useful way is to educate relevant publics about the essence of various security procedures and actions, to let them know that they benefit from resulting security. Those security measures should be inclusive all supply chain players and focus should be on securing the whole chain.

2.3.3 Concept of Commercial cargo security

There are many practices that can be implemented to increase the security of a cargo load whilst in travel. Available methods for protecting cargo are: Inventory counts done daily to quickly draw attention to any shortages or missing product , use of security guards, GPS systems with alarms when the load goes off route, kill switches that prevent vehicles with stolen loads from moving, special tape to indicate when parcels have been tampered with stolen good datable to help identify criminals offloading stolen goods, and third party investigation teams that work toward recovery. Each port needs to develop their own practices for the security of the cargo while in port or moving to and from ports. These strategies need to encompass building strong relationships with all partners to minimize the chances of inside job .limiting employee turnover, properly training staff including proper certification and careful inside communications with every party involved in the shipping, transportation and receiving of the materials.

Security measures need to consistently reviewed and adjusted to reflect what is happening in the industry at the time, ever involving to stay ahead of sophisticated criminals. Companies need to develop a strong partnership with every one involving of their goods including logistics providers, drivers, border patrol and those on the receiving end to make sure the product arrives safely and valuable loads are properly protected while in transit.

Security is the concern for manufacturers and logistics provider across the globe and those looking at AEO accreditation, a secure supply chain is a must Port keeps goods waiting for export transshipped and imported to and from the ports. The time goods stay in the port depends on clearance time in those ports. At one time the goods in the ports had the value of millions of dollars and due to the nature of the port's operations the risk of damage or theft it is' very high. It is vital to look on how best the goods stored by invest for safety and security. Often, security efforts in port´s are arranged to extend to all properties beyond commercial goods that undermine the degree of focus to the commercial security of goods. This paper limits its scope to the security of commercial goods, exploring its effectiveness and efficiencies

3.0 SOME INSIGHT ON IMPLEMENTATION OF SAFEFRAMEWORK OF STANDARDS AND CARGO SECURITY OPERATIONS IN TANZANIA PORTS

To obtain empirical insights of ports in Tanzania regarding the implementation of the SAFE framework and commercial security, observations and opinions of thirty cargo security expert in Dar es Salaam were gathered and assessed. The experience expert executive with a minimum of fifteen years in the field was drawn from forwarding firms, ship Agents, Cargo Tallying companies and terminal and ICDs operations professional as well as trainers in transports and logistics within Dar es Salaam.

Structure questions posed to the thirty experts sought to elicit their views on the following:

i. Whether there is sufficient awareness, on SAFE framework of standards and on their parts or others, of documented rules/ regulations on securing global trade and commercial cargo security at a national level and Dar port level.
ii. Whether Dar es Salaam port employ the full SAFE framework of standards as stipulated in the 2015 version

iii. What extent customs authority fulfill Customs to Business pillar standards as stipulated by a SAFE framework of standards 2015
iv. What extent Customs authority implement Customs to Other Government Authorities pillar standards
v. Whether the Dar port keeps records of security problem and incidences and uses records to derive information for cargo security planning
vi. Whether they are aware of any usage of security records and information by TPA, other than planning for security systems
vii. The Existence of cost- benefit assessment of security budgets by TPA.
viii. Commonly experienced security problems, their causes and trend in the port of Dar- es Salaam
ix. The envisage gravity of cargo security problems, identifiable in the port of Dar es Salaam.
x. The impact of cargo security problem in Dar port to various publics and vivid measure to check the problems

The following few paragraphs provide findings of the inquiry from the executive survey and observations that were conducted over a period of thirteen months.

3.1 STATUS OF CARGO SECURITY SYSTEM S IN TANZANIA PORTS

The study noted that 70 percent of the respondents are not having detail information on the SAFE framework of standards and on their parts or others, of documented rules/ regulations on securing global trade. Thus as the framework gives the task to customs Authority to oversee implementation, there is a need to increase awareness strategy to both players involves on those three pillars in the country. Much may be done by customs but it's paramount to make sure all supply chain players are well informed and operate at the same pace. The levels of implementation of SAFE framework differ from one pillar to another. For the Customs to customs networking much information shared between customs authority and other authority in EAC, SADC and internationally. Thus indicates there well networking between customs authorities but yet the movement of goods within our borders is not seamless. The focus of networks should promote the seamless movement of goods through our borders. Further, the level of trust between Customs authority in the region need to be improved so as to reduce delays of cargo in those borders. There is a need to simplify clearance processes between our countries borders through examine current cargo clearance procedures and remove duplication.

The issue of whether Dar es Salaam port employs the full SAFE framework of standards as stipulated in the current 2015 version addressed, the study noted that only some of those guidelines implemented in Tanzania. Each supply chain member should be included on the implementation program. There were high involvement from 2005 to 2015 were trade facilitation such as green channel clearance, client risk profiling and compliant scheme in place. Customs authority from 2016 to date, it has over emphases on revenue collection, where all of those initiatives removed.

Another question was to what extent customs authority fulfills Customs to Business pillar standards as stipulated by the SAFE framework of standards 2015. The study reveals that most of those guidelines under this pillar are not implemented. The main focus of the pillar is to facilitate cargo clearance by using up to date technologies. In Tanzania customs still undertake double inspection of imports, exports, and transit. Despite all containers scanned while transferred to ICDs yet they are subjected to physical inspection before released.

On aspect of extent Customs authority implement Customs to Other Government Authorities pillar standards, the study reveals that despite some efforts in place but till now no harmonized clearance procedures for all government agencies neither any single window upon which all agencies should use during the clearance process. Each agency act on its own hence causes a lot of delay in cargo clearance contrary with the spirit of seamless movement of cargo as SAFE framework proposed. Customs and other government agencies should ensure an efficient and effective government response to the challenges of supply chain security. The existence of cooperation of government agencies in Tanzania are not very smooth as each one of them delivers its mandated function without having the common interest on securing global trade. Various procedures are not harmonized and no single window for all agencies to offer their services through it. The establishment of stop center was one step towards the accomplishment of integrations of government agencies service butt it had stopped on having one office with previous procedures and system upon which previous procedures. The respondents proposed the need to streamline those agencies procedure and system upon which they can talk to each other on an interest of facilitating trade and securing global trade. The culture of each agency showing its superiority on through stopping of cargo release should be worked out. The model operand of those agencies causes a high number of movements of people inside the port which is a potential risk to secure global trade as well as commercial security. The SAFE framework encourages establishing cooperative arrangement between customs and other government agencies which are the idea behind the concept of one stop border post, the concept should be implemented also in port of Dar es Salaam.

To unveil the main SAFE securing global trade and securing perils in Tanzania ports, questions were asked to the experts about challenges on implementing the SAFE framework of standards in Tanzania and security problems commonly in encountered in the ports of Dar es Salaam, and their enormity. Responses to those questions revealed that the country is not well prepared to implement the SAFE framework of standard as the second and third pillars have not been the focus of the players and implementation faces the great challenge of maximizing revenue collection in the country. Also the study found the dominance of perils that target customer goods more than TPA's own goods

The focus of SAFE framework of a standard is for common users of port of Dar- es Salaam consider cargo security operations in the ports to be haphazardly done, in the absence of documented rules and regulations for facilitating cargo security in the ports. About 70 percent of them confirmed the contention at 92% response rate. This deficiency was noted to reply at the organization as well as state level. Further investigation on the remaining 30 percent, revealed that their non0 confirmation was mistaken by regulation and rule to cargo safety as opposed to cargo security.

Most experts' feels that the ports implement cargo security measures based on personalized ideas of ports officials as they change from time to time. When the ideas instructed, verbally or through memos and circulars, are executed for some time they become security regulations to that extent. Nevertheless, alterations to the parties external to the ports authority they fail to cope with those instructions. This tendency is typical in the case of verbal instructions, which tend to be implemented shortly and discard soon afterward.

The interpretation of the above is that TPA does not have documented cargo security regulations or where available, they are scattered in loose circulars and memos.

Almost all believe the ports of Dar es Salaam takes and keeps records of cargo security matters and incidences despite their withholding of the same to other users, like researchers. However, analysis of the finding below casts doubt on the presumption because of the authority's failure to reflect value for money in their security plans.

Over 80% of the executives were of the views that authority does not use security records and information in their cargo security plans. The executive conceived the main reasons for the setbacks of being poor skills and lack of professionalism on the part of security staff; lack of technological installations (e. g. computers, alarms systems) to facilitate the capture, processing and dissemination of information; and stereotyped view of top management regarding the function of cargo security that doesn't recognize its strategic position.

Consistent to this observation, about 90% of the experts precluded the existence of cost-benefit analysis in TPA's cargo security plans as they pointed to the tendency of assigning security responsibilities to people with customers need's empathy; people who view a customer as a deprived party.

Notably and interestingly, all the experts including those who denoted existence of cost-benefit analysis in cargo security system plans in TPA spelled out the following views:

-Poor of bad utilization of funds with less value being saved than expended

- Security functions in Tanzania ports are entrusted to incompetent personnel

-The problem of cargo insecurity is ''big'' (I .e. 9-10% of total cargo handled in Tanzania ports are subjected to security perils of some sort)or" appalling'' (i.e. Over 10% of cargo going through Tanzania ports are subjected to security perils some sort)

-Theft and damage to ports' own goods in less than 4% with over 96%of security perils befalling customers' goods. In the opinion of all the experts, responsibilities of personnel entrusted for the commercial security of cargo in ports in Tanzania are limited to operational and non-strategic duties. They identified four main duties of cargo security officials in ports as summarized below:

- Controlling and checking entry and exists of cargo and people in ports

Controlling and checking movements of people, especially outsiders, within ports

- Arranging for cargo insurance of cargo handle or stored in their ports
- Process or participate in the process of cargo claims that emanate from security perils

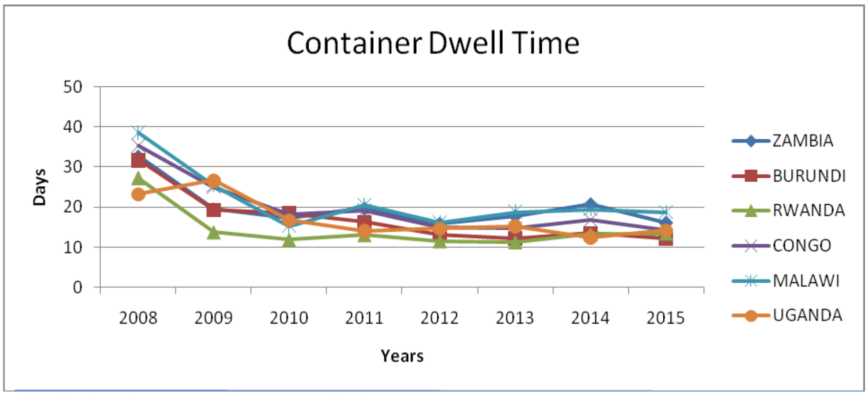
The above does not reflect a single strategic role security. Hence, strategic essence of cargo security in Tanzania ports is impeded by functional design- through inappropriate manning of relevant departments and restricting responsibilities to operational and routine tasks.

3.2. Practical Cargo Security Challenges in Tanzania Ports

Knowing practical cargo security challenges is vital in determining an appropriate security system to employ. Challenges differ between places depending on social- economic situations, locality, cultural and even political situations. Also, the gravity of particular security perils tend to differ among regions, countries or ports

3.2.1.The Conflicting focus for revenue collection and facilitation

The SAFE frame focus on facilitates and international trade by making easier for buyers and sellers to move goods across borders. The benefit expected are faster processing goods by customs and in turn reduce cargo clearance time and cost. The statistics show that despite some improvement in cargo clearance in Dar es Salaam port the container dwell time very high. In the result the port has considered having higher logistics cost due to storage, demurrage, customs warehouse rent and removal charges.



Source: Calculation from SUMATRA statistics 2018

In the opinion of all the experts, the overemphasis on revenue collection in which all of the cargos are subject to physical verification could be one of the causes of high dwells time in Dar es Salaam

3.2.2 Level of professionalism of Freight forwarders as Authorized Economic Operators

The country level of freight forwarders professionalism as the SAFEsecond pillar of Customs to Business requires in order abiding with secure of global trade requirement steal is questionable. Most of the operator on experience bases without proper training and skills improvement program, There code of ethics TAFFA approved which is a positive step to towards professionalism yet the document is in the paper only without any machinery for its enforcement. Also, TAFFA with other players in the industry started processed of establishing professional board for freight forwarders practitioners but the establishment of that board had taken over ten years without even come with the law itself. It's high time for the industry to expedite the process of professionalized freight forwarding service in Tanzania by improve training, certification and establishing proper recognized professional boards for its self controlling. The move could expedite the process of licensing Authorized Economic operator as the SAFE framework of standards requires.

The focus of the third pillar of the SAFE framework of standards is to foster closer cooperation between

3.2.3 Common Cargo Security in TPA

All experts noted less than 4% of perils befalling TPA's own goods. The specific problems identified by the experts in descending order of their gravity are:

i. Pilferage of customer goods from packages in ports
ii. Theft of customer's goods from ports
iii. Damage/spoilage to customer's goods in the course of theft or pilferage or pilferage
iv. Theft of own goods from packages in ports
v. Pilferage of own good from packages in ports
vi. Damage/ spoilage to own goods in the course of theft or pilferage

3.2.4 Level of Staff Competence

Incompetence of security officials was the single reason for security problems that were identified by all experts. Other reasons were lack of appropriate plans and efforts to tackle security problems at firms as well as national levels. Incompetence of security personal anticipates absence of adherence to fundamental principles of cargo security in ports. Disregard of the function by top management was yet another reason observed by 60 percent of the experts.

Investigation about the application of cargo security, an inquiry was made on measures used by TPA in their security system. Measure to check security problems in ports in accordance with theory were listed and the experts requested to identify the ones they think are being used or have experience with in cargo security activities in TPA. The experts picked only three measures out of the even that was enumerated earlier on as follows:

i. Control of access to premises
ii. Inspection of stores by supervisors
iii. Secure structures of buildings and ports

The person outside particular ports may hardly note certain security control even when undertaken, but several measures are noticeable if they really exist. This suggests that some measures not identified by the experts may actually be in use while others are really secluded. Issues like electronic surveillance, marketing orientation, marking of store documented security regulations are but some examples to confirm weak adoption of cargo security in ports.

Investigation as to why certain measures aren't adopted highlight better the understanding of cargo shortfalls and challenges in Tanzania. Nonetheless, the irresponsibility of ports and/or relevant staff incompetence explains some of these performance deficiencies. The following anecdotes one the expert may be emphasizing this contention:

''…. Quit often, the port authority has delivered cargo to this client without our release… though it's a government department… Luckily ocean freight was prepaid all the time….''

The implication we get from cargo security efforts in Tanzania ports is that thing is done with little keen and disregard to principles.

3.2.5 Cargo Security Regulations and Rules in Tanzania

Furthermore, no strategic thinking is attached to security efforts. One of the experts noted the following with respect to this:

Records on cargo security incidence appear to be geared for tackling isolated tasks like pursuing cases at courts of law and insurance claims but not for combating cargo insecurity…'' Six other experts supported the nation when separately requested to comment on it. The other five had a reservation, on grounds that it's the owners of data who can say with certainty what uses do the data have. However, they admitted being unaware of strategic uses of security data and information at least in so far as the ports of Dar es Salaam are concerned.

From this observation, it may be safely said that the underlying major causes of security problems in Tanzania ports is the failure to recognize the danger posed by inappropriate cargo security efforts to ports, customers ,organization's marketing positions and the overall economy.

Commercial impacts of such a situation are discussed in the few paragraphs below.

3.3 COMMERCIAL IMPACT OF THE STATUS OF CARGO SECURITY SYSTEMS IN TANZANIA PORTS

An investigation made to ascertain commercial impacts of cargo security systems in Tanzania under its contemporary situation unveiled the following:

i. Undermined Customer Trust and confidence:

The current status of commercial security of cargo in ports undermines customer trust and expectations as to their suitability. Nine experts were of the opinion that the level of cargo security in TPA is minimal especially due to improper staffing, lack of firm's regulation and rules and inappropriate or insufficient security measure:

When asked whether they think the market applauds cargo security measures at the port of Dar es Salaam as acceptable for cargo security and good services to clients, all experts disapproved the ides. Some regarded the measures as misdirected, inconveniencing and complaints builder while others were of the opinion that the measures as misdirected, inconveniencing and complaints builder while others were of the opinion that the measure is well directed but fail to value communication with a client about security issues

ii. Restraining Effectiveness and Encouraging Graft:

None existence of documented rules and regulations and /or failure to publicize the same clients who are supposed to adhere to them has engendered ineffectiveness of the system, as it limits willingness on the part of clients.

Undue powers by security officials and graft loopholes are introduced in the system as officials can take personalize actions to serve own purposes rather than organizations with no possibility of pertinent publics noting anomalies. Consequently, some security officials have become arrogant and suppress bona fide.

Customers causing ineffectiveness, inefficiency, and inconveniences to entice bribe, while letting bogus clients succeeding their mission leading to the vivid current poor cargo security status in the ports.

iii. Poor Utilization of resources:

Astonishingly, all experts were of the views that security system at the port manifest poor utilization of sponsor's funds. This should not be expected from those who thought, the measures are well directed and the perception that the rate of cargo security risk is unreasonably high as well as the arrogance of some security guards. Again, astonishingly, when the experts were asked whether they consider the benefits of TPA security system to exceed the costs, all couldn't affirmatively estimate the situation.

3.4 STRATEGIC AND POLICY IMPLICATIONS OF THE CARGO SECURITY STATUS

Foregoing part of this paper shown loss of firms' and, that matter, national resources due to inappropriate cargo security systems in Tanzania ports. Thefts and damages to goods, undelivered goods that are intended to feed production centers, increase cost of insurance premiums due to the bad reputation of the port are some of the ways engendering losses and poor resource utilization in the transport and logistics function.

Thus, it calls for further studies to detail the problem and quantify the loss occasioning as a result of the prevailing situation. Giving specific suggestions about the state of the commercial security of goods in Tanzania ports, some experts rightly contended for the need of detailed study to unveil extent of the problem so action appropriate steps to tackle it can be established.

Notwithstanding the above, cargo security regulations are put in place at the firm and national level to encourage the use of principles in cargo security operations and facilitate uses of information and conduction of action orientated researchers to foster continuous development of cargo security in the logistic function.

The government, through pertinent organs like SUMATRA and others, should move to protect consumers of services of the port and other ports. In most cases, consumers have suffered more than the port as observed in the study. Furthermore, claim processes have always been more complicated than the majority, mostly SMEs, can pursue to win their legitimate compensation from TPA. This undermines the government's efforts to eradicate poverty among local SMEs. For a few firms that succeed to get compensated, the time they spend ad failure to meet delivery and / or productions schedules are things to reckon with.

Security standards need to be established so that ports will adopt appropriate cargo security system and engage sufficiently and ethical personal and value information in cargo security systems. This is based on the needs to save resources, support growth of SMEs in the logistics functions and market the port of Dar- es – Salaam to transit and cargo movers.

Under the current global situation with terrorism taking roots and threatening the economic and social prosperity of nations, cargo security should be evaluated in its wider perspectives. While focusing on commercial security of goods, proper plans to ensure commercial good have often served other security needs like preventing the movement of destructive weapons aimed at supporting war and terror crimes. Well- conceived national cargo security regulations that are made public and binding to every party in logistical functions are conducive in this respect.

A strategic disadvantage that the status of cargo security system puts Tanzania has to be surmounted. Since the port of Dar –es- Salaam serves other countries' international trade's remarkable impact on the level of Tanzania's exports of services that spontaneously accompany transportation of goods through the port. This cannot be ignored.

Also, a study by Chande (2005) revealed the stead percent increase of Tanzania cargo volume through Mombasa between years 1998-2003 from 5-7% pegging Tanzania as growing transit cargo client for Mombasa port. This implies growing importation of services into the country, services that the country should instead be exporting.

Chande (2005), reveals that Tanzania became the second important transit (client) country for Mombasa port by volume and trend beginning the year 2000, only behind Uganda. It's predicted by some expert that of the one of the reasons for the situation is the unacceptable degree of cargo insecurity at the port of Dar es Salaam.

The application for the foregoing paragraph is that, inappropriate cargo security at the port may have perpetuated importation of transportation and related services from Kenya undeservedly unfavorable situation to the balance of payments of the nation.

Apparently there remain questions to be answered to qualify certain observation of this paper. Instead of relying on predictions, for instance, it needs further study to single out reasons for Tanzanians using Mombasa port more and more in recent years and ascertain the weight of commercial security of goods'' as one of the reasons. The impact of in appropriate cargo security systems to performance and success of ports users, especially the easily vulnerable SMEs need also be more carefully investigated for it can have remarkable interpretations to the effectiveness of government efforts in poverty alleviation campaigns.

From the foregoing, it is impending for the customs, ports and business community to augment their concern about, and effort to establishing appropriate systems in implementing the SAFE framework and commercial security of goods in ports as soon as is practicable. At this rate, it appears to be of paramount importance to encourage researches in the area so as foster policy and plan related information and decisions.

4.0 CONCLUSION AND REMARKS

Generally speaking and as most experts observed, there is a urgency need to expedite implementation of SAFE frameworks in the country. Despite some challenges the country facing in implementation yet, it's one of useful tool in securing global trade. The calm situation in the region where no serious terrorist attack noted does not remove the possibility of its occurrence. The importance of securing global trade should be the focus of implementation efforts and it should not be overridden by revenue collection move. Commercial security of goods in Tanzania seems to be lacking as it being operated haphazardly. Functions of cargo security in ports have attracted negligible attention by top managers and administrators both individual firm and national levels leaving no purposeful efforts to make it contribute to the major objective of increasing value of firms. The result has not only been losses of, and damages to, goods in ports but also a manifestation of poor fund utilization of sponsors in cargo security systems.

Noting the significance of transport and logistical function to the economy of any country, transport community and the nation at large need to do large need to do something about the appalling commercial security of cargo in Tanzania ports by ensuring minimum requirements; presence of regulations and rules governing commercial security of goods, publicizing the rules and regulations, creating awareness of regulations to relevant publics, and ensuring skills and knowledge and practices by all personnel entrusted with responsibilities of commercial security of goods. Since little is known about the situation of commercial security of goods in ports in Tanzania and in the supply chain system at large, researches on the subject matter should be encouraged. Appropriate cargo security systems- Theoretical Perspectives'& imminence of Researches in Tanzania Ports

ABBREVIATIONS

AEO	Authorized Economic Operator
CSI	Container Security Initiative
C-TPAT	Customs-Trade Partnership Against Terrorist
ICDs	Inland Container Depots
ISPS	International Ship and Port Security
OTS	Office of Transport Security
TAFFA	Tanzania Freight Forwarders' Association
TPA	Tanzania Ports Authority
WCO	World Customs Union

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Measuring Business to Business of inland container terminal ports service quality in Tanzania: A study of Dar es Salaam port

Eliakunda, Walter Kissimbo

Abstract

Inland container depots play a critical role in the economy of many countries. Inadequate inland container cargo clearance may significantly affect customers, government agencies, shipping lines, cargo owners and results in their dissatisfaction. However, what constitutes business to business of inland container depots service quality and its measurement has not been well assessed in the literature. Therefore, this study assesses measuring business to business of inland container terminal ports service quality in Dar es Salaam port in Tanzania.

Following a literature review, a conceptual model of B2B inland container depots using the INDSERV model. The model was validated through a survey of 364 members of all service providers and service users' managers in Dar es Salaam port. Partial least squares structural equation modeling (PLS-SEM) was conducted to confirm the INDSERV dimensions and to assess their relationship with business to business of inland container depot service quality using Smart PLS 3.2.8 software. B2B inland container depots service quality is found to be measured by four latent constructs, potential quality, process soft quality, process soft quality, and output quality and all of these latent constructs have significant positive effects on inland container depots service quality.

In addition to its academic contribution, this study also contributes to management practices because port managers can use the INDSERVE scale to measure their B2B inland container depots service providers and user's satisfaction and justify the value for money in the quality management of B2B service quality.

Keywords: Business to Business, Inland container Terminals, INDSERV, PLS-SEM,

INTRODUCTION

Ports are well known as playing an important role in B2B service quality and local and international supply chains. Ports engage in various activities: loading/discharging cargo onto/from vessels; providing value-added services such as labeling, packaging, cross-docking, and others; and acting as warehouse and distribution centers (World Bank, 2007). Ports add more value to shipments that are in the port area by further integrating themselves into value chains. Many ports are increasingly being perceived as integrated and inseparable nodes in their customers' supply chains. Ports play a critical role in the effective and efficient management of this industry.

According to Asubonteng *et al*. (1996), due to increasing competition and the hostility of environmental factors, B2B cargo clearance service quality has become a cornerstone supply chain strategy for B2B companies. This highlights how useful measuring B2B cargo clearance service quality is to organizations for their growth since it could help them tackle these challenges they face in competitive environments. This implies that B2B service quality -based companies are compelled to provide B2B cargo clearance quality services to their customers to have a sustainable competitive advantage. There is, however, a need for these organizations to understand the measurement of B2B cargo clearance service quality is to attain their objectives.

Handling large volumes of cargo at a minimum unit cost and shortest time is paramount in positively effecting the B2B service quality supply chain network. Notteboom and Rodriguez, (2009) observed that the evolution of inland container ports was looked at as the cycle in the continuous development of containerization and intermodal transport. Establishment and explosion in global supply chains in the 1990s, coupled with export-oriented growth strategies adopted by developing countries resulted in a paradigm shift in freight distribution systems. Multimodal transport and inland container ports turned out to be the focal point in the new supply chain and logistics strategy formulation, first with the implementation in the USA and developed Europe, followed by East Asian countries and then more recently Africa. This was mainly due to an insatiable focus on trade which resulted in diminishing returns, congestion, and a significant fall inefficiency.

Inland container Depot evolved out of the challenges that faced existing Dar es Salam port i.e., due to the increase in size and capacity of container vessels, port increasingly faced the challenge of inability to handle export and import cargo efficiently. This resulted in congestion at Dar es Salaam ports due to long waiting time of trucks and haulage vehicles (Woxenius *et al.*2004). Notteboom and Rodriguez (2009), argued that the evolution of inland container depots was looked at as the cycle in the continuous development of containerization and intermodal transport.

Unreliability in ports' services results in unhappy customers as a result of the disruption in the smooth movement of these flows in the next stage of the supply chain. Existing studies relating to the measurement of port efficiency and port choice in the logistics and supply chain context are well developed. What measure port B2B cargo service quality has yet to be well investigated. Despite number studies on service quality measurement in various sectors, little studies have been conducted in the cargo clearance in general and inland container depot in particular

In this paper, we aim to address these gaps in the literature by proposing and validating an INDSERV conceptual model of B2B service quality.

The specific research objectives are:

(i) To assess the effect of process hard quality on measuring business to business of inland container terminal ports service quality in Tanzania in Dar es Salaam port;

(ii) To assess the effect of process soft quality on measuring business to business of inland container terminal ports service quality in Tanzania in Dar es Salaam port;

(iii) To assess the effect of potential quality on measuring business to business of inland container terminal ports service quality in Tanzania in Dar es Salaam port;

(iv) To assess the effect of output quality on measuring business to business of inland container terminal ports service quality in Tanzania in Dar es Salaam port;

(v) To assess the mediation effect of output quality, process hard quality and soft quality in the relationship between potential quality and measuring business to business of inland container terminal ports service quality in Tanzania in Dar es Salaam port.

LITERATURE REVIEW

Leveque and Roso (2002) considered an inland container depot as "dry port directly linked to seaport with high capacity transport means, where customers can leave or pick up their standardized unit as if directly as a seaport. This definition takes into account the fact that an inland container depot does not only do the traditional role of transshipment as inland container depot but also to this role, it provides other services for example: consolidation, storage (both cargo and empty containers), maintenance and repair of containers, and customs clearance and maintenance (Wang and Wei 2008).

According to the United Nations Conference on Trade and Development(UNCTAD,1991) an inland container depot is“a common user facility with public authority status, equipped with fixed installations and offering services for handling and temporary storage of any kind of goods(including containers) carried under customs transit by any applicable mode of transport ,placed under customs control and with customs and other agencies competent to clear goods for home use, warehousing, temporary admissions, re-export, temporary storage for onward transit and outright export.” Thus, Inland Containers depots evolved out of the challenges that faced existing Dar es Salaam ports i.e., due to the increase in size and capacity of container vessels, seaports increasingly faced the challenge of inability to handle export and import cargo regularly. This regularly resulted in congestion at different seaports due to long waiting times of haulage and truck vehicles (Werikhe and Zhihong, 2015; Woxenious *et al*, 2004).

Gronroos(1983) considered the service quality as the relationship between the buyers' expectations upon the service offered to them and the one delivered**.**

Based on the interactive approach to the B2B service quality, Lee (2011) suggested four variables model to the service quality with three -dimensional approach describes the service quality from the service provider 's point of view that is through the potential quality, process quality (hard and soft) and the output quality. In this approach, the concept of the process quality is based on the fact that the service production and its utilization cannot be observed separately, because the several service providers have their contribution in the production process. The process quality level will, therefore, depend on how both the service providers and the users participate in the service delivery, i.e. if their style of participation is complementary, the process quality will probably be higher.

Conceptual framework

The conceptual framework (Figure 1) explains the underlying process, which is applied to guide this study. As discussed above, the INDSERV model is suitable for measuring service quality in inland container B2B services using the INDSERV service quality dimensions. This is in line with Gronroos, (1982), the technical quality dimension that is used to measure service quality.

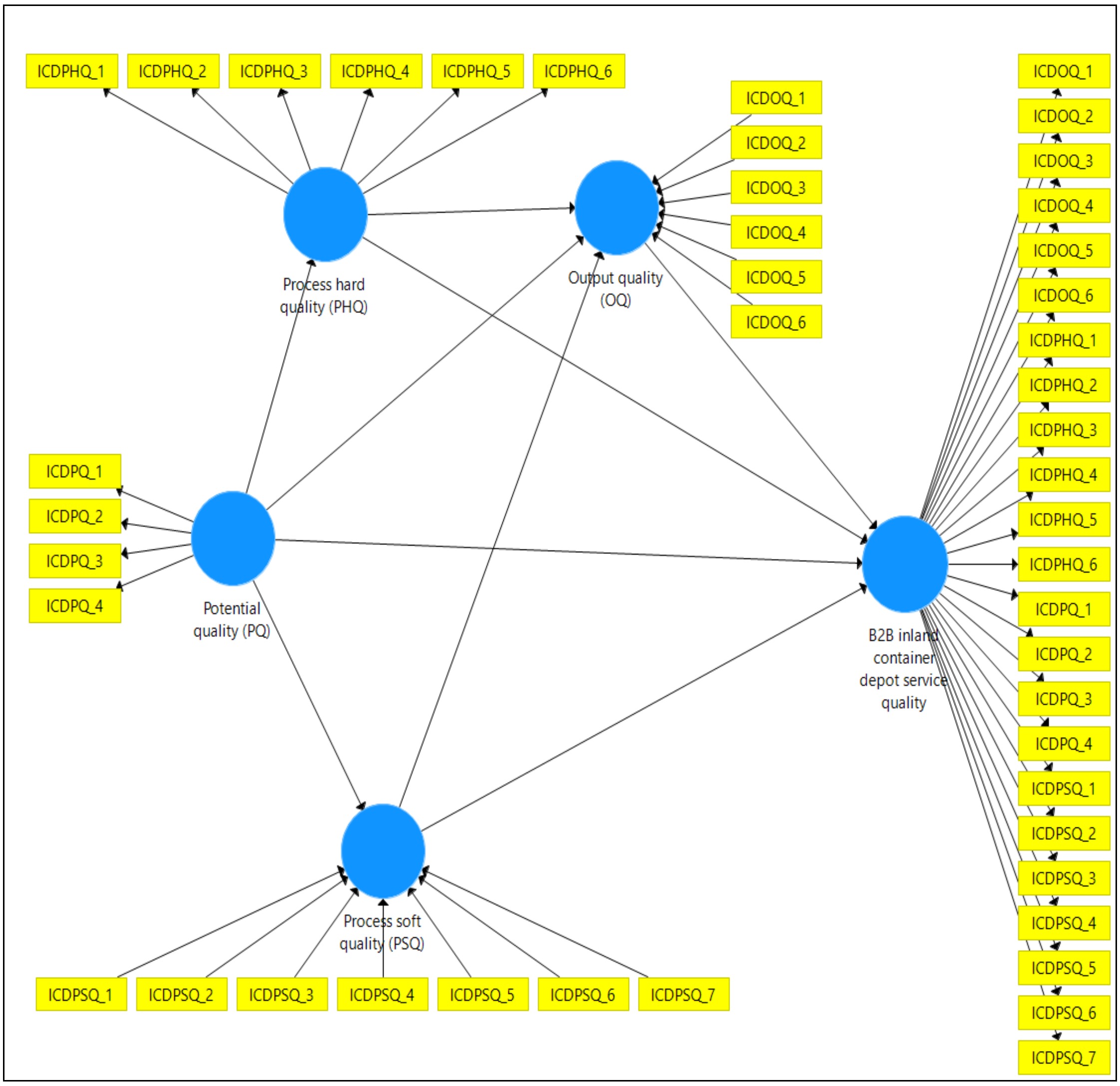

Figure 1: Conceptual Framework

Potential quality

Potential service quality relates to the search attributes that customers use to evaluate the provider's ability to perform the service before the relationship has begun (Gounaris, 2005).

Terminal and ICDs Potential quality (TermICDPQ).

Terminal potential service quality relates to the search attributes that importer, exporter and freight forwarders use to evaluate the Terminal's ability to perform cargo clearance before the documents processed in Terminal.

Process hard quality

Hard process quality comprises of "what" is being performed during the service process. This variable the service user's concern concerning processes through which the services are the assessment of the appropriateness of these processes to produce the best solution timely and according to the service user's need. Hard process quality relates to what the customer receives in material terms. Hard process quality represents the core component of the service performed during the process and primary need of the customer like an employee's technical skills, ability, and accuracy in servicing a firm's customers (Lee, 2011).

Terminal hard process quality comprises of "what" is being performed during the terminals clearance process. This variable relates to the importer, exporter and Freight forwarder's concern for Terminals clearance processes. Its focus on through which the clearance process is delivered and the assessment of the appropriateness of these clearance processes to produce the best solution timely and according to the importer, exporter and freight forwarder's need.

Process soft quality

Process Soft quality pertains to "how" the service is performed during the service process. The soft process quality variable denotes the service user's assessment regarding the interaction with the first line employees from the service provider with whom interaction is developed as a result of the service delivery effort. It goes beyond courtesy capturing communal elements of the interaction between managers of companies or more in understanding customers' needs and personality matching. In

B2B services extended and intimate exchanges are required to produce successful outcomes (Gounaris, 2005).

Terminal and ICDsprocess soft quality pertain to "how" the Terminal service performed during cargo clearance. The terminal soft quality variable denotes the importer's, exporter's and freight forwarder's assessment regarding the interaction with the first line terminal employees with whom interaction developed as a result of the cargo clearance delivery effort.

Output quality

Output quality pertains to the service user's concern regarding the actual offering delivered. This variable comprises not only the results of the technical efforts to service delivery but also the impact that the service delivery consequently produces for the buying organization. Output service quality describes the effects that the solution offered that created for the client after it had been implemented (Gounaris, 2005). In this study output quality mediate both potential quality, hard quality, and soft quality.

Terminal Output quality pertains to the importer's, exporter's and freight forwarder's concern regarding the actual terminal clearance delivered. This variable comprises not only the results of the technical efforts to terminals clearance delivery but also the impact that the Terminals clearance delivery consequently produces for the importer's, exporters and freight forwarders.

B2B service quality

B2B multi-process service quality of cargo clearance defined as service that satisfies port user's requirements from cargo clearance service providers. A complexity of cargo clearance service quality is due to the existence of different processes and multiple service providers (Hirimba. 2015). Cargo clearance measured by the speed of completion processes in the chain (Ibrahim and Primiana, 2015).

Research Methodology

Research design

The current study Design is a non-experimental, cross-sectional survey and explanatory type research. Cross-sectional design facilitated a deeper understanding of the subject. The study was employed quantitative data to answer the research question. Close-ended questionnaires were used for collecting quantitative data from sampled respondents.

Sample

The researcher distributed 482 questionnaires and managed to collect 364.

Data sources

Service quality measurement variables and instruments

Measurement scale of the perceived quality of inland container depot business to business service quality consisted of 34 statements. The dimension of the quality of service potential was measured via 7 indicators, the dimension of process hard quality via 6, process hard quality through 7 items, output quality via 6 indicators and the dimension of business to business service quality via 5 indicators.

A numerical scale with seven intervals (1-strongly disagree, 7-strongly agree) was used to measure the perception of individual quality dimensions. Table 1 presents an overview of the statements used in the empirical research of the business to business service quality.

Table 1: Overview of attribute symbols, attributes, and scales of the researched theoretical constructs

Symbol	**Indicator**	**Scale**
	ICDs potential quality	1-strongly disagree, 7-strongly agree
ICDPQ_1	Terminal and ICDs use up to date technology for cargo clearance	
ICDPQ_2	Terminal and ICDs have sufficient modern equipment for cargo clearance	
ICDPQ_3	Terminal and ICDs has comptent professional personnel to handle cargo clearance	
ICDPQ_4	Terminal and ICDs have sufficient equipment to communicate with its clients	
	ICDs Process hard quality	1-strongly disagree, 7-strongly agree
ICDPHQ_1	Terminal and ICDs procedures are well designed, clear, detailed enough, known and easy to conform	
ICDPHQ_2	Terminal and ICDs timely and effectively perform cargo clearance	
ICDPHQ_3	Terminal and ICDs honor its claims and financial obligations timely	
ICDPHQ_4	Terminal and ICDs adherence to client cargo clearance schedule	
ICDPHQ_5	Terminal and ICDs have a system for transferring documents to other service providers on time	
ICDPHQ_6	Terminal and ICDs are located nearby to facilitate cargo clearance	
	ICDs Process Soft Quality	1-strongly

ICDPSQ_1	Terminal and ICDs accept responsibility once caused delay on cargo clearance	disagree, 7-strongly agree
ICDPSQ_2	Terminal and ICDs do not change frequently its procedures and tariffs	
ICDPSQ_3	Terminal and ICDs listen to the client	
ICDPSQ_4	Terminal and ICDs personnel are not requesting for bribers to pass documents	
ICDPSQ_5	Terminal and ICDs has/have competent and pleasants personel	
ICDPSQ_6	Terminal and ICDs encourage the active involvement of their clients on providing their service	
ICDPSQ_7	Terminal and ICDs and its personnel take interest of the client at heart	
	ICDs Output Quality	1-strongly disagree, 7-strongly agree
ICDOQ_1	Terminal and ICDs clear documents accurately on time	
ICDOQ_2	Terminal and ICDs service delivery reduce cargo clearance cost	
ICDOQ_3	Terminal and ICDs service delivery contribute to positive port cargo clearance image	
ICDOQ_4	Terminal and ICDs service delivery simplify and facilitate international trade	
ICDOQ_5	Terminal and ICDs procedures compatible with other service providers procedures	
ICDOQ_6	Terminal and ICDs service are timely offered	
	B2B Cargo clearance service quality	
BSQ_1	Cargo clearance service providers providing their services concurrent	
BSQ_2	Cargo clearance service providers have efficient communication between each other	1-strongly disagree, 7-strongly agree
BSQ_3	Cargo clearance service providers are electronically connected	
BSQ_4	Cargo clearance service provider(s) has harmonized procedures	
BSQ_4	Cargo clearance service providers have one clearance platform	

Data analysis

This study used a quantitative approach where data were entered into SPSS software version 23. After the data collection, validation by conducting consistency checks to eliminate or control errors and missing information as practicable was done. Data were analyzed using Smart PLS version 3 (Hair *et al.*, 2013; Hair *et al.*, 2017) computer program. PLS-SEM was used to test the measurement of B2B multi-process cargo clearance service quality in Dar es Salaam port. Descriptive, inferential, and mediation analyses were conducted based on Lee (2011) B2B service quality model.

Respondents profile

Each respondent completed a survey questionnaire that contained items related to B2B cargo clearance service quality. Besides, each respondent also provided his or her demographic details such as gender, type of organization, ownership of a firm, duration in the cargo clearance operations, education level, and age. The demographic characteristics of the respondents are given in Table 2.

Table 2: Sample demographic

Demographic variable	Category	Frequency	Percentage
Gender	Male	227	62.4
	Female	137	37.6
Type of organization	Customs Authority	33	9.1
	OGDS	11	3.0
	Shipping Agency	21	5.8

	Inland Container Deports	9	2.5
	Freight forwarding agent	41	11.3
	Importer and exporter	149	40.9
Ownership of a firm	Government institution	44	12.1
	Pure Locally owned	264	72.5
	Pure Foreign-owned but based in Tanzania	3	.8
	Joint Venture Between Foreign and Local investors	38	10.4
	Multinational company operating in Tanzania	15	4.1
Duration in the cargo clearance operations	Less than one year	10	2.7
	Between 2 and 5 years	42	11.5
	Over 5 – 10 years	204	56.0
	Over 10 – 20 years	105	28.8
	Over 20 years	3	.8
Education level	Standard seven	4	1.1
	O’ Level secondary education	9	2.5
	A’ Level secondary education	38	10.4
	Diploma level	180	49.5
	First-degree level	124	34.1
	Postgraduate level	9	2.5
Age	20 to -30 years	31	8.5
	31 to 40 years	155	42.6
	41 to 50 years	144	39.6
	51 to 60 years	33	9.1
	Over 60 years	1	.3

Results assessment of the measurement model first-order constructs

Reliability and multicollinearity

The assessment of the reliability of the items depends on examining the outer loadings. A popular rule of thumb is to accept items with outer loadings of 0.707. In Table 3 the outer loadings for all first-order constructs of each measurement item are provided. The t-test of all the loadings is at the $p < 0.05$ level. All the loadings are above acceptable value and significant. The reliability and convergent validity of the constructs are evaluated by analyzing the Cronbach's alpha and composite reliability of the indicator. Nunnally (1978) recommends a value of 0.70 (in exploratory research, 0.60 to 0.70 is considered acceptable) as a threshold value for this indicator. The Cronbach's alpha scores ranged between 0.783 and 0.882 while the composite reliability scores ranged between 0.72 and 0.86, indicating adequate convergence or internal consistency. Thus, multicollinearity was not a concern in this study, VIF value ranged from 1.358 through 1.99 below cut off of 5 VIF (Hair *et al.*, 2017).

Validity

The average variance extracted (AVE) provides an assessment of convergent validity. Fornell andLarcker (1982) recommend an AVE value of ≥ 0.50. This means that 50% or more of the indicator variance should be accounted for. Consistent with this suggestion, all the constructs have an AVE value above this minimum threshold as shown in Table 3. This study assesses the discriminant validity by the Fornell-Larcker criterion, i.e., the AVE, square root of each construct is higher than the absolute value of their correlation (ranges between 0.46 to 0.619).

Table 3: Results assessment of the measurement model first-order constructs

Item	**Outer loadings**	**Multicollinearity**	**t-value**	**Composite reliability**	**Cronbach alpha**	**Average Variance Extracted**	**Fornell and Larker**
Potential quality				0.860	0.783	0.605	0.778
ICDPQ_1	0.736	1.36					
ICDPQ_2	0.788	1.66					
ICDPQ_3	0.783	1.66					
ICDPQ_4	0.803	1.59					
Process hard quality				0.890	0.852	0.754	0.758
ICDPHQ_1	0.752	1.61	22.71				
ICDPHQ_2	0.764	1.87	21.80				
ICDPHQ_3	0.756	1.85	18.73				
ICDPHQ_4	0.746	1.78	16.74				
ICDPHQ_5	0.739	1.61	18.67				
ICDPHQ_6	0.787	1.96	20.53				
Potential soft quality				0.720	0.780	0.710	0.760
ICDPSQ_1	0.717	1.80	11.77				
ICDPSQ_2	0.759	1.99	13.82				
ICDPSQ_3	0.602	1.53	8.90				
ICDPSQ_4	0.602	1.67	7.23				
ICDPSQ_5	0.838	1.88	12.38				
ICDPSQ_6	0.731	1.66	12.91				
ICDPSQ_7	0.759	1.90	12.79				
Output quality				0.906	0.875	0.605	

ICDOQ_1	0.786	1.857	25.93				
ICDOQ_2	0.827	2.302	29.89				
ICDOQ_3	0.771	2.059	22.70				
ICDOQ_4	0.767	2.117	20.49				
ICDOQ_5	0.769	1.945	23.34				
ICDOQ_6	0.789	2.078	19.98				
B2B				0.875	0.822	0.574	
BSQ_1	0.764	1.623	17.67				
BSQ_2	0.762	1.642	17.36				
BSQ_3	0.787	1.827	22.45				
BSQ_4	0.715	1.587	10.81				
BSQ_5	0.792	1.828	22.84				

Assessing of hierarchical second-order constructs

This study conceptualizes process hard quality and process soft quality as the latent construct of second-order using repeated indicators approach (Riel *et al.*,2017). The researcher has proposed several approaches for specifying and estimating second-order constructs in PLS-SEM. The most used ones are repeated indicator approach and two-stage approach (Ringle *et al.*, 2012).

In the repeated indicators approach, the items of the first-order constructs are re-used for the second-order construct. This procedure to model second-order constructs is based on the hierarchical components approach suggested by Wold (1982). In essence, in this approach, a second-order construct is directly measured by using all of the first-order common factors' manifest variables. For example, when a second-order construct is made up of three first-order constructs with five manifest variables each, all these 15 items would be reused as indicators for the second-order construct. This is the most frequently used method for estimating higher-order constructs in PLS (Riel *et al.,* 2017). The lower order components form the higher-order component (reflective-formative types adopted in this study), the direction of relationships is from the lower order latent constructs to higher latent construct. and therefore represents weights (Sarstedt *et al.*,2019).

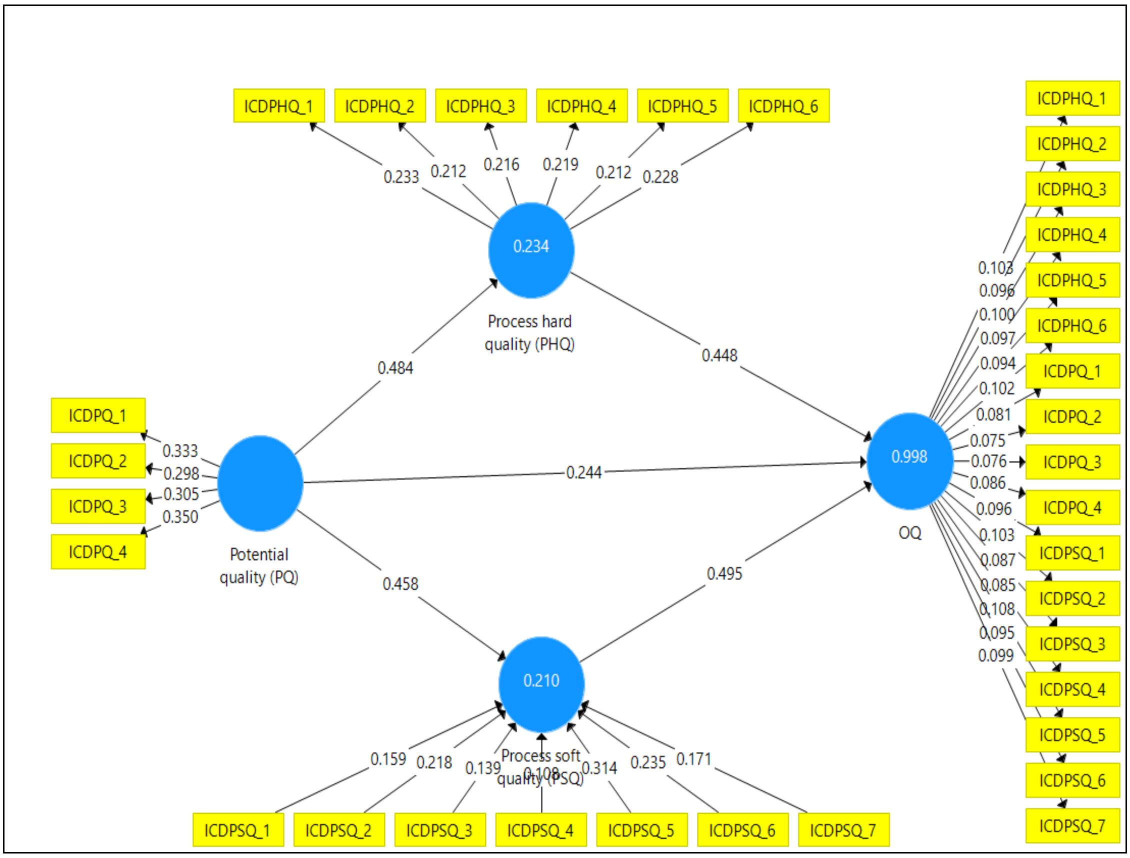

Figure 2: Reflective-formative of inland container depot B2B service quality repeated indicators approach(Sarstedt *et al.*, 2019).

Thus, this study used the standard measurement model evaluation criteria to the path relationships between the lower order and higher-order latent construct by using (1) convergent validity, (2) collinearity between indicators and (3) significance and relevance of outer weights. According to Sarstedt *et al.,(*2019:4), " researcher has to assess the discriminant validity of the higher-order component by considering its lower-order components as the measurement model of the higher-order component".

Convergent validity

The convergent validity refers to the validity of a reflective-formative construct that measures how a specific measurement truly measures the latent construct.

Hair *et al. (*2017) and Sarstedt *et al*. (2019) recommended a measurement model of second-order should employ average variance extracted (AVE) for checking the convergent validity of second-order constructs. According to Hair et al. (2017) recommendations, the AVE value threshold is 0.5. Thus by using repeated indicators approach (Sarstedt *et al.* ,2019), Table 4 below presents the results of the second-order latent constructs, which indicates that the convergent validity was sufficient or ensured. This is consistent with Hair *et al.* (2017) suggestions and suggesting that the measures are reliable.

Table 4: Second order measurement model displays a convergent validity

Construct	**Average Variance Extracted (AVE)**
OQ	0.395
Potential quality (PQ)	0.605
Process hard quality (PHQ)	0.574
Process soft quality (PSQ)	0.522

Collinearity between indicators

The variance inflation factor (VIF) allowed for testing for multicollinearity. As a rule of thumb in PLS-SEM a VIF value higher than 5 indicates a critical level of multicollinearity (Hair *et al.*, 2017). In Table 5 presents that, the VIF values for items of the second-order latent construct models range from 1.358 via 2.167, thus is consisitence with Hair *et al.* (2017) recommendations, that there were no threats for multicollinearity in our data set.

Table 5: Multicollinearity statistics

Indicators	VIF
ICDPHQ_1	1.613
ICDPHQ_1	1.889
ICDPHQ_2	1.875
ICDPHQ_2	1.943
ICDPHQ_3	1.851
ICDPHQ_3	1.966
ICDPHQ_4	1.78
ICDPHQ_4	1.888
ICDPHQ_5	1.613
ICDPHQ_5	1.68
ICDPHQ_6	1.96
ICDPHQ_6	2.048
ICDPQ_1	1.58
ICDPQ_1	1.358
ICDPQ_2	1.774
ICDPQ_2	1.659
ICDPQ_3	1.694
ICDPQ_3	1.657
ICDPQ_4	1.761
ICDPQ_4	1.595
ICDPSQ_1	1.799
ICDPSQ_1	1.907
ICDPSQ_2	1.988
ICDPSQ_2	2.167
ICDPSQ_3	1.529
ICDPSQ_3	1.57
ICDPSQ_4	1.668
ICDPSQ_4	1.72
ICDPSQ_5	1.878
ICDPSQ_5	2.022
ICDPSQ_6	1.662
ICDPSQ_6	1.734
ICDPSQ_7	1.903
ICDPSQ_7	1.979

Significance and relevance of outer weights

Weights indicate the relative contribution of items to their construct.

Table 6: Outer weights

Indicators	Constructs			
	OQ	Potential quality (PQ)	Process hard quality (PHQ)	Process soft quality (PSQ)
ICDPHQ_1			0.233	
ICDPHQ_1	0.103			
ICDPHQ_2			0.212	
ICDPHQ_2	0.096			
ICDPHQ_3			0.216	
ICDPHQ_3	0.100			
ICDPHQ_4			0.219	
ICDPHQ_4	0.097			
ICDPHQ_5			0.212	
ICDPHQ_5	0.094			
ICDPHQ_6			0.228	
ICDPHQ_6	0.102			
ICDPQ_1	0.081			
ICDPQ_1		0.333		
ICDPQ_2	0.075			
ICDPQ_2		0.298		
ICDPQ_3	0.076			
ICDPQ_3		0.305		
ICDPQ_4	0.086			
ICDPQ_4		0.350		
ICDPSQ_1				0.159
ICDPSQ_1	0.096			
ICDPSQ_2				0.218
ICDPSQ_2	0.103			
ICDPSQ_3				0.139
ICDPSQ_3	0.087			
ICDPSQ_4				0.108
ICDPSQ_4	0.085			
ICDPSQ_5				0.314
ICDPSQ_5	0.108			
ICDPSQ_6				0.235
ICDPSQ_6	0.095			
ICDPSQ_7				0.171
ICDPSQ_7	0.099			

Indicator weights/loading significance

Indicator ICDPSQ_4 to process soft quality (PSQ) is not significant has P > .05 (Table 7) . for example, p =.07. The researcher had not dropped this indicator for nonsignificant weight estimates. We considered content validity because if we dropped this indicator may have altered the meaning of the exogenous variable. Thus, in this study, we decided to keep an item with non-significant weight to preserve the construct's content validity (Hair *et al.*, 2017). Indeed, all weight estimates show the expected sign and are significant at a 5% significance level except one ICDPSQ_4 of the process soft quality. The weight estimate of this item is 0.108, and its composite loading estimate is 0.654 is significant. Taking into account content validity the ICDPSQ_4 of the process soft quality may incorporate some of the B2B business's important business processes. Therefore, we concluded to retain the item in the empirical analysis to accommodate content validity and avoid changing the conceptualization of the exogenous variable of process soft quality.

Table 7: Indicators weights, loadings and P values.

	Weights	Loadings	Standard Deviation	T Statistics	P Values
ICDPHQ_1 <- Process hard quality (PHQ)	0.233	0.748	0.015	15.385	0.000
ICDPHQ_1 <- OQ	0.103	0.693	0.007	14.513	0.000
ICDPHQ_2 <- Process hard quality (PHQ)	0.212	0.772	0.013	16.41	0.000
ICDPHQ_2 <- OQ	0.096	0.65	0.008	12.633	0.000
ICDPHQ_3 <- Process hard quality (PHQ)	0.216	0.767	0.013	16.304	0.000
ICDPHQ_3 <- OQ	0.100	0.667	0.008	12.915	0.000
ICDPHQ_4 <- Process hard quality (PHQ)	0.219	0.741	0.015	14.327	0.000
ICDPHQ_4 <- OQ	0.097	0.652	0.009	11.288	0.000
ICDPHQ_5 <- Process hard quality (PHQ)	0.212	0.734	0.013	16.868	0.000
ICDPHQ_5 <- OQ	0.094	0.629	0.007	13.123	0.000
ICDPHQ_6 <- Process hard quality (PHQ)	0.228	0.783	0.013	17.341	0.000
ICDPHQ_6 <- OQ	0.102	0.681	0.007	14.218	0.000
ICDPQ_1 <- OQ	0.081	0.542	0.013	6.132	0.000

ICDPQ_1 <- Potential quality (PQ)	0.333	0.733	0.042	7.845	0.000
ICDPQ_2 <- OQ	0.075	0.504	0.011	7.031	0.000
ICDPQ_2 <- Potential quality (PQ)	0.298	0.791	0.025	11.89	0.000
ICDPQ_3 <- OQ	0.076	0.513	0.009	8.308	0.000
ICDPQ_3 <- Potential quality (PQ)	0.305	0.786	0.026	11.73	0.000
ICDPQ_4 <- OQ	0.086	0.573	0.008	10.485	0.000
ICDPQ_4 <- Potential quality (PQ)	0.350	0.8	0.025	14.111	0.000
ICDPSQ_1 -> Process soft quality (PSQ)	0.159	0.734	0.062	2.573	0.010
ICDPSQ_1 <- OQ	0.096	0.653	0.008	12.696	0.000
ICDPSQ_2 -> Process soft quality (PSQ)	0.218	0.778	0.06	3.663	0.000
ICDPSQ_2 <- OQ	0.103	0.692	0.008	13.209	0.000
ICDPSQ_3 -> Process soft quality (PSQ)	0.139	0.658	0.059	2.35	0.019
ICDPSQ_3 <- OQ	0.087	0.594	0.009	10.017	0.000
ICDPSQ_4 -> Process soft quality (PSQ)	0.108	0.654	0.06	1.796	0.073
ICDPSQ_4 <- OQ	0.085	0.59	0.009	8.963	0.000
ICDPSQ_5 -> Process soft quality (PSQ)	0.314	0.804	0.068	4.634	0.000
ICDPSQ_5 <- OQ	0.108	0.703	0.008	12.839	0.000
ICDPSQ_6 -> Process soft quality (PSQ)	0.235	0.72	0.067	3.516	0.000
ICDPSQ_6 <- OQ	0.095	0.634	0.009	10.868	0.000
ICDPSQ_7 -> Process soft quality (PSQ)	0.171	0.758	0.055	3.112	0.002
ICDPSQ_7 <- OQ	0.099	0.67	0.007	13.736	0.000

Note: All t -values above 1.96 are significant at the0.05 level $p < 0.05$, two-tailed tests. All "p-value in Table 7 all produce by ordinary PLSbootstraapping.

Assessment of structural model

The PLS-SEM procedure does not employ the conventional goodness of measures (Ali *et al*,2018)

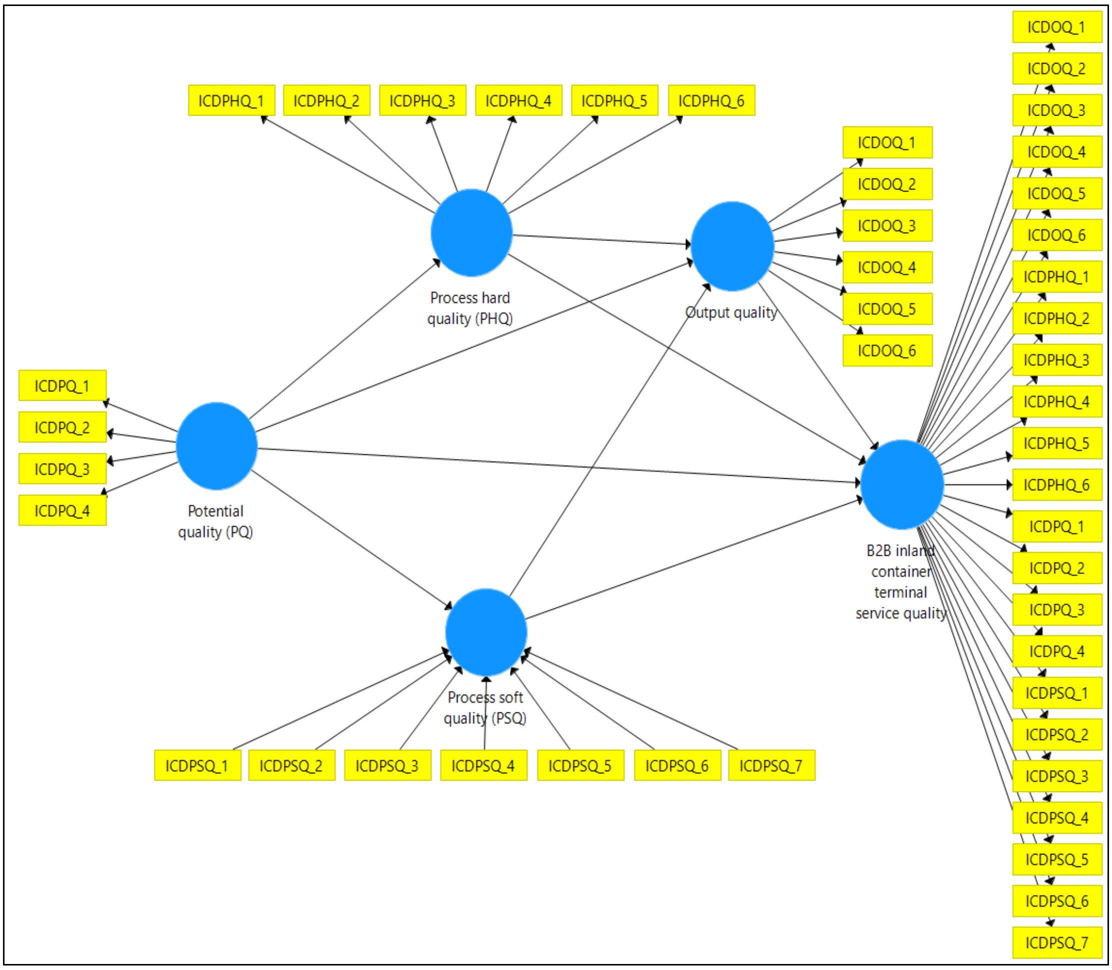

Figure 3: Reflective -formative specification of Inland container depot B2B service quality (repeated indicator approach).

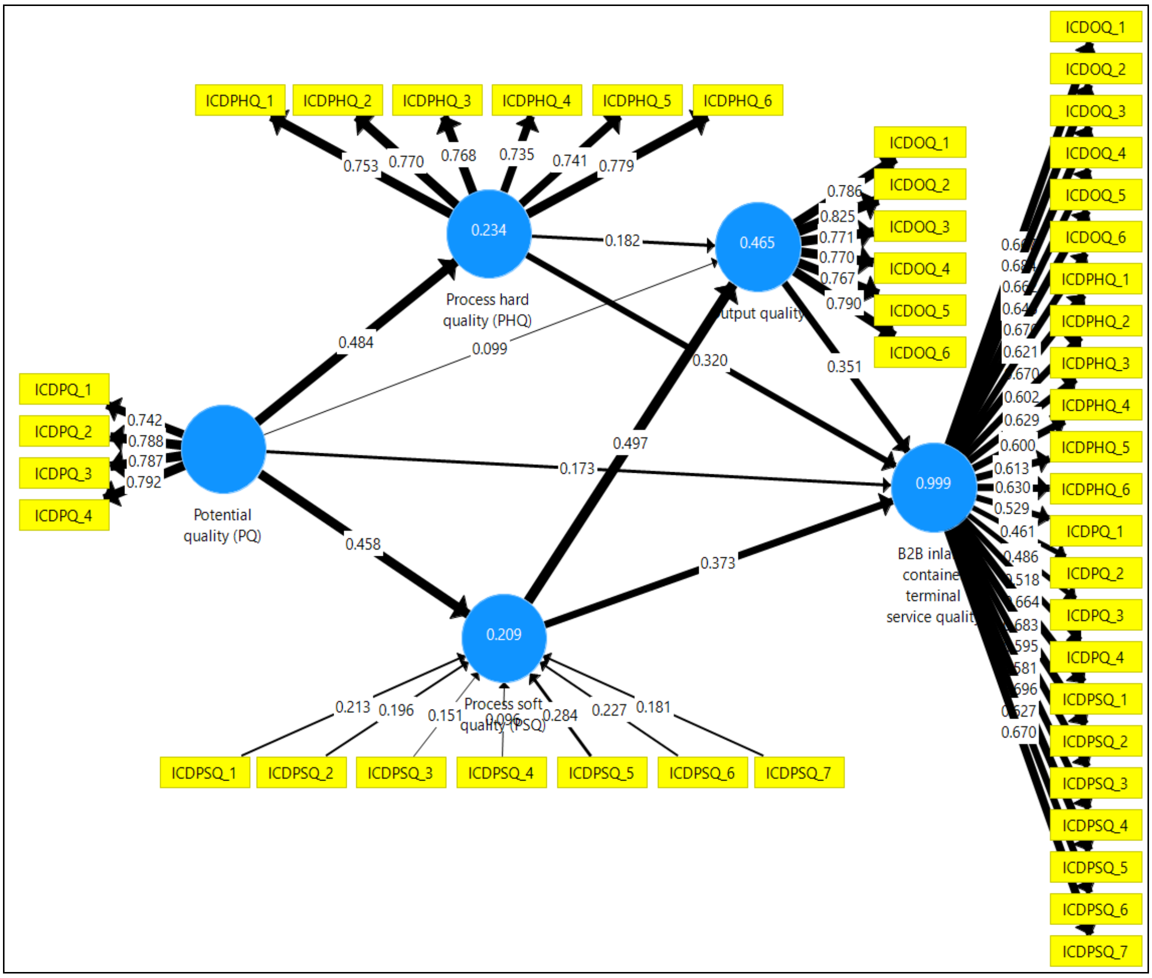

Figure 4: Reflective-Formative repeated indicator approach of inland container terminal depot service quality and PLS-SEM results.

Multicollinearity between constructs

Table 8: Multicollinearity statistics

Construct	B2B inland container terminal service quality	Output quality	Process hard quality (PHQ)	Process soft quality (PSQ)
B2B inland container terminal service quality				
Output quality	1.868		1.102	1.39
Potential quality (PQ)	1.397	1.378	1.231	1
Process hard quality (PHQ)	1.839	1.777		1.21
Process soft quality (PSQ)	2.181	1.720	1.434	

Significance and relevance of the path coefficients

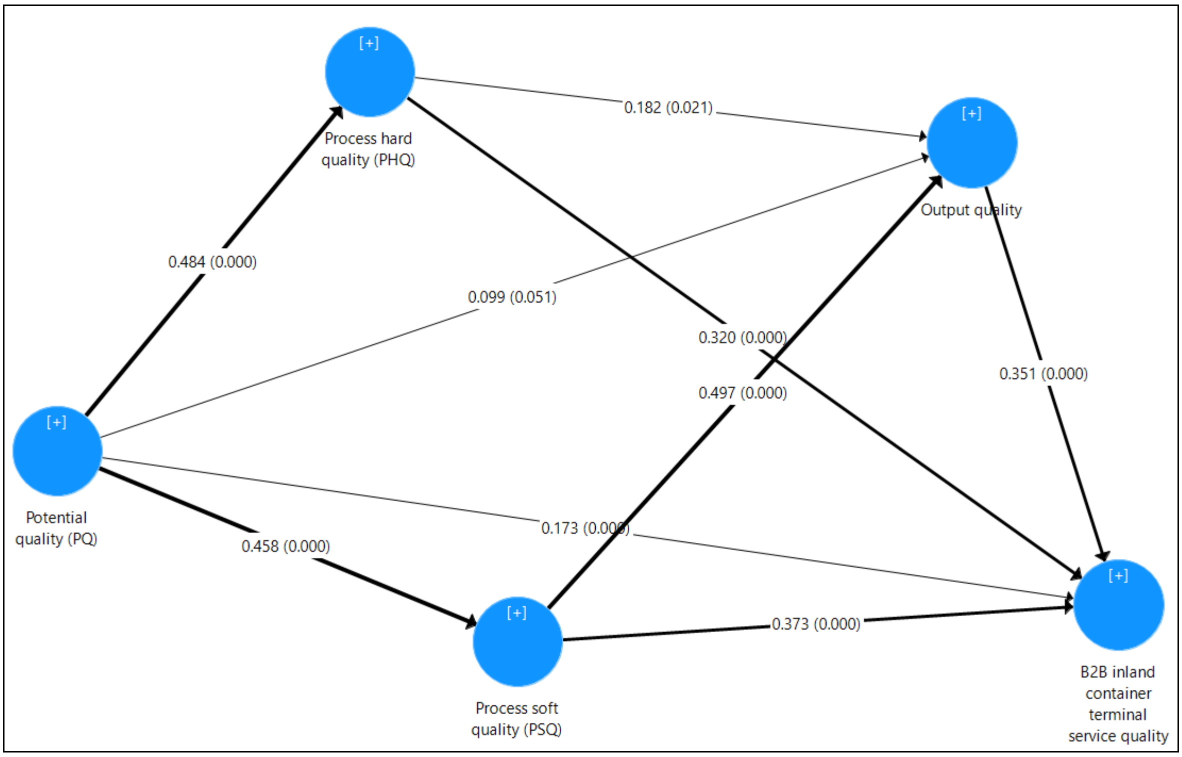

Figure 6: Third-order construct a structural model (PLS-SEM bootstrapping analysis)

Coefficient of determination R^2

This study aimed to examine the direct link between potential quality B2B inland container depots with the mediating role of process hard quality, process soft quality, and output quality. Here, Table 9 and Figure 7 present a comprehensive estimation of the structural model with statistical evidence to this proposed model. The coefficient of determination (R^2) is an essential criterion for the structural model. Various scholars have explained that the value of R-squared (R^2) presents a proportional variation of exogenous variables and the predicting variable(s) can describe it appropriately (Hair *et al.*, 2017). The R^2 value ranges from 0 to 1, with higher levels signifying higher levels of predictive accuracy. According to the recommendations of Cohen [1988), R-square values (R^2) 0.26, 0.13 and 0.02 related to endogenous constructs might be interpreted as substantial, moderate or weak respectively. While, in marketing research, R^2 values of 0.75, 0.50, or 0.25 for endogenous latent constructs can, as a rule of thumb, be correspondently described as substantial, moderate, or weak (Hair *et al*.2017).

However, the (R^2) value of the endogenous variable (B2B inland container depot service quality) was 0. 0.999, which indicates the PLS-SEM analysis produces smaller predication errors because all indicators of the lower -order constructs are to identify the higher-order component; hence, the higher-order component's variance was fully explained by lower-order components (For example R2 value 0.999 is near to unity that the combinations of exogenous latent variables namely, potential quality, process hard quality and output quality jointly explain 99.9% of the variance in a B2B inland container terminal depots service quality. However, the R-square value (R^2) of (a B2B inland container terminal depots service quality) the endogenous latent construct was significant as shown in Figure 7 and Table 9.

Table 9: Explanatory power statistics

	R Square	R Square Adjusted
B2B inland container terminal service quality	0.999	0.999
Output quality	0.465	0.46
Process hard quality (PHQ)	0.234	0.232
Process soft quality (PSQ)	0.209	0.207

Path coefficients

The first hypothesis (H1, H2, H3, H4,H5,H6,H7,H9,H10,H11 and H12) were also supported since there is a significant positive effect of process hard quality on the relationship potential quality and B2B inland container terminal service quality (β = 0.32, P = 0.000). The hypothesis (H8) not supported, is rejected since it has an insignificant p-value of 0.051 (p > 0.05). Its associated path coefficient is 0.099. which indicated that there was not a significant relationship between potential quality and output quality. The results of hypotheses H5, H6, and H7 showed that output quality, process hard quality and process soft quality mediated the relationship between the potential and inland container depots B2B service quality respectively.

Finally, the findings of this study confirmed positive relationship all hypotheses for the bias-corrected confidence interval and except hypothesis H8point estimate as indicated in Table 10.

Table 10: Structural model results and hypothesis testing

Structural path	Hypothesis		path coefficient	t value (bootstrap)	95% BCa Confidence interval	P Values	Decision
	No.	Sign					
Process hard quality (PHQ) ->B2B inland container terminal service quality	H1	+	0.32	15.644	0.287, 0.374	0.000	supported
Process soft quality (PSQ) -> B2B inland container terminal service quality	H2	+	0.373	15.37	0.337, 0.433	0.000	supported
Potential quality (PQ) -> B2B inland container terminal service quality	H3	+	0.173	8.316	0.131, 0.205	0.000	supported
Output quality -> B2B inland container	H4	+	0.351	12.473	0.302,0.408	0.000	supported

terminal service quality							
Potential quality (PQ) -> Output quality -> B2B inland container terminal service quality	H5	+	0.035	0.017	0.009, 0.073	0.034	supported
H6: Potential quality (PQ) -> Process hard quality (PHQ) -> B2B inland container terminal service quality	H6	+	0.155	0.023	0.106, 0.196	0.000	supported
Potential quality (PQ) -> Process soft quality (PSQ) -> B2B inland container terminal service quality	H7	+	0.171	0.024	0.118, 0.213	0.042	supported
H8: Potential quality (PQ) -> Output quality	H8	+	0.099	1.957	0.024,0221	0.051	Not supported
Potential quality (PQ) -> Process hard quality (PHQ)	H9	+	0.484	6.405	0.329,062	0.000	supported
Potential quality (PQ) -> Process soft quality (PSQ)	H10	+	0.458	6.036	0.283, 0.58	0.000	supported
Process hard quality (PHQ) -> Output quality	H11	+	0.182	2.315	0.039,0.346	0.021	supported
H12: Process soft quality (PSQ) -> Output quality	H12	+	0.497	4.9		0.000	supported

Note: Significant at the 5% level (p-value < 0.05)

Predictive power

In addition to evaluating the magnitude of the coefficient of determination (R^2) as a criterion of predictive accuracy, we tested Stone-Gesser's Q^2 value (Geisser, 1974; Stone, 1974. According to Hair *et al.* (2017:202) that, "$Q^2$is in an indicator of the model's out of sample predictive power or relevance". The inner model varying magnitude of predictive relevance to the endogenous latent construct is 0.35, high for

B2B inland container terminal depot service quality and small for output quality, process hard quality, and Process soft quality for 0.258, 0.125, and 101 respectively. Hence, all Q2 values are considerably above 0, thus, providing evidence for the structural model ‘s predictive relevance in terms out -of- sample prediction (Hair *et al.*, 2017)

Table 11: Construct cross-validated redundancy

Latent construct	SSO	SSE	Q^2 (=1-SSE/SSO)
B2B inland container terminal service quality	8,372.00	5,442.63	0.350
Output quality	2,184.00	1,620.33	0.258
Potential quality (PQ)	1,456.00	1,456.00	
Process hard quality (PHQ)	2,184.00	1,911.71	0.125
Process soft quality (PSQ)	2,548.00	2,289.60	0.101

Model fit

This study also determined the overall model fit through standardized root-mean-square residual (SRMR) as the root mean square discrepancy between the observed correlation and the model implied correlations. This study follows Henseler *et al.* (2014) and defines the standardized root mean square residual (SRMR) as an index for model validation. The SMR is the absolute measure of fit, a value of 0 indicates a perfect fit, when consider values below 0.08 employed in CB-SEM is normally considered good fit(Hu and Bentler, 1998) but this value is too low for PLS-SEM and Henseller *et al.* (2014) suggest cut off of 0.12 values, values less than 0.12 is considered well fit the model, while greater than 0.12 considered a lack of fit (Hair *et al*. 2017). In this study, the model estimation with PLS-SEM reveals a saturated

SRMR value of 0.08, which confirms the overall fit of the PLS path model (See Table 12).

Table 12: model fit

	Saturated Model	Estimated Model
SRMR	0.07	0.08

CONCLUSION AND RECOMMENDATION

CONCLUSION

This study was aimed to assess measuring business to business of inland container depot service quality in Dar es Salaam port in Tanzania. The results of this research strongly indicate that all four latent constructs namely Potential quality, Process Hard Quality, Process Soft Quality, and Output Quality have a direct and indirect significant positive effect on measuring business to business of inland container terminal ports service quality in Tanzania in Dar es Salaam port. Also, this finding is unique for the cargo clearance because it introduced and empirically validated the measurement of inland container depot B2B cargo clearance service quality.

To this end, our empirical tests show that inland container depots base their evaluation of the perceived B2B cargo service quality on their evaluation of four corresponding latent constructs: Potential quality, Process Hard Quality, Process Soft Quality, and Output Quality. The combination of all these four latent constructs constitutes a cargo clearance 's overall perception of the B2B cargo clearance quality of service. Based on these findings, it appears that a hierarchical conceptualization of B2B inland container depots cargo clearance service quality is appropriate. As a result, our study is in-line with recent developments in conceptualizing and measuring perceived service quality, this finding is consistent with other studies which tried to try to measure these relationships (Brady and Cronin 2001; Gounaris, 2005), consolidates multi-process cargo clearance service quality conceptualizations within a single, comprehensive, multidimensional framework, with a strong theoretical base suitable for capturing the actual components that comprise Cargo clearance service quality in the B2B environments.

This study also confirmed that delivering a potential quality, process service quality and output quality have a significant positive effect on B2B cargo clearance service quality.

Additionally, this higher-order construct model's conception of B2B cargo clearance service quality is in line with contemporary advancements in the study of B2B service quality which calls for a new direction in service quality research. These advances are particularly important because a multi-process of B2B cargo clearance service quality is associated with several key organizational results, including storage, clearance, and transshipments.

The measuring of B2B inland container depots service quality has inadequate studies. The results from this study reveal and validate that the INDSERV model is a model of four latent constructs and these constructs positively influence inland container depot B2B service quality.

Limitations and future research directions

Our study is not free of limitations, which, however, future research may easily resolve. One such limitation is the one port context of the study.

Although in this study cargo clearance service providers from private and public were investigated, if ones follow Lovelock's (1983) classification than, for instance, all four types of services investigated are quite intangible and there is a lack of any formal relationship between the provider and the client. Thus, again, future research is required in other types of B2B cargo clearance services so that a more detailed investigation of the psychometric properties can become possible.

The results showed that the process of hard quality is a fundamental latent construct in improving B2B multi-process service quality. In the model, we included second-order latent constructs such as potential quality, process soft quality, process hard quality and output quality for third-order as a driver of B2B multi-process service quality. The less than one R^2 for B2B Multi-process inland container depot cargo clearance shows that there are other variables at stake that possibly impact B2B multi-process service quality.

The study employed the B2B service category based on Dar es salaam port only. The study warrants further explanation and exploration for transferrable and representation of B2B cargo clearance within other populations.This study is cross-sectional research and therefore lacks causality. This study can be improved by conducting a longitudinal research design.

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