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Topic:

**ASSESSING THE EFFECT OF DIGITIZED PORT SYSTEM ON SERVICE
DELIVERY AT THE CUSTOMS DIVISION OF THE GHANA REVENUE
AUTHORITY**

by

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(BSc. PROCUREMENT MANAGEMENT)

**A THESIS SUBMITTED TO THE DEPARTMENT OF SUPPLY CHAIN AND
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DECLARATION

I hereby declare that this submission is my own work towards the Masters of Science in Logistics and Supply Chain Management degree and that to the best of my knowledge, it contains no material previously published by another person nor material which has been accepted for the award of any degree of the University, except where due acknowledgement has been made in the text.

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DEDICATION

This project is dedicated to the Almighty God and my family for their plentiful blessings and guidance throughout this journey and above all my life.

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I thank the Almighty God for seeing me through this course. My heartfelt thanks go to my supervisor Dr. Mawuko Dza for his time and patience in providing me with all the necessary guidance and support throughout this work.

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ABSTRACT

Ports facilitate international trade and logistics, which enables them to help the economic development of countries and regions. The delays that occur during the port's clearing procedure have drawn a lot of criticisms. Some importers and exporters complain about the strenuous procedures they go through to clear their products, claiming that they must pass through around 23 distinct points. The main objective of the study is to assess the effect of digitized port system on service delivery. For the industry participants, the research would be of considerable value on the grounds that the customs division of the Ghana Revenue Authority would be able to fully utilize the digitized port systems in delivery a better service which can also grow other equally vital sectors of the division. Also, operational performance will be examined to determine the role it plays in this relationship. In academia, the research would be used as a resource for students looking to research a related subject. The first objective of the study was to determine the relationship between digitized port system and service delivery at the port. The study found a significant and positive relationship between the digitized port system and service delivery. The second objective was to determine the effect of operational performance on service delivery. The study found that operational performance positively and significantly impacts service delivery. The third objective confirmed that operational performance moderates the relationship between digitized port system and service delivery. The study recommended that to build distinctive business at the port, it is prudent to ensure that most of the operations at the port are digitized. It is recommended for further studies to look at how service delivery enhances customer satisfaction at the port.

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ABBREVIATIONS

CEPS	Customs, Excise and Preventive Service
DIC	Destination Inspection Companies
GCMS	Ghana Customs Management System
GCNet	Ghana Community Network
MPS	Meridian Port Services
MSW	Maritime Single Windows
NSW	National Single Windows
SGS	Societe General de Surveillance
TEU	Twenty-foot Equivalent Unit
UNCTAD	United Nations Conference on Trade and Development



CHAPTER ONE

INTRODUCTION

1.1 Background to the Study

Ports facilitate international trade and logistics, which enables them to help the economic development of countries and regions (Arvis et al., 2018a). According to Haraldson et al (2020), ports should be viewed as dynamic biological systems both inside national socio-economicpolitical and worldwide economic systems, where both complexity and the generation of economic value have grown over time. Second generation ports began to offer some storage and limited other services, whereas first generation ports just operated as a freight gateway between land and sea (Haraldson et al., 2020). Fourth generation ports have begun to interact with other ports in terms of information exchange and standard-setting, while third generation ports began to develop into integrated supply chain entities with flows of information in addition to the physical flows (Haraldson et al., 2020). Fifth generation ports nowadays are frequently described as being customer-centric and geared at servicing the entire community (Haraldson et al., 2020).

The Physical Internet is a development that is anticipated to have an influence on present economic and trading patterns, technology, regulations, and governance systems. On the front page of The Economist in 2006, the word "PI" was first used in the context of transportation and logistics (Markillie, 2006). It suggests that physical packages be sent similarly to how data packages are transported over the internet (DI). According to a later definition, the PI is "an open global logistics system predicated on physical, digital, and operational interconnectedness through encapsulation, interfaces, and protocols" (Montreuil et al., 2013: p. 1). The development is regarded as a breakthrough in the disciplines of logistics, transportation, and facility design (Pan et al., 2017). It asserts that in the end it will contribute to social, economic, and environmental sustainability

(Montreuil et al., 2013). On the other side, service delivery focuses on the location, timing, and method of delivering a service or product to a client (Lovelock and Wright, 2002).

Although achieving customer expectations is mostly dependent on service delivery, service delivery innovation has not been adequately covered in prior studies (Chen et al., 2009). Additionally, service delivery is a collaborative process that enables businesses to trade services with their clients (Verganti and Buganza, 2005; Zeithaml et al., 1988). While there are many different types of businesses that provide services, including those in the financial, professional, supply chain, and entertainment industries, for example, a lot of research has concentrated on the interactions between customers and service providers that take place in convenience stores, fast food outlets, supermarkets, and banks (Leidner, 1993; Mars and Nicod, 1984; Rafaeli, 1989; Schneider et al., 1980; Sutton and Rafaeli, 1988).

The majority of this attention has been on how to handle the transient, impersonal, and frequently nonrecurring encounters with consumers by organizing and empowering low-skilled workers (Bowen, 1986; Bowen and Ford, 2002; Bowen et al., 1999; Bowen and Lawler, 1992, 1995). For instance, in the field of service marketing, a stream of research has looked at factors that influence the quality of the service provided based on the seminal work of Parasuraman et al. (1985, 1988), and the majority of empirical studies have looked at service quality in relation to these more transactional interactions with customers (Bitner et al., 1990; Cronin and Taylor, 1992).

Although it is crucial to comprehend transactional service interactions, especially the elements of quality service delivery, this emphasis only covers one aspect of service (Bowen and Jones, 1986; Gutek, 1995). In a word, digitalization has improved port operations by making it easier to give better services. Information that is analog or paper-based (in a tangible format) is said to be

digitized. Digital transformation is a term used to describe this process that may be automated to have an effect (Burkett, 2017). The purpose of this paper is to assess the effect of digitized port system on service delivery. Hence, given the latter in the existing research the effect of digitized port system on service delivery will be investigated.

1.2 Problem Statement

The delays that occur during the port's clearing procedure have drawn a lot of criticism. Some importers and exporters complain about the strenuous procedures they must go through to clear their products, claiming that they must pass through around 23 distinct points. Some clearing and forwarding services now routinely impose arbitrary and illegal fees, which drives up the cost of conducting business at the nation's ports (Asuliwonno, 2011). Importers, exporters, and businesses in Ghana are all severely constrained in their capacity to trade competitively on the global market by delays, bribes, anomalies, and the expense of transportation. This typically leads to unjustifiably high consumer prices for imported products, which lowers importers' profitability (USAID West Africa Trade Hub Technical Report 2010). A 2011 news release by an investigative journalist said that since prices are passed over, prospective investors, importers, exporters, and regular Ghanaians are forced to face the brunt of the selfishness and greed displayed by these authorities and agents.

The Ghana Ports and Harbours Authority has expressed concerns about the system's insufficient infrastructure and lack of a telecommunications network at the ports during a meeting with the Customs, Excise and Preventive Service (CEPS) and the Minister of Trade and Industry (Nsiah, 2014). These shoddy infrastructural projects are causing challenges to efficient port administration (Nsiah, 2014). The problem of enhancing the level of service provided to Ghanaians and visitors at the Tema harbor is not particularly recent. The port is still facing difficulties even though

improvements are still being made gradually. Customs and clearing processes encountered difficulties because port operations were not computerized or automated; all services and activities, including documentation and information provision, clearance, and processing, were performed manually (Asuliwonno 2011). In the middle of all these issues, some brokers have also developed strategies for increasing the costs importers must pay (Broni, 2014). Importers face several challenges in recent times.

The time it takes to retrieve a container for inspection could be as long as a day, but before one could clear the goods, there would need to be delays with paperwork, bank payments and confirmations, clearance by CEPS, and immigration authorities. All of these delays could add up to at least three days. These issues prevent the port from achieving its objectives of being the entryway to West Africa. To this effect, the study seeks to investigate the digitized port system on service delivery at the customs division of the Tema Harbour in Ghana.

1.3 Objectives of the Study

1.3.1 Main Objective

The main objective of the study is to assess the effect of digitized port system on service delivery.

1.3.2 Objectives of the study

1. To investigate the current prevailing digitized port system for service delivery at the Ghana Revenue Authority, customs division.
2. To assess the effect of digitized port system on service delivery at the Ghana revenue authority, customs division.
3. To assess the effect of operational performance on service delivery at the Ghana revenue authority, customs division.

4. To examine the moderating role of operational performance on the relationship between digitized port system and service delivery.

1.4 Research questions

The following are the research questions;

1. How does the current prevailing digitized port system impact service delivery at the Ghana revenue authority, customs division?
2. What is the effect of digitized port system on service delivery at the Ghana revenue authority, customs division?
3. What is the effect of operational performance on service delivery at the Ghana revenue authority, customs division?
4. How does operational performance moderate the relationship between digitized port system impact service delivery?

1.5 Significance of the Study

For the industry participants, the research would be of considerable value on the grounds that the customs division of the Ghana Revenue Authority would be able to fully utilize the digitized port systems in delivery a better service which can also grow other equally vital sectors of the division. Also, operational performance will be examined to determine the role it plays in this relationship. In academia, the research would be used as a resource for students looking to research a related subject. Once more, readers would be able to recognize the importance of a digitized port system, operational performance and service delivery and thus, the UNCTAD (2008) states that the customs digitized port system significantly increases the efficacy and efficiency of customs operations. To prevent future repetitious research in this area, it is important to describe the current

status of the literature and identify future study potential at this early stage. This is because the issue has recently gained considerably greater significance for academics (Chowdhury and Paul, 2020; Iyengar et al., 2020). In order to help industry be better prepared to deal with uncertainties as they emerge, knowledge on digital port systems and service delivery would be highly helpful.

1.6 Scope of the Study

The study will focus on the effect of digitized port systems on service delivery and the role operational performance play in this relationship. The study will be conducted in the Customs Division of Ghana Revenue Authority. Since the customs division of the Ghana Revenue Authority is a wide area, the study will be conducted in the sector. The study will have three main variables to be investigated, digitized port system, operational performance and service delivery. The customs division of the Ghana Revenue Authority will be contacted for the data collection.

1.7 Overview of Research Methodology

A descriptive research approach will be used in the study to examine the associations between the variables. Since the investigation will reveal an already-known phenomena, the study variables represent that phenomenon. Furthermore, a survey technique will be used. The study will use a quantitative technique to collect its primary data. The Ghana Revenue Authority's stakeholders in the customs division, who have some thoughts on digitized port systems and associated operations (service delivery) in the industry, would be included in the population. Data analysis will be done using SPSS. Inferential and descriptive statistics will be used in the data analysis.

1.8 Limitations of the study

The study confronted several difficulties. Even though the researcher distributed the surveys to all parties involved, a few respondents neglected to return them. As a result, there may be a little

amount of inaccuracy when generalizing the results. Additionally, it was challenging persuading every reply. Despite these difficulties, the study's conclusion was unaffected by the constraints.

1.9 Organization of the Study

Five sections make up this study. In the first section, the study's introduction is provided. The objectives of the study, the field of research, the limitations, and the technique employed are listed after an overview of the research problem. A survey of significant research-related literature, together with associated hypotheses and findings, are presented in the second chapter. The chapter ends with a conceptual framework for the inquiry based on the literature.

Chapter three provides a description of the study methodology, including the research design, sample, and techniques for evaluating the validity and reliability of the measures used.

In Chapter Four, the study's results are presented and discussed in relation to relevant ideas and earlier research.

The last chapter includes a summary of the research results, the author's closing remarks, and recommendations for industry participants and other stakeholders based on the study's findings.

CHAPTER TWO

LITERATURE REVIEW

2.1 Introduction

This chapter presents the Conceptual Review, Empirical Review, Theoretical Review and Conceptual Framework of the effect of digitized port system on service delivery at the customs division of the Ghana Revenue Authority.

2.2 Conceptual Review

This section looks at the definitions of the various study variables. They are defined as it appears in literature and then how they are made operational in the study.

2.2.1 The Digitized Port System

One of the main forces behind the development of the contemporary transportation industry is digitalization. Practically every modern economy has produced its own national regulations or future scenario documents that outline prospective benefits and risks brought on by technology development. These developments are expected to be swift and significant in the transportation sector in general. Ports are anticipated to play a larger role as supply chain and multimodal transport nodes as a result of new technology breakthroughs (Acciaro et al., 2018; Mangan, Lalwani, and Fynes, 2008; Olivier and Slack, 2006). For instance, if more operational data were accessible for the development requirements of the whole port community, administrative port organizations might identify financial possibilities from synergies and economies of scale.

The ability to enable more effective information distribution between port community organizations, operators, and public-private partnerships is one of the key challenges for port

digitalization in the short term (5 years), according to an open data analysis (Inkinen, Helminen, and Saarikoski, 2019) (for efficiency gains, see Aydogdu and Aksoy, 2015; Vairetti, GonzálezRamrez, Maldonado, Alvarez, and Vo, 2019). Comparing port digitalization to other maritime research areas like ship navigation, route optimization, or autonomous shipping, port digitalization is a complicated issue that has not been well investigated. High-end robotics and automation (Zolich et al., 2019), IoT integrations (Herrero Carcel, 2016), autonomous and remote-controlled vessel docking operations (Wang, Wang, and Tan, 2015), and software platforms and communication tools enabling simpler and more effective onshore port affairs (Golzer and Fritzsche, 2017) are examples of these technologies.

The digitization of cargo clearance procedures and terminal operations should guarantee ports' competitiveness. Leveraging digitization to enhance corporate operations is known as "digitalization." Information that is analog or paper-based (in a physical format) gets "digitalized," or converted into a digital format. The term "digital transformation" refers to this process, which may be automated to have an effect (Burkett, 2017). The automation of equipment is not like this, though. Terminal automation in ports is becoming more and more commonplace worldwide. In relation to the automation of machinery and the digitalization of information processing and interchange among a sizable number of stakeholders, in particular port procedures (UNCTAD, 2018). However, digitalization is the processing of information through systems like National Single Windows (NSW), Port Community Systems (PCS), and Maritime Single Windows (MSW).

By providing a single input of information that is available to relevant businesses and government agencies, these platforms are frequently utilized to increase efficiency and lower the cost of conducting business at ports. According to the United Nations Center for Trade Facilitations and

Electronic Business (2005), the NSW is a facility that enables parties involved in trade and transport to submit standardized information and documents with a single-entry point to satisfy all regulatory requirements related to import, export, and transit. The NSW is an economic-wide concept that is often handled by the commerce or finance ministries or their agents, in contrast to the other two digitized port-specific platforms. In addition to managing free zones and airports, it is also useful for carrying out more complex tasks like tax administration. According to the International Maritime Organization's Convention on Facilitation of International Maritime Traffic, 1965, as modified (FAL Convention), which took effect on April 8, 2019, maritime single windows enhance electronic information transmission between ships and ports. For electronic information interchange, the convention suggests using MSW.

The technology framework known as a port community system provides networking between public and commercial agents and entities participating in the ship and cargo services provided by ports (Caldeirinha, Felcio, Salvador, Nabais, and Pinho, 2020). PCS are community-owned systems with a diverse range of stakeholders, including terminal operators, carriers (ocean, road, and rail), freight forwarders, enforcement organizations (such as customs), port authorities, and numerous lobbying organizations, such as labor unions, environmentalists, and other policymakers (Srouf, van Oosterhout, van Baalen, and Zuidwijk, 2008). Electronic platforms have, however, generally failed to deliver the desired results in developing nations, according to the information systems (I.S.) literature (see Heeks, 2002 for additional information). There are several causes. The failure is frequently attributed to resistance to technology.

Another current explanation is technological determinism, which many governments support without taking into account the embeddedness of economic and social-political systems (Aryee,

Andersen, and Hansen, 2021). A number of disputes between the government, shipper representatives, labor, and private groups occurred in Ghana as a result of the implementation of the Single Window platform and the building of an ultramodern terminal at the Port of Tema. We describe controversies as disagreements that arise over technical issues that challenge accepted theories about infrastructure as well as technological remedies. According to Osei-Owusu, Mahmood, and Sambasivan (2020), there are a variety of interpretations of these controversies that might provide light on the execution of historic digitization initiatives in the Port of Tema.

2.2.2 Ports and Harbours in Ghana

The larger of Ghana's two ports is the Port of Tema. Burkina Faso, Mali, and Niger are landlocked nations, and Tema serves as a gateway to them from West Africa. It manages over 85% of Ghana's commerce. Its reach extends to the Sahel area, where it competes favorably for transit traffic with the ports of Abidjan, Lome, Cotonou, and Dakar. The port handled 19 million tons of cargo in 2020, compared to 6 million tons in 2000. By 2020, transit traffic will account for 8% of all traffic, up from 2% in 2000.

Tema's first dedicated container port, managed by Meridian Port Services (MPS) Ltd under the first-ever container terminal concession deal signed by the Ghana Port and Harbours Authority, opened its doors in 2004 as part of the economic reform program (GPHA). The Port Authority owns 30% of the MPS, which is a joint venture between the Bolloré and APM Groups, which own 70%. By 2010, a 500,000 TEU annual capacity was planned for the two-quay terminal. Tema's original adaptation of neoliberal principles tinged with nationalism highlights the expansion of its research in pace with developments in international commerce (Chalfin, 2010). Only 166,963 TEU worth of containers were moved in 2000. Plans for expansion were made when the anticipated

capacity of 500,000 TEUs was exceeded in 2008. A new container terminal with a 2 million TEU yearly capacity was launched by MPS in 2019. The terminal began to receive post-Panama boats almost immediately. The port's performance on the Liner Shipping Connectivity index improved as the average size of ships calling increased, solidifying the port's position as the preferred port of call for big boats traveling to West Africa. The modern port in Africa is the Port of Tema.

According to Chalfin (2010), the Port of Tema exposes the intricate factors at play in reviving Africa's maritime boundaries. Tema reflects the problems faced by Sub-Saharan African (SSA) ports, which are supported by government institutions, local capital, the biggest shipping and logistics companies in the world, as well as private investors and rent-seekers.

2.2.3 Single Window Implementation

The creation of a Single Window is a challenging task. Coordinating several government departments, evaluating legislation, and harmonizing data are just a few of the challenging tasks (Chang *et al.*, 2020). Since its launch in 2002, the Ghana National Single Window initiative has courted controversy on several occasions as it has been used to simplify the clearing of products. The simplest way to understand the occurrence and character of the disagreements is to examine the historical narrative of Single Window implementation in Ghana. An electronic single window system was first proposed in 1998, at the conclusion of the Rawlings administration, but after two years of stalemate, it finally took off in 2001 under the Kuffour administration. Ghana Community Network (GCNet) Ltd was founded in 2001 as a joint venture with shares owned by Societe General de Surveillance SGS (60%) and the Customs Division of the Ghana Revenue Authority (20%), the Ghana Shippers Council (10%), and two regional banks (each 5 percent) (Aryee and Hansen, 2022).

As part of a service agreement with the Ghana Ministry of Trade and Industry, GCNet installed and ran the TradeNet Electronic Data Interchange system and the Ghana Customs Management System (GCMS) (De Wulf and Sokol, 2004). A single-window portal where all stakeholders, including both state agencies and private service providers, may submit and access information was launched by GCNet and was modeled after Singapore's well-known TradeNet. Many customs and import operations, according to De Wulf and Sokol (2004), were automated, made simpler, and enhanced, resulting in cost savings for enterprises, greater revenue collection, and quicker processing of container traffic via the Port of Tema. The necessity to modernize customs via the supply of I.T. infrastructure and systems gave rise to GCNet, as the Ghanaian version of the Singaporean Tradenet software system became called (named after the initial I.T. seller of the system in Ghana).

The primary duties of classification and value were carried out by Destination Inspection Companies (DIC) for Ghana Customs. They were hired by the Ministry of Finance to offer values of products at ports and calculate shippers' tax obligations using their technology and databases. GCNet worked with the DICs until 2007, when a new administration led by Kuffour hired Bankswitch Ghana Ltd to take over for the DICs. Bankswitch reportedly persuaded the government that their system would generate more income than the DICs were generating, according to Graphic Online, the state newspaper's online portal (Abbey, 2015). When Bankswitch was hired, there was debate about why Ghana Customs wasn't permitted to carry out its primary duties but had to pay outside companies a portion of the nation's income to provide the service. The World Customs Organization dislikes the practice of outsourcing customs duties since it implies that the organization does not require its customs administration (Abbey, 2015). 2008 saw

Bankswitch's technology in pilot mode. In the 2008 elections, the opposition, led by Prof. Mills, defeated the incumbent party and triumphed. Due to non-performance and overlap between GCNet and the DICs' and Bankswitch's operations, the new government terminated the contract with Bankswitch in 2009 (Nyinevi *et al.*, 2022). Prof. Mills passed away in 2012, during his third year in office. His vice president, Mahama, then assumed presidential duties and went on to win the election that year. The Mahama administration terminated the DICs in 2015 by hiring Westblue Consulting to give technical help to Ghana Customs.

Once more, the administration of customs was unable to perform the fundamental tasks of categorization and value. The two main IT solution suppliers, GCNet and Westblue Consulting, subsequently merged to operate the Ghana National Single Window. While GCNet received its mandate from the Ministry of Trade and Industry, Westblue Consulting received one from the Ministry of Finance to work with the Ghana Revenue Authority's Customs Division (Senyo *et al.*, 2021). The opposition party, led by Akuffo-Addo, defeated the Mahama administration in the 2016 election. The Vice President started a thorough digitization program for the nation's public services as soon as he took office. Priority was given to the GNSW project, which was largely manual owing to reluctance from within customs and non-cooperation from Other Border Agencies (OBA) (Addo, 2017). The Vice President designated the Port of Tema a paperless port in September 2017 and charged GCNet, Westblue Consulting, Customs, the Port Authority, and other border agencies with ensuring that all clearing processes and payments were fully digitalized to prevent fraud and corruption.

Technical components of the project were completed in a few weeks, and reports demonstrating a functioning system and reductions in the time and cost of moving cargo out of the port were completed together with ongoing stakeholder training and sensitization efforts (Amankwah-sarfo,

Boateng, Effah, and Boateng, 2018). A new supplier, Ghana Link Network Limited, was given a \$40 million, 10-year single-window contract to supply paperless services at the port by the Ministry of Trade and Industry in March 2018, while the "paperless port" initiative had only been in operation for one year at that point. And when Westblue Consulting was established in 2015, Ghana Link Limited was one of the DICs that was released from its obligations. TradeNet, a system operated by GCNet and Westblue Consulting, was superseded in 2020 by UNIPASS, a new system that was adapted from CUPIA of South Korea. As of right now, the UNIPASS that was implemented is known as the Integrated Customs Management System (ICUMS), and Ghana Link Network Services (hereinafter referred to as Ghana Link) is the only operator or IT vendor providing end-to-end service on behalf of Customs (Aryee and Hansen, 2022).

We discovered four IT suppliers to the GNSW during the past 20 years in total (five if we include the DICs). Since its origin, software/technology has only undergone one big modification. Since its creation until 2020, GCNet has provided services, although at various points, particularly after each change of government until the GoG replaced them with Ghana Link in 2020, it has had to work with one or two of the other IT providers, such as the DICs, Bankswitch, and Westblue Consulting. All these new IT vendor debuts have been met with debates that have mostly taken place in the media. The purpose of this study is to explore the interpretations that different parties have given to these demonstrations, as suggested by (Osei-Owusu et al., 2020).

2.2.4 Service Delivery

The capacity of a company to provide value to consumers during an encounter process is known as service delivery. The delivery of services differs from manufacturing in a number of areas, and as a result, the quality problems in the service industry are distinct from those in manufacturing.

For instance, while manufacturers supply observable and tangible things, the output of the service sector is often immaterial. The service industry often handles a sizable number of transactions.

Similar to manufacturing commodities, services are used as they are produced and cannot be maintained. In addition, although manufacturing is capital-intensive, services are often more laborintensive. In the service industry, interaction between service providers and clients is typically necessary for the service to be provided. Some may contend that depending on how consumers engage with service providers, customers' perceptions of service quality go up or down (Kilian and Zhou, 2018).

Furthermore, more customization is frequently required throughout the service supply process compared to product manufacture. Service heterogeneity and potential performance problems are typically brought on by customization. This means that when a service is designed, carried out, and offered (Cândido and Morris, 2001), the customer's contact with it should be considered. Quality difficulties in the service industry are significantly impacted by these distinctions between the production of commodities and services. Customers, for instance, anticipate a high degree of service quality and are also interested in the frontline person who offers the services because of service simultaneity in customer service (Van Looy et al., 2003; Zeithaml and Bitner, 2003). Like how it is challenging to evaluate the service's quality before using it, the service is produced and used simultaneously. As a result, not all instances of quality failure can be identified and prevented before a client utilizes the service.

The challenges of quality assurance are made clear when comparing the many attributes of services and manufactured commodities (Wetzels, 1998; Cândido and Morris, 2001). This is because perceptions on quality change throughout the service delivery process. Marketing academics concentrate on analyzing the service encounter as a process where perceived worth or excellence

has neither a start nor a finish. Accordingly, a variety of elements relating to the quality or value of the services provided by workers may impact perceived quality or value, and perceptions of quality and value frequently influence a variety of outcomes, including organizational success or consumer behavior.

2.2.5 Efficiency in Service Delivery

The nature of services makes efficient service delivery a frequent challenge for marketers. Both technological and humanistic methods of service delivery have been proposed. Based on two service classification schemes, managerial recommendations are produced for the proper use of technology and humanistic approaches to service delivery in a range of service sectors. For service marketers, providing services effectively is of utmost importance. The same potentially disastrous mistakes that have plagued American manufacturing are still being made by a lot of service firms today. The smooth execution of the service delivery process will undoubtedly be crucial as the US economy continues to develop as a service economy. The best possible use of resources is achieved through efficient service delivery, which also reduces related expenses. Sadly, the qualities of services frequently make efficient delivery challenging (Ozuem *et al.*, 2021).

For increasing the effectiveness of service delivery, two sets of strategies have been proposed. The first is sometimes called a technology approach, and the second is sometimes called a humanistic approach. Different service industries utilize these two strategies in different ways. However, technological techniques typically place more emphasis on an industrial orientation toward service production, whereas humanistic approaches prioritize interactions between employees and customers. In contrast, a more humanistic centered method of service delivery may be used for legal services. The quality of the service provided in this instance depends heavily on the

lawyerclient relationship. Legal services that are tailored to each client are produced by using the humanistic approach, which gives the attorney a great level of discretion while providing services (Asatiani *et al.*, 2021).

2.2.6 Operational Performance

Stakeholders at the port must develop operational plans that support the implementation of their own corporate competitive strategies since the operations department plays a key role in creating and maintaining competitiveness. Mady (2008) explains that manufacturing competitive priorities are the methods by which a company may decide whether to compete in a market. Operational performance is described as "the output or outcome delivered owing to distinct operational capabilities" (Tan et al., 2007, p. 5137). Operational performance may be viewed as either internal performance or process performance, according to Manikas and Terry (2010). Operational performance was defined by Flynn et al. (2010) as the enhancements made by a company in response to a shifting competitive environment.

In terms of the components of product and process quality, efficiency, and productivity, an organization's internal operations are often assessed using a set of several dimensions, according to Ketokivi and Schroeder (2003). In several research, internal operations' productivity, effectiveness, and efficiency were used to gauge operational performance (e.g., Abdallah et al., 2014). Cost, quality, delivery, and flexibility, however, are the most often cited metrics for operational success in the literature (Abdallah et al., 2016; Al-Abdallah et al., 2014; Ortega et al., 2012; Phan et al., 2011; Flynn et al., 2010; Abdallah and Matsui, 2009). Our strategy is to leverage these frequently used operational performance metrics, including cost, quality, delivery, and flexibility.

2.2.6.1 Aspects of Operational Performance

Numerous academics supported various operational performance principles or elements. According to Corbett and Wassenhove (1993), the effectiveness of an organization's operations may be measured in three ways: cost, quality, and delivery time. As opposed to this, Samson and Terziovski (1999) believe that operational performance may be measured by the usefulness of productivity, delivery performance, and output indicator quality. In the same vein, Jabbour et al. (2013) assessed operational performance using flexibility, quality, new product development, cost, delivery, or time to market for items with a fresh appearance.

According to Nawanir et al. (2013), operational performance is further enhanced by applying the principles of inventory, quality, delivery, productivity, and cost reduction. Recent evaluations by Abdallah et al. (2016) gave it high marks for delivery, adaptability, affordability, quality, and innovation. But according to Slack et al. (2010), speed, reliability, cost, quality, and adaptability are the essential elements of operational success.

Cost, quality, delivery time, and flexibility are the four main business qualities that influence competitiveness, according to Hallgren and Olhager (2009). In fact, cost, quality, productivity, flexibility, and time-to-delivery are the most widely and frequently used measures of operational performance in the existing literature (Nawanir et al., 2013; Truong et al., 2014; Leite and Braz, 2016; Nabass and Abdallah, 2018).

2.3 Theoretical Review

This section discusses the theory underpinning the study. Theory can be defined as an explanation of a phenomenon and the study tends to further determine how it can make contribution to theory. Since the port system in Ghana and around the world makes use of sophisticated systems in their operations, the study will underpin its foundation on the Dynamic Capability View (DCV) Theory.

2.3.1 Dynamic Capability View Theory

Vogel and Güttel (2013) stated that the DCV theory is one of the most vibrant theories in the scope of strategic management and has often been touted as ‘the new touchstone firm-based performance focused theory. Extant literature has also referred to the DCV theory as an extension of the Resource Based View (RBV) theory (Wang et al., 2016). Literature posits that the only difference lies between the dynamic nature of the DCV and contemporary studies seeks to focus on the everchanging technological usage. Gupta et al. (2020) defined dynamic capabilities as a firm’s ability to integrate, build and reconfigure both internal and external competencies in addressing today’s rapidly changing environment. As digital transformation implies changes to for example value creation processes and organizational tasks, with the aim to attain competitive advantage, it can be argued that dynamic capabilities are necessary to successfully implement these changes. While ad hoc problem-solving may be sufficient in some cases, the dynamic capability to systematically adapt to changes may be preferred when environmental changes threaten the value of a firm's capability to compete in today's market (Ferreira *et al.*, 2020). In the strategic management literature, adaptation to changes in technology has often been studied through a dynamic capabilities lens (Konlechner *et al.*, 2018; Warner and Wäger, 2019). Dynamic capabilities provide a consistent approach for studying digital transformation, considering the

powerful impact digital technologies continuously have and will have on business performance (Warner and Wäger, 2019).

The reconfiguration might occur in an erratic or uncertain setting. Gupta et al. (2018) stated that tracing back into the foundations of capabilities, it began with the notion that the static nature of RBV did not fully showcase how firm resources could develop and integrate in a fast-changing market. Zott (2003) discusses DCV as the ability to use innovation in gaining competitive advantage, given market positions and path – dependencies. Gupta et al. (2020) stated that though the DCV remains an extension of the RBV theory, which elaborates how organizations attain advantages over their competitors based on their resources and capabilities, the DCV theory gives an explanation on how the firm can sustain competitive advantages in dynamic environments.

The DCV theory has the same stance as the RBV theory which posits that a firm with resources would develop dynamic capabilities which may lead to competitive advantages firms resulting in firm performance. The study proposes operational performance as an interaction variable between the port digitized system and service delivery relationship. The mounting of several digitized systems at the port can facilitate easy delivery of duties and this study considers this as resources turned into capabilities. However, once these resources are utilized effectively would result into capabilities which will set the firm apart from its competitors. This results in service delivery, enhancing competitive advantages and performance.

2.4 Empirical Review

Further studies on this topic will be interesting since several academics have looked at the connection between digitized port systems and service delivery from diverse angles.

Fahim et al (2022) in their study titled “Port performance evaluation and selection in the Physical Internet”, aimed at the port performance evaluation and selection challenge is the topic of our

article. We discover that in a preliminary stage of the modeling of intelligent agents' performance preferences, modest differences in weights indicate the transition from the current to the PI. This is in comparison to the existing port performance evaluation and selection literature. For port authorities, this is partially comforting since they can manage essentially the same set of performance measures to appeal to both decision-makers. The findings also highlight disparities amongst agents, with a greater emphasis being placed on Level of Service, Network Interconnectivity, and Information Systems in particular. Qualitative research method was used.

Aryee and Hansen (2022) in their study titled “De-politicization of digital systems for trade facilitation at the port of Tema: A soft systems methodology approach”, aimed at the execution of the Ghana National Single Window and the Port of Tema's development project are the two main topics of this paper's discussion of the digitalization issue. The findings show a fragmented government where ministries, agencies, and individuals exercise authority through I.T. vendor contracts implemented through a single portal. Due to opaque and dubious contracts, the scenario raises the cost of doing business at the port for shippers. Qualitative research method was used.

Fahim et al (2021) in their study titled “On the evolution of maritime ports towards the Physical Internet”, aimed to identify these ports' potential future growth trajectories toward the PI, the aim of this research is to contribute to the scientific discussion on drastically varied futures for marine ports throughout the globe. As a result, it is anticipated that a fully operational PI may not be attained by 2040. Additionally, our study demonstrates that the speed of development and acceptance of FTL systems depends on global governance. Qualitative research method was used.

Inkinen et al (2021) in their study titled “Technological trajectories and scenarios in seaport digitalization”, aimed at the prospects of digitalization in Finnish ports operating international trade and transports. The future potential of digitization in Finnish ports engaged in international commerce and transportation is the main topic of this research. The results confirm that before other advancements can establish themselves and take over system level management, trust and cyber security must come first. Qualitative research method was used.

Kaup et al (2021) in their study titled “25th International Conference on Knowledge-Based and Intelligent Information and Engineering Systems The Port Community System as an example of integration of port users”, aimed at the use of integrated IT systems in integrated transport management, and in particular, the use of the Port Community System for communication between an integrated transport operator and specific carriers or loaders in the organization and performance of specific transport functions where a significant portion of cargo operations are carried out in seaports. The study findings mentioned above indicate that businesses view the adoption of such technologies as beneficial. This demonstrates how crucial the PCS and its many components are to port users' operations. Since most respondents only have theoretical knowledge of systemic solutions centered on the PCS, a sizable majority of them were unable to say whether the solutions suggested will directly affect the optimization of their job. Quantitative research method was used.

Kapkaeva et al (2021) in their study titled “Digital Platform for Maritime Port Ecosystem: Port of Hamburg Case”, aimed to close the knowledge gap between practical business solutions and scholarly research, the study offers a contemporary informative perspective on port operations. By

developing a single information space that will enable working information interchange and systematic analysis of all process participants' activities, this collaboration may be accomplished.

Qualitative research method was used.

Biljohn and Lues (2018) in their study titled “Social innovation and service delivery in Belgium and South Africa”, aimed to compare the Mangaung Metropolitan Municipality (MMM) with the City of Ghent (CoG) in Belgium to examine the usage of SI in the provision of LG services (South Africa). LG is required to work with the public, but even when platforms are established, several variables affect the public's capacity to contribute. Collaborative projects promote public involvement in a more flexible and inclusive method of service delivery, assisting in the implementation of community development aspirations. To collaborate, it would be necessary for both residents and LG officials to gain new skills and ways of cooperating. Qualitative research method was used.

Namagembe (2019) in her study titled “Enhancing service delivery in humanitarian relief chains: the role of relational capital”, aimed to at how relational capital affected how humanitarian organizations inter-cluster coordinated and provided services, as well as how inter-cluster coordination mediated and moderated that link. Results showed that relationship capital affects inter-cluster coordination and service delivery in humanitarian relief chains; inter-cluster coordination partially mediates the relationship between relational capital and service delivery in humanitarian relief chains; and no interactive effect was found when the moderation effect of intercluster coordination on the relationship between relational capital and service delivery in humanitarian organizations was examined. Quantitative research method was used.

Furunes and Mkono (2019) in their study titled "Service-delivery success and failure under the sharing economy", aimed to to examine consumer and employee perspectives on service delivery in the sharing economy. The findings show that consumers and the workforce have both favorable and unfavorable experiences, and the research emphasizes the difficulties of fragmented service delivery because of service delivery mediated via mobile applications. Qualitative research method was used.



Table 2.1: Summary of Empirical Review

Author(s) / Year	Main Purpose	Theory(ies)	Methodology	Findings
Fahim et al (2022)	The port performance evaluation and selection challenge is the topic of our article.	This is not undergirded by any theory	Qualitative Method	We discover that in a preliminary stage of the modeling of intelligent agents' performance preferences, modest differences in weights indicate the transition from the current to the PI. This is in comparison to the existing port performance evaluation and selection literature. For port authorities, this is partially comforting since they can manage essentially the same set of performance measures to appeal to both decision-makers. The findings also highlight disparities amongst agents, with a greater emphasis being placed on Level of Service, Network Interconnectivity, and Information Systems in particular.

Aryee and Hansen (2022)	The execution of the Ghana National Single Window and the Port of Tema's development project are the two main topics of this paper's discussion of the digitalization issue.	systems thinking theory	Qualitative Method	The findings show a fragmented government where ministries, agencies, and individuals exercise authority through I.T. vendor contracts implemented through a single portal. Due to opaque and dubious contracts, the scenario raises the cost of doing business at the port for shippers.
Fahim et al (2021)	By identifying these ports' potential future growth trajectories toward the PI, the aim of this research is to contribute to the scientific discussion on drastically varied futures for marine ports throughout the globe.	This is not undergirded by any theory	Qualitative Method	As a result, it is anticipated that a fully operational PI may not be attained by 2040. Additionally, our study demonstrates that the speed of development and acceptance of FTL systems depends on global governance.
Inkinen et al (2021)	The future potential of digitization in Finnish ports engaged in international commerce and transportation is the main topic of this research.	This is not undergirded by any theory	Qualitative Method	The results confirm that before other advancements can establish themselves and take over system level management, trust and cyber security must come first.

Kaup et al (2021)	The paper discusses the use of integrated IT systems in integrated transport management, and in particular, the use of the Port Community System for communication between an integrated transport operator and specific carriers or loaders in the organization and performance of specific transport functions where a significant portion of cargo operations are carried out in seaports.	This is not undergirded by any theory	Quantitative Method	The study findings mentioned above indicate that businesses view the adoption of such technologies as beneficial. This demonstrates how crucial the PCS and its many components are to port users' operations. Since most respondents only have theoretical knowledge of systemic solutions centered on the PCS, a sizable majority of them were unable to say whether the solutions suggested will directly affect the optimization of their job.
Kapkaeva et al (2021)	In order to close the knowledge gap between practical business solutions and scholarly research, the study offers a contemporary informative perspective on port operations.	This is not undergirded by any theory	Qualitative Method	By developing a single information space that will enable working information interchange and systematic analysis of all process participants' activities, this collaboration may be accomplished.

Biljohn and Lues (2018)	This study compares the Mangaung Metropolitan Municipality (MMM) with the City of Ghent (CoG) in Belgium in order to examine the usage of SI in the provision of LG services (South Africa).	This is not undergirded by any theory	Qualitative Method	LG is required to work with the public, but even when platforms are established, a number of variables affect the public's capacity to contribute. Collaborative projects promote public involvement in a more flexible and inclusive method of service delivery, assisting in the implementation of community development aspirations. In order to collaborate, it would be necessary for both residents and LG officials to gain new skills and ways of cooperating.
Namagembe (2019)	The study looked at how relational capital affected how humanitarian organizations inter-cluster coordinated and provided services, as well as how inter-cluster coordination mediated and moderated that link.	Resource-Based View Theory	Quantitative Method	Results showed that relationship capital affects inter-cluster coordination and service delivery in humanitarian relief chains; intercluster coordination partially mediates the relationship between relational capital and service delivery in humanitarian relief chains; and no interactive effect was found when the moderation effect of inter-cluster coordination on the relationship between relational capital and service delivery in

				humanitarian organizations was examined.
Furunes and Mkono, (2019)	The purpose of this research is to examine consumer and employee perspectives on service delivery in the sharing economy.	Role and script theory	Qualitative Method	The findings show that consumers and the workforce have both favorable and unfavorable experiences, and the research emphasizes the difficulties of fragmented service delivery as a result of service delivery mediated via mobile applications.

2.5 Conceptual Framework

This section conceptualizes the framework for the study. The study has digitized port system as its independent variable, service delivery as dependent variable and operational performance as the moderating variable. The interaction effect of operational performance is shown in figure 2.1.

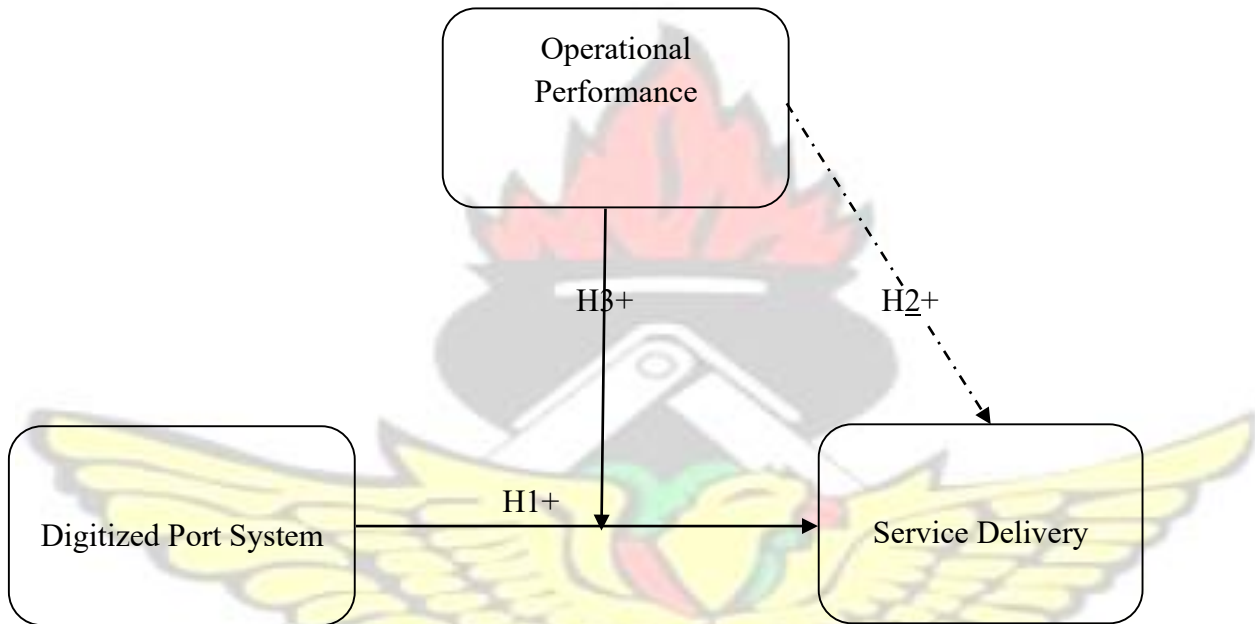


Figure 2.1 Conceptual framework of the study

Source: Author's own construct, 2022

2.5.1 Hypothesis Development

The above framework results in the hypothesis below.

2.5.1 Digitized port system and service delivery

The relationship between the digitized port systems and service delivery cannot be taken lightly. Filgueiras et al. (2019) conducted a study to find a positive and significance relationship between digitized systems and service delivery. It is believed that since digitalization embraces technology and the essence of technology is to make work easier, mounting of several digitized structures in

the ports can enhance service delivery. Port workers do not heavily have to rely on manual ways but more sophisticated means with better visibility of operations. Laudien and Pesch (2019) in a similar study stated that digital technologies often help to speed up processes in the service sector disentangling the still very often assumed relationship between human activities and service delivery. The DCV theory is also of the notion that digitalizing our port systems which would lead to competitive advantages could also lead to service delivery. In the same vein, a positive and significant relationship was detected between digitalization and service delivery (Jonsson et al., 2020). Therefore, study hypothesizes that:

H1+: Digitalized port systems have a positive and significant relationship with service delivery

2.5.2 Operational Performance and Service Delivery

Efficient and effective operations at the port will lead to better service deliveries. Onyango (2015) established a positive and significant relationship between operations strategy and service delivery. Once effective strategies exist within organizations leading to operational performance, there will an improvement of service delivery to customers. Zhao and Stank (2003) defined operational elements as activities which are performed by service providers contributing to consistent quality, efficiency, and productivity. These elements in turns improves service delivery. The study therefore posits that;

H2+ Operational performance has a positive and significant relationship on service delivery

2.5.3 The moderating role of operational performance on the relationship between digitalized port systems and service delivery

The DCV theory posits that a firm with resources would develop these resources into capabilities which in turn translates to competitive advantages ad firm performance. This theory extended these resources into dynamic resources. The study posits that these digitalized systems could be termed as dynamic

resources which could lead to capabilities. Brosig et al. (2020) stated that information technology is focus of digitalization and as such, extant literature argues the importance of information technology capabilities under RBV and DCV theories. These capabilities developed by digitalized port systems coupled with effective and efficient operations at the port will result in service delivery. The study elevates the importance of operational performance as an interaction variable between digitalized port systems and service delivery. Therefore, the study posits that;

H3+: Operational performance moderates the relationship between digitalized port systems and service delivery.

2.6 Chapter Summary

The chapter presented an overview of literature on the study. It started by introducing the chapter and presenting an overview on the various concepts of the study referred to as conceptual review. The study also presented the theory on which the study was built referred to as theoretical review. Similar studies conducted in literature was also presented in the empirical review section of the chapter. The conceptual framework as well as the hypothesis concludes the chapter.

CHAPTER THREE

METHODOLOGY

3.1 Introduction

This chapter illustrates the steps followed for the study to be executed. The chapter comprises of the research approach, the research design, the study population, and the sample selected from that population. The sampling size and sampling method were also discussed in the chapter.

3.2 Research Approach

Research approach can be defined as the overall strategy that determines the path to which the research work will follow. Thus, it typifies the design upon which the entire study was shaped.

Almond (2016) stated that the choice of a research approach should be determined by the study's objectives. This is important because quantitative design enables the researcher to easily quantify the data that were collected from the field creating an ease when analyzing it. Again, quantitative researchers argue that the approach is objective and is not subject to the interpretation of the researcher, rather, it is based on the results produced from the quantitative data. Moreover, quantitative research is straight forward and specific as compared to qualitative research. For this, the quantitative approach was employed due to the type of study and the total sample size involved

3.3 Research Design

The study employs the descriptive design because the relationships between these variables were established using this approach. The study was also cross sectional in nature in the sense that data was collected at different locations within a specific period. This helps the researcher because of time constraints and the resources involved. Closed ended questionnaires were designed to collect primary data from the respondents.

3.4 Population of the Study

The research population comprise of all Customs Officers whose operations is at the port. The population basically depicts the options available for the sample size to be obtained.

3.5 Sampling Procedure and Sampling Size

Sampling refers to the art of selecting a set of respondents out of a population who share the same characteristics of the population of the study such that the information derived from the sample can be used to represent the whole group. For the purposes of the study, the researcher selected custom officers who perform diverse operations at seaports of Ghana. In all, 154 respondents were selected to partake in the study.

The study adopted the non-probability sampling technique where the researcher used the purposive and convenient sampling techniques. This was necessary because the researcher ensured that respondents were not pressurized to participate in the study.

3.6 Data Collection and Analysis

This section discusses the various sources of data.

3.6.1 Types and Source of Data

Data source refers to the various archives through which data is derived for a research study. For the purposes of this study, the researcher sampled primary sources of data from the respondents. Thus, with the help of questionnaires, data was collected primarily from the respondents. However secondary data was used to design this questionnaire and obtain literature for this research to be carved on.

3.6.2 Methods of Data Collection

As a result of post-Covid-19 precautionary measures, the designed and printed questionnaires were sent to the respondents by electronic mail to fill. These respondents were given ample time to fill these questionnaires. Contacts were made available to them so they could fall on if the need arises.

3.6.3 Data Collection Instruments

The study employed the use of closed-ended questions to collect data from the respondents. Because the study sought to collect quantitative data, a survey instrument was employed. This was so because of the type of research design and the context of the study. The questionnaires were divided into four sections that were categorized into various subheadings to align with the research objectives.

3.7 Data Analysis

Due to the nature of the study and the research design, closed ended questionnaires were designed by the researcher. The analysis was done to first determine the demographic information of the respondents. The SPSS software version 23 was used to determine the validity of the data collected and followed by the descriptive and inferential statistics determination.

3.9 Ethical Issues

One of the important things to do in research is the ethical consideration in conducting the entire research process. Per this reason, the researcher ensured that some key ethical issues were considered and observed to the latter. Firstly, the researcher ensured that the names of the respondents were not required, this was all part of the process of ensuring that the confidentiality of the respondents is noted. Secondly, the researcher ensured that no respondent was forced to respond to the research questionnaire. This was done because the researcher believed if a respondent would want to partake in the study, then it should be from utmost will and convenience. Furthermore, the researcher also ensured that the information provided by the respondent was used only for research purposes as well as the fact that no one's information was made open to another respondent.

3.10 Ethical Considerations

Regarding the ethical concerns, the researcher saw to it that all prior studies by other authors mentioned in this study were duly recognized. Additionally, the researcher was very careful to incorporate all pertinent information, and no mistakes or additions were made on purpose to persuade readers to agree with any in-depth argument. Regarding moral responsibility, all respondents' consent was properly obtained, allowing them to freely participate in the study

without being subjected to any pressure or deception. The researcher also informed them of the precise purpose of the study with a guarantee of confidentiality.

KNUST

CHAPTER FOUR

DATA PRESENTATION, ANALYSIS AND DISCUSSION

4.0 Introduction

This chapter outlines the results obtained from the primary data obtained from the study. It starts by analyzing the demographic characteristics of the result after which the reliability of the data collected was assessed. The later parts of the thesis outline the descriptive and inferential statistics of the data collected. Whilst descriptive statistics looks at the characteristics of the items under the construct, inferential statistics largely looks at the relationships between these variables. The chapter concludes by discussing the results obtained based on the objectives of the study.

4.1 Demographic Characteristics

Table 4.1 shows the demographic information of the respondents. 33 persons representing a total of 26.80% of the respondents said they work with ports operations whilst 41 persons representing a total of 33.30% said they work with the preventive unit. The post clearance section of custom had a total respondent 49 which represents about 39.8% of the respondents.

On the work experience of the respondents, 72 persons said they had been working with customs not more than 10 years. 49 persons said they had been working with customers between 11 and 20

years. Only two persons representing a total of 1.60% said they had been working with the organization above thirty (30) years.

The respondents were also made to describe their ranks. 66 persons said they were principal collectors which represented a total of 53.70% of the total respondents. The total number of senior collectors who were involved in the study were 37 representing a total of about 30.10% of the total respondents. 19 persons representing 15.40% of the total respondents said they were collectors.

Only one of the respondents was an assistant collector which represented about 0.80% of the total respondents.

Table 4.1 Demographic characteristics

Variable	Frequencies (N)	Percentage (%)
Department	123.00	100.00
Port Operations	33.00	26.80
Preventive Unit	41.00	33.30
Post Clearance Unit	49.00	39.80
Work Experience	123.00	100.00
Below 10 years	72.00	58.50
10 – 20 years	49.00	39.80
21 – 30 years	2.00	1.60
Rank	123.00	100.00

Principal Collector	66.00	53.70
Senior Collector	37.00	30.10
Collector	19.00	15.40
Assistant Collector	1.00	0.80

Source: Field Study (2022)

4.2 Reliability Test

To test the reliability of the study variables, the Cronbach Alpha Values are presented in table 4.2.

Digitized port system with eight (8) items has a Cronbach Alpha value of 0.72. Service delivery has six (6) items and a Cronbach Alpha value of 0.78. Operational performance has six (6) with a Cronbach Alpha Value of 0.84. These values were above the 0.7 mark and these variables qualify to be used for further analysis.

Table 4.2 Reliability Analysis

Constructs	No. of Items	Cronbach's Alpha
Digitized Port System	8	0.72
Service Delivery	6	0.78
Operational Performance	6	0.84

Source: Field Study (2022)

4.3 Descriptive Statistics

This section presents the descriptive statistics which is used to determine the characteristics of the study variables. A seven - point Likert Scale rated as **1 -Strongly Disagree, 2 - Disagree, 3 – Neutral, 4 – Agree, 5 – Strongly Agree** was used to measure the extent to which the various items

of the study constructs in the firms were agreed by the respondents. The criteria analysis was calculated by subtracting the minimum value (1) from the maximum value (5) and dividing it by the length of the scale i.e., 5. This criterion resulted in the following scale; **1.00 – 1.80 = strongly disagree**, **1.81 – 2.61 = disagree**, **2.62 – 3.42 = neutral**, **3.43 – 4.23 = agree**, **4.24 - 5.00 = strongly agree**.

Table 4.3 shows the subconstruct for digitized port systems

The respondents were asked whether there is a high docking line efficiency. A mean and standard deviation values of 3.43 and 1.12 respectively were recorded which largely agrees to the assertion.

The respondents were also asked if there is an integrated digital merchandise management system. A mean and standard deviations of 3.36 and 1.07 respectively were recorded. When the respondents were asked if there us a high degree of mechanical systems automation, a mean and a standard deviation value of 3.16 and 1.07 respectively was recorded. The statement “*There is a high worker security*” recorded a mean and standard deviation values of 3.31 and 1.03 respectively. When the respondents were asked about the digitization of access security, a mean and standard deviation values of 3.52 and 1.00 respectively was recorded which shows the level of agreement of the respondents. When the respondents were asked about the digital interaction with clients, a mean and standard deviation values of 3.45 and 0.97 respectively was recorded. The statement “There is management transparency” recorded a mean and standard deviation values of 3.56 and 0.98 respectively. The statement “*There is customs process digitization*” recorded a mean and standard deviation values if 3.41 and 1.23 respectively. Table 4.3 Descriptive Statistics for Digitized Port System

Items	Min.	Max.	Mean	Std. Dev.
There is a high docking line efficiency	1.00	5.00	3.43	1.12
There is an integrated digital merchandise management system	1.00	5.00	3.36	1.07
There is a high degree of mechanical systems automation	1.00	5.00	3.16	1.07
There is a high worker security	1.00	5.00	3.31	1.03
There is digitization of access security	1.00	5.00	3.52	1.00
There is digital interaction with clients	1.00	5.00	3.45	0.97

There is management transparency	1.00	5.00	3.56	0.98
There is customs process digitization	1.00	5.00	3.41	1.23
Mean	1.00	5.00	3.40	1.06

Source: Field Study (2022)

Table 4.4 shows descriptive statistics for service delivery. When the respondents were asked if there is an on-time delivery at the port, a mean and standard deviation values of 3.36 and 1.07 respectively were recorded. The item “*The is a high speed of delivery*” recorded a mean and standard deviation values of 3.16 and 1.07 respectively. The statement “*The port systems help in fast delivery*” recorded a mean and a standard deviation of 3.31 and 1.03 respectively. The statement “*The overall cost of operations at the port is low*” recorded a mean and standard deviation values of 3.52 and 1.00 respectively. When asked if the port is competitive, a mean value of 3.45 was recorded and a standard deviation value of 0.97 was also recorded. The item “*The turnover at the port is high*” recorded a mean and standard deviation values of 3.56 and 0.98 respectively.

Table 4.4 Descriptive Statistics for Service Delivery

Items	Min.	Max.	Mean	Std. Dev.
There is on time delivery at the port	1.00	5.00	3.36	1.07
The is a high speed of delivery	1.00	5.00	3.16	1.07
The port systems help in fast delivery	1.00	5.00	3.31	1.03
The overall cost of operations at the port is low	1.00	5.00	3.52	1.00
The prices at the port is competitive	1.00	5.00	3.45	0.97
The turnover at the port is high	1.00	5.00	3.56	0.98
Mean	1.00	5.00	3.39	1.02

Source: Field Study (2022)

Operational performance served as the moderating variable of the study. The item “*Annual throughput of each terminal in the port in TEUs has increased*)” recorded a mean and standard deviation values of 3.47 and 1.14 respectively. The item “*The total annual port throughput in TEUs has increased*” has a mean value of 3.33[SD = 1.08]. The item “*The annual export throughput for each terminal, and total for the port has increased*” recorded a mean and standard deviation values of 3.50 and 1.06 respectively. The item “*The annual import throughput of each terminal, and total for the port has increased*” recorded a mean and standard deviation values of 3.34 and 0.82 respectively. A mean and standard deviation values of 3.33 and 0.81 was recorded when the respondents were asked whether the annual ship calls has improved. The item “*The annual ship calls in tons has increased*” recorded a mean and standard deviation values of 3.24 and 0.79 respectively.

Table 4.5 Descriptive Statistics for Operational performance

Items	Min.	Max.	Mean	Std. Dev.
Annual throughput of each terminal in the port in TEUs has increased	1.00	5.00	3.47	1.14
The total annual port throughput in TEUs has increased	1.00	5.00	3.33	1.08
The annual export throughput for each terminal, and total for the port has increased	1.00	5.00	3.50	1.06
The annual import throughput of each terminal, and total for the port has increased	1.00	5.00	3.34	0.82
The annual ship calls in number has improved	1.00	5.00	3.33	0.81
The annual ship calls in tons has increased	2.00	5.00	3.24	0.79
Mean	1.00	5.00	3.37	0.95

Source: Field Study (2022)

4.4 Statistical Test

The correlation and regression analysis results are presented in this section to determine the effect of the relationships between digitalized port system, service delivery and operational performance. To achieve this, a multiple regression analysis was done to determine the relationships mentioned above.

4.4.1 Correlation Analysis

Correlation shows the relationships between the study variables. Digitized port system and service delivery has a correlation value of 0.941. The relationship is significant at the 0.01 level (2 – tailed). Digitized Port System and Operational Performance recorded a correlation value of 0.534 and significant at 2-tailed. Service Delivery and Operational performance has a correlation value of 0.556 and significant at 2-tailed. Table 4.6 shows the detailed relationship between the variables. Table 4.6 Correlation Analysis

		DPS	SD	OP
Digitized Port System (DPS)	Pearson Correlation	1		
	Sig. (2-tailed)			
	N	123		
Service Delivery (SD)	Pearson Correlation	.941**	1	
	Sig. (2-tailed)	.000		
	N	123	123	
Operational Performance (OP)	Pearson Correlation	.534**	.556**	1
	Sig. (2-tailed)	.000	.000	
	N	123	123	123
**. Correlation is significant at the 0.01 level (2-tailed).				

Source: Field Study (2022)

4.4.2 Regression Analysis

Since correlation is not causation, the causal relationships between the variables are explained in this section.

4.4.2.1 Digitized port system and Service Delivery

Table 4.7 shows the relationship between digitized port system and service delivery. An r square value of 0.885 shows that about 88.5% of the variance in service delivery is caused by digiti. A sig. F Change value of 0.000 shows that the relationship between these variables is insignificant.

Table 4.7 Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics					Durbin-Watson
					R Square Change	F Change	df1	df2	Sig. F Change	
1	.941 ^a	.885	.884	.23807	.885	930.887	1	121	.000	1.972
a. Predictors: (Constant), Digitized Port System										
b. Dependent Variable: Service Delivery										

Source: Field Study (2022)

Table 4.8 shows the table of the analysis of variance. A total variance of 52.760 was recorded for this relationship. The degree of freedom recorded for this relationship is 1 and a mean square value of 52.760 was also recorded.

Table 4.8 Analysis of Variance

Model		Sum of Squares	Df	Mean Square	F	Sig.
1	Regression	52.760	1	52.760	930.887	.000 ^b
	Residual	6.858	121	.057		
	Total	59.618	122			
a. Dependent Variable: Service Delivery						
b. Predictors: (Constant), Digitized Port System						

Source: Field Study (2022)

Table 4.9 shows the co-efficient of variation of the relationship. An unstandardized beta value and t values of 1.071 and 30.510 respectively shows that a positive significant relationship exists between the variables

Table 4.9 Co-efficient of Variation

		Unstandardized Coefficients		Stand. Coeff.	T	Sig.	Correlations			Collinearity Statistics	
		B	Std. Error	Beta			Zeroorder	Partial	Part	Tolerance	VIF
1	(Constant)	-.248	.121		-2.046	.043					
	DPS	1.071	.035	.941	30.510	.000	.941	.941	.941	1.000	1.000
a. Dependent Variable: Service Delivery											

Source: Field Study (2022)

4.4.2.2 Operational Performance and Service Delivery

Table 4.10 shows the relationship between operational performance and service delivery. An r square value of 0.309 shows that about 30.9% of the variance in service delivery is caused by digitized port system,. A sig. F Change value of 0.000 shows that the relationship between these variables is insignificant.

Table 4.10 Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics					Durbin-Watson
					R Square Change	F Change	df1	df2	Sig. F Change	
1	.556 ^a	.309	.303	.58345	.309	54.136	1	121	.000	2.100
a. Predictors: (Constant), Operational Performance										
b. Dependent Variable: Service Delivery										

Source: Field Study (2022)

Table 4.11 shows the table of the analysis of variance. A total variance of 59.618 was recorded for this relationship. The degree of freedom recorded for this relationship is 1 and a mean square value of 18.429 was also recorded.

Table 4.11 Analysis of variance

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	18.429	1	18.429	54.136	.000 ^b
	Residual	41.190	121	.340		
	Total	59.618	122			
a. Dependent Variable: Service Delivery						
b. Predictors: (Constant), Operational Performance						

Source: Field Study (2022)

Table 4.12 shows the co-efficient of variation of the relationship. An unstandardized beta value and t values of 0.541 and 7.358 respectively shows that a positive significant relationship exists between the variables.

Table 4.12 Co-efficient of Variation

Model		Unstand. Coef.		Standardized Coefficients	t	Sig.	Correlations			Collinearity Statistics	
		B	Std. Error	Beta			Zeroorder	Partial	Part	Tolerance	VIF
1	(Constant)	1.570	.253		6.196	.000					
	OP	.541	.074	.556	7.358	.000	.556	.556	.556	1.000	1.000
a. Dependent Variable: Service Delivery											

Source: Field Study (2022)

4.4.2.3 The moderating role of operational performance in the relationship between digitized port system and service delivery

Table 4.13 shows operational performance as a moderator between the digitized port system – service delivery relationship. An r square value of 0.889 shows that about 88.9% of the variance in service delivery is caused by the interaction effect of the independent variable and the moderator. A sig. F Change value of 0.000 shows that the relationship between these variables is insignificant.

Table: 4.13 The moderating role of operational performance in the relationship between digitized port system and service delivery

	Unstandardized coefficients (t-values)		
Variable	<i>Outcome Variable = Service Delivery</i>		
	<i>Model 1</i>	<i>Model 2</i>	<i>Model 3</i>
<i>Main effect paths</i>			
Digitized Port System (DPS)	1.071(30.510)	-	1.025(24.952)
Operational Performance (OP)		0.541(7.358)	0.073(2.088)
Interaction Effect			
DPS X OP			-0.017(-0.376)
<i>Goodness of fit indicators</i>			
R ²	0.885	0.309	0.889
ΔR^2	0.885	0.309	0.889
Constant	0.000	0.000	0.000
Durbin Watson	1.972	2.100	2.095
VIF (largest VIF among predictors)	1.000	1.000	1.398
Hypothesis	H1+	H2+	H3+
Outcome	Supported	Supported	Supported
*Critical values of the t distribution for $\alpha = 0.05$ (two-tailed test) are 1.96 (t values are reported in parentheses). **Critical values of the t distribution for $\alpha = 0.01$ (two-tailed test) are 2.58 (t values are reported in parentheses)			

4.5 Discussion of results

The discussion has been done based on the objectives of the study. The first objective of the study is to determine the relationship between digitized port system and service delivery. The second objective is to determine the relationship between operational performance and service delivery.

Lat but not least, the third objective is to determine the moderating role of operational performance on the relationship between digitized port system and service delivery. Table 4.19 shows the regression results of the sub-constructs of the various study variables.

4.5.1 Digitized Port System and Service delivery

The study revealed that digitalized port system has a positive and significant relationship with service delivery. The level of digitalization at the port affects the rate at which service is delivered at the port. This is in conformance with Filgueiras et al. (2019) who conducted a study to find a positive and significant relationship between digitized systems and service delivery. This is also in corroboration with the resource-based theory which states that firms can gain and sustain competitive advantages by developing and deploying valuable resources and capabilities. The various levels of digitalization at the port will result in service delivery at the port. However, resources could result in the performance of firms but firms must ensure that these resources are valuable. Laudien and Pesch (2019) stated that digital technologies often help to speed up processes in the service sector disentangling the still very often assumed relationship between human activities and service delivery. The essence of technology is to make work easier. Hence the presence of the various digitized systems at the port will lead to fast delivery of services to customers at the port.

4.5.2 Operational performance and service delivery

The study concludes that operational performance leads to the service delivery. This finding gives credence to the resource-based view of the firm which states that resources lead to capabilities which leads to performance (Ralston et al., 2013). In a study by Onyango (2015), a positive and significant relationship was established between operations strategy and service delivery. One of the major components of operational performance is cost and delivery. Hence an improvement in

the operational performance of activities in a firm will lead to an increase in the service delivery at the port. Brooks et al. (2013) stated that there is the need for ports to have a method to identify and prioritize port investments in order to take advantage of opportunities available for future growth. This will culminate in the operational performance which will ensure that the service delivery in firms is optimized.

4.5.4 The moderating role of operational performance on the relationship between digitized port system and service delivery

This study concludes that digitized port system can lead to service delivery. However operational performance moderates the relationship that exists between digitized port system and service delivery. The extent of the operational excellence at the port will ensure that the digitized port systems will result in service delivery at the port. Hence high/low operational performance at the port will have a resultant effect on service delivery at the port.

Table 4.19 Hypothesis results

Hypothesis	Results
H1: Digitized port system have a significant and positive effect on service delivery	Supported
H2+: Operational performance has a significant and positive effect on service delivery	Supported
H4+ Operational performance moderates the relationship between digitized port system and system delivery	Supported

Source: Field Study (2022)

CHAPTER FIVE

SUMMARY OF FINDINGS, CONCLUSION, AND RECOMMENDATIONS

5.0 Introduction

This chapter offers insights into the findings, as well as conclusions and recommendations. The earlier chapter listed the findings and outcomes of the study and the discussion on the results in this chapter states the summary of the findings. The conclusion of is further presented in this chapter.

5.1 Summary of Findings

The findings address the objectives of the study

5.1.1 The relationship between digitized port system and service delivery

The first objective of the study was to determine the relationship between digitized port system and service delivery at the port. The study found a significant and positive relationship between the digitized port system and service delivery.

5.1.2 The effect of operational performance on service delivery

The second objective was to determine the effect of operational performance on service delivery. The study found that operational performance positively and significantly impacts service delivery. This confirms that a unit rise in operational performance would result in same in-service delivery.

5.1.3 The moderating role of operational performance in the relationship between digitized port system and service delivery

To determine whether operational performance moderates the relationship between digitized port system and service delivery, a regression analysis was used to confirm the hypothesis. The

analysis confirmed that operational performance moderates the relationship between digitized port system and service delivery.

5.2 Conclusion

The study examined the empirical conceptualization of the moderating role of operational performance in the relationship between digitized port system and service delivery. According to the results, the digitized port system is very important for service delivery at the port. It is prudent for the port to institute digitized systems which would result in swift operations at the port. This would result in more customers patronizing the port since time is of a great value. More often than not, delays at the port results in customers paying unnecessary charges. The various operational measures in terms of cost and delivery are also vital to the service delivery at the port. The study also revealed that once there is high operational performance, service delivery will highly affect customer satisfaction at the port.

5.3 Recommendations for Management

The following recommendations are made based on the findings of study;

To build distinctive business at the port, it is prudent to ensure that most of the operations at the port are digitized. The results obtained from the study has revealed that once there is digitization at the port, customers would be happy because of efficient service delivery. Cost and delivery should be factors that should be considered in the port operations so as to result in efficient service delivery at the port. The ports should have research and development departments which from time to time would recommend appropriate technologies that would ensure that service delivery continually improves at the port.

5.4 Areas for Further Research

Based on the above findings made in this study, the present research has impact meaningfully to enhancing present knowledge where future studies should examine how digitization could affect operations at the various ports in Ghana. Further studies should also look at how service delivery enhances customer satisfaction at the port.



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Appendix

Questionnaire KWAME NKRUMAH UNIVERSITY OF SCIENCE AND TECHNOLOGY SURVEY QUESTIONNAIRE

I am a Postgraduate student at the Kwame Nkrumah University of Science and Technology, Department of Supply Chain and Information systems. This survey instrument has been designed to enable me carry out research on the topic: **“Assessing the Effect of Digitized Port System on Service Delivery at the Customs Division of the Ghana Revenue Authority”**.

Any information provided will ONLY be used for academic purpose, and it will be treated as **HIGHLY CONFIDENTIAL**.

Please write in ink in the box which corresponds to the statement, which in your opinion is the most appropriate answer to the related question. For the following questions, kindly select by checking (✓) all that apply

SECTION A: DEMOGRAPHIC INFORMATION

1	What Department of the Customs Division of the Ghana Revenue Authority are you?	<input type="checkbox"/> Port Operations <input type="checkbox"/> Preventive Unit <input type="checkbox"/> Post Clearance Unit <input type="checkbox"/> Petroleum Operations <input type="checkbox"/> Suspense Regimes <input type="checkbox"/> Mining Operations
2	How long have you been working in the Customs Division of the Ghana Revenue Authority?	<input type="checkbox"/> Below 10 years <input type="checkbox"/> 10 – 20 years <input type="checkbox"/> 21 – 30 years <input type="checkbox"/> 31 – 40 years <input type="checkbox"/> Above 40 years
4	What is your rank at the Customs Division of the Ghana Revenue Authority?	<input type="checkbox"/> Commissioner <input type="checkbox"/> Deputy Commissioner <input type="checkbox"/> Assistant Commissioner <input type="checkbox"/> Principal Collector <input type="checkbox"/> Senior Collector <input type="checkbox"/> Collector <input type="checkbox"/> Assistant Collector <input type="checkbox"/> Others

SECTION B: DIGITIZED PORT SYSTEM

Please using a scale of **1=strongly disagree**, **5 =strongly agree**, how you would rate this firm's operational performance along the items shown in the table below:

The is a high speed of delivery					
The port systems help in fast delivery					
The overall cost of operations at the port is low					
The price at the port is competitive					
The turnover at the port is high					

Source: Chu et al. (2013); Prajogo et al. (2012)

SECTION D: OPERATIONAL PERFORMANCE

Using a scale of 1 to 5 [where 1=strongly disagree; 5=strongly agree], indicate this firm's customer satisfaction in relation to that of key competitors.

<u>1</u>	<u>2</u>	<u>3</u>	<u>4</u>	<u>5</u>
Strong Disagree	Disagree	Neutral	Agree	Strongly Agree
Annual throughput of each terminal in the port in TEUs has increased				
The total annual port throughput in TEUs has increased				
The annual export throughput for each terminal, and total for the port has increased				
The annual import throughput of each terminal, and total for the port has increased				
The annual ship calls in number has improved				
The annual ship calls in tonnes has increased				

Source: Chu et al. (2013); Prajogo et al. (2012)