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Determinants of Service Delivery at the Port of Mombasa, Kenya

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Abstract:

Kenya Port Authority is still facing myriad challenges such as infrastructural development, high logistical costs and unskilled workforce affecting its service delivery. It was in this regard that the researcher sought to establish determinants of service delivery at the Port of Mombasa. This study was guided by the following specific objectives; to examine the effect of information system on service delivery, determine the effect of infrastructure on service delivery, and to assess the influence of custom clearance process on service delivery at the Port of Mombasa. The study was built on human capital theory, Servqual model and queuing theory as pillars of this study. The research study adopted explanatory research design. Target population was 1200 consisting of clearing and forwarding agents, shipping agents, transporters and warehousing firms. A closed ended structured questionnaire was used to collect primary data from 137 sampled respondents. A pilot study was conducted to ascertain the reliability and validity of the instruments. The quality and consistency of the study was further assessed using Cronbach's alpha. Data was presented in form of, percentages, means, standard deviations, regression and correlation. It was determined that $r^2 = 0.625$ which implied that infrastructure development, customs service clearance, and information systems can explain 62.5% of service delivery at KPA. The P-value of 0.000 (Less than 0.05) implies that the model of was significant at the 95% confidence level. The study found out that information system significantly contributes to the improvement of service delivery ($\beta_1 = 0.259$; $P = 0.000$). It was also determined that improvement in infrastructure development would lead to an improvement in service delivery ($\beta_2 = 0.400$; $P = 0.003$). Further the study determined that an improvement in custom clearance process would lead to an improvement of service delivery ($\beta_3 = 0.361$; $P = 0.000$). The researcher concluded that there is need to evaluate other determinants which contribute to successful service delivery at Kenya Ports Authority. The study also concluded that infrastructure development plays a significant role and was the most important factor that ought to be considered by organization at Mombasa port in order to enhance service delivery. The study recommends that organization should continue investing more in infrastructure development to enhance efficiency, through automation to minimize human conduct so as to avoid bureaucratic procedures that hampers and slows down clearance processes. The study further recommends training of personnel to improve on efficiency in service delivery at the port.

Keywords: Information systems, infrastructure, custom clearance and service delivery

1. Introduction

Service quality can be seen as the gap as the between the expected service and the actual perceived service (Stefano, *et al.*, 2015). Basically, the purpose of port of Mombasa is to create a satisfied customer. The creation of customer satisfaction can provide several benefits, such as the relationship between the organization and the customer becoming more harmonious, providing a good foundation for repeat purchases and the creation of customer loyalty, and generating word-of-mouth recommendations that are profitable for the organization (Nuridin, 2018).

The vast majority of research into port service delivery has focused on efficiency, or 'doing things right'. While some research has looked at port service delivery in terms of effectiveness, in almost every case it is concerned with effectiveness in economic terms, such as the rate of profitability, the studies consider measures such as rate of port throughput, terminal performance, port congestion, availability of stevedore services, and so on that are deemed to influence effectiveness and logistics service delivery, (Dwarakish, & Salim, 2015).

The trade in the global scene has been carried out for many centuries. The major instruments of accessing the trade routes and market have been pegged on the maritime transport. It is estimated that maritime transportation accounts up to 80% of the world's voluminous trade (Rhyne, *et al.*, 2017). The rest of the transport takes place in rail, road and air transport. The linkage of the various continents has been through the sea transport due to its strategic points. The aspect of competition and need to being abreast in maritime transport has coerced various ports to have restructuring so as to meet the ISO qualification standards. Due to this rapid development, the ports in various countries are being transformed to have modern and specialized equipment to handle huge volume of cargo (Fardella, & Prodi, 2017).

Ports have traditionally evaluated their performance by comparing their actual and optimum throughputs (measured in tonnage or number of containers handled). If a port's actual throughput approaches its optimum throughput over time, the conclusion is that its performance has improved over time. On the other hand, when the port registers poor performance such as high container dwell time, threat of Vessel delay surcharge and worst still is the big ships avoiding

the port. In the long run this renders transport from the port un-competitive by factual analysis. Crane productivity which is calculated per crane and can be expressed in gross and net values; Port Productivity, there are seven different productivity measures which terminal operators need to compute, although they may wish to include others for monitoring their productivity. These core productivity measures are: Ship productivity which is the broadest measures are: Ship productivity which is the broadest measures of ship by port gate operations has resulted in an increase in truck turnaround within the port area. Entry and exit are now taking as much as 6 hours. (Kenya Transport Association, 2008) Loading Point in efficiencies; when it comes to loading within the port, trucks are spending up to 6 hours to load for containerized cargo and 2 days for bulk and conventional cargo. For instance, most of the loading at the grain bulk handling facility happens at night when the customs department is closed and transporters have to wait until the following day to load. Traffic Congestion within Port Cities and Cities along the Transport Corridor; both the cities of Dares salaam and Mombasa are heavily congested with huge volumes of truck traffic entering and leaving the ports.

In Mombasa, the heavy traffic between the port exit gates and Mariakani means that trucks are spending as much as 6 hours to navigate through a 30KMs stretch, which ordinarily would take 30 minutes. The situation is compounded by narrow roads and single lane roads between Changamwe and Miritini. As for cities along the corridor, Nairobi and Eldoret and Kampala are the most notorious in terms of traffics congestion. Lack of bypass roads in these cities, coupled with single lane roads passing through Eldoret town mean that trucks are spending an average 5 hours to transit through these cities at peak hours. Such infrastructure constraints within the port area and major cities along the transport corridor are responsible for the long truck turnaround times recorded in this survey Delays related to delivery at destination points; it is taking up to two days for trucks to off load cargo at destination points. This is common for local and other transit cargo that is destined for bonded warehouses where importers have failed to fulfill their tax and regulatory obligations when cargo crosses borders and thus trucks experience unnecessary delays as they await customs clearance. (East Africa Logistics Performance Survey 2012)

Port activity is no longer limited to just cargo handling; logistics service provision in an international context has become a core part of the business (Munim, & Schramm, 2018). In this situation, the most imperative aspects of logistics performance are logistics costs and reliability of supply chains. Poor logistics facilitation takes a large toll on a country's competitive advantage, and insights in this respect were conferred by Munim, & Schramm, (2018). In a world of just-in-time production processes, it is not only the time and cost of delivery of shipments that matters, but also its reliability and predictability. A firm's hedging costs due to poor reliability and predictability of logistics services can be significantly high in terms of higher inventory maintenance requirements (Arviset *al.*, 2010). Despite such significance, the impacts of port infrastructure quality and logistics performance on a country's trade and economy have been largely overlook Meanwhile, many countries are planning to build up regional hub ports, following successful cases such as Singapore, Shenzhen, Hong Kong, Dubai, to name a few and expecting additional growth of their economies in forms of new service markets. This could be aided by developing transshipment facility and efficient transport network. However, the port-city relationship has changed and the urban structure of cities is no longer important for explaining the intensity and spatial distribution of maritime transport networks (Ducruet *et al.*, 2016). Slack &Gouvenal (2015) argued that the potential for economic development through hub port development is more limited than suggested in most maritime literature.

The Port of Mombasa has exceeded its design capacity throughput of 250.000. 20-foot equivalent container units (TEU) which has put pressure on the existing custom bonded warehouses, yet it is expected to handle growing imports and exports. It is already operating at maximum capacity for both general and containerized cargo, and will suffer progressive declines in operational effectiveness unless both capacity utilization and efficiency issues are urgently addressed (Song, & Dong, 2015). The situation of poor capacity utilization on the custom bonded warehouses and high demand has inevitably resulted in port congestion. This has resulted on the delays for not only the shipping companies but also the logistics firms locally.

In as much as future of the export market looks bright, the aspect of logistical costs has had a negative impact on the performance (Narayanan, *et al.*, 2015). Some of the logistical obstacles the port is high volume of goods, long distance from the farm to port and the low value of the agricultural exports. Additionally, the port of Mombasa has exceeded its design capacity throughput of 250.000. 20-foot equivalent container units (TEU) has put pressure on the existing custom bonded warehouses that is expected to handle growing imports and exports and operate at a maximum capacity for both general and containerized cargo. At this rate the port is likely going to suffer progressive declines in operational effectiveness unless both capacity utilization and efficiency issues are urgently addressed (Acciaro, & McKinnon, 2015). The situation of poor capacity utilization on the custom bonded warehouses and high demand has inevitably resulted in port congestion. This has resulted in delays not only for the shipping companies but also the logistics firms locally. With the growth in international trade, international ports are under pressure to upgrade and provide modern technology. They are also being forced to improve terminals efficiency to provide competitive advantages that will lure more ships (Min, *et al.*, 2017).

Despite the importance of KPA and the problems facing the port, limited study have been directed on the topic. For instance, Datche and Kisingu (2017), examined the factors influencing logistics service delivery at the port of Mombasa. Kasozi, (2019), studied the factors affecting efficiency of container freight stations at the port of Mombasa. Nyema (2014), examined the factors influencing container terminals efficiency. Based on the study review it was evident that conceptual and methodological research gap exists on the determinants of service delivery at the Port of Mombasa. It was in the regard of the existing problem and the existing problem that formed the basis of this study.

2. Literature Review

2.1. Concept of Service Delivery

The concept and notion of service delivery is the practice of providing customers with a positive helpful experience when they enter a business, throughout the time they stay at the business, and even after the customer leaves, should they have additional questions or products to return (Tummers, *et al.*, 2015). According to Parasuraman, Valarie, Zeithaml & Berry (2015), service delivery is objective when it is related to external tangible features which can be measured factually (Oh, & Bush, 2015). Subjective service delivery is rated when a customer's imagination, personal experiences, emotions, expectations and attitudes are taken into account. The most common reason for displeasure is the difference between an objective and the subjective evaluation of service delivery (Pleyers, & Poncin, 2020). According to Parasuraman *et al.*, (2015), Service Delivery processes assist staff in tailoring services to meet the specific business needs at a price the business can afford.

Logistics service delivery from the perspective of 'consumer benefits from lower transport costs' can be estimated by calculating the additional costs when a 'second best' port would have to be used; these additional costs do not have to be incurred because of the presence of the port, thus they can be regarded as the benefits of the presence of this port. Due to the competition between ports, for instance competition between the port of Mombasa, Kenya and that of Dar-es-salam Tanzania it can be assumed that these benefits are passed on to the port users, and finally to the consumers in the hinterland, in this instance the hinterland being the east African land locked nations such as Uganda, Rwanda, Burundi, Ethiopia, and Southern Sudan. Even though some economic impact studies do argue along these lines, the benefits to consumers in the port hinterland are not presented explicitly (Dooms, *et al.*, 2015). Some of the additional costs are as a result of bureaucracies within the port setting such as delays in loading and or offloading cargo, documentation processing delays by the port authorities, system breakdowns, long port customs procedures and even port staff apathy to work or just inefficiencies and lack of proper competencies.

3. Theoretical Review

3.1. The Human Capital Theory

The postulation of the Human Capital Theory dates back in 1954 by Arthur Lewis. The human capital theory states that there is a positive correlation between value of services and goods with the capacity of the people involved. The definition of human capital according to the theory states that it is as unit level capacities of individuals (Ployhart *et al.*, 2014). Human Capital is also examined as an intangible and intellectual resource in an organization. Weller, *et al.*, (2019) conjectured that it's through the human capital aspect that systems, processes and routines are operated or become operational.

The relevance of this theory pegs on the study objective of staff competence level. The staff competence level is dependent on the knowledge skills and exposure of the workmanship in the organization. The performance of staff in various logistical firms is largely dependent on the qualification, skill and training of the individual employed in an organization. The staff in an organization usually bring along three levels of human capital, organizational capital, the process capital and innovation capital. The three types of human capital are needed in various stages of the growth of the logistical firms involved in the maritime transport (Pinto, *et al.*, 2015). It can be stated that when a logistical firm has the required staff that have right qualification, skills and undergone rightful training have the chance to excel in the market and survive hazy economic situations.

In as much as the theory is important to the staff competence level, it has various limitations. The first limitation as noted by Alghamdi, (2018) is that this theory puts a lot of emphasis on education and earnings and had little in regards to the role of experience of the workmanship in an organization. Second limitations of the theory according to Lazear (2009) are that a lot of emphasis is put on skills and knowledge that are industry specific. This industry specific skills and knowledge as stated by Lewis are acquired through apprenticeship and vocational schools. Some of the industry specific skills and knowledge can also be acquired in other non-related industries. Lastly, Heckman & Park (2012) stated that this theory ignores the roles of non-cognitive abilities. The non-cognitive abilities have of the recent years been given more limelight because they shade more light on attitudes of individuals, mindset and general behavior.

3.2. Servqual Model

Servqual Model was originated by Parasuram, Zeithaml and Berry (1988) and it was based on disconfirmation paradigm. The model was based on the following service factors: tangibility, responsiveness, reliability, credibility, courtesy, security, communication, accessibility and understanding the customer. Pakurar, (2019), narrowed down these factors into five, which include: reliability, assurance, tangibility, empathy and responsiveness assurance.

The SERVQUAL model proposes the use of the gap analysis or difference between expected level of service and delivered level of service for measuring service quality perception with five dimensions: reliability, responsiveness, assurances, empathy, and tangibility. SERVQUAL is an analytical tool, which can help in identifying the gaps between variables affecting the quality of the offering services (Pakurár, *et al.*, 2019, 2015). This model has a wide acceptance among marketing researchers and scientists, although it is an exploratory study and does not offer a clear measurement method for measuring gaps at different levels.

This model can be used to measure service quality of KPA, using various dimensions. These dimensions include: reliability is the ability to perform the promised service dependably and accurately; responsiveness is the willingness to help customers and provide prompt service; assurance is the knowledge and courtesy of employees and their ability to

convey trust and confidence; empathy is the caring, individualized attention; and tangibles covers the physical facilities, equipment and appearance of personnel (El Saghier, (2015).

3.3. The Queuing Theory

This theory was postulated by Agnes KrarupErlang in the year 1909 when working as an engineer at the Copenhagen telephone exchange. According to this theory a system of queuing in an organization or firm should be designed in a way that it can be predicted in length of time for waiting (Bhat, (2015). The queuing theory is applicable to day-to-day situations and also used in manufacturing and service industries. In order to construct the queuing system for a situation, there is great need to know the possible occurrences and chances. Therefore, the knowledge of exponential and Poisson probability functions of distribution is worthwhile to be applied. The major component of a queuing system involves four major areas: the input source, the queue, the queue discipline and service mechanism (Paul *et al*, 2015).

The relevance of this theory encompasses the custom clearance process as an objective of study. There are three major categories of queuing patterns: single queuing nodes, simple two-equation queue and the queuing networks. The custom clearance process is best feature in the queuing network category. This is because the clearances of cargo at the port which are in queues and at various departments are usually connected to a single customer routing. Therefore, the cargo containers are queued as nodes creating complex nodes. The queuing system has been applicable in numerous sea ports across the globe (Iris, & Lam 2019). Saeed,& Larsen (2016) in study applied the queuing theory at the Alexandria port container terminal. The exponential probability distribution was applied in two sets: the arrival time of container cargo and service time of the container cargo.

3.4. Technology Acceptance Model

Davis (1989) presented a theoretical model aiming to predict and explain ICT usage behavior, that is, what causes potential adopters to accept or reject the use of information technology. Theoretically, TAM was based on the Theory of Reasoned Action (TRA). In TAM, two theoretical constructs, perceived usefulness and perceived ease of use, are the fundamental determinants of system use, and predict attitudes toward the use of the system, that is, the user's willingness to use the system. Perceived usefulness refers to "the degree to which a person believes that using a particular system would enhance his or her job performance", and perceived ease of use refers to "the degree to which a person believes that using a particular system would be free of effort" (Davis,1989).

Figure 1
Source: Davis 1989

Hassan, *et al*,(2015) examined why organizations applies technology in warehouse management. In their work, the authors identified factors as reliable measures to characterize attitudes towards warehouse service delivery. Factors enabling positive attitude were; less time, cost and avoiding personal interaction (categorized as relative benefits); and factors characterizing negative attitudes were experience, information quality, financial security, low stress, trust and visual appeal. This theory can be used to explain the relationship between information technology and the service delivery at the Port of Mombasa. The theory can also be applied by KPA and KRA in the adoption of Integrated Customs Management Systems (ICMS) in carrying out operations in custom bonded warehouses at various entry points.

4. Empirical Review

4.1. Effect of Information System on the Service Delivery

Computerized information system that is user friendly to allow exchange of information amongst the firms at customs has helped to improve the entire clearance process. From lodging of entries, acceptance to processing of cargo, goods declarations for import and export, transit, assessment and payment of relevant taxes, to arrival of the goods to customs and border control (Polycap, 2017). Earlier researchers have also indicated that making trade procedures that are easy to follow coupled with faster transport and easier predictability of goods encourages developing countries to develop interest to participate in world trade which could bring on board all business ventures to international trade. As reported by (UNCEA, 2013) trade facilitation is a main factor in international trade proficiency and the economic growth of countries. Alongside with increased competition and pressures to raise efficiency has led to harmonization of the complex customs trade procedures by streamlining of trade procedures (Avgerou, &Bonina, 2020).

Information systems means hardware, software, telecommunications, databases and other technologies which are used by custom bonded warehouses to improve their performance or it means equipment, and procedures used to gather,

sort, analyze, evaluate and distribute needed, timely and accurate information to decision makers (Autry, Griffis, Goldsby&Bobbitt, 2015; Nedelko, 2018; Closs& Xu, 2010; Porter & Millar, 2011; Ho, 2016). The integration of information system in port service delivery and in particular consignment management holds great potential to unlocking the efficacy of the port in today's economy by improving information sharing, increasing predictability, reducing waste in value chains, better monitor demand for certain products and place orders to prevent an out-of-stock situation, hence reducing bullwhip effects and lead time. ICT continues to be one of the most important enablers of effective service delivery in the Port of Mombasa (Gekara et al., 2020) and improves ports agility, reduces cycle time, achieves higher efficiency and deliver consignment to customers in a timely manner (Le, et al., 2020).

Study Varila, Seppanen&Heinonen. Burinskiene (2012); Sun *et al.*, 2017 showed that ports service delivery productivity could only be achieved by looking at the processes. Varilaet al (2012) pointed out that in manual activities in the port, the forklift became the most expensive equipment because of labour, maintenance costs and equipment. The research suggested reducing duplicative or multiple handling of pallet, and non-productive movements and construction of routes. A great deal of interest in ports service delivery stems from the availability of information and the methods to analyze this information to reach meaningful results. Haag & Stephen, (2010) assert that the increasing importance of electronic business brings to fore new opportunities and the widespread use of internet makes ICT tools a source of competitive power for many ports around the world. Further, ICT has been adopted in store management processes by firms as a competitive edge and to build strategic long-term relationships along the supply chain. The presence and use of electronic devices are also noted as a worthwhile operationalization of information systems. In East Africa the latest launch of the electronic cargo tracking system is a vivid example of the use of the electronic devices and use of information system. The ECTS are designed in a way to relay the real time situation of the cargo in transit. Another element of the ECTS is that it enables containers after being inspected to be locked and made tamper proof. In case of theft or accident the management at the port can be able to be notified and salvage the situation at hand Mugambi, (2017).

- H_{01} : There is no significant effect between information system and service delivery at the Port of Mombasa

4.2. Effect of Infrastructure Development on the Service Delivery

Infrastructure is the basic systems and services, such as transport and power supplies, that any port must possess in order to work effectively. Infrastructure in an economic setting is a component of the territorial structure of national economy, which is formed by the transport, communications, trade, energy and water management system, as well as dwellings, schools, objects of health protection, culture, sports and other objects for care of inhabitants and their arrangement in any territory (Skorobogatova, &Kuzmina-Merlino, 2017). The level of infrastructural development in port is usually measured by the container port throughput. The container port throughput is measured in TEU. There have been tremendous strides made in port infrastructure development in the last one decade. The major development has been realized with average growth rate of 8% translating to 406.9 million TEUs. It is worthwhile noting that on average scale the Asian continent has taken lead in demand for container port services due to adequate port developments in infrastructure (Achurra-Gonzalez *et al.*, 2019).

Munim, & Schramm, (2018) explained that investment into transport facilities improves logistics ability and reduces freight costs. Wilmsmeier& Hoffmann (2008) estimated the role of liner shipping connectivity (LSC) and port infrastructure in determining freight rates in the Caribbean. They found that a one-standard-deviation increase in LSC implies an expected reduction of USD 287 in freight rate, and that a one-standard deviation increase in port infrastructure for an importing country implies an expected reduction of USD 225 in freight rate. Furthermore, Sánchez *et al.* (2003) found that freight costs are lower in efficient ports after controlling for distance, liner service availability, and type of product and insurance costs. Also, an increase in port efficiency from the 25th to the 75th percentile is expected to reduce shipping costs by 12% (Jouili, (2019). Quality of infrastructure and transport costs is important for export-led economic growth (Ribeiro, *et al.*, 2016). Thus, it can be derived that efficient ports have better quality infrastructure and logistics performance than inefficient ones.

Additionally, an efficient port system with enhanced logistic abilities is a key determinant of foreign direct investment into a country (Panayideset *al.*, 2015). On the other hand, inefficient ports reduce national and international trade and affect economic growth adversely Jouili, (2019). Also, the role of ports in the internationalization process of business firms was highlighted by Ellis (2011). A country's logistics performance plays a vital in facilitating transportation of goods to the international market. Korinek&Sourdin (2012) points out that "Inefficient logistics services impede trade by imposing an extra cost in terms of time as well as money". Munim, & Schramm, (2018) found a significant negative association between transport cost and international trade. Long customs clearance time adversely affects firms' total factor productivity (Martincus, et al., 2015).

Meanwhile, a better business environment comprising quality logistics services is associated with better export performance (Portugal-Perez & Wilson, 2012). Also, better accessibility of freight increases logistics employment (van den Heuvel *et al.*, 2014). Overall, firms in countries with better logistics performance have higher probability of exporting to international markets and attracting foreign direct investments (Hausmanet *al.*, 2013). Thus, logistics development has a positive impact on regional economic growth (Chu, 2012; Lean *et al.*, 2014; Li *et al.*, 2017; Lunet *al.*, 2016). Coto-Millán *et al.* (2013) found that a 1% increase in logistic performance index can increase the world economic growth by between 1.1– 3.4%.

- H_{02} : There is no significant effect between port infrastructure development and service delivery at the Port of Mombasa.

4.3. Effect of Custom Clearance Process on the Service Delivery

Customs clearance procedures refer to a specialized procedures and processes designed to maintain uniformity and controls in cargo clearing process in custom bonded warehouses. Customs clearance procedures are common in maritime organizations such as KPA but the situation becomes more cumbersome when two or more organization have been involved, in this case KRA and KPA (Investopedia, 2018). Before the release of consignment to customers, there are procedures and process which must be followed by clients. The custom clearance process of ports is one of the great key performance indicators developed by the United Nations Conference on trade and Development (UNCTAD). In the year 1976, the KPI of port performance were majorly grouped into two: the operational performance indicator which entails the input-output measures of productivity and financial performance indicators that entails the aggregate impacts of the ports to the various economic activities over time. Various key port performance indicators have been designed. The key port performance indicators can also be generally grouped as: traffic, financial, custom procedures, security, operational and financial (Varriale, & Alvino 2018)

The custom clearance process revolves around the nature of transaction in place: the import and export process. The presences of the check point facilities are vital in a port. This ensures that the goods/cargo meet the standards of international level. The second component of the check points is that it ensures the right levies and duties are actually paid as per the stipulated rules and regulations in place (ICC, 2010). Onwogu (2018) examined corruption and efficiency of custom clearance processes in selected countries, where it was established that corruption causes a diversion of effort from clearance functions to unproductive services of negotiating bribe payments. It also established that improvements in port facilities will improve customs effectiveness. The relationship identified between corruption and the effectiveness of the customs service is robust and includes regulatory quality, government effectiveness and an alternative use of the corruption index.

The provision of custom clearance and quarantine services imposes high security procedures to access the dry port, similarly to seaports, and depending on the country it may include high fencing, cameras and guards (Acciaro, & McKinnon, 2015). The port of Mombasa is vital to Kenya's domestic economics. Maritime trade accounts for more than 70% of the port of Mombasa's total cargo volume, and that volume is growing at around 12% per year (KPA, 2010). A study by UNCTAD (2016) recommends that automation of the procedures reduces corruption by minimizing direct contact between Customs officers and traders, and significantly reduces the potential negative impact of physical inspections. "ICT applications can reduce waiting times at border crossing and at ports, secure appropriate processing of fees and Customs duties, simplify formalities, and provide timely information to transport operators. It also reduces transaction costs, enhances supply capacities, and increases global market access". Ondari (2016) established that the advantages of bureaucracy are many folds, apart from consistent employee's behaviour, it eliminates overlapping or conflicting jobs or duties and behavior of the system is predicable; thus, the study concludes that bureaucratic procurement procedures had a positive impact on the efficiency of inventory management among firms in Kisii town. This study concluded that bureaucratic procedures have an effect on successful store management.

- H_{03} : There is significant effect between custom clearance process and service delivery at the Port of Mombasa

5. Methodology

Explanatory research design was used in this study. The population of the study was 1200 port stakeholders from clearing and forwarding, shipping agents, transport and logistics, and warehousing at the port of Mombasa was the study area. From the target population of 1200, Taro Yamane (1973) sample size formula and modified by Kent (2008) was used to select a sample size of 137 respondents. A stratified random sample was a useful blend of randomization and categorization, which enabled both a quantitative and qualitative process of study to be undertaken (Cohen, 2003). The study used a questionnaire in data collection. The Cronbach's coefficient alpha was applied on the results obtained to determine how items correlate among them in the same instrument. Cronbach's coefficient Alpha of more than 0.7 was taken as the cut off value for being acceptable which enhanced the identification of the dispensable variables and deleted variables. Descriptive and inferential statistics were analyzed.

5.1. Analysis of the Results

The study conducted initial data analysis using simple descriptive statistical measures such as, mean, standard deviation and variance to give glimpse of the general trend. However, correlation analysis was used to determine the nature of the relationship between variables at a generally accepted conventional significant level of $P=0.05$ (Sekaran, 2003). In addition, multiple regression analysis was employed to test the hypotheses. Multiple regression analysis is applied to analyze the relationship between a single dependent variable and several independent variables (Hair *et al.*, 2013). The study also utilizes variable inflation factor (VIF) to handle the issue of Multi-collinearity. The beta (β) coefficients for each independent variable generated from the model, was subjected to a t-test, in order to test each of the hypotheses under study. The regression model used to test is shown below:

$$Y = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + e$$

Where;

Y = Service Delivery

β_0 = Regression intercept (value of y when the X_i are Zero)

β_{is} = Regression coefficients determining X_i on how they affect y

X_1 = Information System,

X_2 = Infrastructure,

X_3 = Custom Clearance Process,

$\beta_0 \beta_1 \beta_2 \beta_3 \beta_4$ are the coefficient of the variables.

ϵ = is the error term.

5.2. Correlation Analysis

In trying to establish the relationship between the dependent and independent variables, the study carried out a correlation analysis which involved coefficients of correlation and determination. The coefficient correlation was computed to establish the strength of the relationship between dependent and independent variables (Boer, & Schwarte, 2018). The study used Pearson Bivariate correlation coefficient to determine the correlation between the dependent variable, service delivery, and the independent variables; information system, infrastructure development, customs clearance services and staff competency. According to Sekaran (2015), correlation between the variables is supposed to take a linear trajectory with its coefficient ranging from -1.0 (perfect negative correlation) to +1.0 (perfect positive relationship).

5.3. Pearson Correlations

	S Delivery	InfoSystem	Infrastructure	C Service
SDelivery	1			
Sig. (2-tailed)				
InfoSystem	.741**	1		
Sig. (2-tailed)	.000			
Infrastructure	.777**	.926**	1	
Sig. (2-tailed)	.000	.000		
CService	.743**	.917**	.959**	1
Sig. (2-tailed)	0	0	0	

**** Correlation is significant at the 0.01 Level (2-Tailed)**

InfoSystem (Information System), Infrastructure Development, CService (Customs Clearance Service).

The results findings as tabulated above, indicates that there was a positive and significant correlation between the independent variables; information system, infrastructure development, and customs clearance services, and the dependent variable, service delivery. The analysis indicates that Pearson correlation (r) data analysis yielded a positive correlation coefficient (r) equal to 0.741, 0.777, and 0.743 for information system, infrastructure development, and customs clearance services. This illustrates that there is a positive and significant relationship between the independent variables and dependent variable.

5.4. Multi-Collinearity

This term is used to describe the inter-correlations or inter-associations among the in variables. Thus, Multi-collinearity occurs when more than two independent variables are highly correlated (Cooper & Schindler, 2016). Multi-collinearity can be detected with the help of tolerance and its reciprocal variance inflation factor (VIF). Tolerance should be above 0.20 (Menard, 2005) and this was the cut-off value for this study. It is clear that serious multi-collinearity occurs when the value of tolerance is smaller than 0.10 and the value of VIF is greater than 10 (Ghozali, 2015).

Variables	Collinearity Statistics	
	Tolerance	VIF
Information System	.940	1.052
Infrastructure Development	.910	1.086
Customs Clearance Service	.887	1.125

Multi-Collinearity for the Study Variables

All variables had tolerance values of above 0.2 and VIF of less than 10. This indicated that multi-collinearity among variables was not a problem and the proposed model in chapter three was valid. Admittedly, all the variables used in the multiple regressions' models had the tolerance values of above 0.20 showing Multi-collinearity was not a problem in this study as indicated above.

5.5. Coefficient of Determination (R^2)

The independent variables were subjected to linear regression analysis in order to measure the success of the model and predict causal relationship between the independent variables; information system, infrastructure development, and customs clearance services and staff competency, and the dependent variable, services delivery.

Model Summary					
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	D-W
1	.791a	0.625	0.611	.729	1.578

a. Predictors: (Constant), Staff Competency, InfoSystem, Infra_Development, Cust_Clearance_Service

As shown above, the model explains 62.5% of the variance (Adjusted R Square = 0.611) on service delivery at port of Mombasa. This reveals that apart from the four studied variables, there are other determinants which can be used to predict service delivery in this model.

5.6. Regression Coefficients

The findings below show the relationship between independent variables (Information System, Infrastructure Development, Customs Clearance Service) and dependent variable (Service Delivery) was positive and statistically significant ($F=45.851$; $p<0.05$), hence determinants investigated are fundamental and have great effect on service delivery at port of Mombasa. Additionally, it also indicates that the model was statistically significant and can be used to predict the dependent variable.

Multiple Regressions (Coefficients)						
Model		Unstandardized Coefficients	Standardized Coefficients			
		B	Std. Error	Beta	t	Sig.
1	(Constant)	13.512	1.108		12.197	0
	InfoSystem	0.259	0.085	0.168	3.047	0
	Infrastructure	0.4	0.131	0.689	3.051	0.003
	CService	0.361	0.107	0.135	3.374	0

Multiple Regressions (Coefficients)
a. Dependent Variable: Service Delivery

Table above shows the overall test results findings for the hypostasized study model. The interpretation of the results findings showed follows regression model as indicated below.

$$Y = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \epsilon$$

Therefore, from the regression findings, the research model becomes;

$$Y = 13.512 + 0.259X_1 + 0.400X_2 + 0.361X_3$$

Whereby Y = Service Delivery

X_1 = Information Systems X_2 = Infrastructure Development X_3 = Customs Clearance Service

The above model shows that holding four investigating determinants (Information Systems, Infrastructure Development, and Customs Clearance Service) at zero constant the performance of service delivery at the port will be 13.512. However, a unit positive change in information system would results to 16.8% increase in service delivery performance at the port ($\beta_1=0.259$, Sig=.000) aunit positive change infrastructure development would result to 68.9% increase in service delivery performance at port of Mombasa ($\beta_2=0.400$, Sig=.003)aunit positive change Customs Clearance Services would result to 13.5% increase in service delivery performance at port of Mombasa ($\beta_3=.361$, Sig=.000). The study also revealed that infrastructure development at 68.9% was the most important and significant factor that ought to be considered by organization management at Mombasa port in order to enhance service performance, followed by information system at 16.8%, and the least was customs clearance service at 13.5%.

5.7. Hypotheses Testing

Hypothesis Statement	β	t	p-value	Decision
H ₀₁ : There is no significant effect of information system on service delivery at the Port of Mombasa.	0.168	3.047	0.000	Reject the H ₀₁
H ₀₂ : The port infrastructure has no significant effect on service delivery at the Port of Mombasa.	0.689	3.051	0.003	Reject the H ₀₂
H ₀₃ : The custom clearance process has no significant effect on service delivery at the Port of Mombasa.	0.135	3.374	0.000	Reject the H ₀₃

Hypotheses Testing

6. Summary of the Findings

6.1. Information System

The first objective was determining the effect of information system on service delivery at the port of Mombasa. With overall mean score of 4.27, there was general agreement that information system have a positive and significant

effect on service delivery at the port of Mombasa. When information system was correlated with service delivery at the port, there was a strong positive Pearson correlation, $r=.741$, $p=0.000$, with regression coefficient of 0.259. This demonstrates that information system plays a significant role in influencing service delivery at the port of Mombasa. This conforms (Avgerou, & Bonina, 2020) observations who noted that information system is one of the most important enablers of effective service delivery. In line with this (Radjou, 2013) explains that use of information system at the port improves port's agility, reduces cycle time, achieves higher efficiency and deliver consignment to customers in a timely manner.

6.2. Infrastructure Development

The second objective of the study was determining the effect of infrastructure on service delivery at the Port of Mombasa. With overall mean of 4.54, respondents were in agreement that infrastructural development has a great influence on service delivery at port of Mombasa. This is supported by a strong positive Pearson correlation ($r=.777$, $p=0.003$) with regression coefficient of 0.400, between infrastructure development and service delivery, which implies that infrastructure development greatly affects service delivery at the port of Mombasa. In support of this Ribeiro, *et al.*, (2016) explained that investment into transport facilities improves logistics ability and reduces freight costs. In agreement with this Wilmsmeier & Hoffmann (2008) adds that investment in quality infrastructures at the port helps to reduce freight rates for importing and exporting countries as in the case of Caribbean port. In line with this finding Sánchez *et al.* (2003) found that freight costs are lower in a port with efficient infrastructures. On the other hand, inefficient ports as explained by (Clark *et al.*, 2004) are bound to reduce national and international trade which can affect economic growth adversely due to poor service delivery.

6.3. Customs Clearance Service

On the third objective, the relationship between custom clearance process and service delivery at the Port of Mombasa. The study looked at mapping and directions at the port, storage and waiting charges and clearing and forwarding agents, and respondents were in agreement with a mean score of 4.47. When project customs clearance service was correlated with service delivery; there was a strong positive Pearson correlation ($r=.743$, $p=0.000$) with regression coefficient of 0.361. This indicates that customs clearance service affects to great extent provision of service delivery at the port of Mombasa. This result conformed to the finding of an earlier study which showed that improvement in port facilities improves customs effectiveness, if there is no corruption and bribery to cause a diversion of effort from clearance functions to unproductive services of negotiating bribe payments (Onwogu, 2018).

7. Conclusions

7.1. Information System

From the study findings above, the study concludes that there is a positive link between information system and service delivery that positively affects service delivery at the port of Mombasa. The study also concludes that information systems that are used by custom bonded warehouses to gather, sort, analyze, evaluate and distribute needed, timely and accurate information to decision makers have been found to improve service delivery and performance at the port. The study further concludes that integration of information system in port has had great effect in unlocking the efficacy of the port by improving information sharing, increasing predictability, and reducing waste in value chain.

7.2. Infrastructure Development

The study established that infrastructure development is essential in-service delivery at the port of Mombasa. The construction and expansion of terminals has potential to improve efficiency at the port. The study concludes that there is a positive link between infrastructure development and service delivery which suggests that infrastructure development plays a significant role in service delivery at the port of Mombasa. In support of this Lakshmanan (2011) explained that investment into transport facilities improves logistics and reduces freight costs. In line with this Onwogu (2018) agrees with study findings that an improvement in port facilities improves customs effectiveness.

7.3. Customs Clearance Service

The study found that customs clearance services have a significant effect on service delivery at the port of Mombasa. This concurs with study findings by (UNCTAD, 2017) who ascertained that customs clearance as one of the key indicators of port performance. Customs clearance procedures are common in Maritime organizations such as KPA. They are specialized procedures and processes designed to maintain uniformity and controls in cargo clearing process in custom bonded warehouses. Thus, study concluded that corruption causes a diversion of effort from clearance functions to unproductive services of negotiating bribe payments. This concurs with UNCTAD (2016) recommendation that automation of the procedures reduces corruption by minimizing direct contact between Customs officers and traders, and significantly reduces the potential negative impact of physical inspections.

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