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RESEARCH ARTICLE

An Analysis on Performance of Container Freight Station in the Port of Mombasa in Kenya

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Key words:Container Freight Station,
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This study sought to examine the performances of Container Freight Station (CFS) in the port of Mombasa in Kenya. Although the concept is new in Kenya, there study will find out and analyze the effects of container freight station in decongesting the port of Mombasa and how CFS can make the Port of Mombasa become more efficient and effective as Port of choice for East and Central Africa region.

The study used primary and secondary data analysis on data collected from the existing documents and interviews conducted within the organization various operational CFS and C& F agents operating within Mombasa.

The finding shows that Mombasa port is currently among the fast growing ports in the world in terms of container handling trends. These has lead to congestion every now and then for the last ten years. The constraints has been a major hurdle in port operation as cargo imported especially cars and containers which have surpassed yard holding capacity against a backdrop of poor cargo off-take to their final destination.

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Introduction

The Port of Mombasa, Kenya Ports Authority (KPA) is the gateway to East and central Africa plays an important role in facilitating trade and development of the region. The port handles 90% of Kenya's external trade in terms of tonnage. It also plays a major role in the East African region due to its strategic position of serving the hinterland countries in East and Central Africa.

In the process of seeking the way forward for both long term and short term measures on congestion in the port of Mombasa, Kenya Ports Authority (KPA) identified one of the short term measure, being the establishment of Cargo Freight Station (CFSS) to be run by private entities and have an Memorandum of Understanding (MOU) with the Port of Mombasa to handle the overflow of cargo from saturated terminals by receiving cargo directly from the Port.

Container Freight Station (CFS) is an extension of the port thus ordinarily operating under customs control and other governmental agencies, It is a large warehouse used for "stuffing and stripping" containers, usually located within 10 KM radius of the Mombasa Port. Sound planning practice dictates that every port should acquire and set aside a significant amount of undeveloped land adjacent to the terminal for future growth and expansion in cargo, also referred to as a "land bank". There are currently no consistent standards that define the amount of additional land that a port should "land bank" but historically, major ports have typically acquired as much land adjacent to the port as their budgets would allow, and have frequently acquired land 20 or more years in advance of their anticipated need where port should be an exception.

CFS operates in the same way as an Inland Container Depot (ICD) only that the latter is in most cases located further inland. Their main functions include receipt and dispatch of cargo, loading and offloading of group cargo from containers, provision of transit operations among others.

The port of Mombasa is of great significance to the EAC as it acts as a gateway to east African countries and thus greatly impacts the economy. Moreover, the Port of Mombasa has a wide variety of shipping services that travel to important destinations worldwide, including Western Europe, Asia, the Americas, the Far East, and of course the rest of Africa. Regular feeder services operate between the Port of Mombasa and Dar-es-salaam, Mogadishu, Durban, Salalah, Djibouti, and Dubai.

Congestion has led to an increase in the entering and transiting cost to and from the Port of Mombasa that has significantly increased the cost of doing business in both Kenya and the EAC. There is lack of effective integrated rail and road links which means that Mombasa remains poorly equipped to handle containers and other goods. The linking quayside services to the Northern Corridor are very fundamental in the facilitation of trade and regional integration. Increment of import volumes have led to increased stress on land transport, and have created the need for faster and more efficient intermodal connections. Progress in this area has been poor and the failure of the railway system has resulted in a large number of new truck movements in and around the port which have contributed to the growing problem of truck congestion, parking and road deterioration. Rail transport carried around 80 percent of goods transiting Mombasa in the early 1970s but today, only 5 percent of Mombasa's freight moves on rails, a decline that has been due to the absence of sustained government investment in the railway system and most recently, the lack of investment by Rift Valley Railways which is the company responsible for the operation of Mombasa to Uganda railway line. This has brought about heavy congestion both in and out of the port as there is no other means apart from the use of heavy trucks through an increasingly crowded town centre. **(Kenya Economic Update, 2010 June Edition No. 2)**

According to Mr. Kimanga the East African Tea Trade Association chairman, exporters of tea have been greatly affected yet tea is Kenya's top foreign exchange earner. Most tea that was brought into the port in December has not even been exported because ships can neither load nor offload as there is not space to keep the cargo. Ships have also been forced to stay longer in the high seas to wait for free berths that they can dock for loading or offloading, incurring additional delay costs to the ship owners (Mombasa port congestion to take three months, 2012). For instance the ship owners may prefer the port of Dar-es-salaam to the Mombasa port.

As of August 2013, there are Container freight stations are enlisted to mitigate the cargo congestion crisis at the Mombasa port. Firms nominated to offer the services were 10; they are Consolbase Limited, Mombasa Container Terminal, Compact, Interpel, Awanad, Mitchell Cotts, Port Side, Focus, Makupa Transit Shed and Mombasa Island Cargo Terminal.

KPA has since embraced the use of technology, to compete favorably with other ports worldwide such as Durban port, and port of Tema in Ghana which have embraced the use of ICT to facilitate its ports operations and CFSs. KPA has taken this positively to contribute to the growing volumes of containers through the use of systems such as Computer Automated Terminal operating systems (CATOS) to facilitate business processes such as customs clearance, container planning, yard planning, container get in, receive pre-advise and make bookings. Thus the port management in outsourcing services to contracted private CFS must enhance efficiency and facilitation by encouraging the integration of CFSs workflow with KPA systems to ensure efficiency, uniformity and extreme system workflow.

Poor off-take by rail, road and the use of CFSs as storage areas, without consideration of their capacity to handle large volumes of containers has complicated CFSs logistics causing delays in dispatch of the cargo and having greater impact on country economic wealth.

Most importers have opted to divert their cargos to neighboring ports, to avoid high cost of storage at the CFSs in Mombasa thus making the government to lose revenue from imports thus lowering the country Gross Domestic Product (GDP) revenue and Gross National Product (GNP). The country has registered low economic growth because of congestion problem emanating from the port of Mombasa which is regarded as the East and central Africa port gateway

The port congestion has been also related to aging cargo handling equipment, and management resistance to change to effective performance standards and bring efficiency in their operations.

2.0 Literature Review

2.1 What is congestion?

According to Transnet (2008) there are many views on the definition of congestion which include as to whether it is a back log in vessels waiting at outer anchorage for a berth, poor operational performance of the port operator where vessels are not leaving on time, lack of capacity to match the demand which leads to stack congestion, or it is the erratic calling of shipping lines to a port that causes bunching of vessels.

From the many definition listed on congestion it can therefore defined as the inherent lack of infrastructure, both on the landside and the waterside that constrains the flow of freight

Ironically, the huge economic impact of the port congestion does not seem to bother mandarins (the key decision makers) at the Ministry of Transport. This is reflected by the way the ministry is trying to solve the crisis; weeks after the pile-up flew out of hand. According to Njiru the permanent secretary in the ministry of transport pointed out that new lanes will be opened to ease traffic flow, and others experiencing snarl-ups will be closed. From his statement it is a short term solution to resolve the crisis but not a long term solution indeed. The relevant authorities at the port need to find ways to encourage container owners to collect their cargo as fast as possible to avoid turning the port into a storage facility. **(The standard, 2012)**

2.1 Container handling equipments

Containers, also known as intermodal containers or ISO containers because the dimensions have been defined by ISO, are the main type of equipment used in intermodal transport, particularly when one of the modes of transportation is by ship. Containers are 8-foot (2.4 m) wide by 8-foot (2.4 m) high. Since introduction, there have been moves to adopt other heights, such as 8-foot-6-inch (2.59 m), 9-foot-6-inch (2.90 m) and 10-foot-6-inch (3.20 m). The most common lengths are 20 feet (6.1 m) nominal or 19 feet (5.8 m) - 10¹/₂ in (0.27 m) actual, 40 feet (12 m), 48 feet (15 m) and 53 feet (16 m), although other lengths exist. They are made of steel and can be stacked atop one another (a popular term for a two-high stack is "double stack"). **(Rushton, A., Oxley, J. & Croucher, P., 2004)**

According to **Rushton, A., et al (2004)**, handling equipment can be designed with intermodality in mind, assisting with transferring containers between rail, road and sea. These can include: Transtainers for transferring containers from sea-going vessels onto either trucks or rail wagons is mounted on rails with a large boom spanning the distance between the ship's cargo hold and the quay, moving parallel to the ship's side. Gantry cranes, also known as straddle carriers, are able to straddle rail and road vehicles, allowing for quick transfer of containers. A spreader beam moves in several directions allowing accurate positioning of the cargo. Grappler lift is very similar to a straddle carrier. Reach stackers are fitted with lifting arms as well as spreader beams and lift containers to swap bodies or stack containers on top of each other.

2.2 Implementation of Performance Management

Kaplan & Norton (2001) highlight the importance of approaching the implementation of performance management from a change management perspective. Kaplan et al (2001) believed that the following factors are crucial for an effective strategic performance management implementation. Top manager agreement, commitment and leadership - start with a clear agreement at the top on the strategy, goals, measures and the performance targets to be implemented. Managers' participation and accountability - having the agreement, commitment and leadership at the top is insufficient if it does not go along with having the agreement, commitment and leadership of the rest of the management team. Furthermore, the involvement of employees is also crucial. Inviting managers and employees to assist on the development of the system facilitates their buy-in, and enhances their trust, understanding, and ownership of the performance measures. Communication and feedback - The factor "communication" is one of the most cited in the literature. When most authors stress its importance, they tend to focus on the reported feedback of measurement results to the employees Even so, there are other aspects related to communication that can affect the effectiveness of performance management. The change management literature highlights the relevance of verbal and non-verbal communication used to clarify all aspects related to the measures, in particular and performance management in general; and to facilitate the buy-in from the people in the organization.

2.3 Congestion in Ports

According to the study carried out by European Association For Forwarding, Transporting, Logistics and Custom Services on port-of-UK **(Clecat Fiata,2004)**, on average, traffic in European ports has increased by 4% a year in the last 20 years (+ 7% for container traffic). Traffic in Asia-Europe grew by 15% a year in the last few years.

Ports are obviously the first to experience the consequences of congestion. The UK ports of Felixstowe and Southampton have already had a taste of these consequences: some ship operators opted to unload cargo in Rotterdam or Antwerp and then fed the freight back to the UK by shipping on smaller vessels through alternative ports. At port-only level, congestion adversely affects all operators: Carriers: vessel delays, extra fuel costs, missed feeders, Terminal operators: extra manpower, yard congestion, Road hauliers: waiting time and Shippers: longer transit times, delayed inventories, longer lead times.

Stakeholders and authorities contributed actively to the "E-port project" in Genoa, Italy, which is aimed at improving port logistics operability by facilitating formalities for containerized cargo. The system acquires data from the relevant parties by means Electronic Customs Declarations (ECD) whereby data base is then made available to the control authorities, allowing time schedules to be respected and, in some cases, speeding them up. **(CLECAT FIATA, 2004),**

2.4 Inefficiencies of Container Freight Stations

According to Transnet, (2008), arguments relating to inefficiencies experienced by CFSs while trying to decongest the ports include inaccurate Expected Time of Arrivals (ETA's), inaccurate discharge and load information, late submission of stowage plans by lines, changes in stowage plans, on geared cellular vessels ships cranes obstruct gantries from working productively in certain stow positions on vessel, overbooking of vessel's capacity results in cargo being short shipped and/or rolled over, poor planning of tranships and bunkering where it affects the operation

2.5 Performance Measures

It is important to evaluate inland terminals as part of the whole transportation system because the effectiveness and efficiency of these intermodal hubs substantially contributes to the overall competitiveness and attractiveness of an industrial area. Further the efficiency and performance of inland terminals affects to a large extent the economic well-being of a country. In inland terminals the problem of obtaining data on each of the variables across large samples is likely to be virtually insurmountable. Actually comparisons of productivity between inland terminals are usually made at a high level of aggregation, excluding major influencing factors. Quite often efficiency and productivity analysis are exclusively based on financial reports because of data unavailability. **(Hansen et al, 2008).**

CFS management is perceived to be experiencing a lot of performance management problems and this is the area that needs consideration to ensure that all systems workflow enhance efficiency and effective performance.

Despite the fact that more and more CFSs are coming up and the existing ones are engaged in a process of handling container operations and warehousing, the management is still involved in the control of efficiency which determines the survival of the business in a competitive market environment. Quality performance is becoming a more important factor of competition than price. Reliability, flexibility, application of rules, time spent resolving conflicts and arguments are included in the quality of service, as well as the handling capacity. Quality performance denotes the ability to solve problems.

Performance measurement is the strictest sense as the process of quantifying the efficiency and effectiveness of action.

In the literature about container freight terminals, most of studies focused on internal management of operators, such as efficient analysis of storage and retrieval operation **(Vis, 2006)**, safety of operations **(Lu & Shang, 2005)**, berthing ships **(Imai, Nishimura & Papadimitriou, 2008)** and the spatial coverage of container terminal **(Parola & Veenstra, 2008).**

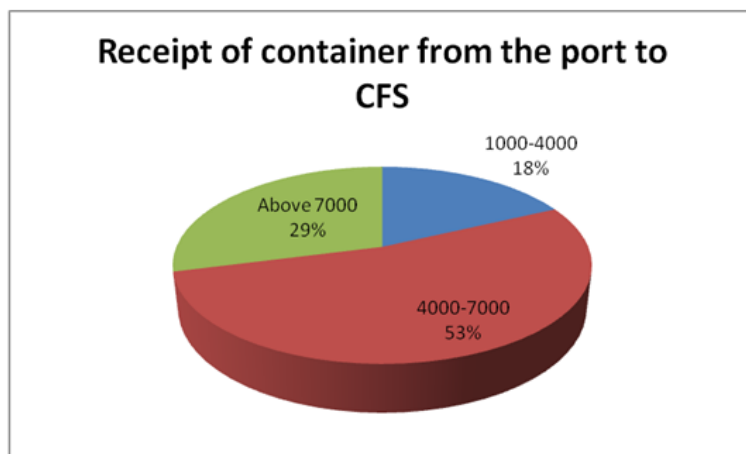
4.0 Data and Analysis

4.1 Operation

The respondent's distribution by age in operation showed that most of the CFSs have been in operation between the periods of 1-10 years. They accounted for 65% while the least represented period group was over 10 years with no respondent. The longest serving CFSs of 5-10 years and their performance on container receipts from the port are as shown in the chart Figure No1. There are difficulties faced by transit cargo on removal from the port as a result of KRA rules & regulations such as transit cargo not moving from the port in 3rd shift/evening, CFS has to be within 6 Kilometers from the Port among others. It was observed that almost all the current CFSs operating in Mombasa are located near residential areas and there are a lot of issues currently being raised by the local resident, All the current

CFSs operating in Mombasa use the road only as the mode of transportation of containers from the port, their location are outside the rail-line routes, Most of the CFSs operate manually. This means that tracking of containers in the CFSs is done manually by either the tallying clerk or the operations personnel. It was also noted that Stripping and stuffing of containers at the CFSs can actually take less or more than specified period depending on the gang available at a particular time. The larger the gang the faster the activity will be done.

Fig 1: Receipt of Containers from the Port to CFS



Source: Author's own calculations

4.2 CFSs Container Allocation and Delivery

To measure efficiency in their operation, the study makes a sample analysis of five months container allocations and CFSs deliveries from October 2012 to February 2013. The efficiency delivery indicators used are the total allocation, delivery as by the last sling, delivery by 48 hours and further delivery after 48 hours as shown in table1.

Despite their significant contribution in decongesting the port, the level of operating efficiency is insufficient. Analysis from the tables above shows poor performance, with an average 13.8 % of the total allocated containers still remaining in the port beyond the time provided of maximum 48 hours.

The container traffic increased from 16.29 million tonnes in 2007/8 to 21.34 million tonnes in 2011/12, an average annual growth of 7.0 per cent, these was a positive development in terms of business and national economy and this call for KPA to re-strategies on its core business of cargo handling as enshrine in the KPA Act and leave the storage of cargo to other stakeholders. This is a global trend whereby multi-modal business aims at efficiencies to traders within a reasonable cost. Some of the challenges affecting the port of Mombasa as a result of increase in through put over the last 10 years especially cargo handling capacity and yard space has been well taken care of by the current trend of equipment purchase policy and utilization of Container Freight Station yard instead of port yard. The encouragement of private sector participation has led to positive infrastructural development and operations of 10 Container Freight Station within Mombasa areas which are currently helping the port of Mombasa in cargo handling and storage facilities. The positive implication has been the salvage of KPA from the possibility of Vessel Delay Surcharge and the efficiency brought in the ability to create more space for incoming cargo and faster deliveries from the port of Mombasa terminal yard and Motor vehicle yards. For all the current 10 operational CFSs in Mombasa, none of them are railed based terminal but road dependant for inflow of cargo. This has some negative effect in terms of traffic congestion, parking space and economies of scale in cargo handling. To some extend according to this study, this is acceptable considering the fact that Container Freight Station is a new concept and hence was not put in consideration during road design, city planning among other things. The concept is based on business strategies and efficiency in cargo handling & deliveries, there is less bureaucracy which affects all state run institution. The container yard is fully dependant on what the business owners' intent to handle over a given period of time and the type of cargo they plan to handle.

4.3 CFS Yard Capacity in Mombasa(2012/13)

CFS capacity is the maximum number of containers the CFSs can hold in a period of one year. The capacity of a CFS is derived from combined factors of its facilities and associated services. CFS performance figures of the year 2012/13 have been used for calculating the capacity of facilities of the CFSs.

4.3 Mombasa traffic throughput

The congestion in the port of Mombasa is coming from positive development arising from additional business as a result of economic growth in the region, among them is the fast growing development on infrastructure in Southern Sudan, Rwanda, Uganda and Burundi, The discovery of oil in Uganda and Kenya has also generate a lot of interest by potential investors in the region but the period which shows the likelihood of forthcoming congestion was the average growth per annum is as shown in the table 3. The business trend in the region has seen a steady growth for the last 5 years as shown in table 4.

Table 1: Total Allocation and Delivery from October 2012 to February 2013

CFS	Total Number of Containers	Delivered by or Before Last Sling	Delivery by 48 Hrs after Last Sling	Delivery after 48 Hrs	Percent of Container in the Port after 48 Hrs
Consolbase CFS	5,121	2,111	2,111	899	17.6%
MCT CFS	5,524	2,259	2,293	972	17.6%
Compact CFS	5,152	2,275	2,060	817	15.9%
Interpel CFS	2,983	978	987	1,018	34.1%
AWANAD CFS	3,473	1,382	1,759	332	9.6%
Mitchell Cotts CFS	5,346	2,865	2,072	409	7.7%
Portside CFS	3,856	1,407	1,693	756	19.6%
Focus CFS	4,688	2,666	1,696	326	7.0%
Makupa Transit Shade CFS	4,019	3,193	765	61	1.5%
Mombasa Island Cargo Terminal	1,538	729	647	162	10.5%
Total Deliveries	41,700	19,865	16,083	5,752	
% of Deliveries	100%	47.6%	38.6%	13.8%	

Source: KPA Container Operations-CFS data

Table 2: CFSs Yard by Acres and Ground Slots

	CFS	Acres	Ground Slot
1	Awanad -Terminal i	2.45	194
	-Terminal ii	2.0	202
2	Compact -Terminal i	4.5	434
	-Terminal ii	6.5	525
3	Consolbase -Terminal i	6.0	550
	-Terminal ii	7.5	655
4	Focus	108	1074
5	Makupa Shed	9.5	800
6	Mitchell Cotts -Terminal i	14.2	1,262
	-Terminal ii	1.5	160
7	MCT -Terminal i	1.98	202

	- Terminal ii	5.7	518
8	Interpel	2.5	224
9	Portside	4.0	383
10	MICT	5.4	510
Total		181.7	7696

Source: KPA Civil Engineering (Drawing Office)

Table 3: Mombasa traffic throughput 1998-2003 (Millions Tons)

	2007	2008	2009	2010	2011	2012
DOMESTIC	11,112,263	11,121,433	13,975,155	13,393,974	14,129,361	15,159,787
TRANSIT	4,423,103	4,874,277	4,980,780	5,381,754	5,596,166	6,625,641
TRANSHIPMENT	426,436	419,020	105,267	158,272	226,995	143,363
TOTAL	15,961,802	16,414,729	19,061,202	18,934,000	19,952,522	21,928,791

Source: Author's own calculations

Table 4: Mombasa traffic throughput 2007-2012

YEAR	1998	1999	2000	2001	2002	2003	Average growth p.a (%)
Domestic	7.32	6.74	7.47	8.18	8.01	8.87	4.2
Transit	1.13	1.31	1.45	2.12	2.22	2.45	17.6
T/ment	0.11	0.14	0.20	0.30	0.34	0.61	42.6
Total	8.56	8.16	9.13	10.60	10.56	11.93	7.2

Source: Kenya Ports Authority (2012); Annual Bulletin of Statistics

5.0 Conclusion

The above mentioned recommendation are a critical look at roles and responsibilities play by various parties involved in the Cargo clearance in the port of Mombasa and notwithstanding the original report which form the basis of this study. This research is consistent with earlier research by Kenya Association of manufacturers (KAM) and East Africa Tea Traders Association on the need for Kenya Maritime Authority (KMA) to come up and strongly play their role on supervisory and guidance to various stakeholders dealing with cargo handling and deliveries among others.

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