

# A Comparative Study of Dry Ports in East Africa and China

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## Abstract

The period between 1970s and 1990s witnessed a number of global changes. Significant ones were; liberalization of trade, deregulation of many economies, and emergence of economic integrations of countries and regions. These changes in addition to innovation and advancement of ICT impacted on trade and the shipping sector. The volume of trade, the cargo transported by sea, and the number of shipping vessels increased thus putting pressure on existing sea ports. Dry ports were introduced as a way of accessing the hinterland and also reduce the pressure on the bottle necked, congested and inefficient sea ports. The adoption of dry port concept began in Europe and North America, followed by Asia, South America and then Africa. This trend created the need to conduct studies about this sector. This paper therefore tries to compare historical perspectives, developing mode, and management model of the dry ports sector in China, a high income developing country, under a socialist system, with advanced shipping infrastructure, against the East African region, which is characterized with low income countries, free market policies, and a largely less developed shipping infrastructure. The paper also presents discussions on the pros and cons of both systems from which, conclusions and recommendations are drawn to support future studies and policy formulation. This paper not only serves the purpose of contributing to existing academic knowledge in respect to dry ports, but it also gives the policy makers and practitioners in the logistics and trade sectors a chance to compare the practices in the two developing regions and apply what is suitable for a particular case.

**Keywords:** Comparative study, Dry Ports, East Africa, China

## 1. Introduction

Many landlocked developing countries continuously face the challenge of physical isolation, supply chain related barriers from the sea and the high costs of trading with the rest of the world (United Nations Economic Commission for Africa, 2011). In order to counter these challenges associated with landlockedness, the dry port concept evolved. Dry ports also evolved out of the challenges that faced existing sea ports i.e., due to the increase in size and capacity of container vessels, sea ports increasingly faced the challenge of inability to handle import and export cargo in a regular manner. This regularly resulted into congestion at different sea ports due to long waiting time of trucks and haulage vehicles (Woxenius et al, 2004).

The bottlenecks commonly inhibited productivity at sea ports with an upward bearing on shippers' transportation and operational costs, in addition to other negative counter effects like, carbon emissions as a consequence of congestion, accidents, boredom of drivers and loss of morale among port workers. According to McCalla (1999), expanding the physical port area would be the solution, however, seaports are extensive land consumers in metropolitan areas, (Jarzemskis and Vasiliauskas, 2007). Pellegrin (2001), pointed out that, committing too much land to port expansion may not necessarily translate into benefits hence posing a dilemma. Nottenboom and Rodriguez (2009), observed that the evolution of dry ports was looked at as the cycle in the continuous development of containerization and intermodal transport.

Establishment and explosion in global supply chains in the 1990s, coupled with export oriented growth strategies adopted by developing countries resulted into a paradigm shift in freight distribution systems. Multi modal transport and dry ports turned out to be the focal point in the new supply chain and logistics strategy formulation, first with the implementation in USA and developed Europe, followed by East Asian countries and then more recently Africa. This was mainly due to insatiable focus on trade which resulted into diminishing returns, congestion, and a significant fall in efficiency.

Today, there is an extensive need for integrated global logistics as evidenced by emergence of considerable market for logistics services not only in industrialized nations but also, in developing economically booming countries in Asia and elsewhere. Traditional Companies in the People's Republic of China like COSCO, China Shipping and Sino-trans, have adjusted their structures and operations to fit the modern changes. Previously, traditional Chinese logistics companies were state owned, large, monopolistic in nature and had little sense of innovation largely because they were inward looking and lacked competition that could trigger

innovation. Whereas they continue to focus on freight, transport and shipping, they have also refocused attention to warehousing, distribution and outsourcing activities. In order to up its game in global shipping logistics, China invested significant amounts of money in creating multimodal transport networks and establishment of dry ports since 2001.

On the other hand, East Africa was comparatively late in regard to containerization and dry port development. East African countries were only under pressure recently to refocus on containerization aspects due to relatively impressive economic growth figures averaging 5% per annum, and rapid increase in trade volume with the far East, particularly with China. In order to reduce congestion and quicken the flow of containers and cargo at the regional major sea ports of Mombasa (Kenya) and Dares salaam (Tanzania), governments recently took concrete steps to prioritize dry ports development to smoothen the flow of supplies and trade across the East African Countries that include; Kenya, Tanzania, Uganda, Rwanda, Burundi, Eastern Democratic Republic of Congo and Southern Sudan. However, the process was gradual beginning with setting up necessary laws, conducting feasibility studies, creation and review of institutional structures and finally sourcing private investors in dry port development. Governments are making efforts to improve the road and railway networks to facilitate speedy and affordable movement of cargo to and from the region.

### **1.1 Objectives of the study**

Although China and East Africa are both regarded as developing economies, China occupies a unique position in that; it is the second largest economy in the world by GDP, with advanced rail and road network, and more of a command economy compared to East Africa whose level of infrastructural development is gradually evolving, with low GDP figures and with higher level of economic liberalization. This paper therefore sought to; compare the aspects of history, developing mode and management models in the dry port sector, in China and East Africa. This paper will help policy makers to understand the distinctive policy differences in the two regions that may help in future benchmarking or policy reforms. It will help academicians who would like to do further research about the sector in East Africa and China. Finally; it will serve as one of the pioneer papers in this particular sector in East Africa and open up the region for further scrutiny in shipping logistics aspects.

#### **1.1.1 Data sources and Methodology**

The study employed descriptive, case study and cross-sectional study approaches. Cross-sectional design facilitated deeper understanding of the subject while, the case study approach enabled the author to have a close look at a particular dry port in East Africa in order to understand its history, creation and management form. The case study approach gave a true picture of a region like East Africa where previous studies in this particular sector are lacking. To enrich arguments in this paper, some field visits were made to primarily see what activities of a dry port look like. A descriptive design was used to describe each situation in the respective places of study, and discussion and findings presented in narrative form. In this paper, secondary data used was obtained from selected websites of sector players in the East African region, books and journal papers related to the subject. This enabled the writer to get unbiased data from which conclusions were drawn.

#### **1.1.2 Dry port Concept:**

The word dry port has been defined by many scholars and the definitions reflect the broad view of the concept from different perspectives. Important to note is that the definitions emanate from the perspective of the physical facility, function and purpose. The definitions were also born of the fact that the periodical steep rise in container flows resulted in crowded terminals, congestion and prolonged dwell time for containers. As a solution to these problems at the main sea ports, the trans-ocean vessels started to call at single hub port while feeder vessels, haulages, trucks and trains connected to many smaller inland or dry ports, (Baird A.J, 2002).

Leveque and Roso (2002) defined a dry port as “an inland intermodal terminal directly linked to seaport(s) with high capacity transport means, where customers can leave or pick up their standardized unit as if directly as a seaport. This definition takes into account the fact that a dry port does not only do the traditional role of transshipment as inland terminals but in addition to this role, it provides other services like; consolidation, storage (both cargo and empty containers), maintenance and repair of containers, and customs clearance. Dry port functions include distribution, consolidation, storage, customs services, and possibly equipment maintenance (Wang and Wei 2008).

According to the United Nations Conference on Trade and Development (UNCTAD, 1991), a dry port is “a common user facility with public authority status, equipped with fixed installations and offering services for handling and temporary storage of any kind of goods (including containers) carried under customs transit by any applicable mode of transport, placed under customs control and with customs and other agencies competent to clear goods for home use, warehousing, temporary admissions, re-export, temporary storage for onward transit and outright export.” This definition though broad is not far from Weigmans et al (1999) that takes into account, the value adding role of dry ports like freight consolidation and distribution of cargo. To Jarzemska et al (2007), a dry port means a common user facility with public authority status equipped with fixed installations and provides temporary storage of goods and containers including customs clearance. Allen (2008) further qualified dry ports

as being positioned away from typical borders, but with access to major metropolitan areas, highways, and labor bases. The following key terminologies are key to defining and deriving a proper meaning from the word ‘dry port’. The three terms give the understanding from the perspective of form and function of dry port and they include;

**Containerization:** This relates to the fact that dry ports are linked with container handling, both maritime and domestic, as well other intermodal activities like swap bodies, consolidation, trans loading, deconsolidation and small scale manufacturing.

**Dedicated Link:** A dry port must be linked with a high capacity corridor. Normally; rail and barge are the recommended links although haulages or trucks may also be used.

**Massification:** A dry port must generate economies of scale in form of reduced costs and time within the distribution process. Handling large volumes at a minimum unit cost and shortest time is paramount in positively impacting on the supply chain network.

It's however important to note the difference between a dry port and an inland container depot (ICD). Where as an Inland container depot handles only containerized cargo, a dry port handles various types of cargo in addition to other services earlier mentioned.

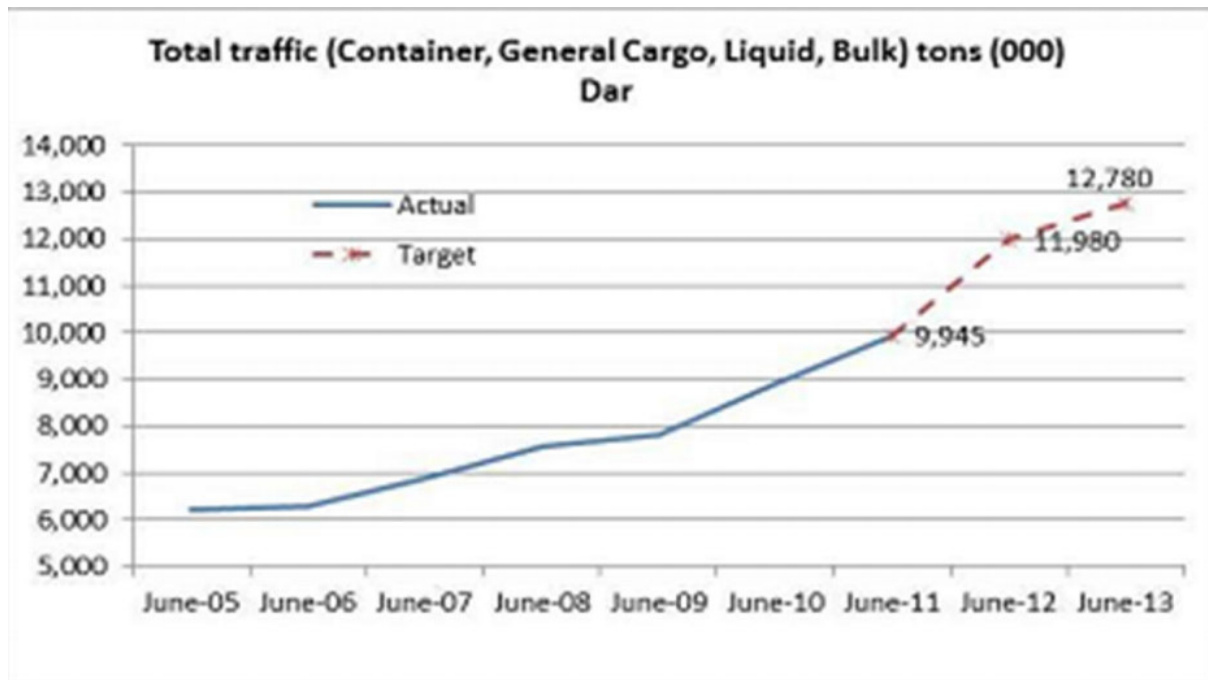
Girish Gujar (2010), presented three types of dry ports and they include; Gateway (Sea) Terminals, Rail Terminals and Distribution centers. First, a sea terminal creates the interface between inland and sea activities of freight distribution. Second, the rail terminal serves as a link to gateway terminals while, the third category (distribution centre) as its popularly known in Europe performs many value adding activities like sorting, debulking, labeling, grading and inventory control in addition to transportation and warehousing.

### **1.1.3 Dry Ports in East Africa: Historical perspective**

Mombasa and Dares Salaam Sea ports found in Kenya and Tanzania respectively are the current gateways to East Africa from the Indian Ocean, although a third Sea port in Lamu (Kenya) is under construction by China Communications construction Company in a deal worth \$478.9 million to directly link the coast, Kenya, Ethiopia and Southern Sudan. Traditionally, dry ports development and expansion was linked to economic growth and increase in volume of trade. The growth in the volume of trade turned such regions or places into the centers of attraction (Grishi, 2010). Key South East Asian ports like Singapore, Hong Kong, Mumbai and Shanghai are a classic example. Continuous rise in trade resulted in a rapid rise in demand for port services, of which failure to meet capacity needs created inefficiency and operational bottlenecks. Challenges to expansion in original sea ports included limited land or high cost of land, together with the high cost of relocating people and compensations for the destroyed property to pave way for port expansion. Many nations beginning with the most developed and industrialized established dry ports as a solution.

Although East Africa lags behind Europe and Asia, in terms of volume of trade and port development, it has not been an exception to the above assertion. For example, According to the China State Council's Information office white paper (2013), between 2000 and 2013, trade volume between China's and Africa increased rapidly from about \$10.5 Bn to \$200 Bn. This increase in trade together with impressive economic growth figures averaging 5% per annum in the region impacted on the operations of ports because of a sharp rise in cargo (containers) and rise in demand for port related services.

Andrew Roberts (2013), reported that as the trade and economic growth figures in East Africa increased, Sea port activities, traffic jam and congestion increased at Mombasa Sea port too. For example, from 2005 to 2008, imports at Mombasa port grew at an annual rate of 9.7 % (liquid bulk), 11.5% containerized cargo and at 23 % (dry bulk). This implies that as trade and economic growth increased, the need for port services also increased and due to limitations in expansion of existing sea ports, investment in dry ports was required and this trend has led to recent investment in dry ports in East Africa. According to the Shippers Council of East Africa, (2013), Mombasa, the busiest container terminal in East Africa saw container volume increase by 25% in the first half of 2012 alone, and handled an estimated 840,000 TEU in 2013 from about 700,000 TEUs the previous year. Figure.1 in this paper shows the growth trend in traffic (Container, general cargo, liquid and bulk) at Dar es Salaam port in Tanzania between June 2005 – June 2013



**Figure 1. Traffic at Dares Salaam port in Tanzania East Africa**  
 Source: European Union Working Paper, N0.32012

The trend above in figure 1 shows that traffic in East African ports increased as trade and economic growth figures rose in recent times in the East African region

As traffic increased, other bottlenecks came in hence increasing operating costs as shown in figure 2 in this paper.



**Figure 2: Trend of growth in operational costs at Dares Salaam port –Tanzania**  
 Source: European Union Working Paper, N0.3 2012

Figure 2 above indicates that operational costs increased as a result of many bottlenecks that set in due to increase in the volume of trade.

#### 1.1.4 Transport Corridors and dry ports of East Africa's

East Africa is linked to the international maritime transport network by the Indian Ocean at the Eastern Coast of Africa. Traditionally, the region is linked by two major sea ports i.e., Mombasa Sea port in Kenya and Dares Salaam Sea port in Tanzania.

The East African landlocked countries that include; Uganda, Rwanda, Burundi, Southern Sudan, Eastern Congo and Zambia in Central Africa are connected to the coast by what is officially termed as the three



transport corridors .

The first corridor is known as the ‘northern corridor’. It’s origin is Mombasa port and connected to the hinterland by rail (Rift Valley Railways-RVR) and by road via Kenya to Uganda, Rwanda, Burundi, Southern Sudan and Eastern Democratic Republic of Congo(DRC) .Along this corridor is the Mombasa dry port in Kenya(4 KMs) from Mombasa main sea port, Malaba dry port in Uganda and two inland container depots (along lake Victoria) i.e., Kisumu in Kenya and Port Bell in Uganda. Kisumu and Port Bell inland ports are as old as the East African countries, while, Mombasa and Malaba dry ports are new and have been constructed and expanded recently as a result of pressure on Mombasa sea port.

The second corridor is the “Central Corridor” with origin in Dares Salaam sea port and linked to the hinterland by rail (Tanzania Railway Limited-TRL), and by road via Tanzania, to Uganda, Rwanda, Burundi and DRC. One inland port exists on this route at the Lake Victoria City of Mwanza in northern Tanzania. The three inland ports of Kisumu, Port bell and Mwanza traditionally linked Uganda, Kenya and Tanzania with Lake Victoria (the second largest fresh water lake in the world) acting as a major water way. The third corridor is the “Southern Corridor” and connected to hinterland by rail (Tanzania Zambia Railway Authority- TAZARA) and by road via Tanzania to Zambia and Malawi. This corridor has one dry port at Isaka which is still being developed into a modern dry port.

From the above paragraph, we can see that the Eastern African region had inland container depots (ports) as earlier as 1960’s, but, the region had not invested in intermodal dry ports. It was only after the year 2000 with pressure on Mombasa and Dares Salaam Sea ports that governments in the region took concrete steps to invest in dry ports in order to remove obstacles to speedy flow of goods from and to the region. Currently, Mombasa dry port, malaba dry port and Isaka dry port are the key dry ports in the region although more infrastructural development is in progress.

The main reasons behind creation of dry ports in East Africa were to; reduce congestion at the main seaports, increase trade between the hinterland and the coast, as well as creating efficiency in services related to shipping. A press conference by Kampala City traders Association (KACITA) indicated that the period of clearance and movement of goods from Mombasa sea port to Kampala in Uganda reduced from 15 days to only four days with completion of Malaba dry port.

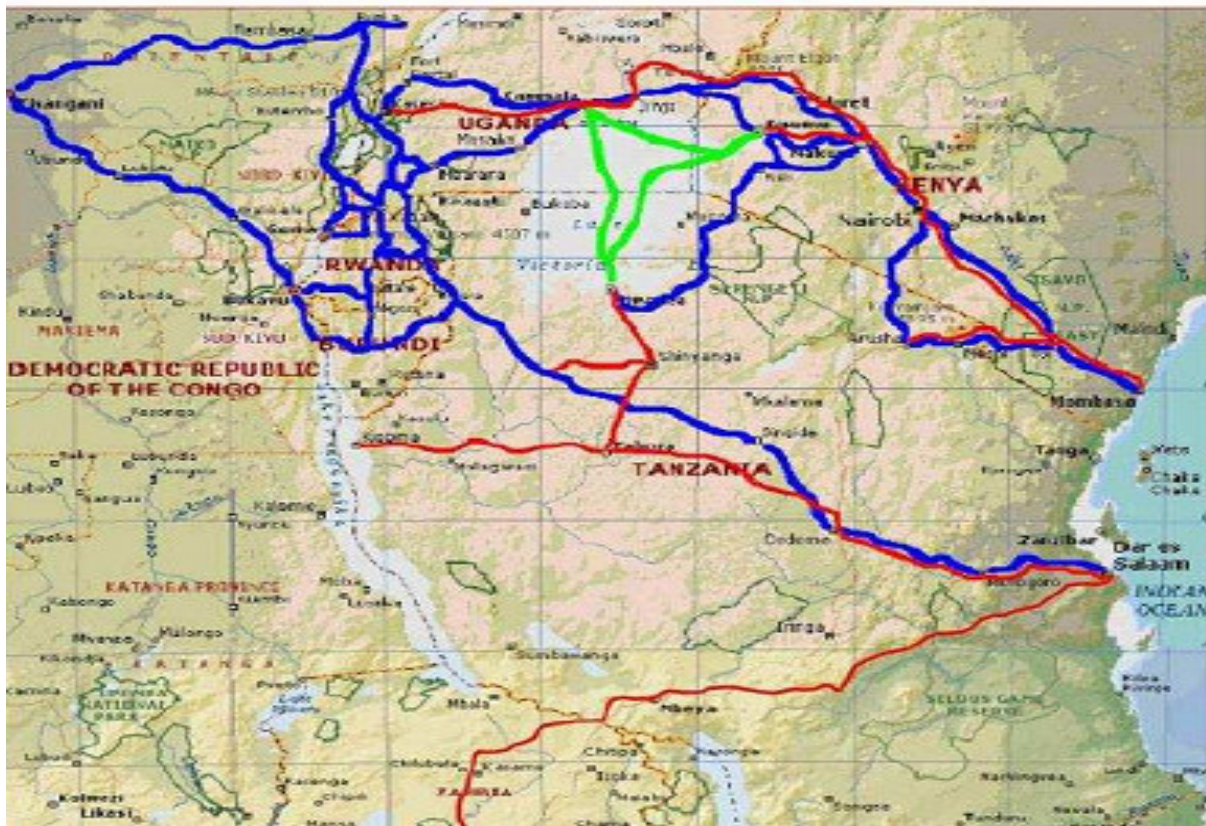


Figure 3: Transport corridors of East Africa from the coast

Source: European Union Working Paper, N0.3 2012

The red lines indicate transport corridors blue lines indicate the area covered by central and north corridors that accounts for 80% of transit goods.



Figure 4: East Africa's Northern transport Corridor served by Mombasa Sea port and proposed Lamu Sea port.  
Source: The East African published by Nation Media group-May 2011

### 1.1.5 Developing Mode of Dry ports in East Africa.

The earliest Inland container depots in East Africa along Lake Victoria namely; Mwanza in Tanzania, Kisumu in Kenya and Port bell in Uganda were constructed in 1901 by the colonial administration and were fully financed by the East African governments, to facilitate trade between the East African Community original member countries, Kenya, Uganda and Tanzania. Important to note is that ICDs were linked by water, railway and by road. However, over the years due to political differences among member countries and political instability after 1960s, trade diminished and the infrastructure became redundant, obsolete and ignored.

With expansion in trade in 1990s and 2000s, the volume of trade increased and today's dry ports of Mombasa, Malaba and Isaka were developed using two modes. First, using the PPP mode for example, Mombasa dry port in Kenya and Malaba dry port in Uganda where, respective governments identified the locations, compensated those who were relocated and for destroyed items, leased the land, including a commitment to upgrade roads and the railways gauge to modern high speed rail while, two private companies invested in dry port development. Second, Public developing mode, for example, Tanzania's Isaka dry port where government owns land, developed the port, and divested it to the private sector and still maintains close supervision.

The first developing mode offered cash strapped East African countries the opportunity to attract private capital and enable governments to direct resources to other crucial priorities. Secondly, such dry ports benefit from prudent and professional dry port management practices of the private sector that may be lacking in government or public management. The second developing mode applied in Tanzania was and is suitable, where the private sector was and is still reluctant to invest in dry port development because of doubt about short-term, profit. It also shows that it is possible for government to take the lead and later divest to achieve its intentions.

### 1.1.6 Dry port Management model in East Africa

Various models are used in managing dry ports in the world. According to the World Bank toolkit (2007), three port management models exist and they include; the Landlord model, whole port concession model, and the service model. In a service model, the Port Authority provides all services required for the port to function normally.

A landlord model involves both the private sector and the public sector. In this case, the public sector plays the regulatory role, outsources port operations and leases the infrastructure to private sector. A whole port



concession is characterized by handing over complete responsibility for port management and operations to the private investor for a number of years. While privatization of dry ports can be realized through a number of alternative modes of privatization, the trend in Africa and East Africa in particular has seen the increasing use of the landlord model, involving the grant of a concession by a port authority to an operator. A study by Ashurst (2013), a leading International consulting firm, revealed that in Africa generally, Concessions can be granted by port authorities in a number of circumstances, including:

- for the operation of an existing public terminal;
- for the operation of an existing terminal that must undergo large-scale reconstruction and be reequipped; or
- for the construction and operation of an entirely new terminal.

### **1.1.7 The Landlord model in East Africa**

In East Africa, the most popular dry port management style is the Landlord model. This was adopted out of the general shared belief that a Public –Private Partnership (PPP) is the most optimal model of management and operation of dry ports. Central governments provide land and compensate the relocated or destroyed items and invest in rail and roads, while the private companies develop, operate, and manage dry ports as evidenced in the development and management of Mombasa dry Port and Malaba dry port in Kenya and Uganda respectively (The 2<sup>nd</sup> East African Heads of State Retreat on infrastructure Development and Financing, 2012). The port authorities concentrate on, supervision, safety and security (Tanzania Ports Authority website). It is therefore important to note that, PPP as a form of financing dry port sector in East Africa does not involve giving monetary support to private companies. The three major private players in the dry port sector in East Africa are; APM terminals, Great Lakes ports Ltd and Reli Assets Holding Company (RAHCO).

According to Louis Berger (2011), different agencies have their respective mandate in infrastructural development. In the northern corridor infrastructure master plan in which dry port development is listed as a priority sector, Louis points out that respective governments have a responsibility to undertake the feasibility study, although sometimes with support of development partners like the EU, IMF or World Bank, through a regional body, the East African Community. Environmental consent is given to the developers by the National Environmental Management agencies in respective countries. In Uganda for example, the constitution of Uganda (1995) and the National Environment Act (1995) placed all the legal powers over enforcement and regulation of environment issues under the National Environment Authority (NEMA) including approving environmental impact assessment reports for public projects. This is the same in all the five East African countries. Under the laws that established the environmental bodies, they are assumed to be independent. However, they hardly stop or delay a project that is of government interest.

### **1.1 Case: Mombasa dry port**

Mombasa dry port is the largest dry port in East Africa situated on 7.3 hectares, managed and operated by APM Terminals (APMT) in a joint venture with Great Lakes Ports Ltd, a local company. It has the most technologically advanced CFS operations, with direct rail links to both the sea port of Mombasa and the inland cities of Nairobi in Kenya and Kampala in Uganda. Kenya Ports authority is the landlord and regulator. This facility houses Kenya Revenue Authority (KRA), Kenya Bureau of Standards (KBS), banking facilities, clearing and forwarding companies as well as related service companies. This is similar to Malaba dry port in Eastern Uganda, developed, managed and operated by Great Lakes Ports Ltd, a private company. The two governments act in landlord capacity in the respective countries. Activities that include transportation, container maintenance, container repairs, cargo consolidation and deconsolidation, cargo stuffing and unstuffing, and value adding activities like fumigation, packing, labeling and bar-coding are done by outsourced third parties whose offices are located within the premises of the dry port.

Despite the fact that dry port development has been prioritized by all stakeholders, development of modern intermodal transport is still far from being realized as most of the goods are still transported by road which significantly increases costs. The railway line is too old though undergoing rehabilitation by Rift Valley Railway Corporation. The northern corridor's infrastructural project signed by the heads of states of Uganda, Kenya and Rwanda in May 2014 has raised hopes with a commitment and concrete steps to kick start construction of a high speed rail, to link the three east African countries. This will significantly cut supply chain cost and quicken the movement of goods.

However, it's important to note that; although the landlord system is preferred, exists in all policy papers, and is largely implemented in some countries, full divestment has not been fully achieved in the whole region. This is due to the fact that, some bureaucrats want to maintain the status quo to corruptly benefit from inefficient condition of operations. A close look at Tanzania Ports Authority (TPA), it's debatable whether the landlord model is truly functional as envisaged in the country's laws.

According to the Tanzania Ports Authority Act (2004) the primary role of the authority is to *"promote the effective management and operation of sea and inland ports, enter into contractual obligations with other persons or bodies in order to secure the provision of port services (whether by joint venture, PPP or other*

*means) and to this end, delegate its own function of providing port services to one or more port operators.”.*

From the statement above, private sector leadership in operations and management of dry ports is clearly preferred and accepted, but, the real situation in Tanzania is different. There is a mix of public service and landlord models. To date, large volumes of cargo are handled through the general cargo terminal operated by TPA. This is still done contrary to the 2005/06 strategic plan whose aim was to fully divest and stop the involvement of TPA in all operational activities and execute the landlord function. Reli Assets holding Company (Rahco), a custodian of the assets of the defunct Tanzania Railway Corporation with significant influence from the Central government is the operator of Isaka dry port. This shows that Though East Africa accepted and embraced the landlord model of dry port management; some impediments still exist to achieve complete implementation as observed in Tanzania.

#### **1.1.9 Advantages and Shortcomings of the East Africa's Landlord Model.**

Placing the above contradictions in implementation aside, the landlord model of East Africa offers some advantages. First, it gives the customers more options to choose from since third party service providers operating at the dry port are many. The competition among service providers can lead to good quality services and cost reduction. Second, the speed of services offered may be quicker compared to the public managed port and the operators are not inconvenienced by the burden of managing all people who work at the port since those are employed by the third party companies. Third, the private operator entity is assured of income such as fees, rent and other charges from service providers that use the facilities while; government earns revenue in form of taxes and licenses.

On the other hand, the landlord model presents shortcomings. First, the port operator has little or no control over the price of third party service providers within the port and this may impact negatively on general dry port usage as some customers may quit the port if prices are too high. Second, a poor service by a service provider may soil the image of the dry port, and lastly, a government policy change and uncertainty for the future may discourage further development of the dry ports by the private investor which leaves the governments exposed. Most companies involved could be only profit motivated or foreign may not focus on future needs of the region in terms of maintenance of port infrastructure which could pose a risk to the region.

## **1.2 Dry Ports in China-Historical perspective**

The last three decades after China's economic reform witnessed a shift in China's economy which witnessed unprecedented growth and transformation, and later propelled China to the second position after USA in the world by GDP. This shift also turned China into the "factory of the world" as it's widely known. This growth impacted on the volume of inward bound and outward cargo and general traffic at Sea Ports in China. For example, in 2010, Shanghai overtook Singapore in container traffic to become the world's busiest port (Felix Richter, 2013). These changes called for reform in the logistics sector and the need to adapt, in order to cope with the pressure on the existing sea ports. One such solution was to invest in dry ports in China.

GirishGujar noted that in 2001, an important directive entitled "*Advisory opinions on ways to speed up the development of China's logistics*" was unveiled by six ministries responsible for administration of transport and logistics. These comprised the "State Economic and Foreign Trade Commission (SEFTC)". The ministries included; The Ministry of Railways, Ministry of Communications, Ministry of Information technology, Ministry for Civil Aviation administration, and the Ministry of foreign trade and economic cooperation. They set policy guidelines that could be followed by infrastructural overhaul and legal reform to allow more players in the logistics sector.

The development of dry ports in china looks advanced on outlook with excellent infrastructure but, can be said to be in its infancy, for example, the first, dry port was constructed in 2002 in Beijing as collaboration between the Port of Tianjin and Beijing Local Government. Since then, three sets of dry ports were constructed and meant to link the mainland and China's sea ports. Ningbo Sea port is in proximity with; Jinhua, Yiwu, Shaoxing, Yutao and Quzhou dry ports. Tianjin port is in proximity with 12 dry ports, Dalian Sea port in North Eastern Region has five dry ports close to it, while Shanghai has Shanghai dry port close to it. Figure 5 in the paper is the Map of China showing the location of dry ports and some sea ports mentioned in this paper.

Reform in logistics in recent times has seen foreign logistics and transport /shipping countries play a significant part in china. Notable companies include; TNT, UPS, Maersk and NYK. China zealously embarked on dry ports development and logistics sector reform to improve efficiency of domestic logistics system, boost economic potential of the hinterland, improve social welfare and attract private investment.

### **1.2.1 Developing Mode of Dry Ports in China**

There are two development modes of dry ports in China. The two modes have been used depending on the reason why and where a particular port was being constructed. First, most dry ports in China were developed to meet the supply chain needs of those regions but in line with national interests. Second, dry ports in China were developed in order to gain competitive advantage for the hinterland by respective local governments .



One of the dry ports developing modes in China is the joint venture between the Local governments and Seaport operators which are mainly state-owned companies in collaboration with China Railway Corporation. This collaboration normally generates a new “independent company” to undertake the management and operations. One example is the dry ports around Ningbo Sea port i.e.; Jinhua, Yiwu, Shaoxing, Yutao and Quzhou that were constructed in partnership with Zhejiang provincial government and city governments.

The second developing mode is by backland local governments that plan, initiate and manage infrastructure development with support of China Railway Corporation. Such dry ports are normally initiated to gain competitive advantage in domestic supply chain and improve welfare. For example in 2010, a dry port was constructed in Shaanxi province to link the supply chain between the landlocked western China and Sea ports in the East. After construction, the home owned companies pick on or create a new company in collaboration with railway or sea operators to control and operate the port.



Figure 5: Location of China's dry ports.

Source: Qingcheng Zeng, Michael J.Maloni, Jomoni Aliyas Paul and Zhongzhen Yang(2012).

### 1.2.2 Management Model of dry ports in China-Public Management model

Generally, it's rare for private companies to invest in dry ports in China. Private companies are operators rather than owners. In china, contrary to the East African situation, only transportation of containers by rail and maintenance of railways wagons is outsourced from China Railway Corporation. Other activities like transportation of containers by road, transportation of containers within dry ports, cargo stuffing and unstuffing, and door delivery/pick up to ICDs are done inhouse. Other activities done in-house are; cargo consolidation and deconsolidation, container repairs, as well as value adding activities such as, palletization, fumigation, re-packing, bar-coding and labeling. The word In house in this paper means that the activities are done by the port ownership or management.

### 1.2.3 Advantages and Shortcomings

The major advantage of China's management model is that, since the ports are owned by local governments and operated by homegrown companies, investment in infrastructure is big and quick. Although it is true that the real investment figures are not fully accessible to the public, the rapid development in dry ports itself is evidence, since the dry ports are new, many and modern according to my field visits. This model also provides a chance to balance between profitability and national interests. The profits from the dry ports are able to be reinvested and certainty is almost guaranteed because players are fewer and government agencies that work through consensus.

On the other hand, it's important to note that; ventures fully owned and managed by the public or government like the case of China may be marred with inefficiency and corruption. Government investment in dry ports

sometimes may be politically motivated without necessarily, a particular region having the need. This may lead to misallocation and wastage of resources that would address a much pressing need. Lastly, the Chinese model creates a bulky institution with so many activities and employees which may pose a coordination and management nightmare and could negatively impact on efficiency in operations.

#### **1.2.4 Conclusion.**

Dry ports form an important part of any country or regional development. The success of any management model depends on the right policy initiatives, smooth implementation, commitment of resources and proper coordination among different players in the sector. For poor developing countries like East African countries, the PPP/landlord model is appropriate but must be in line with national interests, budget framework as well as creating safeguards against private sector related risks.

Where private sector is reluctant to invest resources in dry ports for fear of short term losses, governments need to take the lead like the Chinese situation. It's further important to take a pro-active approach in dry ports development after forecasting future needs of the country or region rather than a reactionary approach that simply responds to a situation like the case of East Africa. Creating a dry port itself can create opportunities, improve economic potential of a place, and change the welfare of a disconnected hinterland like the China situation.

Continued supervision of the sector by government is vital since sometimes private dry port developers and operators may lead to exploitation of the public and third party service providers. Where private companies own and operate dry ports like in East Africa, governments have a task to inject more resources in modern railways to connect nodes since private companies do not invest or do not have funds to invest in railway network. To benefit from professional and efficient dry port management, gradual partial divestment of dry ports where government is the operator is ideal for efficiency. Finally, it can be highly profitable to invest in the dry port sector in poor developing countries contrary to the notion that such investments are suitable for only rich developed countries like Europe and North America and rich developing countries such as China.

#### **1.2.5 Future research direction:**

The authors are motivated to carry out future research on dry port development in East Africa with focus on motivation, challenges and opportunities as well as risk analysis and management in dry port investment in developing countries.

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#### **References**

- Allen, R. S. 2008. "Inland Port Savings." *Journal of Commerce Online*. <http://www.joc.com/>
- Andrew Roberts(2013). Congestion at Mombasa Port to blame for slow pace of Kenya's growth into a regional hub. [www.businessdailyafrica.com](http://www.businessdailyafrica.com)
- Ashurst(2014). Africa, a new port of call for international operators. [www.ashurst.com](http://www.ashurst.com)
- Baird A.J (2002). The economics of Container transshipment in Northern Europe. *International journal of maritime economics* Vol 4, 249 -250. Based on Analytic Network Process." International Seminar on Business and Information Management, Wuhan, China.
- China State Council.(2013). China Economic and Trade Cooperation. Government White Paper, PRC.
- European Union Commission. (2012). Rough Seas ahead: analyzing governance in ports and logistics management sector, Dares Salaam and Dakar . Working Paper No3.
- Fang Li, Xiaoming Shi, Hao Hu.(2011). Location selection of dry ports based on AP clustering : Case of South West China. *Journal of System and Management Sciences* Vol 1 No.5, pp.93 – 105.
- Felix Richter. (2013). China has the world's busiest container ports. [www.econintersect.com](http://www.econintersect.com)
- Girish Gujar,(2010). A comparative perspective on dry ports in India, China and Western Europe. The 4<sup>th</sup> International Conference on operations and supply chain management, Hongkong and Guanzhou, July 25<sup>th</sup> – July 31<sup>st</sup> . inland-port-savings .
- Jarzemskis, A. and A.V. Vasiliauskas (2007). Research on dry port concept as intermodal node, *Transport*, vol 22, no 3, 207-213.
- Leveque, P., Roso .V,(2002). Dry port concept for seaport inland access with intermodal solutions. Chalmers University of technology.
- Louis Berger (2011). Northern Corridor infrastructure master plan. Final report of the East African community. [www.eac.int](http://www.eac.int).
- Notteboom, T.E. and Rodriguez J. P.,(2007). The terminalization of supply chains: Reassessing the role of terminals in port/hinterland logistical relationships. 1<sup>st</sup> edition, Ashgate pp.51-66.
- Pellegram, A. (2001). Strategic land use planning for freight: the experience of the Port of London Authority

(1994-1999).Transport Policy, 8, 11-18.

Qingcheng Zeng, Michael J.Maloni, Jomon Aliyas Paul,and Zhongzhen Yang(2013).Dry Port Development in China: Motivations, Challenges, and Opportunities.Transportation Journal Vol. 52 No. 2.

Robert J.McCalla (1999).Global Change, Local Pain: Intermodal Seaport terminals and their service area. Journal of Transport Geography 7,247-254.

Shippers Council of East Africa.(2013).Congestion at the port of Mombasa: call for action.[www.kenyashippers.org](http://www.kenyashippers.org).

Tanzania Port Authority Act.(2004).Port Act NO.17 of 2014.

The 2<sup>nd</sup> East African Community Heads of State Retreat on Infrastructure Development and Financing(2012).Report of the EAC,29<sup>th</sup> November 2012.

UNCTAD (1991).Handbook on the management and operations of dry ports.

United Nations Commission for Africa (2011).Progress Report on the Implementation of the Outcomes of the Mid-Term Review Meeting of the Almaty Programme of Action.E/ECA/CTRC/7/4

Vandervoort and Morgan (1999).EU Dry port Concept: A look at the development, design and effective operations of dry ports.

Wang, C.-H., and J.-Y. Wei. 2008. "Research on the Dry Port Location of Tianjin Port

Weigmans,B., E, Masurel and P. Nijkamp,(1999). Intermodal freight terminals: an analysis of the terminal market. Journal of Transport Planning and Technology, vol 23, 105-128.

World Bank. (2007).Port reform Kit. International Bank for Reconstruction and Development, second edition.

Woxenius, J., Roso, V., &Lumsden.K. (2004). The dry port concept: connecting seaports with their hinterland by rail. First International Conference on Logistics Strategy for Ports.Dalian China.



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