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THE IMPACT OF GOVERNANCE STRUCTURE ON PORT PERFORMANCE:

A CASE OF DURBAN PORT

By

TSHEPISO MOKONE

South Africa

A dissertation submitted to the World Maritime University in partial

Fulfilment of the requirement for the award of degree of

MASTER OF SCIENCE

In

MARITIME AFFAIRS

SHIPPING MANAGEMENT AND LOGISTICS

2016

DECLARATION

I certify that all the material in this dissertation that is not my own work has been identified, and that no material included for which a degree has previously been conferred on me.

The contents of this dissertation reflect my own personal views, and are not necessarily endorsed by the University.

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(Date)   19 SEPTEMBER 2016

Supervised by: Prof. Dong-Wook Song
World Maritime University

Assessor: Prof. Devinder Grewal
Institution/Organisation: World Maritime University

Co-assesor: Dr. Martin Schramm
Institution/Organisation: Hamburg Port Consulting GmbH

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ABSTRACT

Title of Dissertation: The Impact of Governance Structure on the Port Performance: A Case of Durban Port

Degree: MSc

Studies on ports have been developing. One of the most important topics related to port are issues concerning governance and performance. The dissertation analyses the impact of governance structure on the performance of Durban Port. The research paper presents the literature on the various port governance models and port performance indicators. It argues that the process of amending or changing a governance structure is complex because the selection of a port model may have a positive or negative influence on the port performance. In the context of South Africa, Transnet, a state-owned entity, has control over the operations of all nine ports; this includes the Port of Durban. Transnet has ensured that all the port adhere to the same rules and regulations.

Several port performance indicators were discussed to highlight their importance. Port performance indicators are important to stakeholders and customers, therefore, ports utilize these indicators to remain competitive. The nature of the research is qualitative. A case study methodology was utilized to examine the impact of governance on the performance of Durban Port. The paper also provides an analysis of the results. The research paper ends with a conclusion, recommendations and the limitations that were encountered.

KEYWORDS: Governance, Port Administration Models, Port Performance

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LIST OF ABBREVIATIONS

DCT	Durban Container Terminal
ITF	International Transport Forum
NPA	National Port Authority
PRSA	Ports Regulator of South Africa
SAPO	South African Port Operation
SATS	South African Transport Services
TEU	Twenty foot Equivalent Unit
TNPA	Transnet National Port Authority
TPT	Transnet Port Terminal

1. INTRODUCTION

1.1. Background

The shipping industry has carried about 90% of the world trade (Esmer, 2008). It has been the leading means of carrying merchandise in large quantities by way of sea. Import and export of goods would not have been possible without the maritime industry. The expansion of seaborne trade has brought benefits for customers worldwide through competitive freight rates. The growing efficiency of shipping and increased economic liberalisation has enabled continual growth for the industry. Harlaftis, Tenold, & Valdaliso (2012) "characterized maritime transport as the world's key industry. Maritime transport has been the main driver of trade growth and hence of the emergence and expansion of a global economy." Transnet(2015) supports that shipping lines try to decrease operating costs by economies of scale and shipping entities focus on increasing the vessels operations within the global maritime industry. They also argue that this has created cascading effects on the world's shipping industry as large vessels cannot operate in certain routes. Ports and carriers are implicated by this issue. According to Transnet (2015) ports that do not upgrade infrastructure and equipment to service the larger vessel, and under-performing ports, encounter reduced port calls and connectivity will diminish.

Ports are a vital economic activity in coastal countries. The higher the throughput of goods and passengers, the more infrastructure, provisions and services related to the activities("Economic importance of ports", n.d.). These factors will bring varying degrees of advantages or disadvantages to the environment, local and regional economy of a nation. Ports contribute in terms of supporting the economic activities in the hinterland as they act as a vital connection between the land and sea transportation. According to Dwarakisha & Salima (2015), ports are considered as one of the primary components of the general transportation sector and are linked to improving the world economy. Ports are mainly a means of integration into the global economic system. Frankel (1987) supports that,

"The function of a port is not to provide a separate and distinct service, but to serve as an integral part of a chain of transport links that forms an integrated transport system designed to move cargoes from origins to destinations."

The role of a port is to provide safe and efficient facilities for maritime activities, essentially acting as a point of entry for import commodities and an exit point for export commodities (Transnet, 2015). The role of ports as transport nodes is increasing in strategic regional and economic importance. Ports serve hinterland and neighbouring landlocked countries, therefore, each port is vital because it fulfils its role within the economy of the surrounding region and the transport corridor it feeds.

In order for ports to function adequately certain rules have to be adhered to. Port governance is one the most important elements in the maritime industry. It ensures that ports operate within the parameters of specific rules and regulations. It determines the legislation and structures that are imposed on ports, influencing the objectives and determines the manner in which management decisions are made. Governance is the enforcement of regulations governing property rights and conducts According to Talley (2012) governance "in the case of ports, governments, or other relevant policy makers, usually impose governance structures with particular national or regional policy objectives in mind. The scope of governance change is to adjust strategies and corporate goals in order to align with the contextual economic environment."

Port performance is an important factor that boosts regional development and port competitiveness. Ports respond to the escalating pressures to upgrade in order meet the growing sea traffic and changing technology in the maritime industry. Port perfromance should be improved in order to provide comparative advantages that will attract more customers. According to ITF (2010) some

challenges encountered by ports are securing traffic flows and preventing diversion to other ports that include handling containers and goods rapidly,providing adequate equipment,decreasing berth times and,catering large storage capacity and ensuring different modal connections to hinterland.The performance of a port has a direct and indirect impact on activities pertaining to maritime logistics, insurance and finance because of their position in a supply chain.These activities will enable job creation which will impact local and regional growth.

Transnet National Ports Authority is a governmental institutuion that operates the ports in South Africa.It provides port infrastructure and marine services at the eight commercial seaports in South Africa. According to Weir Mineral Australia Ltd (2013) "Transnet port terminals were established in 2000, when Transnet's then single port division, Portnet, was divided into operations and landlord businesses namely, SAPO (Transnet port terminals) and National Port Authority." Transnet port terminals have contributed in supporting the South African government's export growth strategy. Most are handled through. South Africa's six largest ports: Richards Bay, Durban, Saldanha, Cape Town, Port Elizabeth and East London, import and export commodities mostly in Southern Africa. Port Terminals handle cargo and offer logistics services.

The Port of Durban is the largest port in Africa in terms of value of cargo handled as well as the number of vessels handled. It has the largest container terminal in the southern hemisphere. According to Foolchand (2006) "the Durban Port is located on the eastern seaboard of the African sub-continent and at the convergence of the world's major shipping routes viz. to Australia, North America, Far East, South America and Europe. He states that the port serves its own extensive hinterland, which includes Gauteng and many of the SADC countries." According to Transnet (2015) South Africa is located along the North-South and Transoceanic pendulum (secondary) connectors. They further support that the routes complement the Circum-Equatorial corridor and are

predominantly reflective of existing commercial trades in raw materials and accommodates container traffic as extension lines from the Circum-Equatorial route. Transnet (2015) states that they formulated the Economic Development Department (EDD) in 2010, in order to address three key aspects of the South African economy: reduce poverty levels, economic growth and job creation.

Figure 1: An Aerial view of the Durban Port

Source: Transnet National Ports Authority

The South African government realised the need to focus on the development of the nation's blue economy. The government believed that the South African maritime sector is contributing far less than it should be to the country's economy. As an attempt to combat the development issues of the South African Maritime Sector, the government has initiated the Operation Phakisa project. The project was established in 2014 to leverage South Africa's strategic location, infrastructure and skill base to accelerate growth of marine transport and manufacturing, unlocking the economic potential of South Africa's oceans. Minister Mthambi (2014) mentioned that the ocean economy contributed about R54 billion to South Africa's GDP, and accounted for approximately 316 000 jobs.

1.2. Objectives

- To examine the possible impact of governance structure in South Africa on port performance of Durban Port.

- Compare the performance of Durban Port with other national Ports.

1.3. Methodology

In order to conduct the research, secondary sources will be required. The data will be obtained from applicable article journals, books, internet sources and reports published by the South African Maritime Safety Authority, Transnet National Port Authority, Durban Port and Ports Regulator of South Africa. Hoepfl (1997) describes a qualitative research as any kind of research that produces findings not arrived at by means of statistical procedures or other means of quantification. A qualitative methodology will be utilized in order to make the research successful.

1.4. Structure of the paper

Chapter one contains the introduction of the research paper. This chapter provides the background and context of the research. The chapter states the purpose and contains an overview of the research paper. Chapter two discusses the literature on port governance and administration. The literature provides an overview of the port governance and administration in general and in the perspective of South African Ports.

Chapter three identifies the measurement and indicators utilized to evaluate the performance of the port. It discusses different types of indicators utilized in order measure the performance. Chapter four identifies the methodology utilized in this research paper. It analyses the qualitative research methodology. The chapter explains that the research utilizes a qualitative approach even though it also includes quantitative data. The chapter discusses the data selection method used. Chapter five discusses the results and findings from the literature and data gathered. Chapter six discusses the conclusion and possible recommendations. Figure 2 illustrates the structure of the dissertation.
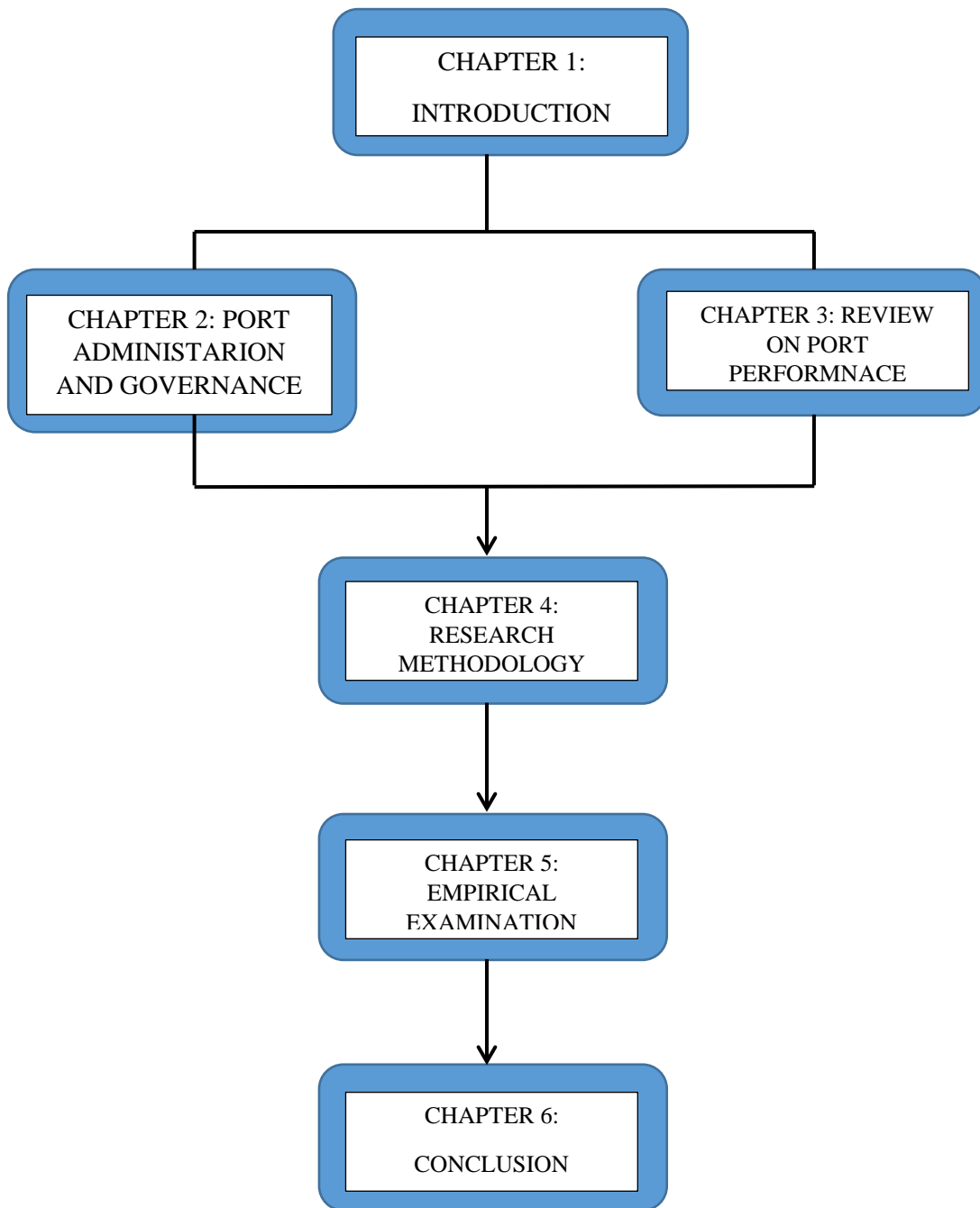
Figure 2: Dissertation Structure

2. REVIEW ON PORT ADMINISTRATION AND GOVERNANCE

2.1. Port Administration and Governance in General

It is known that ports are diverse. Port governance and administration contribute towards the uniqueness of a port. It is important to distinguish governance and administration. Authors have different perspectives regarding the terms. Governance is defined as a process of governing an organization or a group of individuals. Bourgeois, Duhaime & Stimpert (1999) conclude that governance is an organisational structure that consists hierarchical reporting, sharing information, operational processes and control systems.

Vieira, Kliemann Neto & Amaral (2014) demonstrate that the concept of governance is as follows: A corporate behaviour that is desired, especially relating to listed companies, a concept associated with public policies, mixed with the notion of government or when an entity organises its participants. De Langen (2006) port governance relates to corporate governance. In the early 1990s, port governance studies began to develop and intensified through different approaches and purposes. Brooks & Pallis (2008) argue that a topic pertaining to the analysis of governance models and their relationship with port performance has emerged.

Governance pertains to the safeguarding and appropriate use of financial and other resources; authority of the ownership of assets and the degree of freedom available relating to assets; procedures established for decision-making purposes; and the scope of operations and activities undertaken by establishing limits (Skagway Port Development Plan, n.d.). "Governance is the actions of a formal body or an informal organisation to ensure adherence to a set of agreed rules, regulations or guidelines" (Theocharis, 2016). He further supports that governance is when power or authority is exercised by a state or an organisation for the management of common affairs. It is crucial for a port to be governed.

Administration relates to the implementation of the rules and regulations. It also refers to as the process of administering an entity. The formation of policies, plans and procedures, setting up of goals and objectives, enforcing rules and regulations are the functions of administration. It involves forecasting, planning, organizing and decision-making. Goodnow(2009) supports that administration is a process of executing of rules and policies. It is viewed as the top layer of management in a hierarchy of an entity. The nature is more bureaucratic. There are four types of port administration models that are classified as follows:

Privatization

Privatization is viewed as an extreme form of port reform (The World Bank, 2007). The state is not involved in the port sector when it is fully privatized. In this model, the land is privately owned, unlike the situation in other port management models. The ownership of the land will convert from public to private. Privatized ports are few in number and can found mainly in the United kingdom Brooks & Cullinane (2007).In addition, along with the sale of port land to private interests, some governments may simultaneously transfer the regulatory functions to private successor companies (The World Bank, 2007).Privatized ports are self-regulated owing to the absence of a port regulator. A risk may arise where the port land can be sold for non-port activities, therefore, it cannot retain its original purpose for maritime use. A sale of land to private ports may result in a national security issue. The U.K. decided to implement privatization owing to the following: to modernize institutions, installations, and to be responsive to customers' d0emand; to achieve financial stability, reach financial targets, and to continue as a going concern by relying on private resources; and to achieve labour stability.

Service Ports

According to Brooks and Cullinane(2007) this type of port is mostly public in which the Port Authority has ownership of the land, assets, performs all the regulatory and port functions. Service ports have declined in numbers. According to The World Bank (2007) "many former service ports have are in transition toward a landlord port structure, such as Colombo(Sri Lanka), Nhava Sheva(India), and Dar es Salaam (Tanzania)." Developing countries have some ports that are still governed under this model. Service ports are usually managed by the ministry of transport and the chairman is a civil servant appointed by, or directly reporting to, the minister concerned (The World Bank, 2007). A service port also conducts cargo handling activities. Separate public entities usually conduct the cargo handling activities and they report to the same ministry as the port authority. Conflict may arise when multiple public entities with conflicting interests report to the same ministry, constitutes a management challenge. For example, owing to this challenge, port authorities and cargo handling of Mombasa, Tema and Takoradi were merged into one entity (The World Bank, 2007).

Tool Ports

According to Brooks and Cullinane (2007) "the Port Authority owns, develops, and maintains the port infrastructure as well as the superstructure, including cargo handling equipment such as quay cranes and forklift trucks." The port authority staff usually operates the equipment owned by port authority. The equipment owned by port authority is usually operated by. Private cargo handling companies contracted by the shipping agents or other principals licensed by the port authority carry out cargo handling on board vessels, apron and quay. For example, Ports of Autonomes in France, are operated and managed according to the tool port model, even though the private terminal operators have invested in gantry cranes for the latest terminals. This caused conflicts between terminal operators and port authority staff, which affected operational efficiency. Segregation of duties within a tool port system creates a challenge regarding the split operational responsibilities. A private cargo handling

entity signs a contract with a ship-owner; the port authority owns and operates the cargo handling machinery. However, the cargo handling entity does not have full control over the cargo handling operations. Some port authorities allow operators to use their own equipment, in order to prevent conflicts between the cargo handling entities (The World Bank, 2007). The tool port and service port are both similar in terms of financing and its public orientation.

Landlord Ports

A landlord port is a mixture of public and public mixed orientation. The port authority is the regulatory body while the port operations are carried out by private companies. Some examples of landlord ports are Rotterdam, Antwerp and Singapore. Currently, landlord ports are a dominant port model (The World Bank, 2007). In this model, the infrastructure is leased to operating companies or industries such as refineries, tank terminals, and chemical plants. A fixed sum per square per meter per year is usually paid to the port authority. The lease amount relates to the costs of the construction. Private entities are responsible for providing and maintaining for their superstructure including buildings, and installing their equipment. The World Bank(2007) argue that in landlord ports, dock labour is employed by private terminal operators, although in some ports part of the labour may be provided through a portwide labour pool system.

It is important for an organisation to consider the consequences that may arise as a result of the selection of a specific port administration model. Table 1 illustrates the strengths and weaknesses of each Port Administration model.

Table 1:   Strengths and Weaknesses of Port Administration Models.

	Strengths	Weaknesses
Landlord Port	• Private entities handle cargo using their machinery. • Private entities invest to ensure a strong market and long-term relationship.	• Conflicts between the private sector and general public may occur owing to different interests. • Possible uncontrolled operations • Over capacity
Tool Port	• Enormous investment by the port authority. • No redundancy.	• Double entity undertaking operations and management. • Conflict may arise regarding equipment's assignment and operational efficiency.
Service Port	• Unity of command and management	• Handling operations not compatible with administrative duties. • Private sector out of the port business. • Strong power from trade unions.
Private Port	• Political decisions do not influence management. • Higher efficiency in asset and human resources management.	• Risk of monopoly. • Possible deviation from core business from core business to more profitable activities. • Risk of footloose arrangements.

Source: ICS Port and Terminal Management (2013 ed)

Table 2 indicates the summary of the allocation of responsibilities of the four port models. The models present an approach to classify port responsibilities; however, they fail to provide adequate guidance to the government faced with pressure to devolve port administration as to which technique(s) to implement for local situation (Brooks & Cullinane, 2007).Therefore, it is important to understand how the performance of a port can be improved. These classifications enable management to understand the allocations of responsibility for capital investment at a port. The models fail to provide an understanding of the strategic intent of a port, its role in the economy as seen by government and the allocation of responsibility for regulatory monitoring.

Table 2:   Allocation of responsibilities under the World Bank models

Responsibilities	Service	Tool	Landlord	Private
Infrastructure	Public	Public	Public	Private
Superstructure	Public	Public	Private	Private
Port labor	Public	Private	Private	Private
Other functions	Majority public	Mixed	Mixed	Majority private

Source: The World Bank Port Reform Tool Kit

2.2. Port Administration and Governance in South Africa.

2.2.1 Ports in South Africa

South Africa has nine ports. The eight commercial ports are as follows: Cape Town, East London, Mossel Bay, Ngqura, Port Elizabeth, Richard Bay, Saldanha Bay and Durban. Port Nolloth has its limitations in terms of waterside infrastructure; therefore, it provides support services to the offshore mining operations and does not have a forecasted cargo demand.

Port of Richards Bay

The port was established in the 1970's. It has potential for expansion. It is the largest bulk coal terminal in the world and it was also expanded to accommodate other bulk and break-bulk cargoes. The port has public, private operators and 21 operational berths. Richards Bay Coal Terminal Company privately operates the coal terminal. The coal terminal can handle maximum of 6m tons.

Port of Cape Town

The port is old and located on one of world's busiest trading routes. It can handle volumes of fresh fruit exports and offers fishing ship repair and maintenance services. It is South Africa's second busiest container port. The terminals can handle about 3161 vessels per annum and it has 34 berths including lay-by berths. The container terminal which has six deep sea berths equipped with post Panamax container cranes is operated by TPT.

Port of East London

This is the only commercial river port in South Africa. Owing to the automotive sector being dominant in the port sector, the port is no longer one of the main maize

terminal ports of the country. The port has 12 commercial berths, a multi-purpose terminal, a bulk terminal and a car terminal.

Port of Saldanha Bay

It is South Africa's largest natural port, which can accommodate vessels of up to 21.5 meters deep, which includes Panamax and Cape size vessels with deadweight of approximately 300,000 tons. The port was established in the 1970s and it became one of the world's largest iron-ore ports. There are plans underway to expand the scope and operations of the port.

Port Of Port Elizabeth

The port was established in 1825. "The port is equipped to handle dry bulk, bulk liquid, general cargo and container cargo; facilities at the port include a tanker terminal and a car terminal as well as a privately operated fresh produce terminal." (Trade and Industrial Policy Strategies, 2014) .The container terminal at Port Elizabeth handles about 1,271 vessels per annum. The container terminal has the ability to load railway trains directly under the gantry cranes, without containers having to be double handled.

Port of Mossel Bay

The port is small and it has limited infrastructure. It is the only port that operates two off-shore mooring points within the port limits. One is utilized as a marine tanker terminal and the other is used by feeder vessels from Cape Town and Durban. The port is utilized by the fishing industry and PetroSA's gas-to-liquids plant and is not popular for commercial activity.

The Port of Ngqura

It is the newest South African commercial port. It was initially planned to handle dry and liquid bulk cargoes, however, it later adapted for container handling. In October

2009,the port began its commercial ship operations. "Its main breakwater is the longest in the country and in its first year of operation it handled about 3.5 million tons of cargo." (TIPS,2014). The port is the only port in the country that is capable of handling new generation vessels carrying between 8000 to 9000 TEUs. The port has five berths totaling 1,800 meters of quay wall; one for liquid bulk, two for container vessels and two for dry bulk and break bulk. The port facilities also include an extensive rail system with links to the City Deep rail terminal in Johannesburg.

Port of Durban

Durban is the busiest port in Africa and has the best container terminal in Sub-Saharan Africa and many commercial ships call at the port per annum. The port has 59 berths and a single buoy mooring point. Durban accounts for 64% of the containers handled in South Africa. According to TIPS (2014) the port is served with excellent rail and road links to Gauteng province. Containers, vehicles, grains, forestry, liquid bulk, coal, agricultural products, steel and passengers are the main commodities handled at Durban. Plans to further expand the port are underway with the dig out at the site of the old airport.
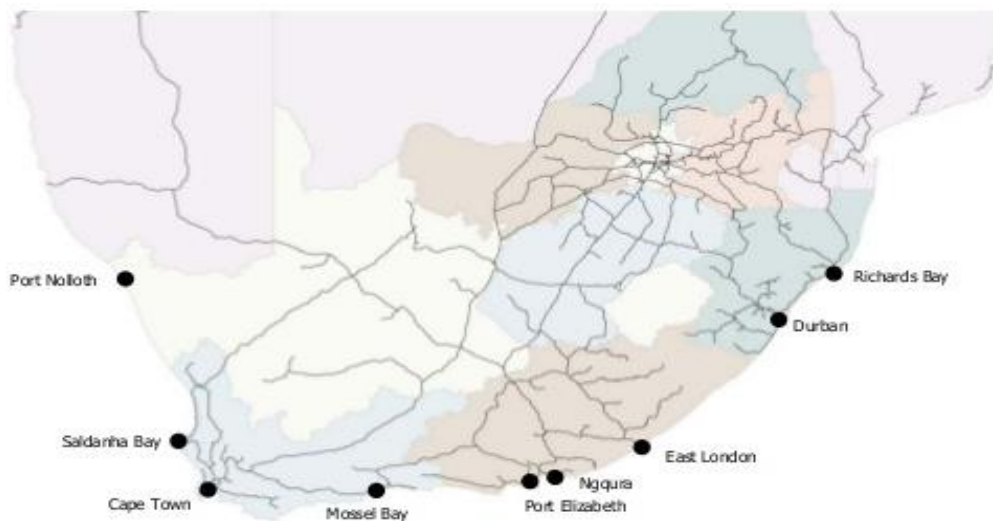

Figure 3: The locations of the South African Ports

Source: Transnet National Ports Authority

2.2.2   The Evolution of South African Port Governance structure.

The evolution of Port Institutional Frameworks occurred owing to the following problems: labour practices were restrictive; government control prevented many port from responding to increased demands imposed; and the inability or unwillingness to invest in port infrastructure affected the port service quality. The socio-economic structure of a country, historical developments, the location of the port and the type of cargoes handled affect the manner in which ports are structured, managed and organized. Owing to some of the challenges faced by South Africa, there was a need to for the country to make changes to their regulation and governance structure.

According to Gumede & Chasomeris (2012) port users justified their dissatisfaction with regards to policy, governance and pricing that promoted: "import substitution; insufficient investment in port infrastructure and superstructures; bureaucracy; skewed prices; and created suspicion in the maritime and transport industries about the impartiality of the port entity."

In May 2007, the Ports Regulator of South Africa, state-owned, came into effect. According to the National Port Act of 2005, the functions of the Port Regulator are too: "exercise economic regulation of the ports system in line with the government's strategic objectives; to promote equity of access to ports and to facilities and services provided in ports; to monitor the activities of the National Ports Authority to ensure that it performs its functions in accordance with this Act; and also to hear complaints and appeals under the Ports Act" (Government Gazette, 2005) .This mandate is to be exercised in accordance with government policy in respect to commercial ports, as set out in National Commercial Ports Policy(Ports Regulator, n.d.).

According to Havenga (2010) South Africa's ports have evolved under various forms of governance as follows: the Pre-Union self-governed structures (1833-1908) where the tariffs were administrated by each port authority; the South African Railways and Harbours (1909-1981) brought an end to inter-port competition by introducing a

uniform tariff structure, the railway and harbour authorities merged; South African Transport Services (1982-1989) became a state-owned entity that controlled capital of all ports from a finance perspective; Transnet was established in 1989 with the purpose of commercializing the activities of SATS; and Ports Regulator was established in the 2000's in order to regulate the activities of the ports. Table 3 illustrates the evolution of governance structure in South Africa.

Table 3 : Evolution of governance structure and regulation in South Africa

Duration	Organisation	Governance and Pricing attributes.
1833-1908	Autonomous Structure Pre-Union	• The harbours were financially autonomous. • Revenue generated as a result accrued to harbour administrations and was easily identifiable. • Competitive tariffs occurred as a result of inter-port competition.
1909-1981	South African Railways and Harbours(SAR&H)	• The amalgamation of harbour and railway authorities. • Inter-port competition was brought to an end by introducing a uniform tariff structure. Ports were supposed to be conducted according to sound business principles, be self-efficient by generating sufficient revenue, with the exception of providing reasonable cheap transport for the industrial and agricultural sectors. • Proceeds generated by harbour activities covered the losses incurred by the railways; this created a large degree of cross subsidisation.

1982-1989	South African Transport Services (SATS)	• The SATS Act of 1981 converted SATS into a business enterprise belonging to the state. • SATS controlled the ports physical capital, from an expenditure and revenue perspective. • The Act also required the "economic interest and the transport needs of the whole country." • Even though SATS reduced inter-modal cross-subsidisation, labour profits increased, some inter-modal and intra-port cross subsidisation survived.
1989-2007	Transnet	• Transnet was established on 1st November 1989,in order to commercialise the activities of SATS, the government was the sole shareholder. • Transnet maintained five divisions: Poornet(ports);Autonet(roads); Petronet(pipelines); Spoornet(rail); and South African Airways, they all operate as independent entities. • Portnet had objectives that were conflicting; it had to play a role as a port authority to act in the best interest of the public, and it had to maximize on its comparative advantage to achieve its own objectives.

		• As a result of the National Commercial Port Policy of 2002, Portnet split into a landlord port authority (Transnet National Port Authority) and a port operator (Transnet Port Terminals),in the year 2002.
2007-present	Transnet and Port Regulator	• "Ports Regulator was established under the provision of National Ports Act of 2005 which objectives are to: • Develop productive and effective port industry for economic growth and operations of ports. • Promote and improve efficiency and performance in the management and operations of ports. • Promote the development of an integrated regional production and distribution system in support of government policies. • Although both Transnet and Ports Regulator are state owned entities, they are independent of each other. • Since 2010/11 TNPA has to apply for tariff increases annually to the Ports

			Regulator.
			• Ports Regulator allows for industry comments on the TNPA tariff application and TNPA's responses to those comments and then makes a decision.
			• TNPA had developed Port Rules in terms of section 80(2) of the National Ports Act "for the control and management of ports and the approaches thereto and for the maintenance of safety, security and good order in the ports". Port rules came into effect on 6 March 2009."(Gumede & Chasomeris,2012)

Source: Sanele Gumede and Mihalis Chasomeris (2012)

The most significant change occurred in 2002. According to TIPS (2014) South Africa was inspired by other countries in separating its port infrastructure from port services, by creating two separate bodies within Transnet: TNPA, the landlord, assigned with the responsibility of the port infrastructure; TPT assigned with the responsibility of the port services. The main reason for the change was that there was a conflict of interest between the landlord (NPA) and the main user of the ports (TPT).Transnet utilized it profits generated from port operations to subsidize other operations in the group, this resulted in an underinvestment in ports (TIPS,2014). Therefore, the split of the entity mitigated this challenge and as a result TPT no longer subsidizes the other entities in the group.

2.2.3   Port Governance challenges in South Africa.
The section highlights current impressions of port ownership, operation and governance in South Africa. It also indicates the similarities and contrasts between

worldwide port models and South African port models. Table 4 illustrates a Port Function Matrix that offers a clearer understanding of the port models of regulation.

Table 4:   Port function matrix

Port Models	Port Functions		
	Regulator	Land Owner	Operator
1. Public	Public	Public	Public
2. Semi-Public	Public	Public	Private
3. Semi-Private	Public	Private	Private
4. Private	Private	Private	Private

Source :Baird(1995)

South Africa's nine ports are publicly owned. Transnet is the landlord (Transnet National Port of Authority), a public transport operator (Transnet Port Terminal), and Ports Regulator is state owned. Transnet and the Ports Regulator operate independently even though they are state owned.

The port institution structure of SA has led port users to explain their discontent which includes monopoly power that prevents competition, player-referee concerns and promotes a system of a unitary pricing system where a single tariffs book applies to all eight commercial ports. According to Brooks & Culliane (2007) there have been several case studies pertaining to port reforms. "Port reforms have considered the following: concessions, commercialisation, privatisation, port competition and other structural reorganization of the public sector involvement, such as municipal or nationally owned and operated ports"(Brooks & Culliane ,2007).

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Song & Lee (2007) mention that numerous studies contend that port competition provides the best premise to good and efficient governance. The evolution in governance structures of other countries indicate that there is no simple "one size fits all" approach that can be applied to port reform. Some governments around the world view privatisation and competition as a solution to attaining port efficiency. Baird & Valentine (2007) observed that privatization in the United Kingdom did not lead to or improve port efficiency; rather it has led to heavy reliance on subsidisation in the maritime sector. On the contrary, China and Korea resulted in more efficient ports owing to privatization (Cullnane & Wang, 2007).As a result of privatization, more transparent governance has been achieved by Korea (Song & Lee, 2007).Some countries were able to advance their efficiency and port management with government involvement, while other countries experienced challenges with government intervention. It is important to consider the economic and political context that a port is operating in before applying a specific reform strategy. Ports play a significant role in terms of contributing towards the elevation of the economy. In South Africa, before applying and reform strategy, it is important to understand the context of the country and its democratic development state vision that the country is pursuing.

South Africa's port governance promotes a system of ports as opposed to competition between ports. The current governance structure does not challenge the uniform system of port pricing, a single tariff to all eight commercial ports. Chasomeris (2011) notes, however, that the lack of competition and possible player-referee governance concerns might be dealt with by suitable regulation.

Poon (2009) concludes that South Africa is pursuing an effective democratic developmental state. Edigheji(2005) defines the concept of a democratic developmental state one which ensures popular involvement in the governance, transformation processes and generates alliances with the general public. He further

supports that the developmental state should be guided by the objectives of authoritative governance, coherence, stability, accountability inclusiveness, popular participation and ability to generate consensus. A premium should be placed on its institutional attributes and its relations to surrounding social structures (Edigheji, 2005). A country that promotes and achieves better economic performance fulfils the concept of a democratic development state (Edigheji,2005).

Poon(2009) explains that " The concept of the developmental state has become a buzzword for certain government officials and political figures ,indicating theory predilection to use greater degrees of state intervention and industrial policy as a means of achieving wide ranging priority economic/social policy objectives such as :creating economic growth ,decent jobs and reducing poverty levels; spurring rural development ,and land reform ;as well as improving health/education sectors and public service delivery ,and cutting the incidence of crime and disease." Zuma(2009) suggests that South Africa has to strengthen its democratic institutions and improve public services as to fulfil the democratic development state requirement. Zuma (2009) states that South Africa will achieve its vision of becoming a developmental state by involving state-owned enterprises and development finance institutions during the strategic planning and performance monitoring stage.

This notion of SA being a developmental state has led Transnet(2010) to believe that the current institutional structure is consistent with the quintessence of a democratic developmental state and further to have confidence that Transnet will remain the dominant player with regards to owning and operating of certain parts of the freight system for many years ahead. The SA economy has encountered several issues, which the state-owned entities in SA still need to resolve. These challenges include a huge level of unemployment, skills shortages, increasing congestion, poor regional integration, weak maritime connectivity and the carbon intensity of the current system (Transnet, 2010). SA has an unemployment crisis. The current unemployment rate is 26.6% (StatsSA, 2016).

Transnet (2010) believed that they were in a favourable position to enable the South African freight system to combat the challenges. In addition to ports, Transnet controls all rail freight business in the country through Transnet Freight Rail (TFR) as well as pipelines. Notteboom (2009) explains that "Transnet's unique position has prevented global terminals operators from entering the SA container stevedoring market. While market argues that the powers of Transnet prevent competition, it creates an excellent environment for coordination among ports between the ports and the rail system." Additionally, Transnet (2010) claims that they have "made significant strides over the past five years," and they have plans that include "creating additional capacity through efficiency improvements and expansion of the infrastructure network, attracting more cargo to rail and promoting intermodal solutions, developing a transhipment hub to overcome challenges of poor maritime connectivity both regionally and globally and developing a climate change strategy for the company." Since the country's focus on democratic developmental state, the port reform rhetoric in SA has clearly shifted from discussions in the potential concession of port terminals to discussions on public-private partnerships.

Companies that adhere to Companies Act 71 of 2008 and the King Code of Corporate governance are considered to have good governance (King III, 2009). The King Code outlines elements for good governance such as transparency, independence, responsibility, discipline, social responsibility and fairness. "Transnet claims to be complying with King Report, however, a number of studies have criticized Transnet for not being transparent and for their lack of information in their reporting" (Botes, 2015).

2.3. Summary

The economic performance of ports are still of interest to stakeholders. The decision to partially or completely devolve ports is influenced by the analysis of governance, ability to manage and assess port performance factors. Some factors may direct

management to upgrade their organizational systems and encourage compliance with international standards. It is important for an organization to select a governance structure that will favour the ports operations. Therefore, Transnet decided to change the governance structure in order to adhere to rules, regulations and to act in favour of the citizens of the country, since one of its main objects is to contribute to the economy of the country.

3   REVIEW ON PORT PERFORMANCE MEASUREMENT

The economy of South Africa is determined by its foreign trade. Durban plays a significant role as a gateway of Africa. It is the largest port in Africa and two thirds of the total container traffic is to and from South Africa (Rodrigue, Cooper & Merk, 2014) Port performance indicators are going to be identified in order to determine the performance of the port.

Performance indicators are utilized to measure various aspects of the port operations. The indicators should be easy to calculate and understand in order for them to fulfil their purpose. They provide an insight to the port management in terms of the key operations areas. They can be utilized to compare performance with targets, to also observe the trend in performance levels. The indicators may be used as an input for negotiations on the port congestion surcharges, port development, port tariff considerations and investment decisions (UNCTAD, 1976). A port authority with the overall responsibility for the smooth functioning of the port is the logical correct organization to maintain a set of performance indicators. Performance Indicators are utilized to measure efficiency. It is important to determine the costs of vessels and goods at the port because it forms a major part of maritime transport chain.

According to Esmor (2008) about 90% of the world total trade in volume are moved by the sea. This is an indication that ports play a crucial role in the supply chain but then the issues of performance, efficiency and productivity also arise. According to Institute of Chartered Shipbrokers (2010) two thirds of the total maritime costs take place in ports during wharf age, handling and storage operations. Port costs also include port dues and costs invoiced by agents for various port operations. Time in port and quality of services provided are also included in the port costs. The economy of country will be influenced by the efficiency of its ports, in a case of monopoly or a competitive market. Performance indicators show how efficiency is

influenced by the infrastructure, layouts, equipment, storage facilities, work organization and labour policy.

The port performance may be categorized as the physical, financial and quality performance. Indicators for measuring performance are usually divided as follows: Indicators of output, service, utilization, quality of service and productivity.

3.1   Indicators of Service

Indicators of Service measure the quality of service that a port provides to a ship owner. These service indicators are useful for owners and shippers because the time spent by ships in ports will be paid by the shipper and ship owner. Waiting time, ship turn-around time and service time fall under this category.

Waiting time is defined as the time a vessel spends waiting for a berth that is unoccupied. The delay between the arrival of the ship in the port and its tying up at berth is also known as waiting time. Port management utilize a performance indicator that enables them to calculate the waiting ratio per ship. The formula is as follows: Waiting time ratio = Time waiting for a berth /Service time. Table 5 indicates the average waiting hours per annum. In the Durban Port the average waiting hours increased overall. However the hours declined in the years 2003 and 2005.

Table 5: Average waiting time

Port	Year	Average waiting hours
Durban (Berths 108, 109, 200, 202, 203, 204, 205)	2001	26.14
	2002	38.31
	2003	34.55
	2004	39.60
	2005	31.17
	2006	47.25
	2007	55.14
	Average	38.88
Cape Town (berths 601–04) average	2001	12.23
	2002	18.94
	2003	22.06
	2004	10.77
	2005	15.08
	2006	19.79
	2007	40.98
	Average	19.98

Source: Dynamic Shipping and Port Development in the Globalized Economy

Ship turnaround time is one of the most important indicators. It indicates the total time spent by a vessel in a port during a call. Esmor (2008) concludes that this indicator is the sum of waiting time, berthing time, service time and sailing delay. He further discusses that ship turnaround should only marinally be longer thatn a ship's waiting time at berth. Figure 4 illustrates the average ship turnaround time of three local ports, Durban Port, Cape Town Port and Port Elizabeth. The average ship turnaround time declined in 2014/15 as compared to 2013/14 in the port of Durban, while the Cape Town terminal also experienced the same trend. Port Elizabeth remained constant.
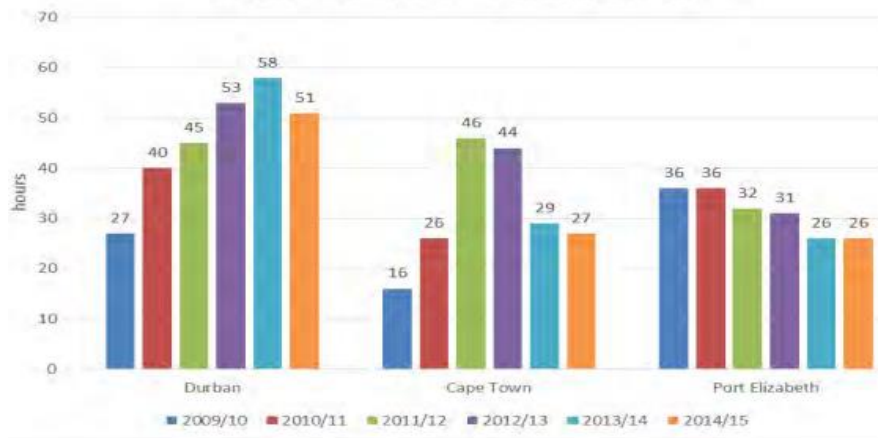

Figure 4: Average Ship Turn-around Time
Source: Ports Regulator of South Africa

Service time is the time that a ship stays at a berth whether it is operating or not. The time is established from first line ashore to the time the last line is let go. The service time ratio may be established for a berth, terminal or port using the formulas.

3.2 Berth utilization
It is the application of appropriate techniques in order to maximize the utilization of a berth. The efficiency of the berth utilization will depend on proper planning and coordination of the resources and facilities. Berth occupancy indicates the total hours when a berth is occupied during a specific period. Berth occupancy differs depending on the season. It indicates the level of demand of the port services. The ratio is

determined by dividing the time the berth has been occupied in hours per annum by the total number of hours in a year (8750). Berth occupancy Ratio=Total Service time (per berth) /hours in a year(8750). According to Ports Regulator of South Africa (2015) the Durban Container Terminals featured in the International Top 100 container terminals and was recorded the highest moves per ship working hour in the South African system .Figure 5 indicates that the terminals range between 40-80 moves per ship working hour.
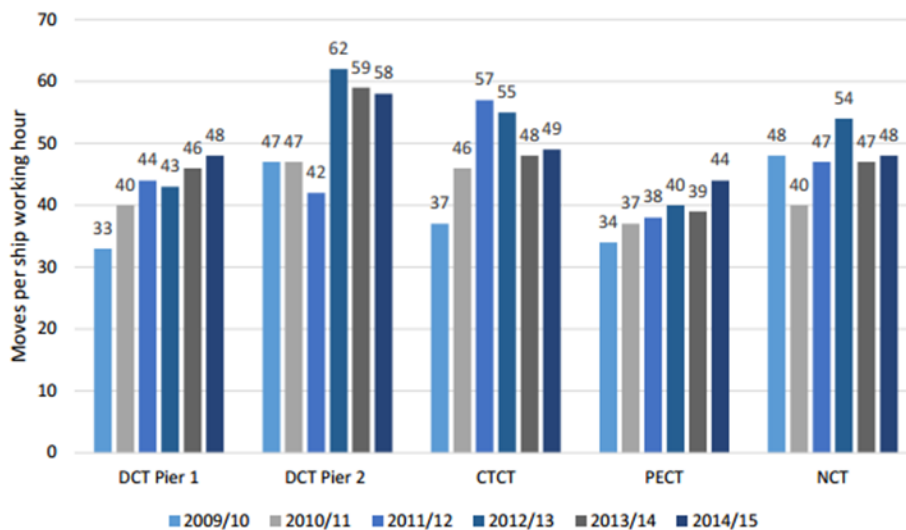
Figure 5: Container move per ship working hour: SA container terminals

Source : Ports Regulator of South Africa

Berth work time refers to the number of hours spent on a ship that has operated in port out of the total service time at berth. It indicates duration of idle time during berth operations. According to ICS (2010) for example, "a ratio of 50% means that the port works only 12 hours a day and the ship idle for 12 hours. Berth working time ratio = total time worked/total service time."

3.3   Handling indictors

According to ICS (2010) handling indicators include three sets of resources Ship/Shore handling equipment, yard transfer equipment and the Labour Force. The

indicators are utilized to measure performance of handling operations. It is advisable to calculate these ratio's on a monthly/daily basis instead of yearly basis in order to capture peak situations (ICS (2010).Berth output, ship output and gang output feature in this category.

Berth output is the total amount of cargo handled at a berth throughput annually. The indicator is useful for planning; it is also useful to determine the capacity that each berth can handle. "High berth occupancy is a sign of congestion (>70%) and hence decline of services, while low berth occupancy signifies underutilization of resources (50%)" Mwasenga (2012). Ship output is the rate at which the cargo is handled to and from vessel. Begum(2003) explains that ship output indicates the performance of the operations during a specific time frame. It is calculated as follows: Ship output=gang output* number of gangs *hours. Gang output helps management to monitor the labour performance, port operations and to prepare port tariffs.

3.4 Equipment utilization and availability

The effectiveness of resource utilisation and includes both machinery and human resources. Downtime is when a port cannot perform its functions owing to maintenance or a matter that is beyond the port. For example, TNPA's priority was to mitigate the effects of load shedding and reduce the downtime of Durban port operations through monitoring and controlling the electrical grid network and generations. Utilization of equipment relates to the effectiveness of resource utilisation which includes human resources and machinery. According to PRSA (2014/15) utilisation indicators measure the use of port facilities and capacity. For example, rates at which resources are utilized over a period of time. According to ICS(2010) the formulas are follows: utilisation of cranes=number of worked hours/number of available hours; and utilisation of workers = number of man hours worked /number of man hours available.

3.5 Storage indicator

Ports are known as gateways for countries but they also serve as distribution centres. Large quantity of cargo passes through storage in ports. The efficiency of storage

will have an impact on the cargo handling performance. An adequate management and controlling system of the storage will result in decrease congestion in port. "The efficiency of storage operations depends on the layout of the yard, equipment availability and documentation procedure"(Begum, 2003).

Dwell time is the time spent by cargo in a port. It can be applied to any other cargo. Cargo dwell time occurs when the average time that cargo remains within the terminals, from the time of arrival for loading and discharging at terminal. According to Raballand, Refas, Beuran & Isik (2012) dwell time figures have become a commercial tool to attract cargo and generate turnover. It is critical for a port to reduce its dwell time. More than 50% of the total land transport from port to hinterland cities in landlocked countries in the Sub-Saharan Africa are spent in ports Kgare, Raballand & Ittman(2011). However, there has been uncertainty regarding the components that contribute the most towards dwell time in ports. From the perspective of terminal capacity, where high dwell times can be utilized as justification for expanding port capacity, improving dwell times will result in an increase in capacity for container handling without physical expansions (Raballand et al., 2012).Therefore, it is important to reduce the dwell time in order to reduce logistics costs. Raballand, et.al (2012) Dwell time figures have become a commercial tool to attract cargo and generate revenue. Long dwell times create an anti-competitive atmosphere.
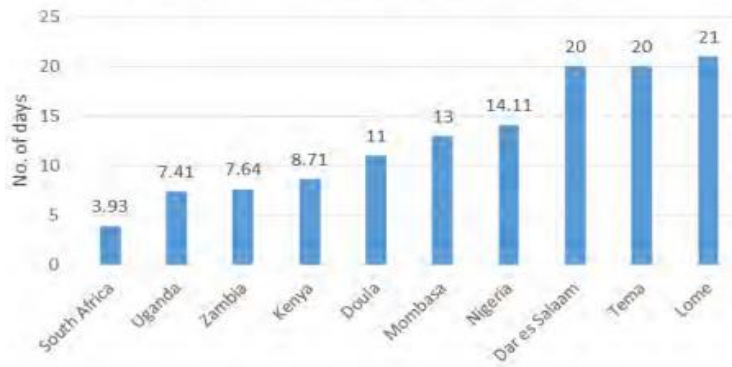
Figure 6 : Dwell time in Sub Saharan African Ports

Source: Ports Regulator of South Africa

Figure 6 indicates the cargo dwell times in the Sub Saharan African ports. The South African terminals dwell times are a good benchmark for other Sub-Saharan African countries as improvements have been made in reducing dwell times between 3 and 5 days for imports and exports.
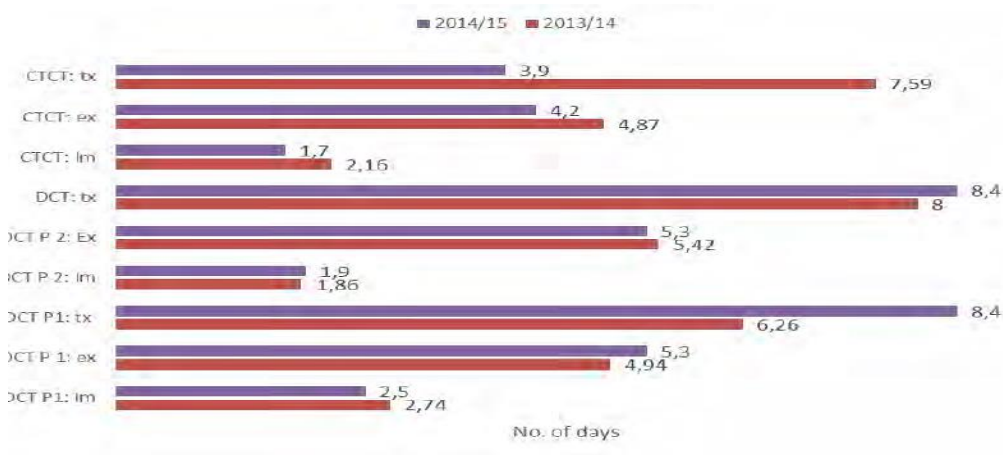
Figure 7: Dwell time in South African Ports

Source: Port Regulator of South Africa

Figure 7 indicates the terminal performance, transshipment (tx) and import (im) targets were met in the two years, with transshipment faring even better with reported cargo dwell times of less than 10 days even in Cape Town with a higher number of dwell time days allowed. Export (ex) cargo has tended to stay slightly longer than the targeted time in the port of Durban in 2014 and 2015. The three

terminals generally performed better than the set target on dwell times for imports and transshipments where cargo has stayed relatively for shorter periods than the target.

3.6   Quality of service indicator

Quality of service indicates the ability of a port to provide proper services to clients. It may include the working hours of the port, the process of obtaining services, the duration of the goods/services being delivered to the customer. Working hours are important for the port and clients. The coordination of all administrative and operational services takes place during working hours. It is one of the key features of port efficiency. The target is to reach simultaneous working schedule for all services and departments. It is calculated as follows: working hour's ratio=number of non-coordinated hours /24 hours. Table 6 indicates that the working hour s at the Port of Durban exceed the ones at the port of Cape Town. Durban port is very busy and more vessels call at the port, therefore, the working hours are greater that Cape Town.

Table 6 : Average working hours per year

Port	Year	Average working hours
Durban (Berths 108, 109, 200, 202, 203, 204, 205)	2001	39.00
	2002	37.95
	2003	42.70
	2004	41.31
	2005	41.48
	2006	41.53
	2007	37.29
	Average	40.18
Cape Town (berths 601–04) average	2001	24.42
	2002	23.06
	2003	31.24
	2004	30.44
	2005	31.01
	2006	31.38
	2007	30.70
	Average	28.89

Source: Dynamic Shipping and Port Development in the Globalized Economy

3.7   Reliability and punctuality indicator

A reliable port is one where there are no disruptive events that could undermine the scheduled work. The punctuality ratio is the difference between the planned and actual arrival departure times and number of ship calls made. The port should be schedule in terms of forecasted times and planned schedules.

3.8   Financial Indicators

They are described as the profit and loss contribution of each category of port operation and service. A port authority should be aware of the costs generated by its operations and the revenue resulting from these operations (UNCTAD,1976).Sound financial information is a prerequisite to sound port tariff system(UNCTAD,1976)
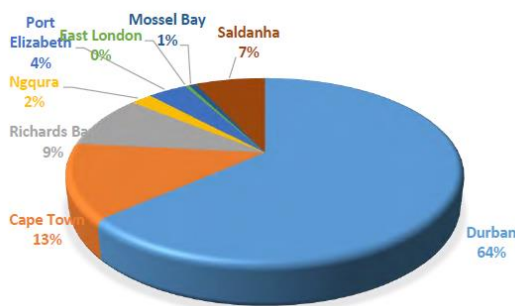
Figure 8:   By Port Operating Contribution
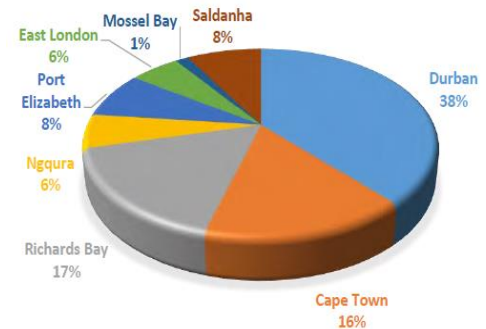
Figure 9:   By Port Operating Costs

Source: PRSA Ports Review 2015

According to Figure 8 Durban Port generates the largest profit (64%) as compared to the other ports. It also incurs the most costs (38%) as compared to the other ports. This indicates that Durban Port is one the busiest port in South Africa; therefore, the port contributes to boost the economy of South Africa.

3.9   Summary

Port performance indicators are utilised to provide management with information regarding the operations of the port, they are also tools to measure performance and they are utilized to communicate with relevant stakeholders. The indicators are useful to measure whether port development is satisfactory or not, to determine where performance can be improved and to communicate the performance to interested parties.

4 RESEARCH METHOLODOLY

Research methodology is described as systematic approach to solve the research problem (Kothari, 2004). In order to decide on procedures and techniques that will be applicable to the problem, it is vital to for a researcher to comprehend the assumptions regarding the various techniques. Creswell (n.d.) interprets research methodology as a strategy or plan of action that joins methods to results; it drives our choice and use of techniques. The design of the research enables a study to be conducted in a descriptive manor by sequence of events. It guides a researcher in the process of collecting, analysing and interpreting results.

Creswell (n.d.) states that there are three approaches to research: quantitative approach, qualitative approach and mixed methods approach. A quantitative approach involves compiling statistics, opinion surveys and questionnaires, then examining the results to produce data-driven analysis. Kumar (2008) explains that this technique is based on a measurement of quantity. A qualitative approach is a process that enables a researcher to gain an understanding of underlying reasons, opinions, and motivations of the study. It also refers to non-numerical representation of an object (Trochim, Donnelly & Arora, 2016).It is an approach that is more descriptive than quantitative. Mixed methods are a combination of quantitative and qualitative approaches. The approach provides the researcher the ability to link both opinions of participants' and measurable variables.

The nature of the research is to examine whether the governance structure has a positive impact on the port performance of Durban Port. A qualitative approach is appropriate for this study. The approach allows the researcher to analyse and interpret the results according to the perspective of the researcher. According to Sahu (2013) this approach is concerned with subjective assessment of attitudes, opinions and impressions. The approach produces results either by a form that does not involve rigorous quantitative analysis or non-quantitative analysis (Moura, 2014).The nature of the study is qualitative eventhough it utilizes quantitative data.

A case study methodology was considered an appropriate method to analyse the effects of governance structure on the port of Durban Port, because it gives a chance to study in depth and provides sufficient information in the area of study. The technique enables direct observation of the operations of the port. The technique allows the researcher to utilize a variety of methods to collect data. The method is not limited to one source of evidence since it relies on a variety of sources. The study relies on secondary sources such as books, article journals, internet sources and reports published by the South African Maritime Safety Authority, Transnet National Port Authority, Durban Port and Ports Regulator of South Africa. The relevant information was extracted from the sources.

Owing to the lack of data regarding the performance of Durban Port, the study was limited to the following indicators: container throughput, dwell time, container handling, and number of ships. Therefore, the limitation also affects the duration of the data, which implies that for each indicator the duration of the data differs.

Container throughput

Figure 10 below indicates the container throughput per month from 2000 to 2010.Prior to 2000, the amount of container throughput encountered a downward trend. This implies that there was a decrease in TEU. After Transnet changed its governance structure in 2000, the throughput began to increase gradually. Between 2000-2008, the figure shows that the container throughput was increasing in a linear trend. The average throughput prior to 2002 was 102 384, while it was 172 901 post 2002.This implies that the average container throughput improved by 25.65%.
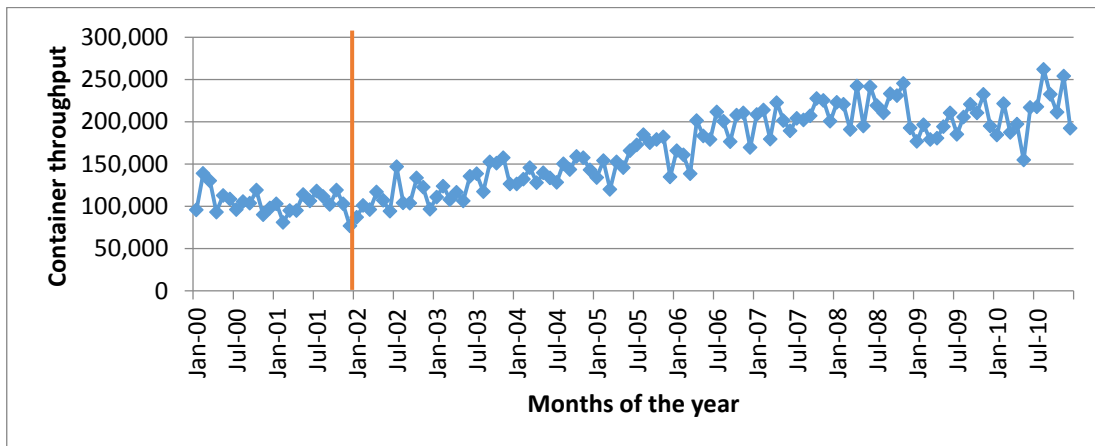
*Figure 10***:** Monthly Container throughput

Source :Transnet National Port Authority

The position of Durban port is favourable from the context of SA, because it is the largest port in the country and also a gateway to Johannesburg, the largest metropolitan area. Container penetration increased from 22% to 67% between 1980 and 2012 and it will continue to grow in developing countries, even though developed countries have reached the peak ("Increasing container traffic is pressuring port and hinterland infrastructure",2015). Durban Port began to experience growing volumes of cargo from 2002. The situation resulted in pressure to reassess the terminals in terms of their operations, capacity and their connectivity to hinterland. This is one of the reasons that drove port development to occur in order to improve the facilities and handle increasing cargo. Durban Port has managed to handle the changing traffic base and the movement towards containerisation. "By 2003, Durban was the foremost container handling port in Africa and second only to Melbourne (in year 2003 figures) inthe southern hemisphere" (Jones, 2003).
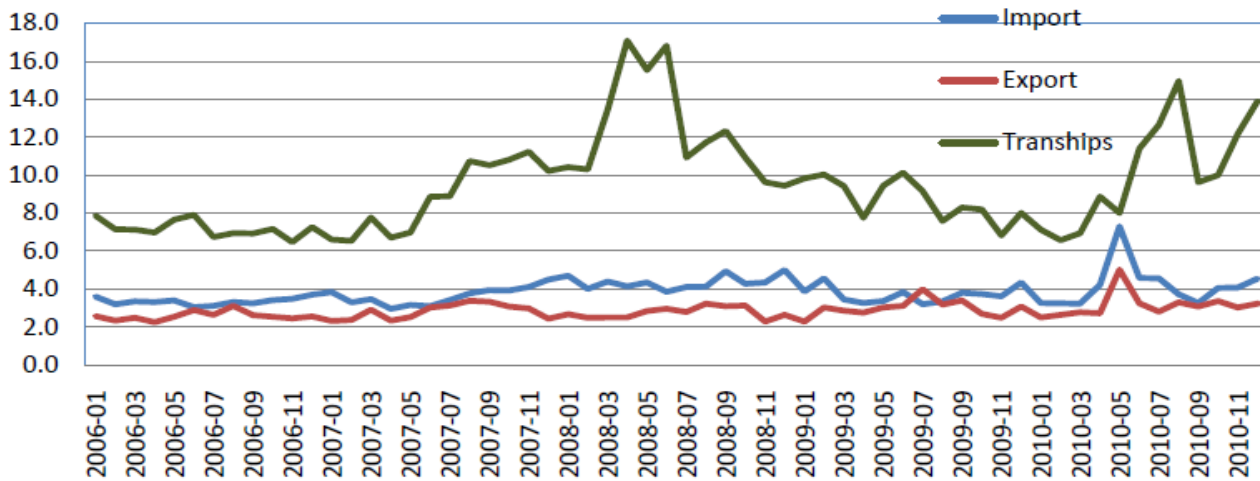
Dwell time

Figure 11: Dwell time in DCT Pier 2

Source: The World Bank

The results in Figure 11 illustrates the dwell time that was obtained from the DCT. It shows that the average dwell time from 2006 until 2010 is 4 years. The average dwell time for imports and exports were less than 4 days, with a peak in May 2010.The operations of the port might have been disrupted by a strike which caused an increase in dwell time. The dwell time for transshipments is between 5 to 10 days, with peak around April, June 2008 and September 2010.The peaks occurred because free time for transshipment at the port was set at 7 days, and charged at a low rate when it dwells less than 15 days. Before the 3 days free period expires, the cargo is usually relocated from the terminal to the warehouses. Therefore, the information does not capture all the dwell time figures for the port. "Durban port shows that cargo dwell time is mainly a function of the characteristics of the private sector, but the onus is on public sector players, such as customs officials and the port authority, to put pressure on private sector users to comply with the rules and reduce cargo dwell time" (PRSA, 2012). Durban Port can still attempt to reduce the dwell time; however, it will be more challenging than prior to 2002.
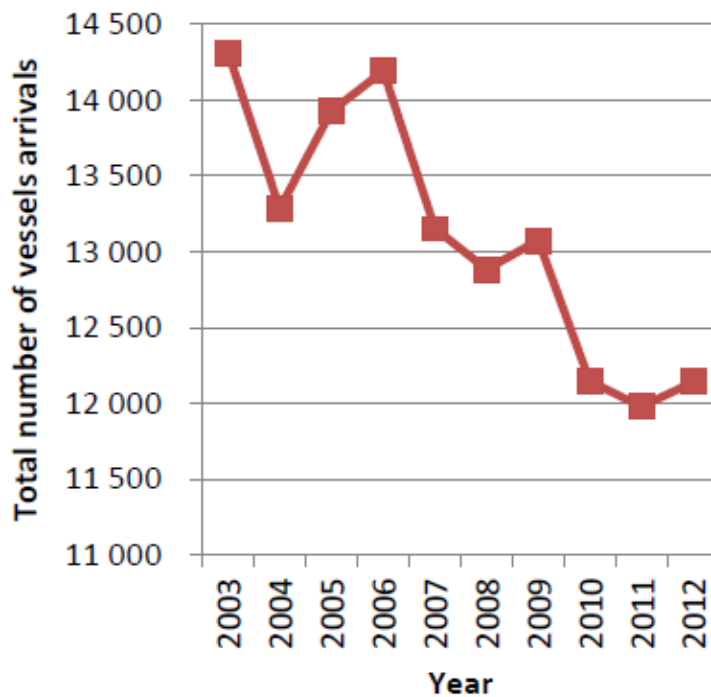
Number of vessels

Figure 12: Number of vessels arrivals

Source: Transnet National Ports Authority

The volume of cargo passing through the Durban Port has indicated an increasing trend with reference to Figure 10; however, Figure 12 indicates that the number of vessels passing through the port remains almost consistent. The number of vessels appears to be remaining consistent owing to larger vessels being utilized for transportation of cargo and shipping lines strives to achieve economies of scale. Therefore, the greater the number of large ships, then the less amount of vessels will be required to load or discharge cargo at the port. According to Jones(1997) "a notable trend has been the increase in 'multipurpose' traffic, single vessels that can carry a mélange of unitized, break-bulk and parcel bulk cargo. Overarching both these trends however, is the inclination of ship owners to replace their aging fleet with larger and more economical bulk and container vessels"
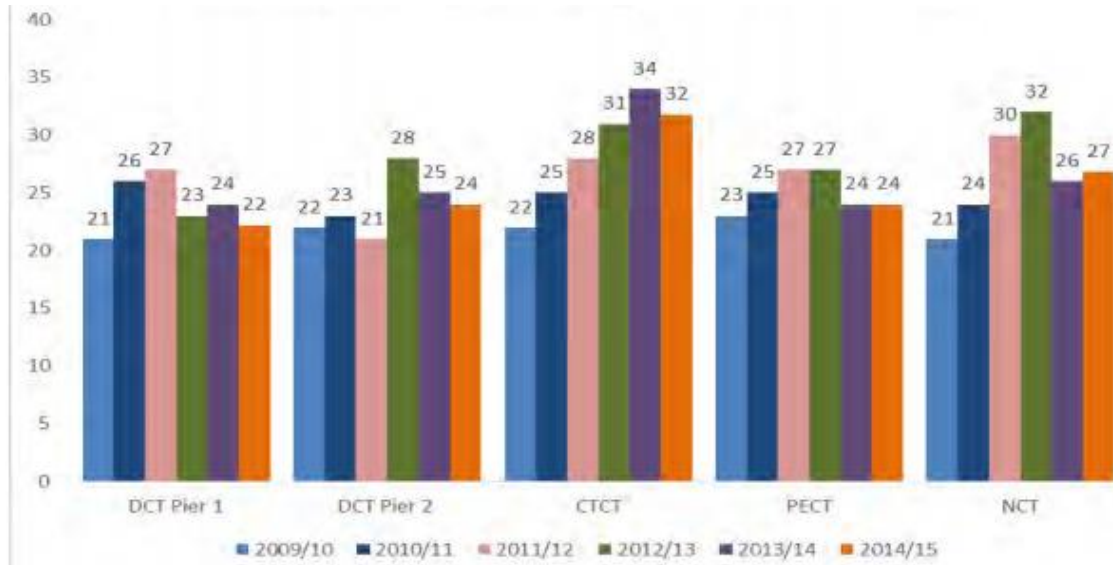
Crane moves per hour

Figure 13: Crane moves per hour

Source: Port Regulator of South Africa

Crane moves hour per are an indication of the effective measure of efficiency of the facilities of a port.The results from Figure 13 show that the Port of Cape Town has higher gross crane moves per hours in comparison to the other terminals. Cape Town increased since 2010 and has declined slightly in 2014/15.The other ports do not indicate a consistent trend. This may occur owing to targets that are probably based on the prior performance rather than a set of standards. The average gross crane moves per hour for both piers were 24.The average amount of moves for Durban Port is below the target of the "Medium Term Strategic Framework of 35 moves per hour, set to be achieved by 2019" (PRSA, 2015). Port of Cape Town managed to come close to the target in 2014; however, it did not manage to sustain the number of moves. The terminals have yet to reach an average performance of 30 moves per hour. Public reports have disclosed that TPT invested at DCT 2 for 7 tandem lift cranes. "This investment puts SA terminals on par with many European terminals handling similar volumes and vessel sizes" (PRSA, 2015).

Time spent at anchorage
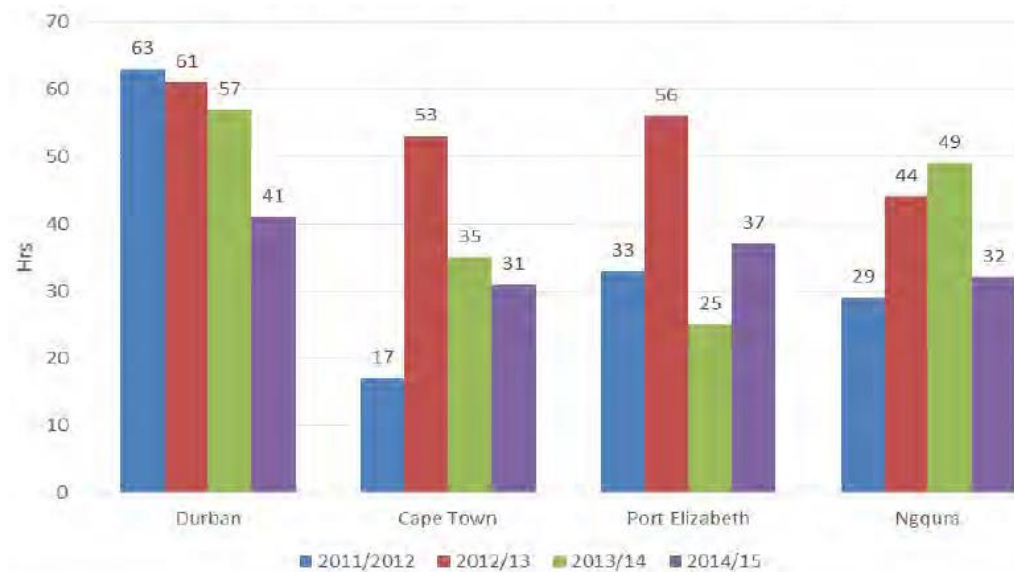
Figure 14: Time spent at anchorage: South African Terminals

Source: Ports Regulator of South Africa

Figure 14 illustrates the time spent at anchorage by container terminals. Durban Port has improved its performance over a four year period. However, the greatest improvement was between 2014 and 2015 with a reduction of 16 hours. The fact that fewer ships called at the Durban port might have also contributed to this improvement. The other ports have been inconsistent in terms reducing the time at anchorage; this makes it difficult to determine the trend. The others port appear to be more competitive than Durban Port. The port of Ngqura is performing at an exceptional level considering that it is a newly established port.

4.1   Summary

A case study methodology was utilized in order to derive the results. The five port performance indicators show that Durban Port has been performing at an exceptional level. The Port shows potential of becoming more competitive it may match the level of other international port such as Rotterdam.

5 EMPIRICAL EXAMINATION

5.1 Data Analysis

The research results were analysed to determine whether the governance structure has a positive impact on performance of Durban Port. The intention was to link the governance structure to port performance, where the input variable was governance structure and the output variable was performance. The results were analysed based on the performance indicators disclosed in chapter four. The analysis was based the following:

Container throughput (TEU)

The governance structure of Transnet changed in the year 2002, where Portnet was split into two state-owned entities, TNPA the landlord and TPT responsible for the port operations. TNPA is responsible for safe, effective and efficient economic functioning of the national system. The national ports authority also provides marine services and port infrastructure at the eight commercial ports in South Africa. It operates within a regulatory and legislative environment established by the National Ports Act 2005.TPT is responsible for commercial handling services of sea-route freight across imports, exports and transhipments in containers, bulk, break-bulk and automotive. The structural change of the entity has impacted the container throughput of Durban Port. The container throughput demonstrates a positive outcome. Prior to the change, the trend of the container throughput was declining. However, after the change in the governance structure, the container throughput increased in a linear trend. The port accounts for 60% of the national containerized cargo and over 4500 commercial ships call at the port per year (Rodrigue et al., 2014).This is an indication that the port play's a crucial role. Durban Port is ranked 58th in top 100 busiest ports in the world (Lloyds List, 2016). This is an indication that the governance structure has contributed tremendously towards the performance of the port.

Dwell Time

The duration of dwell time was from 2006 until 2010.The results in Figure 11 indicate that the dwell has been consistent for the duration. An average of 4 days was recorded from both import and exports. Durban Port's dwell time has been competitive in terms of the Sub-Saharan African region. Durban Port appears to be a good benchmark for South African ports and for Sub-Saharan African ports, in terms of performance. According to Raballand *et.al.*(2012) Durban Port has the lowest cargo dwell time in Southern Africa and in Sub-Saharan Africa. "Durban's dwell time is comparable to that of most ports in Europe or Asia, where dwell times of three to four days are the norm" (Raballand *et.al.*,2012). Dwell time is affected by the operations of the port which includes the governance of the port. The governance structure has a positive influence on dwell time because the port has managed to sustain the consistency of dwell time.

Number of vessels

The data ranged from 2003 until 2012.No data was available prior to 2003.According to the results in Figure 12, the number of vessels has declined drastically. A number of factors can be considered to determine the cause in the decline of ships. Currently, the sizes of vessels have increased. For example, larger container vessels have generated cost savings for the carriers and decreased maritime transports costs (Merk, Busquet & Aronietis, 2015).Carriers try to carry cargo in large volumes in order to reduce the unit costs of the cargo. This is known as economies of scale. Therefore, the larger the vessel, more reduction in unit costs of the cargo. Carriers do not have to utilise multiple small ships to ship the cargo, but instead they can use a large vessel to carry the cargo. It is also known that Durban is an expensive port. According to Port Strategy (2014) Durban is one of the most expensive ports in the world, mainly owing to the high cargo costs. Therefore, some vessels may opt to arrive at alternative ports in the country or neighbouring countries. Durban port developments may also disrupt some of the operations of the port, owing to the

upgrade of the facilities or systems. This factor may only enable the Port to accommodate fewer vessels as compared to the normal limit.

Crane move per hour

The outcomes indicate the Port of Durban experienced a challenge regarding the crane moves per hour. DCT Pier 2 improved its moves from 2012 to 2013.IN 2012,Minister Gigaba unveiled "Transnet's seven new state-of-the-art ship-to-shore cranes at the Durban Container Terminal – Pier 2, as the company surges ahead in its drive to boost productivity and efficiency in arguably the biggest and busiest port in the southern hemisphere." Owing to the additional cranes in DCT Pier 2, the crane moves per hour improved (Mncube, 2013). He further states that DCT Pier 2 had experienced challenges regarding its productivity, which affect the overall performance of the port. The challenge occurred owing to old and outdated equipment being utilized. A target of 35 crane moves per hour was set, however, Durban port did not manage to reach the target. Even though the facilities were upgraded, the port is still experienced challenges of increasing the crane moves per hour. Port of Cape Town has been performing exceptionally as compared to Durban.

Time spent at anchorage

This indicator is affected by the operations of the port. If the operations of the port are efficient and effective, then the vessels will not spend ample time at anchorage. The port of Durban has the highest anchorage time as compared to the other ports; therefore, vessels wait long before they can be serviced. The Port of Durban has indicated an improvement in Figure 14, even though it has the highest anchorage time as compared to the other national ports. A busy port is likely to experience. This performance indicator has not been consistent for the other ports. The results show that vessels spend less time at anchorage at Cape Town, Port Elizabeth and Ngqura Port as compared to Durban Port. A reduction in the time at anchorage will increase

the operations of the port; it will also result in financial benefits by having lower unit costs and make the port more competitive.

5.2 Summary

From the analysis of the five port performance indicators, it appears that the overall performance of the Durban has improved owing to the governance structure. The performance is attributable to the governance structure. It has been proven that the port has contributed immensely towards the economy of South Africa. It has contributed 15% of the South African GDP. According to (Rodrigue et al., 2014) Durban contributes significantly towards the labour market; this has been established by the estimation of direct employment (such as cargo handling, ship repair, security) and indirect employment (such as agriculture, inland transport) within the port.

6   CONCLUSIONS

6.1   Summary

The key object of the research paper was to determine the impact of governance structure on port performance of Durban Port. The paper argues that the governance structure substantially contributes towards the performance of Durban Port in a positive manor. Different authors have placed emphasis on port governance and established a number of port governance features. Port authorities and governments have implemented port reforms in their organisations in order for ports to become more efficient. They have a duty to ensure that they achieve their objects and that ports perform as intended. A sufficient time period has lapsed so ports may evaluate the impact of governance structures on port performance.

The research paper discusses the types, strengths and weaknesses of port governance. The paper also argues that governance affects the performance of a port. It also suggests that port performance is affected owing to the choice of a specific governance structure. It is also noted that ports have to achieve economic objectives, which means that the aim is to either maximize revenue for stakeholders or returns on investment by the government. The paper discusses the port performance and the indicators that were utilized to measure performance. The indicators were grouped into categories.

A case study methodology was utilized to test the hypothesis. Five port performance indicators were analysed to determine the impact of governance structure on Durban Port. From a holistic point of view the governance structure implemented by Transnet was favourable for the Port of Durban. The results indicated that Durban significantly improved its performance since 2002.The objectives of the paper were achieved. The paper identified the possible impact of governance structure on port performance and Durban Port was compared with to other national ports. Durban Port has shown that its performance has advanced for the past decade. It has

responded to political goals such as providing opportunities to citizens and has contributed towards the GDP of the South African.

6.2   Recommendations
Based on the study, the author recommends existing and future solutions in order to overcome some of the challenges faced by the Port of Durban.

In order for the port to retain its leading position in Africa, Durban Port can become more autonomous in order to be more competitive. It will result in a reduction of employees at the port and the mistakes prone to human error will be at a minimum. The congestion at the port will be reduced because an autonomous system functions faster than a manual system. The implementation of autonomous system will improve the performance of the port.

Durban Port should upgrade and expand its facilities. By doing so the port will be able to accommodate large vessels and expand its container capacity. Discussions of deepening and increasing the length of the berths have taken place. Transnet has plans to build a dig out port in Durban. The developments will be sufficient to meet customers' future demands.

The government should only focus on regulating the ports to ensure that they are serving in the best interest of the country. The pricing of the port services could be set by private operators instead of having a uniform tariff system. This will encourage competition among operators. It will enable operators to be free from government control.

Continuous training is imperative for staff and management. A skilful labour workforce is important due to the change in the technology in shipping, for example, ship size, type and cargo packing. There is a need to place emphasis on training in

order to produce suitable skills for specific jobs and to meet the customers' demands. This will enable the employees to be assigned with the tasks related to their skills. By doing so, Durban port will establish good communication channel between the various shippers, port users and to understand the customers' needs.

The efficiency of the Durban Port can be improved by privatisation. The government will not intervene with the operations of the port. Private sector is less stringent as compared to the public sector. Durban Port may consider privatizing some of the operations of the port and to also ensure that auditors audit the operations on a regular basis.

6.3   Limitation and further research areas

The dissertation had some limitations which may have affected the interpretation of the results. The size of the sample was limited. Creswell (1998) concludes that a range between 20 and 30 is the minimum amount of observations for research. It is also noted that the bigger the size of the sample, the better the results. Due to the lack of data the number of observations varied per indicator, this implies that the frequency of the data was not consistent. Therefore, this factor also affected the number of indicators that could be analysed.

For further research, the following should be taken into consideration: indirect factors that might affect the governance and performance the Port of Durban; to determine whether the rules and regulations are functioning as intended; and other performance indicators can be analysis once the data is available.

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