Mthembu and Chasomeris
Journal of Shipping and Trade (2023) 8:17
https://doi.org/10.1186/s41072-023-00148-7

Journal of Shipping and Trade

ORIGINAL ARTICLE Open Access

An evaluation of the governance structure of marine services in South Africa's ports system

Sphiwe Eugene Mthembu[1,2*] and Mihalis Chasomeris[2]

*Correspondence:
Sphiwe.Mthembu@transnet.net

[1] Transnet National Ports Authority, Port of East London, Port Control Building, East London, South Africa
[2] Graduate School of Business and Leadership, University of KwaZulu-Natal, Durban, South Africa

Abstract

Port governance structures are a vital factor impacting port investments, efficiencies, effectiveness and productivity. An important determining factor is the port management and whether it is centralized under the national government as a State-Owned Enterprise (SOE), decentralized to the municipal level, or alternatively privatized. Reforms in port management indicate that ports either subscribe to a public service port, tool port, landlord port or private port approach. Several inefficiencies exist in the governance, pricing and performance of marine services in South Africa. This study aims to evaluate the governance structure of marine services in South Africa's ports. The research methodology included observations, a focus group with six participants and semi-structured interviews with twenty participants that included port managers, harbour masters, port experts, port agents, terminal operators, and cargo owners. The main findings confirmed the need for the participation of private service providers in the provision of marine services in South Africa's ports and additional regulations on marine services to advance investment, performance and protection of port users. Although there is a need for private sector participation in the provision of marine services in South Africa's ports, participation should enhance the country's economic and developmental agenda, including job creation, investment in infrastructure, improved service provision and transforming the ports system.

Keywords: Marine services, Privatisation, Port governance, Port pricing, Port productivity, Investment

Introduction

Marine services in ports are a critical component of the port logistics chain. Ships visiting the ports require marine services to assist in navigating safely through port entrance channels and port waterways to access cargo berths. Several inefficiencies exist in the pricing and performance of marine services in South Africa. (Gumede and Chasomeris 2018; Grater and Chasomeris 2022; Mthembu and Chasomeris 2023, 2020). Chronic failures and inefficiencies in the provision of marine services in ports can have a grave negative impact on trade and, therefore, on the functioning of a country's economy. Marine services provision in South Africa's ports is notorious for chronic service failures that have generated industry players' concerns regarding shipping delays (Mthembu and Chasomeris 2023; Meyiwa and Chasomeris 2020). For example, the World Bank (2022)

published the rankings of 370 competent container handling facilities in 2021. South African ports were ranked towards the bottom, with Port of Port Elizabeth at position 312, Ngqura at position 363, Port of Durban at 364, and Port of Cape Town at 365. The governance structures of marine services play a fundamental role in the pricing, investments, efficiencies, effectiveness and productivity in providing marine services in South Africa's ports (Meyiwa and Chasomeris 2020). The Ports Regulator of South Africa showed that even though total National Ports Authority (NPA) charges are 69% higher than the internationally benchmarked mean, marine charges in South Africa's ports are 44 percent below the mean (PRSA 2021). The centralization of decision-making, and interconnectedness of the ports system are arguably the main contributors to the current marine state of affairs. The recent developments in ports governance structures and models have led to mounting pressure on countries' national governments to decentralize port-related decisions to regional, municipal and private entities (Panayides and Song 2009). Decentralizing decisions regarding port management and the provision of port services through partnerships, leases, licensing, and concessions have increased private sector participation in port operations (Brooks and Ferrell 2019). Generally, the common functions in port operations that are susceptible to transfer to the private sector are stevedoring, cargo handling, superstructure, pilotage, towage, mooring, dredging and other smaller operations of the ports. Port authorities transfer these port functions to private operators in an effort to increase port efficiencies and diversify investment in port infrastructure and superstructure. Opening the maritime industry for private sector participation in the provision of marine services could be the answer to several of the governance, pricing and productivity issues associated with the provision of marine services in South Africa's ports. This study aims to evaluate the governance structure of marine services in South Africa's ports. The research methodology included observations, a focus group and semi-structured interviews with twenty-six personnel including ports management, ports harbour masters, port experts, port agents, terminal operators and cargo owners. The paper encompasses the literature review, research methodology, findings, discussions as well as conclusions and recommendations.

A review of the literature

Ports are catalysts for socioeconomic activities which are crucial for the country to deal with societal progress, stagnation or regression in the regional and national economies (Munim et al. 2020). Ports generate economic benefits because of their operational activities, additional indirect benefits in the form of trade enhancement and collateral increases in trade-related services (World Bank 2007; Duru et al. 2018). The International Maritime Organization (2003) recognized the importance of having adequate marine services including pilotage, tug assistance, vessel traffic control, dredging and linesman in ports to ensure the safety of navigation and for the protection of both infrastructure and the environment. According to the Institute of Chartered Shipbrokers (2015), marine services (pilotage, tugs, mooring, VTS and dredging) are indispensable to the port operations systems. The efficiencies of marine services play a crucial role in the port performance: from the ship arriving at the port limit, anchorage area, berth availability, tugs and pilot availability and actual berthing of the ship. The increase in the number of vessels calling on ports increases the demand for tugs. According to Gans and

King (2003), there are benefits to be achieved from having a single service provider for pilotage, towage, and lineman services in ports. The key goal for a Ports Authority should be to ensure that pilotage, towage, and mooring services providers do not discourage or cause shippers to stop using the port (Chasomeris and Gumede, 2022). According to Kim (2016), ships are in greater danger when entering the confined water of the ports. The danger of collision is greater in the busy areas of the port limits than in the open seas. In general, the greatest danger from a shipping perspective is a ship becoming grounded in the confined waterway of the port approaches (Helmick et al. 2003). According to World Bank (2007), the readily availability of tugs, pilots and linesman can minimize the risk of ship-ship collisions, ship-to-infrastructure collisions, and grounding in the port's shallow waters (Helmick et al. 2003). Pilotage is the combination of operations required for a vessel to enter and exit port safely. This operation involves both the presence of port pilots onboard the ship as an expert with adequate knowledge of the confined spaces of the port and assistance by tugs due to risks associated with berthing the ship. The function of pilots is to navigate a vessel directing its movements and to determine and control the movements of the tugs assisting the vessel under pilotage (Port Rules 2009). According to Wu et al. (2020), pilotage is compulsory in most seaports around the world, this is supported by Port Rules (2009), that stipulate to the shipping community the need for pilotage and tug assistance to all ships visiting South African ports. It is common within the maritime industry for marine services to be provided by independent private participants licensed or concessioner by the port authority, while in other cases they can be provided by the public sector. Bulmuth (2015) favours privatization in the marine services, citing a positive impact derived from improved efficiencies, the elimination of a monopoly (by creating a more competitive market structure), and a transparent cost structure. According to Yang et al. (2019), bigger port authorities do not ordinarily provide marine services, as these are the functions of private service providers. The likelihood of the port authority (state) providing marine services is greater in smaller ports when compared to big ports. The governance of nautical operations and infrastructure is regarded as lying within the Port Authority's mandate under the harbour master's portfolio (World Bank 2007). This part of port services comprises all legal and operational tasks related to the safety and efficiency of vessel management within the port boundaries (De Langen and Pallis 2007). The main function of the harbor master's role relates to the prioritization of ships, allocation of berths and the coordination of all services necessary to berth and un-berth a vessel (Port Rules 2009). Such services include towage, pilotage, mooring and unmooring, water transfer and vessel traffic services (VTS). Port harbour masters are charged with managing incidents in ports (e.g., collisions, explosions, natural disasters, and pollutants).

The port management structures, and models have advanced over a few decades as the port industry develops and evolves to accommodate growing international trade (Notteboom and Yang 2017). Many countries have embarked on ports sector devolution (Cullinane and Song 2001). These evolutional changes are introduced through commercialization, deregulation, and privatization (O' Brien et al., 2019). Privatization has become an instrument of national government ambitions for investment in infrastructure through public–private partnerships. Privatization is the model underpinning several port sector changes (Cullinane and Song 2001). Over the years, the rapid increase

in global trade and concurrent growth in the number of ships, ships size and parcel sizes have elicited devolution in port governance structures and models of port management approaches (Brooks 2004). These devolutions advocate the transfer of functions and responsibilities of delivering port services from national governments to other public and private entities (Brooks 2004). Pallis (2006) argues that ports may fail to improve their image and further fail to understand port users' demands due to inadequate governance structures and models. In the private ports setting, competition between ports may lead to conflicts, as privatisation could lead to diminishing accountability which is not identified timeously (Xie et al. 2016). The public-controlled ports planning environment may lead to more efficient use of national resources but stifle competition and lower the port's ability to respond quickly to markets (World Bank 2007).

According to Meersman et al. (2006) policies are an essential catalytic agent which may determine a port's relative success or failure as ports are not governed by similar fashions or approaches. Ports are not uniform in all aspects of organizational structure which also determines their commercial freedom (Meersman et al. 2006). Private sector investment and involvement in ports emerged as significant developments as early as the 1980s before some ports became frequent bottlenecks to international supply chains (Lugt et al. 2015). The most notable and highly cited explanations for chronic service failures are centralized governance control, rigid hierarchical planning and command structure (Pallis and de Langen 2010). Ng and Pallis (2010) recommend decentralized structures and provide direction for implemented lessons from congested international ports. The model for decentralizing lies in transferring the legal status from public government organs to the holding shares of a separate entity with responsibility for managing seaport service delivery. Barros (2012) proposes solutions which include: the introduction of market-oriented policies, decentralizing port management functions and reducing government intervention in port affairs. They cite the benefits of matching the needs of port users to investment in port infrastructure (Simoes and Margues 2010). According to Veenstra (2004), the organizational structure of many ports worldwide has been decentralized, with more and more responsibilities of management of seaports being transferred to local, municipal or regional authorities, or being corporatized or passed to private entities. Europe Seaport Organization (2010) and Pinto and Anunciacao (2020) explain that nationalistic governmental ownership port management models tend to be isolated and distant from the ports resulting in a lack of intervention and a delayed response to issues about port operations. De Langen (2004) and Verhoeven (2010a, b) argue in favour of the regional or municipal port authority over a national public authority because a regional or municipal authority does not have pressure to increase profits and provides effective control of regional seaports. While the national government model has a negative impact on the delivery of port services, it mostly serves the interests of the politicians who might try to abandon market-based decisions (Competitiveness of ports in emerging markets 2014). According to World Bank (2007) the process of institutional reforms is complex and only occurs once in each generation. The World Bank (2007) issued a port reform toolkit, classifying port governance models and management structures by categorizing them into four types of port management model approaches: service ports, tool ports, landlord ports and fully private ports.

Table 1 Port governance models: description, advantages and risks. *Source*: Authors compiled from Baltazar and Brooks (2001), Brooks, (2004), and World Bank (2007)

Governance model	Description	Advantage	Risk
Service port model	This is the public sector model in which the port authority owns the land and all the assets (infrastructure and superstructure) using these to perform all port functions to provide all port services. The port is controlled by the Minister of Transport	The development function and operations of the port lie with a single entity, eliminating challenges related to streamlining of activities	Difficulty with regulation, infrastructure development and delivery of services to port users
Tool-port model	In this model, the port authority owns, develops and maintains the port infrastructure, superstructure and cargo handling equipment. In terms of the division of responsibilities and operational activities, the operation of equipment is done by the private sector	In this model, duplication of investment in facilities is avoided and small companies get to operate in the port industry	The risk is the possibility of conflict between companies performing at the operational level doing loading and unloading. Underinvestment is a big factor in this model
Landlord port model	In the landlord model, the port authority maintains ownership of port infrastructure. The superstructure is leased to the private sector. The main responsibility of the port authority in this model is economic exploitation, development of road infrastructure leading to the port, and maintenance of quays/ berths/ breakwaters	The benefit of this model is that one company owns and operates the equipment and superstructure, resulting in improved planning and responsiveness to market conditions	The risk is that there may be duplication in communication between customer, port authority and private operators as both the authority and the operator tend to visit the same customers
Private port	The private sector exclusively owns the port: including land, infrastructure and superstructure. Operation of the port is done by the private sector. The government has less interest in port services	Flexible investment in the port. Port efficiencies and performance are high. Pricing of port services is market oriented	The risk is that of private monopoly. If regulation is left to the private sector, the scenario of the private sector being the referee as well as the player is created and long term policy regulating the ports tends to be inadequate

Table 1 shows a description of each model as well as the advantages and risks associated with each port governance model.

As illustrated above, all port governance models have their own advantages, disadvantages, and risks. According to Gumede and Chasomeris (2012), South African ports have unique port management models that traverse public and semipublic port management models. Brooks and Pallis (2008) argue that seaport performance outcomes have an influence on the consequent manifestation of the next round of port reforms. Dating back to the 1980s, a few countries have evolved, and some have opted for the privatization of seaports services to improve their competitiveness and competitive position (Midoro et al. 2005). Privatisation has become common in recent years, changing the systems of supply chains worldwide (Farrell and Brooks 2019). The main motive for the seaport industry evolution is to achieve gains associated with operational efficiencies (Tongzon and Heng 2005). Maritime is recognized as a critical pillar facilitating world economic activities with its own governance systems yet the freedom to make clear policy decisions is intertwined with mega-governmental and political structures, a phenomenon referred to as "governance of governance" (Gjaltema et al. 2019). This interference has distorted the functioning of the maritime and governance of ports (Roe 2020). According to Zhang et al. (2018) private sector involvement in the provision of seaport services has become a norm rather than the exception. Notteboom (2006) supports this notion, stating that several governments and public port authorities worldwide have withdrawn from providing seaport services and opted for enterprise-based port services. According to the World Bank (2007), most developing countries are reluctant to engage in full privatization as it complicates regulation and heightens the risks of achieving the country's developmental goals. Cao (2020) emphasises the importance of the countries choosing a suitable model of governing the ports one will help promote trade growth. Table 2 shows the role of the public and private sectors' role in port management and service delivery.

Table 2 shows the interface between public and private sector roles in the provision of port services. South Africa's ports exhibit characteristics of being a public port although they are not pure public ports because both public and private sector terminal operators handle cargoes as well as invest in infrastructure and superstructure (equipment) (Gumede and Chasomeris 2012). The roles are sometimes deeply intertwined, blurring the line between public and private sector roles in the port environment (Van der Lugt

Table 2 Public and private role in port management. *Source*: Authors compiled from World Bank (2007) and Chasomeris (2011)

ACTIVITIES / PORT	PORT ADMIN	PORT INFRASTRUCT	PORT SUPERSTRUCTE (EQUIPMENT)	PORT SUPERSTRUCT (BUILDING)	CARGO HANDLING ACTIVITIES	NAUTICAL MANAGT	NUATICAL INFRASTRUCT	PILOTAGE	TOWAGE	MOORING	DREDGING	OTHER FUNCTIONS
PUBLIC PORT	Public	Public	Public	Public	Public	Public	Public	Public/ private	Public/ private	Public/ private	Public/ private	Public/ private
TOOL PORT	Public	Public/ private	Private	Private	Private	Public	Public	Public/ private	Public/ private	Public/ private	Public/ private	Public/ private
LANDLORD PORT	Public	Public	Public	Public	Private	Public	Public	Public/ private	Public/ private	Public/ private	Public/ private	Public/ private
CORPORATISE PORT	Private	Private	Private	Private	Private	Private	Public/ private	Public/ private	Private	Private	Public/ private	Public/ private
PRIVATE PORT	Private	Private	Private	Private	Private	Private	Private	Public/ private	private	Private	Public/ private	Public/ private
SOUTH AFRICA	Public	Public	Public/ Private	Public/ Private	Public/ private	Public	Public	Public	Public	Public	Public/ private	Public/ private

et al. 2016). In South Africa, the mandate for the NPA is to act as the landlord, and also to own, manage, control and administer all nine commercial ports along South Africa's coastline (National Ports Act 2005). The nine commercial ports are: the Port of Richards Bay, the Port of Durban, the Port of East London, the Port of Ngqura, the Port of Port Elizabeth, the Port of Mossel Bay, the Port of Cape Town, the Port of Saldanha and Port Nolloth. With the exclusion of Port Nolloth, the NPA provides all marine services (pilotage, towage, mooring, vessel traffic control, lighthouses, and water transfer) in the other eight South African commercial ports (Transnet 2018). The NPA runs an integrated port management system. The South African Government has created barriers to entry for the provision of marine services through the regulation and policy framework that includes, but is not limited to, Government Maritime Policy, the National Port Act (2005), Port Rules, and Berthing Rules. The Government Maritime Policy and the National Port Act (2005), provide the framework for managing maritime stakeholders. Still, both provide inadequate grounds for administering penalties in case of non-performance by terminal operators. According to Meyiwa and Chasomeris (2020), a conflict of interest exists between the Transnet National Port Authority and Transnet Port Terminals as the Authority and public operator are both sister companies. Table 2 shows the monopolistic ownership and provision of marine services in South Africa's ports which the TNPA largely controls. Port administration, port infrastructure, nautical management, nautical infrastructure, pilotage, towage, mooring and water transfer are all provided by the NPA. The private sector has been permitted to participate in other functions like port superstructure (equipment and buildings), cargo handling, and dredging (Gumede and Chasomeris 2015).

According to the World Bank (2007), all port reforms require solid vision together with proper planning and organization. A big question in the minds of many in the industry is whether there is a possibility of marine services governance evolution which will allow full access of the private sector in the provision of marine services occurring soon in South Africa's ports? The answer appears to be tied to the country's socio-economic objectives with the national government opting rather to continue with the centralization of port governance or to decentralize the decisions to a local/municipal level or to the private sector. As much as there are substantial maritime governance policy changes, these policy reforms have failed to meet the complex maritime environment requirements and subsequently affect the wider maritime economy (Roe 2018). Such a mismatch in policy squarely rests with the national government as a failure in regulation and governance at the sectorial level (Roe 2013). The World Bank (2007) provided a roadmap or set of guidelines for developing countries to implement port reform objectives. This roadmap cites the establishment of policies to guide port reform implementations, a sound legal framework, guidelines for funding and the establishment of roles and responsibilities for implementation. How the government as a representative of the people and maritime community views ports and their operations determines the potential of the port's commitment to the surrounding communities (Selkou and Roe 2022). Their ownership establishes the legal identity of ports (Martins and Azevedo 2011). The structure and ownership model defines the duties and responsibilities of the port to different stakeholders (World Bank 2007). Port governance is underpinned by the adoption and enforcement of principles, rules and structures by the ports authority harnessing

the image and aligning operational activities that deliver social and economic benefits (Notteboom et al. 2022). Baltazar and Brooks (2001) state that the choice of the model to adopt in each country is significantly influenced by issues of the socio-economic structure of the country, the historical development of the ports, the political influence, the type of cargo handled in the ports, the location of the ports and wider social factors. Three inputs are essential in determining port governance: strategy, structure, and the environment in which the port operates (Notteboom et al 2021). De Langen (2004, 2020) and Onwuegbuchunam (2018) identify three levels of governance: public national port authority, public regional/municipal port authority and private ownership. In South Africa, ports fall under the public National Ports Authority, a division of Transnet, a state-owned company. Port governance structures must consider the broader public interest when developing port policies and structures, striking the balance between port developments and social benefits (Brooks et al. 2022). The governance structure of ports is highly linked, to the political structures of the country, as such the influence of politics cannot be ignored (Notteboom et al. 2021). The balance of powers between government, financial institutions and legal/statutory framework bodies can be destructive to the efficient implementation of port reforms due to different and opposing interests of the stakeholders. According to Farrell and Brooks (2019), an assessment of the NPA roles includes seaports operator, landlord, conservation, regulator, trade facilitator, cluster leader, regional development agency and entrepreneur. According to the National Ports Act (2005), the function of the NPA is to own, manage, control and administer ports to ensure their efficient and economic function. The NPA must regulate and control navigation within port limits and port approaches. The NPA must ensure adequate, affordable and efficient port services and facilities are provided through excising leasing, licensing and concessions (National Port Act, 12. 2005). According to the National Ports Act (Act 12 of 2005), NPA must provide or procure tug services and pilot services, must license tugs and pilots' services and regulate the safety of tugs and pilot services by service providers. There are several inefficiencies in the pricing and performance of marine services in South Africa (Mthembu and Chasomeris 2020). The benefits and lessons can be extracted from the case studies of Colombia and Argentina with evidence of liberalization of port labor practices and transfer of services from the public to the private sector releasing choke points in the ports system (World Bank 2007).

Figure 1 illustrates the current structure of ports and marine services governance in South Africa's ports with the Department of Public Enterprise (DPE) having full ownership of Transnet (SOE) Ltd. (CCRED 2014). The national government have full ownership of the national ports operating under the state-owned enterprise called Transnet (Port Rules 2009). Within the state-owned enterprise (Transnet SOE), there are five operating divisions, Transnet Freight Rail (TFR), Transnet Pipelines (TP), Transnet Port Terminals (TPT), Transnet Engineering (TE) and Transnet National Ports Authority (TNPA) (Transnet 2018). The National Ports Authority (TNPA or NPA) is regulated by the Port Regulator of South Africa (PRSA) that reports to the Department of Transport (National Ports Act 2005). Within the NPA tariff book are marine services charges regulated by PRSA and charged to shipping lines (National Ports Act 2005). The Department of Transport is the custodian of maritime policy and the safety of ships in South Africa's waters is enforced through the

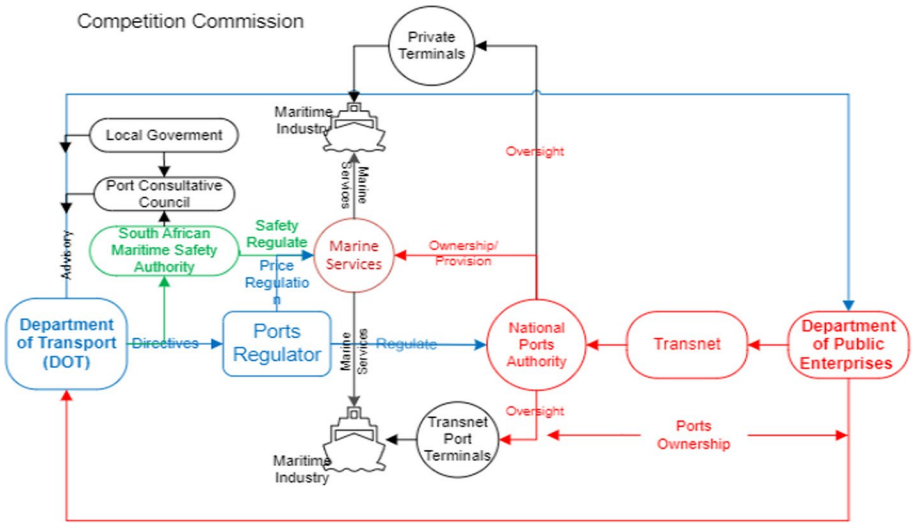

Fig. 1 Illustrates the governance structure and regulation of ports and the provision of marine services in South Africa. *Source*: Center for Competition, Regulation and Economic Development (CCRED) (2014) and Authors' own compilation

South African Maritime Safety Authority (CMTP 2017). The NPA owns and operates ports and provides marine services in ports whilst the Port Regulator regulates the pricing of port infrastructure (National Ports Act (2005). The balance of powers is evident between the Department of Transport (DoT) and the Department of Public Enterprises (DPE) (Comprehensive Maritime Transport Policy 2017). DoT regulates marine charges through PRSA, maritime safety, and the ship registry through SAMSA (CCRED 2014). The Department of Transport is a custodian of the National Ports Act (2005), Standard of Training Certification and Watchkeeping for seafarers (STCW), the Merchant Shipping Act, and the International Convention for the Prevention of Pollution from Ships. The Department of Transport promulgates maritime directives to the ports and port users in South Africa (Gumede and Chasomeris 2017). The Department of Public Enterprises (DPE) have full ownership of Transnet and owns and operates the port and provision of marine services, marine assets, and seafarers. The National Port Act (2005) states that the NPA should be incorporated as a subsidiary of Transnet, nevertheless, the NPA remains a division of Transnet. According to Meyiwa and Chasomeris (2020) the governance model resisted the legislation, and this has at best served to promote anti-competitive behavior and at worst accommodated years of corrupt activities that have negatively impacted the economy. The country remains deeply engrained with supply inefficiencies and a lack of investment in supply chain infrastructure. Meyiwa and Chasomeris (2020) recommend that "the National Ports Authority must be incorporated as a stand-alone entity outside of Transnet to bring the governance structure in line with international best practice for a landlord port (World Bank 2007). The evolution in the ports' governance structure will contribute to reducing conflicts of interest, improving transparency and accountability, incentivising improvements, and attracting private investments into the ports system" (Meyiwa and Chasomeris 2020: 179). The ports operational activities have

a direct impact on hinterland logistics and the derivatives are evident in the fluidity of the country's economic status (Brooks et al. 2021). The communities surrounding major ports may view ports as an originator of irritations, a social inconvenience and unattractive (Notteboom et al. 2022). Meaningful engagement and visible corporate social investment that benefits the communities can change community perception of the ports (O'Brien et al. 2019). Ports that are meaningful engaging port users and surrounding communities sharing visible benefits through schooling programs and community building project benefit from a positive image and reputational integrity (International Transport Forum 2015). Accordingly, Mthembu and Chasomeris (2022) provide evidence that shows that port stakeholders support the creation of a Port Community System (PCS) for South Africa's ports. A PCS would enable the intelligent and secure exchange of information between public and private stakeholders, on a single online platform, improving port performance, competitiveness and attractiveness. Furthermore, such a PCS would help enhance transparency and accountability, promoting better port governance.

Research methodology

This study employs a qualitative research approach to investigate the governance structure of marine services in South Africa's ports. Critical discourse analysis was used and applied to examine interactions and create meaning to respond to the research aims and objectives. Critical discourse analysis is primarily based on realist epistemological view (Fairclough 2013). A qualitative approach uses descriptions and categories to investigate human experiences and realities from participants' viewpoints (Young 2007). The permission to conduct research using interviews with employees and focus groups was obtained from Transnet Executive leadership. Moreover, as part of ethical clearance the University of KwaZulu-Natal Human and Social Sciences Research Ethics Committee granted ethical clearance with protocol number 00002007. Participants were selected from all eight commercial ports in South Africa. The population for the study was deemed to be all marine services stakeholders concerned with the operations of marine services in South Africa's ports. The target population are stakeholders directly impacted by marine services outputs e.g., harbour masters, ports management, ports operators, ports agency, port users, and employees of marine services in South Africa's ports. Non-probability sampling was used to select participants from the target population. In this sampling the probability of each participant being selected from the target population is not known as it contains an element of subjective judgement (Patton 2002). A purposive sampling technique was utilized to select participants, mainly based on their expertise, knowledge, experience and association with marine services in South Africa's port. Primary data was collected through in-depth interviews with twenty-six (26) participants whose input was sought in semi-structure interviews (see Table 3). According to Creswell and Poth (2016), a researcher must interview enough participants to allow for data saturation. These authors propose 5–25 participants as a benchmark. For the purpose of this study, thirty-two participants were selected, twenty-six selected for interviews and six participants for the focus group. During interviews, six participants withdrew from the research. There were eight (8) face-to-face interviews, eight (8) telephonic

Table 3 Category of participants in the study

Category of participants	Planned number of participants	Actual number of participants (interviews)	Actual number of participants (focus group)
Customers and experts	6	5	
Port managers	3	2	
Chief harbour master	1	1	
Harbour masters	5	4	
Snr. operations managers	3	2	
Operations managers	4	3	1
Technical managers	4	3	
Operations supervisors	2		
Tug master	1		2
General marine employees	3		3
Total	32	20	6

interviews and four (4) participants opted to communicate their responses in writing guided by the semi-structured interview questions. One focus group session was conducted. Audio interviews were recorded and transcribed for further analysis. Interview transcripts were coded, categorized and analyzed thematically. Each interview lasted for an average of about 45 min. The main questions asked were, "What is your view of the South African (RSA) ports governance structure? Do you think the port governance structure in RSA ports supports effectiveness, efficiencies and investment in infrastructure? In your view does the provision of the marine services model adequately provide for the needs of the maritime industry?

The main limitation of this study is that the majority of participants are employees of the National Ports Authority (NPA) and this may prejudice some of their responses. Further interviews were conducted with port users and the researcher also conducted participatory observation and survey of literature pertaining to port governance and applied learnings from stakeholder's comments (Meyiwa and Chasomeris 2020). Thematic analysis is the foundational method for qualitative data analysis (Braun and Clarke 2006). The purpose is to search for themes and patterns that emerge from qualitative data (which could be interview transcripts, observation, and documents) (Palmer and Bolderston 2006). In addition to the participants who answered the questions, a focus group interview was conducted with marine employees, including line supervisors. Each participant in both study groups signed a voluntary consent form.

Secondary data was collected from the maritime academic literature, company internal documents and publications including national government policies. Trustworthiness in qualitative research relates to the quality and credibility of the research in a naturalistic way (Palmer and Bolderston 2006). Credibility relates to questions of consistency and understandability whilst transferability speaks the potential adaptation of the research to new contexts (Palmer and Bolderston 2006). To ensure research quality and credibility, the researchers collected data through interviews. This was done to ensure data saturation and ensure no further themes were emerging from interviews (Creswell and Poth 2016; Creswell and Creswell 2018). Furthermore, to achieve trustworthiness (credibility and validity), the researcher utilized various methods of data collection (Interviews,

a focus group, a literature review, and observations) and transcripts were sent back to participants for validation and authentication (Cayla and Arnould 2013; Denzin 2012). Moreover, the draft paper was reviewed by an academic supervisor and peer reviewed by independent maritime experts reviewing the themes (Palmer and Bolderston 2006). The subsequent section discusses the findings.

Findings and discussion

This section of the paper presents findings and discussions from observations, a focus group and semi-structured interviews.

Observation

A combination of participatory and non-participant observations were conducted between November 2020 and May 2021 before and throughout the duration of the semi-structured interviews. During these observations, three themes emerged: the availability of marine infrastructure and equipment; marine services; and the availability of marine skills. To ensure alignment, marine services performance is described as how marine services function to achieve customer satisfaction (Malangalila Kinemo 2020).

Availability of infrastructure and equipment

During observation of shipping in ports, it was observed that the availability of tugs, pilot boats, and helicopters required to assist with shipping movements is an ongoing problem. These result in delays to shipping. According to the port berthing guidelines, marine services departments must provide sufficient floating crafts and pilots to assist with shipping. It was observed that out of 62 shifts in a month (considering two 12 h shifts in 24 h), the marine services department on average can only be provided with the required resources for approximately 70% of the time. Marine services can only cater for 70% of maritime industry requirements. Discussions with pilots and crews' on-board tugboats it became clearer that South African ports largely operate under a severe shortage of marine skills and equipment. Other reasons cited by crews on board marine crafts and pilots were the more serious structural problems that surface regularly. These include delays in the maintenance of equipment; breakdown of equipment; shortage of crews; delays in procurement of much needed spares; and prolonged equipment outages. These challenges negatively impact shipping movements in South Africa's ports, resulting in delays in ships and port users experiencing delays. It was noted during observations that the helicopter to transfer pilots to ships can only be provided during the day and not during the night shift. During discussions with crews, it was explicitly presented that there is generally a lack of skills required to man operations as there are not enough pilots, tug masters or engineers. The delays in the provision of marine services were attributed to the misalignment of the marine services governance structure in ports that fails to respond adequately to operational challenges. More observations were conducted during the harbour master's committee sittings. It was observed during the sittings of the 25th–26th August 2020, 9th December 2020 and 17th January 2021 that the governance structure contributes negatively to the risk profile of the marine services department. At a national level, marine services' top ten risks revealed three key challenges: the ageing fleet; challenges with the execution of maintenance; and a

misalignment in the reporting structures. The national risk registers point to challenges at a national level relating to a lack of investment funding, excessive bureaucracy (red tape) and delays in the execution of maintenance (scanty regime).

The focus group interview

The focus group interview session was conducted on 10th February 2021. The group comprised six marine services employees (Three general marine employees, two supervisors and one manager). The main aim of the focus group was to establish an understanding of the governance structure of marine services and measure its effectiveness in ensuring the seamless provision of marine services in South Africa's ports. Observations reveal that bottom-level employees' understanding of governance structure is limited to the internal reporting structure with no major link to the National Government. It was also observed that supervisory level employees understood governance of marine services to have a link to the Transnet group, with the Transnet Group reporting to the Department of Public Enterprises Minister. The management level employees fully understand the structure of marine services, citing the TNPA reporting to the Transnet Group, the Transnet Group reporting to the Department of Public Enterprises and ultimately to the National Government through Parliament (Center for Competition, Regulation and Economic Development 2014). According to focus group participants: "we report to the port manager and the port manager reports to head office, through the Chief Executive Officer of the National Ports Authority who reports to the Group Chief Executive Officer of Transnet. GCEO reports directly to the board of Transnet which then reports to the Minister of Public Enterprises". The supervisory level employees seemed more knowledgeable regarding marine services governance structure and management, but ground level employees do not fully understand marine services reporting lines. The middle manager participating in the focus group showed additional knowledge of governance structures of marine services citing the jurisdiction of the Department of Public Enterprises as published in the National Port Act (2005). It was obvious that ground-level employees' understanding of the governance structure is insufficient. Contrasting views were observed on the question of governance structure support of the provision of marine services performance in that management level employees advocated for change citing that the structure is not sufficiently supporting a culture of high performance. Ground level employees view the governance structure of marine services as sufficiently good and express satisfaction with the current structure, specifically stating that: "there is no problem with the manner in which the structure is functioning". According to the management level participants the hierarchical structure is a threat to operations due to hindrances arising from the chain of approvals. There is a hierarchical structure that delays delivery of required resources and the challenge with red tape that hinders the delivery of marine services to customers." This view is supported by a number of customer complaints from the South African Association of Ship Operators and Agents (SAASOA) (Meyiwa and Chasomeris 2020). The focus group session contributed to the development of the semi-structured interview questions and the related findings are discussed below.

Findings from the interviews

Semi-structured interviews with the 20 participants revealed that the National Government's socio-economic objectives and developmental goals have a major impact on the governance and management structure of ports in South Africa. Ports provide a means for attaining socio-economic objectives such as job creation, igniting economic activities, skills development, contribution to state revenues, and elevating poor communities.

Marine services governance in South Africa

Marine services in South Africa's ports are centralized under the National Government through the National Ports Act (2005). The NPA is the sole provider of marine services in South Africa. The public sector provides the entire spectrum of marine services, pilotage, stowage, mooring, vessel traffic control, water transfer and dredging (Gumede and Chasomeris 2012). All the respondents agreed that the NPA has a monopoly of marine services in South Africa's ports. The NPA runs an integrated management approach to administer all eight commercial ports in South Africa (Transnet 2018). According to most respondents, the integrated management approach is advantageous for the South African context as it provides flexibility and supports the country's socio-economic objectives. Furthermore, the integrated management approach fits well with marine services' governance as a closed single operator model. A closed single operator model is suitable for the South African context. The link between ports and National Government occasionally proves to be disadvantageous due to inefficiencies due to the hierarchical structure of reporting, excessive bureaucracy, and misalignment of priorities between government departmental goals (World Bank 2007). The bargaining power of unions has had a major influence on the administration of ports in South Africa stemming from the tripartite coalition between the Congress of South African Trade Unions (COSATU), the South African Communist Party (SACP) and the ruling political party the African National Congress (ANC). According to respondents, marine services in South Africa needs a system of governance that is less regulated to afford greater flexibility to allow the efficient provision of marine services in the ports system. According to most participants, the Public Finance Management Act (PFMA) is the greatest constraint to the efficient execution of operations. It contributes to confusion within the management executive structures and approval processes. According to the majority of respondents, "the most fundamental element of the current governance structure of marine services is its ability to cross-subsidize ports that, if they were standing on their own, would not afford to fund their infrastructure and equipment required to service the maritime industry, the case of the Port of East London and Mossel Bay are the main examples, due to lower shipping demand". The advantage of the integrated port management model is its ability to facilitate the coordination and regulation of demand and investment at a national level, reducing duplication whilst allowing greater utilization of assets.

Policy and regulatory framework

Maritime policies are traditionally problematic because of the complexity that comes with the international shipping trade (Brooks and Pallis 2008). According to the participants, South African maritime policies are sufficiently developed to support domestic, regional and continental trade. According to most respondents, South Africa has

adequate maritime policies and regulations, but there are difficulties in effectively implementing these policies. Several respondents said that the maritime industry is complex. When combined with port and hinterland logistics with various players, the current government structure needs to be revised to keep up with the demand of these industries. According to most respondents, "South Africa requires a separate maritime department with its own ministry to function effectively". The National Government intended to achieve an efficient ports system through the NPA, hence developing the National Ports Act (2005). Participants cited misalignment between the policy framework and the country's supply chain requirements due to imbalance and the fact that the Public Finance Management Act No, 1 of (1999) is unsuitable for the maritime industry requirements and hinterland logistics sector. Participants pointed to barriers and constraints in the efficient supply chain due to prolonged lack of investment in these sectors. Under the policy and regulatory framework section, respondents cited the abnormally complex hierarchy in the governance structure of marine services in South Africa's ports as a barrier. Decisions pertaining to investment requirements take excessively long to come to fruition compared to the private sector. The needs of other government agencies tend to conflict with that of the ports, resulting in a lack of investment in ports (Baltazar and Brooks 2001). Because of the link between ports and the government, the political structure tends to take center stage at the expense of customer requirements (Notteboom 2007). The National Port Authority has a monopoly in providing marine services in all eight of South Africa's commercial ports. Operating as an integrated and complementary system of ports, resources are shared between ports, and sacrificing resources for one port to serve one of the others creates dysfunctionality in the provision of marine services. However, according to respondents, the integrated system of ports approach also serves South Africa well in ensuring less duplication of resources at the national level. The integrated system of ports is aligned with government objectives of delivering socio-economic goals (World Bank 2007). This benefit is derived from common policies, procedures and job descriptions across all of South Africa's ports, reducing duplication in the system.

Marine service entry barriers

The provision of marine services is an important element of the ports supply chain logistics (Institute of Chartered Shipbrokers 2015). Marine services serve as a catalyst integrating maritime and land-based trade around the world. Entry into the provision of the marine services market has proven difficult, as only big companies and governments have monopolized this market over the decades (Gans and King 2003). The economic entry barriers into the provision of marine services markets have been the investment cost required for procuring marine crafts and the running costs (cost of fuel, statutory compliance requirement, and manning of marine crafts). According to participants, the most important barrier to entry in South Africa's marine services is the resistance by worker unions such as the South African Transport and Allied Workers Union and the United National Transport Union as they are the biggest labour stakeholders in the port environment. Almost all participants stated that, due to the high capital investment cost required, there is no room for members of previously disadvantaged communities to partake in the provision of marine services in South Africa's ports and gain economic

returns. Most respondents collectively agreed on the need for the introduction of competition in the provision of marine services to improve the availability of tugs and pilots and increase performance. According to respondents, introducing a third party into the marine services market in South Africa's ports will be difficult as the market is relatively small for healthy competition. According to the senior official in the harbour master department who participated in the interviews, the way marine services are priced in South Africa's ports makes marine services the cheapest in the world. The South African government uses a zero-profit-base model to price marine services, reducing shipping lines' costs. The introduction of multi service provider model may increase marine costs but also increase operational benefits. Most ports in developed countries around the world have opted for a multiple services provider model and some in the African continent have adapted to this model (World Bank 2007). Due to higher demand and lower levels of unemployment in developed countries, the multi service provider model tends to benefit the greater port systems with greater efficiencies (European Seaport Organization 2010). According to respondents, opening the South African marine services markets under the current circumstances may have a negative impact on the current cost and general employment in the port sector. The governance model needs amendments. One option available is to dissolve the NPA and to corporatize the port authority to report to regional governance or municipality structures via the board of directors. This arrangement will stop cross subsidization and enable quick decision-making pertaining to investments into port infrastructure. The national government can then focus on policy and the regulation of market conditions to create employment for South Africans and reduce the current unemployment rate of 46.2% (the expanded definition of unemployment includes those who have become discouraged from seeking work) (Statistics South Africa 2022).

Performance of marine services

The performance of marine services has been under intense scrutiny by shipping customers. The availability of pilots, floating crafts, pilot helicopters, dry-docks, tug-crews and berthing gangs have all been raised as concerns. Those in the industry have cited shipping delays as a result of the unavailability of certain elements in the provision of marine services. The CEO of the South African Association of Ship Operators and Agents cited many issues regarding tugs services, dry-docks, pilots, crafts crews and Transnet procurement processes which have impacted the provision of marine services in South Africa's ports. Participants in this study explained that several issues in the monopolistic structure of marine services need to be addressed for it to operate successfully. Such issues include inadequate crews, lack of forward planning, availability of equipment, and the need for efficient procurement processes to support operations for the system to work efficiently twenty-four hours a day seven days per week. One harbour master who participated in the interview cited the ever-changing business environment that is not supported by the changes in the Transnet processes resulting in misalignment with shipping customer needs. Collectively, respondents agreed that marine services operate at an average performance standard with room for improvement in South Africa's ports. The majority of respondents cited the hindrances to the efficient provision of marine services as: hierarchy of reporting with decision taking escalated to

headquarters, red tape in the system, highly unionized environment, outdated ageing marine services equipment, and the laid-back culture of the government workforce. One third of respondents felt marine services provision in South Africa's ports is on par with the rest of the world but cited the long lead-time in decisions as the main shortcoming. Most respondents stated that marine services provision is impacted negatively by the governance structure in that there is a high level of bureaucracy, improper culture and slow decision making with one of the main shortcomings being the current Public Finance Management Act, (Act No. 1 of 1999) requirements which hinder the delivery of most needed resources to support operations. Consistent with a landlord model, the private sector should provide most port services (Ergas et al. 2004). In European ports, marine services provision is dominantly provided by the private sector (European Seaport Organization 2010).

Conclusion and recommendations

Marine services are a critical component of the ports supply chain system. The provision of marine services in ports should be in the hands of a competent port authority or entity to prevent delays in shipping. Chronic services failure still exists in marine services resulting in the department becoming a bottleneck to the supply chain system. There is the possibility that poor marine services could negatively impact on shipping demand from South Africa's ports system. The regulatory environment of marine services should be set out so that it does not stifle operational efficiencies and result in shipping delays. The governance structure of marine services is critical in ensuring quick decision-making and ensuring a fast rate of change implementation in the system to align services with customer demands. As such, South Africa's ports system is not aligned with the world best practices in the industry.

The study's main findings demonstrate the need for private sector participation in the provision of marine services with additional regulatory frameworks for the provision of marine services in ports. There is a general need to open marine services to the private sector in South Africa's ports that will allow the private sector to invest in providing marine services. The increased competition will also benefit the productivity and performance of marine services in the ports system. One challenge is the size of the marine services market in South Africa. Some interviewees argued that it is too small for more than one player. Although there is a need for private sector participation (provision and investment) in marine services in South Africa's ports, such initiatives should enhance the country's economic developmental agenda (previously disadvantaged group participation in the economy and increased private sector investment in the ports system). The maritime policy framework guides maritime activities. Still, the National Ports Act (2005) fails to meet administrative issues related to penalties in cases where a port user is guilty of misconduct. This exposes the harbour master to abuse by industry players. It is essential to continually benchmark South Africa's policy framework against the best in the world. The National Ports Authority requires autonomy in decision-making regarding the capacity requirements as such decisions are crucial to the efficient provision of seaport services. Presently, critical decisions are made at a national level (headquarters) and managers at the port level are merely operators. Consequently, decisions take longer, and the system experiences delays in much-needed operational resources. Partly

attributable to the ageing fleet in South Africa's ports, the gap between the required marine equipment and the available equipment for operations results in inefficiencies in the ports system. The single-operator model adopted by the National Ports Authority is based on a single source of funding for the provision of services. The outcome is long lead times to the recapitalization of marine equipment. The governance structure of marine services has a complex hierarchy of excessive bureaucracy embedded in the system. This hinders the provision of marine services. The marine labour environment is highly unionized resulting in power struggles, inadequacies, and inconsistencies in the implementation of the policies. Political influence stifles and delays many attempts aimed at improving the port system. The outcomes of the existing governance structure of marine services include the lack of operational accountability and shipping delays. The industry has general concern regarding the provision of marine services in all of South Africa's ports. Problems arise primarily from the general lack of resources and the inadequate support from national governance structures to boost performance in the provision of port services.

The main recommendation for this study points to a separation of the National Ports Authority from the Transnet structure to allow for the Ports Authority to have autonomy in the execution of port-related strategic initiatives. This will enhance investment in ports and improve the turnaround time in the procurement of much-needed port infrastructure and equipment. Private sector participation in the provision of marine services is highly recommended to reduce the red tape that emerges from bureaucratic government systems. This will also reduce the impact of the two main trade unions' power that is evident at Transnet's operating divisions. Further development of the marine services regulatory environment to supplement the initiative of opening marine services to private sector involvement is a prerequisite. Marine services prices would increase, but investment, productivity and reliability of marine services should also increase. That may be sufficient to reduce the overall costs of trade through South Africa's ports. The PRSA (2021) benchmarking study showed that marine charges were 44 percent below the internationally benchmarked mean. Opening the provision of marine services to allow the private sector to participate will increase marine services prices. Still, it should increase investment and maintenance expenditure on marine services and improve the availability and productivity of marine services. Such benefits of improved availability, reliability and productivity of marine services (including tugs, pilot boats, pilot helicopters, dredgers, launches and human resources) should be of more significant benefit to the port users than the additional costs incurred by the increase in the prices of marine services.

Abbreviations

ANC	African National Congress
COSATU	Congress of South African Trade Union
DOT	Department of Transport
DPE	Department of Public Enterprises
GCEO	Group Chief Executive Officer
PRSA	Ports Regulator of South Africa
PFMA	Public Finance Management Act
SAMSA	South African Maritime Safety Authority
SA	South Africa
SACP	South African Communist Party
SAASOA	South African Association of Ship Operators and Agents

SOE	State-owned Enterprises
STCW	Standard of Training and Watchkeeping Certificate
TNPA	Transnet National Port Authority
TPT	Transnet Port Terminals
TP	Transnet Pipelines
TFR	Transnet Freight Rail
TE	Transnet Engineering
VTS	Vessel Traffic Control

Acknowledgements
We would like to give special thanks to God all mighty for the opportunity and strength. We also like to send special thanks to all participants who willingly participated on the work. We also like to give thanks to Professor Linda Robinson for English language editing of this work. Special thanks go to all the reviewers that have contributed to advance this work.

Author contributions
This work will contribute to the understanding of governance structure of marine services in South Africa and assist in shaping maritime and policy environment is South Africa and the rest of the world. Mr. SEM and Prof. MC designed the methodological approach. Mr. SEM put together literature review. Mr. SEM conducted research collecting and analysing data. Prof. MGC substantively reviewed work whilst both authors drafted conclusion of this work. All authors read and approved the final manuscript.

Authors information
Sphiwe Mthembu is the Port Manager in the port of East London. Sphiwe Mthembu is also a Doctoral student at the Graduate School of Business and Leadership at the University of KwaZulu-Natal. He holds a Master of Commerce in Leadership from the University of KwaZulu-Natal and B.Com Honours in Management from the University of the Western Cape. Sphere's research focuses on marine services and port logistics systems. One of his goals is to become a professor at one of the reputable Universities in South Africa.
Professor Mihalis Chasomeris is an Associate Professor at the Graduate School of Business and Leadership, University of KwaZulu-Natal (UKZN). Professor Chasomeris has a Ph.D. in economics from UKZN. His fields of academic research and experience in international consultancy include seaport pricing and governance, economic regulation, maritime transport economics, international trade and transportation costs. He has a sustained record of research in economics, as evidenced by his attendance and presentation at national and international conferences, as well as publications in accredited journals.

Funding
Not applicable.

Availability of data and materials
Authors like to indicate that most data used during the study is available from corresponding author on reasonable request. The data is privately saved on authors password protected laptop. Some data that was used during the study was lost during Transnet system cyber-attack. The IT department could not recover some files as they were corrupted during cyber-attacks. Hard copies of literature reviews are also available on request as they are filed in locked cabin.

Declarations

Ethical approval and consent to participate
We authors, Sphiwe Eugene Mthembu and Mihalis Georgiou Chasomeris wish to declare that this work has NOT been published by any journal before. This work in not under any consideration for publication elsewhere. I also will like to declare that I Sphiwe Mthembu currently an employee of Transnet National Ports Authority holding a position of Port Manager and I am also a student at University of KwaZulu Natal studying towards Doctors of Philosophy in Leadership Studies. By no means had Transnet SOE or Transnet National Port Authority funded this work. Prof Mihalis Chasomeris is a Professor at University of KwaZulu Natal. According to Authors, there are NO known conflicts of interest pertaining to this manuscript and that there has not been any financial support received for this work. There is no financial support that could influence the outcome. Authors confirm that this work was approved by both authors. We would like to confirm that there is no impediments to the process of publication that is foreseeable. The research was approved by University of KwaZulu Natal ethical committee (Ref No: 00002007).

Competing interests
The authors declare that they have no competing interests.

Received: 11 August 2022 Revised: 8 May 2023 Accepted: 9 May 2023
Published online: 22 May 2023

References

Baltazar R, Brooks MR (2001) The devolution of port management: a tale of two countries. Presented at the world conference on transport research, Seoul, July. https://www.researchgate.net/publication/252303625
Barros PC (2012) Productivity assessment of African seaports. Afr Dev Rev 24(1):67–78. https://doi.org/10.1111/j.1467-8268.2011.00305.x

Braun V, Clarke V (2006) Using thematic analysis in psychology. Qual Res Psychol 3(2):77–101. https://doi.org/10.1191/1478088706qp063oa
Brooks MR (2004) The governance structure of ports. Rev Netw Econ. https://doi.org/10.2202/1446-9022.1049
Brooks MR, Farrell S (2019) Port policy: are the goss principles still relevant today. Int J Shipp Transp Logist 11(5):405. https://doi.org/10.1504/ijstl.2019.102140
Brooks MR, Pallis AA (2008) Assessing port governance models: process and performance components. Marit Policy Manag 35(4):411–432. https://doi.org/10.1080/03088830802215060
Brooks MR, Knatz G, Pallis AA, Wilmsmeier G (2021) Visibility and verifiability in port governance transparency: exploring stakeholders' expectations. WMU J Marit Aff. https://doi.org/10.1007/s13437-021-00250-2
Brooks MR, Knatz G, Pallis AA, Wilmsmeier G (2022) Transparency in port governance: setting a research agenda. J Shipp Trade. https://doi.org/10.1186/s41072-021-00103-4
Bulmuth SM (2015) The privatization of pilotage services: a panacea for South Africa pilotage ills? (Thesis). University of Cape Town, Faculty of Law, Shipping Law Unit. Retrieved from http://hdl.handle.net/11427/15161
Cao L (2020) Changing port governance model: port spatial structure and trade efficiency. In: Malvárez G, Navas F (eds) Global coastal issues of 2020. Journal of Coastal Research, Special Issue No. 95. Coconut Creek (Florida), pp 963–968
Cayla J, Arnould E (2013) Ethnographic stories for market learning. J Mark 77(4):1–16. https://doi.org/10.1509/jm.12.0471
Centre of competition, Regulation and Economic Development: The Review of Regulation in the Ports Sectors (2014) By trade and industrial policy strategy (TIPS). University of Johannesburg. South Africa. Accessed 21 Feb 2021
Chasomeris M, Gumede S (2022) Regulation, governance and infrastructure pricing in South Africa's ports sector. In: Ferrari C, Haralambides H, Prete S, Tei A (eds) Regulation and finance in the port industry. Palgrave studies in maritime economics. Palgrave Macmillan, Cham. https://doi.org/10.1007/978-3-030-83985-7_4
Chasomeris M (2011) South Africa's ports: governance and pricing reform. Paper presented at the international association of maritime economists conference, Santiago, Chile, 26–28 Oct
Comprehensive Maritime Transport Policy for South Africa (CMTP) (2017) Department of Transport, Republic of South Africa. NDP 2030 Transport policy. May 2017. https://www.transport.gov.za/documents/11623/44313/MaritimeTransportPolicyMay2017FINAL.pdf/4fc1b8b8-37d3-4ad0-8862-313a6637104c. Accessed 21 April 2021
Creswell JW, Creswell JD (2018) Research design, qualitative, quantitative and mixed methods approach, 4th edn. Sage, Washington
Creswell JW, Poth CN (2016) Qualitative inquiry and research design: choosing among five approaches. Sage Publications, London
Cullinane K, Song D (2001) The administrative and ownership structure of Asian container ports. Int J Marit Econ 3(2):175–197. https://doi.org/10.1057/palgrave.ijme.9100013
De Langen PD (2004) Governance in seaport clusters. Marit Econ Logist 6(2):141–156. https://doi.org/10.1057/palgrave.mel.9100100
De Langen PW (2020) Getting port governance right. In: de Langen PW (ed) Towards a better port industry. Routledge, London, pp 22–97. https://doi.org/10.4324/9780203797501-2
De Langen PW, Pallis AA (2007) Entry barriers in seaports. Marit Policy Manag 34(5):427–440. https://doi.org/10.1080/03088830701585134
Denzin NK (2012) Triangulation 2.0. J Mixed Methods Res 6(2):80–88
Duru O, Shibasaki R, Segi S (2018) Maritime transport in regional context, governance and environmental phenomenon. Marit Policy Manag 46(1):1–3. https://doi.org/10.1080/03088839.2018.1515504
Ergas H, Fels T, Soon J (2004) Exclusive licensing in harbor towage. Rev Netw Econ. https://doi.org/10.2202/1446-9022.1048
Europe Seaport Organization (2010) Study aimed at supporting an impact assessment on: "Measures to enhance the efficiency and quality of port services in the EU" July 2013. Version: 1.3. Study carried out by PwC in partnership with: Panteis. Accessed 8 Mar 2021
Fairclough N (2013) Critical discourse analysis: the critical study of language. Routledge, London. https://doi.org/10.4324/9781315834368
Farrell S, Brooks MR (2019) Port policy: Are the goss principles still relevant today. Int J Shipp Transp Logist 11(5):405. https://doi.org/10.1504/ijstl.2019.10022850
Gans JS, King SP (2003) Contestability, complementary inputs and contracting: the case of harbour towage. Aust Econ Rev 36(4):415–427. https://doi.org/10.1111/j.1467-8462.2003.00298.x
Gjaltema J, Biesbroek R, Termeer K (2019) From government to governance…to meta-governance: a systematic literature review. Public Manag Rev. https://doi.org/10.1080/14719037.2019.1648697
Grater S, Chasomeris MG (2022) Analysing the impact of COVID-19 trade disruptions on port authority pricing and container shipping in South Africa. J Transp Supply Chain Manag 16:1–10
Gumede S, Chasomeris M (2017) Regulation of South Africa's ports: dilemmas and reforms. Paper presented at the international association of maritime economic (IAME), conference Kyoto, 27–30 June
Gumede S, Chasomeris M (2012) Port governance in South Africa. Interdiscip J Econ Bus Law 1(4):82–98
Gumede S, Chasomeris M (2015) Maritime port pricing and governance in South Africa: trends and stakeholder comments. J Econ Financ Sci 8(1):47–62
Gumede S, Chasomeris M (2018) Pricing strategy and tariff structure for a port authority: a case study of South Africa. Marit Policy Manag 45(2):1–14. https://doi.org/10.1080/03088839.2018.1446103
Helmick JS, Nicholas A, Glaskowsky JR (2003) State and federal regulation of pilots, piloting and pilotage: a study in contrasts and conflict. https://www.thefreelibrary.com/State+and+federal+regulation+of+pilots%2c+piloting%2c+and+pilotage%3a+a...-a013590341. Accessed 16 May 2021
Institute of Chartered Shipbrokes, Port and Terminal Management (2015) 2015 Edition, London. ISBN 978-1-908833-63-1
International Maritime Organization (2003) Ship/port interface; availability of tugs assistance. Ref.T3/3.01 (8 Sept 2021). http://I:\CIRC\MSC\1101-MEPC409-FAL100.doc. Accessed 03 Mar 2021
International Transport Forum (2015) The governance and regulation of ports, the Case of Italy international transport forum discussion papers. https://doi.org/10.1787/5jrw1khtxts1-en. Accessed 4 May 2023

Kim S-R (2016) Accident related to pilotage and criminal responsibility of pilots. Korean J Comp Crim Law 18(1):193–222. https://doi.org/10.23894/kjccl.2016.18.1.008
Lugt LV, Langen PD, Hagdorn L (2015) Beyond the landlord: worldwide empirical analysis of port authority strategies. Int J Shipp Transp Logist 7(5):570. https://doi.org/10.1504/ijstl.2015.072021
Malangalila Kinemo S (2020) Strategic plan as a tool for performance management in the tanzanian public sector. J Hum Resour Manag 8(3):146. https://doi.org/10.11648/j.jhrm.201200803.15
Martins LL, Azevedo B (2011) Coastline and seaports: legal organization and management. RevCEDOUA 14(27):9–42. https://doi.org/10.14195/2182-2387_27_1
Meersman H, Van de Voorde E, Vanelslander T (2006) Chapter 4 fighting for money, investments and capacity: port governance and devolution in Belgium. Res Transp Econ 17:85–107. https://doi.org/10.1016/s0739-8859(06)17004-3
Meyiwa A, Chasomeris M (2020) South Africa's port doctrine: dilemmas and the way forward. Marit Stud 19:179–191. https://doi.org/10.1007/s40152-020-00166-2
Midoro R, Musso E, Parola F (2005) Maritime liner shipping and the stevedoring industry: market structure and competition strategies. Marit Policy Manag 32(2):89–106. https://doi.org/10.1080/03088830500083521
Mthembu SE, Chasomeris M (2020) Examining marine services pricing in South Africa's port. Paper presented online at the international association of maritime economists (IAME) annual conference, 10–13 June, PolyU, Hong Kong
Mthembu SE, Chasomeris MG (2022) A systems approach to developing a port community system for South Africa. J Shipp Trade 7:26. https://doi.org/10.1186/s41072-022-00128-3
Mthembu SE, Chasomeris MG (2023) An assessment of the capacity and the performance of marine services in South Africa's ports. J Transp Supply Chain Manag 17:a879. https://doi.org/10.4102/jtscm.v17i0.879
Munim ZH, Sornn-Friese H, Dushenko M (2020) Identifying the appropriate governance model for green port management: applying analytic network process and best-worst methods to ports in the Indian Ocean rim. J Clean Prod 268:122156. https://doi.org/10.1016/j.jclepro.2020.122156
National Ports Act (2005) National Ports Act No. 12 of 2005. Government Gazette. Vol 482, no 27863. August 4, Cape Town, South Africa. https://www.transport.gov.za/documents/11623/114625/National_Ports+Act_a12_051.pdf/4f9f271c-3c79-44f8-be7a-e5e0fdbe76d7. Accessed 18 Mar 2023
Ng AK, Pallis AA (2010) Port governance reforms in diversified institutional frameworks: generic solutions, implementation asymmetries. Environ Plan Econ Space 42(9):2147–2167. https://doi.org/10.1068/a42514
Notteboom T (2006) Chapter 19 concession agreements as Port governance tools. Res Transp Econ 17:437–455. https://doi.org/10.1016/s0739-8859(06)17019-5
Notteboom T, Yang Z (2017) Port governance in China since 2004: institutional layering and the growing impact of broader policies. Res Transp Bus Manag 22:184–200. https://doi.org/10.1016/j.rtbm.2016.09.002
Notteboom T, Pallis AA, Rodrigue J-P (2021) Port economics, management and policies. Routledge, New York
Notteboom T, Pallis A, Rodrigue J (2022) Port economics, management and policy. Routledge, New York
O'Brien P, Pike A, Tomaney J (2019) Governing the 'ungovernable'? Financialisation and the governance of transport infrastructure in the London 'global city-region". Prog Plan. https://doi.org/10.1016/j.progress.2018.02.001
Onwuegbuchunam D (2018) Assessing Port governance, devolution and terminal performance in Nigeria. Logistics 2(1):6. https://doi.org/10.3390/logistics2010006
Pallis AA (2006) Chapter 7 Port governance in Greece. Res Transp Econ 17:155–169. https://doi.org/10.1016/s0739-8859(06)17007-9
Pallis AA, De Langen PW (2010) Seaports and the structural implications of the economic crisis. Res Transp Econ 27(1):10–18. https://doi.org/10.1016/j.retrec.2009.12.003
Palmer C, Bolderston A (2006) A brief introduction to qualitative research. Can J Med Radiat Technol 37(1):16–19. https://doi.org/10.1016/s0820-5930(09)60112-2
Panayides PM, Song D (2009) Port integration in global supply chains: measures and implications for maritime logistics. Int J Log Res Appl 12(2):133–145. https://doi.org/10.1080/13675560902749407
Patton MQ (2002) Qualitative research and evaluation methods, 3rd edn. Sage, Thousand Oaks
Pinto CJ, Anunciacao PF (2020) European seaports information systems. The impacts of directive 2010/65/EU. Econ Cult 17(2):38–49. https://doi.org/10.2478/jec-2020-0019
Port Rules (2009) Issued in terms of the National Ports Act, No. 12 of 2005, Section (80)(2). https://www.transnetnationalportsauthority.net/Legal,%20Risk%20and%20Compliance/NationalPortAct/Documents/Port%20Rules%20GG31986%20060309.pdf. Accessed 4 May 2023
PRSA (2021) Global pricing comparator study 2020/21. Port Tariffs. Benchmarking South African port administered prices against a sample of international ports. Report No. 9. https://docplayer.net/215775745-Global-pricing-comparator-study-2020-21-port-tariffs.html. Accessed 28 Mar 2022
Roe M (2013) Maritime governance and policy-making: the need for process rather than form. Asian J Shipp Logist 29(2):167–186. https://doi.org/10.1016/j.ajsl.2013.08.003
Roe M (2018) Polish shipping under communism. Routledge, London. https://doi.org/10.4324/9781315202280
Roe M (2020) Negative juxtaposition. Gov Policy Juxtaposition. https://doi.org/10.1007/978-3-030-31848-2_8
Selkou E, Roe M (2022) Globalisation, policy and shipping: fordism, post-fordism and the European Union maritime sector. Edward Elgar Publishing
Simões P, Marques R (2010) Seaport performance analysis using robust non-parametric efficiency estimators. Transp Plan Technol 33(5):435–451. https://doi.org/10.1080/03081060.2010.502375
Statistics South Africa (2022) Quarterly labour force survey. https://www.statssa.gov.za/publications/P0211/P02111stQuarter2022.pdf. Accessed 1 June 2022
The competitiveness of ports in emerging markets (2014) International transport forum policy papers. https://doi.org/10.1787/5jlwvzht4rmt-en. Access 23 Mar 2021
The World Bank (2022) The container port performance index 2021: a comparable assessment of container port performance. World Bank, Washington, DC. License: Creative Commons Attribution CC BY 3.0 IGO. https://thedocs.worldbank.org/en/doc/66e3aa5c3be4647addd01845ce353992-0190062022/original/Container-Port-Performance-Index-2021.pdf. Accessed 6 July 2022

Tongzon J, Heng W (2005) Port privatization, efficiency and competitiveness: some empirical evidence from container ports (terminals). Transp Res Part A Policy Pract 39(5):405–424. https://doi.org/10.1016/j.tra.2005.02.001
Transnet (2018) Port development plan, retrieve from, http://www.Transnet.net/businesswithus/LTPF%202015/4/port. Accessed 05 Feb 2021
Van der Lugt LM, De Langen PW, Hagdorn L (2016) Strategic beliefs of port authorities. Transp Rev 37(4):412–441. https://doi.org/10.1080/01441647.2016.1245685
Veenstra AW (2004) The handbook of maritime economics and business. Marit Econ Logist 6(2):190–192. https://doi.org/10.1057/palgrave.mel.9100103
Verhoeven P (2010b) A review of port authority functions: towards a renaissance? Marit Policy Manag 37(3):247–270. https://doi.org/10.1080/03088831003700645
Verhoeven P (2010a) Report of an enquiry into the current governance of European seaports, European Port Governance. 'The Espo Fact-Finding Report'. https://www.espo.be/.../espofactfindingreport2010a. Accessed 21 April 2021
World Bank (2007) Port reform toolkit second edition. [Online] http://regulationbodyofknowledge.org/wpcontent/uploads/2013/03/WorldBank_Port_Reform_Toolkit.pdf. Accessed 12 Mar 2020
Wu L, Jia S, Wang S (2020) Pilotage planning in seaports. Eur J Oper Res 287(1):90–105. https://doi.org/10.1016/j.ejor.2020.05.009
Xie F, Chi J, Liao J (2016) From share issue privatization to non-tradable share reform: a review of privatization in China. Asian-Pac Econ Lit 30(2):90–104. https://doi.org/10.1111/apel.12149
Yang D, Jiang L, Notteboom T (2019) Innovative solutions for shipping market turmoil: the search for profitability, sustainability and resilience. Transp Policy 82:75–76. https://doi.org/10.1016/j.tranpol.2019.01.007
Young L (2007) An introduction to qualitative research [book review]. Qual Res J 7(2):80–81. https://doi.org/10.3316/QRJ0702080
Zhang Q, Geerlings H, El Makhloufi A, Chen S (2018) Who governs and what is governed in port governance: a review study. Transp Policy 64:51–60. https://doi.org/10.1016/j.tranpol.2018.01.019

Publisher's Note