

**Politicisation of Digital Transformation in Developing Countries: Essays on Ghana's Port Reform
and Performance**

PhD Dissertation

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Summary

This dissertation investigates the socio-technical, institutional, and political factors that mediate port reforms and performance at the Tema Port in Ghana through a series of standalone yet related essays. Specifically, the dissertation focuses on the politicisation of the digital transformation process, which was a vital component of the port reform meant to improve port performance. In addressing port performance, the study focuses on effectiveness which is a challenge in many state-run institutions in developing countries.

Because ports in developing countries are primarily state-owned and politically controlled, the reform processes are often politicised. Meaning political actors elevate the salient issues to public debates. Using a case study of port modernisation and reforms at Ghana's largest port, the dissertation develops these arguments by tracing the evolution of the port reforms, the interventions made, and the resultant controversies engendered around Information Technology, including large-scale infrastructure development in the Tema Port in Ghana.

The study theorises digital transformation - a process of using digital technology to (re)define a value proposition and change the organisation's identity - as institutional change and reform achieved through the mediation of state and non-state actors, including politicians, or frustrated by the same. The study makes two contradictory yet complementary findings. On the one hand, it identifies bottlenecks, particularly human agency, in the form of political and institutional entrepreneurs who delay the transformation process through duplication of functions and IT vendor procurement politics. On the other hand, human agency in the form of a political entrepreneur succeeds in ensuring digital transformation in the port.

The research results emanate from an action research approach with much insight gained from being on the ground whilst events unfolded in the IT implementation process at the Port of Tema. The researcher used various approaches such as socio-technical systems, soft system methodology, stakeholder analyses and institutional change theory to understand stakeholders'

conduct better. The combined approach was essential in mapping stakeholders and their role in the port and untangling each stakeholder group's complex, diverse and broad perspectives. The complexity of the port space also lends itself to multidisciplinary studies. Therefore, the arguments developed in this dissertation are based on constructs from multiple disciplines for explaining complex interactions and conduct of state and non-state actors in the port sector of developing countries.

Resumé

Denne afhandling undersøger de socio-tekniske, institutionelle og politiske faktorer, der formidler havnereformer og præstationer ved Tema Havn i Ghana, gennem en række selvstændige, men relaterede essays. Specifikt fokuserer afhandlingen på politiseringen af den digitale transformationsproces, som var en vital komponent i havnereformen, der skulle forbedre havnens ydeevne. I forhold til havnepræstationer fokuserer undersøgelsen på effektivitet, som er en udfordring i mange statsdrevne institutioner i udviklingslande. Fordi havne i udviklingslande primært er statsejede og politisk kontrollerede, er reformprocesserne ofte politiserede. Det betyder, at politiske aktører bringer de fremtrædende spørgsmål til offentlige debat. Ved at bruge et casestudie af havnemodernisering og reformer i Ghanas største havn, udvikler afhandlingen disse argumenter ved at spore udviklingen af havnereformerne, de foretagne indgreb og de deraf følgende kontroverser, der er skabt omkring Informationsteknologi, herunder storstilet infrastrukturudvikling i Tema Havn.

Studiet teoretiserer digital transformation - en proces hvor digital teknologi bruges til at (re)definere et værdiforslag og ændre organisationens identitet - som institutionel forandring og reform opnået eller blokeret af statslige og ikke-statslige aktører, herunder politikere. Undersøgelsen har to modstridende, men komplementære resultater. På den ene side identificerer den flaskehalse, især menneskelig handlekraft i form af politiske og institutionelle iværksættere, der forsinker transformationsprocessen gennem dobbeltfunktioner og it-leverandørers indkøbspolitik. På den anden side lykkes menneskelig indblanding i form af en politisk iværksætter at sikre digital transformation i havnen.

Forskningsresultaterne udspringer af en aktionsforskningstilgang med megen indsigt opnået ved at være tilstede, mens begivenhederne udspillede sig i IT-implementerings processen på Tema Havn. Forskeren brugte forskellige tilgange såsom socio-tekniske systemer, blød systemmetodologi, interessentanalyser og institutionel forandringsteori for at forstå

interessenternes adfærd bedre. Den kombinerede tilgang var afgørende for at kortlægge interessenter og deres rolle i havnen og udrede hver interessentgruppes komplekse, mangfoldige og brede perspektiver. Komplexiteten i havnerummet giver også mulighed for tværfaglige undersøgelser. Derfor er argumenterne i denne afhandling udviklet på baggrund af konstruktioner fra flere discipliner til at forklare komplekse interaktioner og adfærd hos statslige og ikke-statslige aktører i havnesektoren i udviklingslande.

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Part A:

Chapter 1: Extended Introduction

1. Introduction

The topic of this dissertation is the politicization of port reform in Ghana, with a particular focus on digital transformation as a strategy for improving efficiency and reducing corruption in Tema, one of Ghana's leading ports. Rather than relying solely on standard metrics of port performance, this dissertation employs a qualitative research design to understand the underlying logics that lead to outcomes other than those that are intended. The study aims to explore the socio-technical, institutional, and political factors that mediate port reforms and performance at the Tema Port in Ghana through a series of standalone yet related essays. These essays capture the perspectives and conduct of stakeholders during the reform process, exploring how perceptions, imaginaries, concepts, and power are interpreted, performed, and exercised by powerful individuals, state and non-state actors to shape the direction of port development. By considering these angles, this study aims to provide new empirical and conceptual insights into port reform and performance in a developing country context, and to advance our thinking on port reform beyond technical issues by considering the role of politicization in shaping reform efforts.

1.1 Setting the Scene: Port Reforms and Economic Development

The consequences of congestion in ports around the world after the COVID-19 pandemic reveal a dependence on ports by local markets and global economic and trade networks. The chaotic aftermath of the COVID-19 pandemic brought closer attention to ports and how they are run and their impact on society in general. With about 80 per cent of world trade in volumes being seaborne trade, ports are not only the backbone of the international trading system but local economies as well.

Since the 1980s, there has been a quest to improve port performance, so that ports can serve their role as economic enablers and facilitators of the world economy. While the connection between ports and economic development is arguable (Brooks, 2016), it finds adequate support in the literature and in practice. Van et al. (2017), links economic liberalization with a connection to the world economy. Likewise, Olukoju (2020) finds that a symbiotic relationship exists between seaports and economic development and that the seaport is both a cause and a result of development. On the one hand, the economic growth and development of the hinterlands are a function of the seaport's capacity and degree of sophistication (Bosa & Hidalgo, 2020; Chalfin, 2010b). On the other hand, institutions (Freund & Rocha, 2011a; Hilling, 1969), geography, and culture (Hilling, 1969) are the essential development factors contributing to efficient or inefficient ports. The impact of this relationship is evident in the development levels of landlocked countries that depend on these factors in coastal states to engage in international trade. Further support for the idea can be gleaned from the relationship between the ports/port cities and the development paths of nation-states in Asia (Ducruet, 2013).

The crucial role played by ports in national development and the global economy is apparent in national policy frameworks and private transnational corporations' strategies. This dual role of ports often also means that they are sites for conflicts in ideas, concepts, perceptions and power. A critical dilemma port managers and other actors in the port face in their everyday effort to national and global imaginaries is contradictory logics and strategies. This can be seen, for example, in the function of the port either as a gateway or transshipment port which creates tensions between local and global economic and political actors.

Chalfin (2010b) argues that ports are sites of state formation where new forms of governance emerge through travelling ideas via international capacity development and technology. State

power has diminished in many ports worldwide because transnational experts introduce states to shared ideas and practices of how ports should be run. Private sector operators can implement modalities of governance that states cannot pursue (Chalfin, 2010) through the control of their global logistics infrastructure. While the country may consider its ports to be national assets, sites for global terminal operations are considered part of the global supply chain infrastructure (Notteboom et al., 2022). Here, seaport and inland terminals confront market players with operational considerations, such as imposing berthing windows, dwell time charges, and truck slots, to increase throughput, optimise terminal capacity, and make the best use of available land (Rodrigue & Notteboom, 2009). The result is the formation of new transnational modes of government, including companies, transnational experts, and other intermediaries (Hönke, 2018). Hence, besides being sites for economic development, ports are also sites for conflicts of logics and power (re)distribution.

1.1.2 Port Reforms in Developing Countries Context

Neo-liberal reforms form the basis of many port reform programmes. Studies of African ports show that port reforms have presented mixed results, consistent with the general literature on such neo-liberal reforms. Neo-liberalism is a complex political-economic governance type that extends market relationships (Larner, 2000). Its main goals are diverse and include providing sustainable economic development (Remmer, 1998; Stroeve et al., 1999), creating a market-based economy that is open to foreign investment and competition, and reducing the role of the state in the economy to promote private sector development. However, the effectiveness of these reforms is mixed, and there is a great deal of debate surrounding their utility and success. Argy (2001) suggests that some reforms aimed at improving the efficiency and effectiveness of government are successful, and others are driven by ideology with little economic benefit.

While some studies have found neo-liberal reforms to be successful in achieving their intended objectives of improving the efficiency and effectiveness of government (Argy, 2001; Huber & Solt, 2004), others have found negative consequences such as increased income inequality, slowed employment growth, and decreased social welfare entitlements (Hall & Ludwig, 2010; Novick et al., 2009; Panić, 2007; Richards, 1997; Siddiqui, 2018; Swank, 2005; Tiwari & Kumar, 2019). Several authors have expressed concerns about the negative consequences of neo liberal reforms. For instance, Richards (1997) found that these reforms had decidedly adverse consequences for most of the urban working class and rural peasantry. Lyberaki & Tsakalotos (2010) argue that these reforms may not be the best solution for economies, as they can be constrained by social and institutional factors. Panić (2007) supports this argument by showing that, in Europe, the best performing of the three known models of capitalism (liberal, corporatist, and social democratic), has the least in common with the neoliberal economic orthodoxy. Furthermore, Choi & Woo (2011) further iterates that in countries with high levels of corruption, extensive economic liberalization leads to faster economic growth, but does not improve distributive justice, ultimately increasing poverty and leaving inequality levels intact after development.

Overall, while neo liberal reforms may drive economic growth, they often neglect people's welfare resulting in negative consequences, as expressed by the majority of the literature. Economic reforms have been found to sideline the social dimension by redefining key aspects of the existing labour and social protection regimes, fundamentally altering perceptions of the relationship between social and economic policies (Novick et al., 2009).

Port reforms have had varied impacts on society and economic sustainability of the port and the countries involved. Developing countries may find it particularly challenging to weather the impact of such reforms. According to Debie (2012) the impact of private investment on port

development is challenging in West Africa because international operators seek to dissociate their economic interests from the well-being of the areas they serve. Furthermore, due to rapid deregulation and lack of expertise in public action concerning port policy, the externalities on society are mostly unaddressed in Africa.

Evidence from Kothuis & Slinger's (2018) study on Tema shows a disconnect between the port enclaves and the surrounding community. In the study, the neighbouring community unanimously recounted the negative impacts of the expansion rather than the positive impacts on their jobs or livelihood. Lawer (2019) also notes that the private investors in the Tema Port expansion project did not respect the social and environmental concerns of the stakeholders as agreed in the Environmental and Social Impact Assessment (ESIA) and stakeholder engagements but had merely signed the agreement to satisfy regulatory requirements.

Besides weak institutions, several challenges offset the gains from reforms, such as poor hinterland accessibility, infrastructure deficit, high transport costs, corruption and bribery, trade fraud, delays at border crossings, lack of harmonisation in customs practice at frontiers, long transit times for trucks, long turnaround times or unnecessarily long wait times for ships, absence of a supply chain culture, shortcomings in the execution of the contract of customs and poor service quality (Abayomi, 2016; Chalfin, 2010; Debie, 2012; Freund & Rocha, 2011a; Gekara & Chhetri, 2013; Layaa & Dullaert, 2014; Ojadi & Walters, 2015; Gael Raballand et al., 2012). However, the biggest constraints are not necessarily the challenges mentioned above, but rather instituted practices with vital human elements or interests (Freund & Rocha, 2011). These challenges discourage trade, alienate transport, and reduce connectivity. Investment in port infrastructure has not been commensurate with support for structural reforms to change the behaviour of stakeholders (Gael Raballand et al., 2012).

Olukoju (2020) aptly summarises the problem by saying, “*human and natural forces impinge on and affect the character, function and fortunes of ports*”. The literature on ports acknowledges the role of stakeholder management in the performance of a port. However, earlier studies have not adequately considered the diversity of stakeholders and the diversity of their interests. While a few have looked at port user groups (Brooks and Schellinck, 2015) and the wider logistics chain (Marlow & Casaca, 2003), even fewer scholars have highlighted the individual or people-level actions that impact port effectiveness (Addo and Avgerou, 2021). Much scarcer is the absence of literature on the political influence on ports. While the literature assumed that the target of reforms in Africa are bureaucrats and government institutions, Chalfin (2010a) finds, studying the Tema Port in Ghana, that they function as the engine for changes in state sovereignty. This dissertation further explores this angle and makes a contribution to the understanding of the nuances of this paradigm. The dissertation explore this discovery further by interrogating how power is redistributed in the reform process.

1.1.2.1 Port Governance and Performance

While the field of port studies formed the basis of the study’s empirical analysis, the conceptualisation of port governance and performance in broader state logic from History, International Relations (IR), and Information Systems (IS) are keys to examining the conduct of stakeholders in port reforms in Africa. An integrated inter-disciplinary approach to sustainable port performance, which identifies the different linkages between politics, economics and international relations, provides an analytical connection that speaks to port performance.

1.1.2.2 Conceptualising Port Efficiency and Effectiveness

Port studies have produced an enormous amount of scholarship on port efficiency that catalogues its drivers (Martino & Morvillo, 2008; Tongzon & Heng, 2005; Yeo et al., 2008), their

measurement (Estrada et al., 2017; Nguyen et al., 2016), and relation to port governance (Akinyemi, 2016; Brooks & Pallis, 2008; Nwanosike et al., 2016; Oblak et al., 2013; Onwuegbuchunam, 2018; Pagano et al., 2013; Trujillo et al., 2013a; Ugboma & Oyesiku, 2020). However, the literature is biased towards efficiency assessments and measures. With a few exceptions (Brooks, 2006; Marlow & Casaca, 2003), it largely ignored the perspective of port users in favour of efficient measures for ships and cargo. Ports seeking to attract large-scale shipping and terminal operating companies do so through technical efficiency improvements, but ports can achieve overall superior performance if efficiency is accompanied by effectiveness (Brooks et al., 2011). The literature distinguishes between port efficiency and effectiveness in accessing port performance. Efficiency measures the operational and financial performance of the port and the maximisation of the produced output with given resources, while effectiveness measures user satisfaction (Brooks & Pallis, 2008; Theo. Notteboom et al., 2022; Pallis et al., 2007). The two sum up a port's overall performance.

Brooks (2006) was one of the first to consider users' perspectives and evaluate whether the port's services met their needs. Brooks et al. (2011) defined the constructs of efficiency and effectiveness. They identified an approach to classify port users as more than just the buyers of the port's services, such as cargo interests (and their agents) and shipping lines, and included a group known as supply chain partners. The supply chain partners are suppliers of services to cargo interests and shipping lines that influence the delivery of port services. Since then, researchers have examined the perspectives of specific port users, such as the logisticians (Marlow & Casaca, 2003; Yeo et al., 2011), supply chain partners (Brooks & Schellinck, 2015b), cargo interests (Brooks & Schellinck, 2015a) as well as user perspectives from a geographical area (Brooks et al., 2011). Studying different user groups is essential because different port user groups have different

expectations. Notteboom et al. (2022) emphasise that stakeholder perception is increasingly vital for correcting operation and governance flaws in a port.

The field of international development acknowledges this shortcoming and measures the outcomes of the efficiency and effectiveness measures to improve a country's competitiveness and the well-being of its inhabitants. Contemporary understanding of port performance is based on the World Bank and UNCTAD's performance measures for ports and countries; hence, it is vital to consider the global indices they have developed to measure the performance of ports. The results of technical efficiency improvement are manifested in UNCTAD's LSCI, while effectiveness (fulfilment of customer expectations) is shown in the World Bank's Logistics Performance Index (LPI) (Theo. Notteboom et al., 2022). LSCI captures countries' connectivity to the global shipping network using six components of the maritime transport sector. These are: number of companies that provide shipping services, number of services, number of ships that call per month, totally deployed container-carrying capacity, size of the largest vessel, and number of direct services without the need for transshipment. LSCI is considered a proxy for accessibility to global trade (UNCTAD, 2019).

The LPI is a survey the World Bank has run every two years since 2007. It aims at helping countries identify challenges and opportunities to improve their trade logistics performance. The components measured are infrastructure, customs clearance, ease of arranging shipment, logistics service quality, international shipments, tracking and tracing, and timeliness (Arvis et al., 2016). Hoffman (2009) postulates a reciprocal connection between the LPI and the LSCI as gains in one can be eroded by mediocre performance in the other. For instance, gains made by investment in terminals will decline over time as high documentation and logistical costs cause trade to shrink.

Hence this dissertation regards efficiency and effectiveness as essentials to improving port performance.

1.1.3 Technological Intervention in Port Reforms

The literature shows that technological intervention can have benefits in port reforms by leading to efficiency gains and improved services in the port. De & Ghosh (2002) exploring the relationship between productivity, efficiency, and technological change in Indian ports, found that increasing use of overhead capital has produced significant improvement in productivities. Carlan et al. (2017a) examined 32 ICT innovation cases in the port sector and found that alignment between company strategies and success degrees in ICT innovation initiatives is key, and that terminal alignment with the right ICT infrastructure is crucial for success. Similar improvements are mentioned by Estache et al. (2001) and González & Trujillo (2005) regarding port reforms Mexico and Spain. However, there are also challenges and economic issues in implementation related to coordination and collaboration among stakeholders (Heilig, Lalla-Ruiz, et al., 2017; Heilig, Schwarze, & Voß, 2017). In essence given the right conditions and collaborations technology will live up to its potential.

1.1.4 The Role of Politics in Port Reform

Political analysts have taken an interest and included infrastructure hubs and technical systems in their analysis, because they found them to be closely related to society and that power is exercised by and through technical systems and standards (Hönke & Cuesta-Fernandez, 2017, 2018). The literature suggests that there are political risks associated with port reform. The complexities of port policies and governance models can vary widely across countries and impact port performance (Brooks et al., 2017; Trujillo et al., 2013b). In developing countries, the public

sectors which include the ports, are highly politicised and susceptible to the influence of powerful political actors (Brierley, 2020, 2021).

However, there are differences in the degree of political influence. Tsai (2005), examining the political risk assessments of five East Asian ports found that micro-risks resulting from port development and management policies are more significant than macro-risks from integrated political and economic conditions. Ham (2001) discusses the difficulties and risks involved in building public-private partnerships in port development, which can be hindered by cultural and institutional differences between the public and private sectors. Overall, politics must be carefully considered and managed in port reform efforts. This dissertation contributes to the understanding of the politics through rich picture developed from applying the soft system methodology and through the socio-technical imaginaries of various groups.

The port studies literature cited above leaves out regulatory and border agencies, a vital port user group that is crucial to the effectiveness of the port. This study contributes to the literature by focusing on state regulatory and border agencies, the primary service providers to shippers at the port. The inclusion of the regulatory and border agencies as a unit of analysis presents us with an opportunity to holistically elaborate on the political and economic context of the port that is significant in the case of Africa.

1.1.5 Purpose and Motivation of Research

1.1.5.1 Why Study a Developing Country Port?

Studying a developing country port is essential for a simple reason: the context in which global best practices are implemented differs and may not have the same effect as in developed economies. Developing country ports have lagged behind the rest of the world in terms of port performance. The inefficiency is partly due to the hold of states on ports run as part of an

inefficient public service. However, global trends in ports and shipping do not accommodate inefficient ports, leaving them at the periphery of global trade and shipping networks. International development organisations such as the World Bank and other agencies of the United Nations system shaped the adoption of trends in port development in developing countries through reform programmes and training aids. Membership of intergovernmental organisations such as the World Trade Organisation (WTO) or the World Customs Organisation (WCO) may also require states to adopt certain practices. Developing countries' adoption of such practices often creates conflicts, controversies, and power struggles.

Furthermore, ports serve as logistics platforms for trade and attract many commercial and regulatory activities due to their location at the interface between land and sea. As natural national borders, they are complex systems that bring together transport and terminal operators, government agencies, merchants, industries, and logistics activities. However, the nature of ports as an interface with institutions and interests makes them susceptible to political, economic, social, and geographical dynamics (Olukoju, 2020). Tensions can arise during the reform process or between local stakeholders, private investors, and authorities who sanctioned the project, because the ports failed to optimise their potential as development catalysts (Debie, 2012).

This study approaches Ghana as a gatekeeper state where different branches of government, corporations, competing groups of port professionals, and security services show power through large-scale infrastructure projects like ports (Dorman (Ed), 2018). The Tema Port is used to highlight the testing and reshaping of Ghana's underlying political settlements.

1.1.6 Research Objectives

The research objective is to explore port stakeholders' conduct regarding port policies and the imaginaries for achieving overall efficiency and effectiveness in the Tema Port. Four research

questions are considered and addressed in four related research articles to achieve the stated objective (see Table 1). Thus, Article 1 maps the complex port institutional environment and highlights the power play there. Article 2 further investigates the socio-technical challenges of port performance through multi-case studies of the Ghana National Single Window (GNSW) customs clearance system. Article 3 tries to understand what the underlying ideas in everyday discourses around the port by different powerful actors mean and their influence on port development and social order. Finally, article 4 explores the specific role of powerful political agents in institutional change through the construct of political entrepreneurship.

Table 1. Overview of Research Questions

Article	Research Question
Article 1	How do port stakeholder interests affect decisions and outcomes in the digital transformation process?
Article 2	Who are the port stakeholders and what relations, and meanings underlie their attitudes and the controversies surrounding the implementation of the national single window?
Article 3	How do national and global narratives of port development intersect, and what are the implications of these intersections for port development?
Article 4	What is the significance of political entrepreneurship in port reforms?

1.1.7 Outline of Dissertation

This dissertation is divided into Part A, an extended introduction detailing this research's background, conceptual, theoretical, analytical, and methodological considerations, and Part B, comprising four empirical research articles that focus on the evolution of digital systems in Tema Port and the competing interest in providing IT services (Article 1), exploring political interference and the controversies that surround them (Article 2) and political intervention (Article 3) in the

implementation of new technology, and the identifying the sociotechnical imaginaries (Article 4) and what they mean for port reform and state development.

The second part of this dissertation is the core of the dissertation and consists of four articles in the following order:

Article 1: Aryee, J., Andersen, C., & Hansen, A. S. (2021). The social-political embeddedness of import clearance: 20 years of digital transformation at Tema, Ghana. *World Customs Journal*, 15(1), 3–14

Article 2: Aryee, J., & Hansen, A. S. (2021). De-politicization of digital systems for trade facilitation at the Port of Tema: A soft systems methodology approach, ISSN 2213-624X. *Case Studies on Transport Policy*, <https://doi.org/10.1016/j.cstp.2021.11.009>

Article 3: Aryee, J and Addo, A (Under review), Political Entrepreneurship and Public Sector Digital Transformation: Evidence from A Developing Country

Article 4: Aryee, J., Andersen, T., & Hansen, A. S. (Under review). Gateways and Transshipment Hubs: National and Global Narratives of Port Development as Socio-technical Imaginaries

1.2 Empirical Context

This section describes this study's empirical context concerning competing interests of stakeholders in the reformed port environment in Ghana, involving many state actors and private interests. Considering the preoccupation with the landlord port governance system broadly used and defined in European contexts that aims at private involvement in ports to achieve

competitiveness, it is helpful to show how the characteristics of the Tema Port, its key stakeholders and the port reform evolved including the technological interventions made.

1.2.1 Port Reform in Ghana

Ghana had the perfect timing for port reforms. In the late 1990s, shippers and members of the port community in Ghana complained of inefficiencies at the port and yearned for a change. Fortunately, around the same time the port authority gained interest in the transit trade and worked to expand their hinterland to the three landlocked countries of West Africa namely, Burkina Faso, Mali and Niger. Ghana's main competitors already in the transit trade were the neighboring countries of Côte d'Ivoire, Nigeria, and Togo. Thus, the reform can be attributed to the need to remain competitive, pressure from port stakeholders and political push.

In 1998, the Ghanaian government-initiated port reforms as part of a shift in trade policy. The World Bank and other development partners supported the Ghana Trade and Investment Gateway project (GHATIG). This comprehensive programme looked to implement measures designed to attract a critical mass of export-oriented firms and facilitate trade. The project is a classic example of economy-wide reforms encompassing ten economic sectors necessary for trade facilitation namely; Ministry of Finance, Ministry of Trade and Industry, Ministry of Works and Housing, Ministry of Interior, Ministry of Roads and Transport (now separated into Ministry of Roads & Highways and Ministry of Transport), Ministry of Communication, Bank of Ghana, Ghana Civil Aviation, Ghana Immigration Service, and Customs Excise and Preventive Service.. In the context of GHATIG, the government further approved a policy to improve border agencies, including ports, to reduce the cost of operations and shorten the turnaround time for vessels. A critical aim of GHATIG was also to attract foreign direct investment (FDI) with an export focus, and an efficient port was critical in making Ghanaian exports competitive. Hence, the policy also aimed

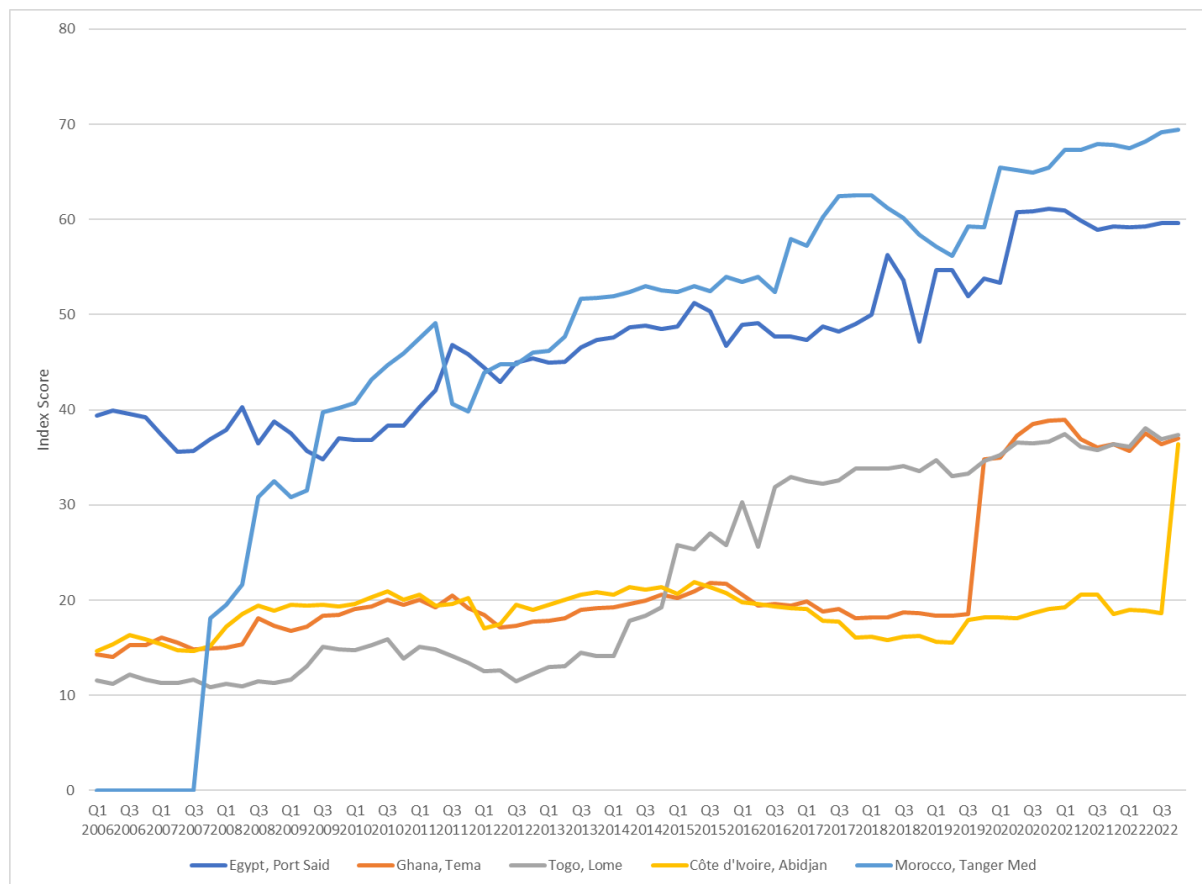
to convert GPHA into a landlord port authority where the private sector could invest and operate to increase the port's performance (REGION, 1998; World Bank IEG, 2013).

The gateway project made significant legal and regulatory reforms to promote investment and facilitate trade. One of the Worldbank's recommendations was for Ghana's ports to adopt a landlord port model of port management – a model which allows private entities to operate the port terminal while the port authority relies on revenue from leasing port assets. However, upon consideration of their role as a public entity with a responsibility to provide a social safety net, the port authority stalled a proposed Landlord Port Bill to parliament (Gyebi-Donkor, 2007) and opted for partnerships with private operators to operate Tema's first dedicated container terminal (T2) to protect the interest of the state.

1.2.1.1 Technological Interventions

Three critical interventions were made to enhance efficiency and effectiveness at Ghana's ports. The first intervention introduced an electronic data interchange system known as Ghana Community Network (GCNet) for processing trade and customs documentation in 2002, contributing to transforming customs and import procedures in Ghana (World Bank IEG, 2013). GCNet is the harbinger of the GNSW that operates as Integrated Customs Management System (ICUMS) since 2017. The second intervention was the construction of a dedicated container terminal (Terminal 2) in 2004 at Tema, with two berths. Terminal 2 increased the productivity at the shipside exponentially. The last intervention, and the most significant initiative commissioned in June 2019, was the US\$1.5 billion port expansion project that brought on board an ultra-modern container terminal capable of berthing some of the world's most giant container ships. The new terminal has propelled Tema in the United Nations Conference on Trade and Development's (UNCTAD) Liner Shipping Connectivity Index rankings (LSCI) (see Figure 1).

Figure 1 : Top 5 African Ports on UNCTAD'S LSCI (2006-2022)



Source:UNCTADSTAT

(<https://unctadstat.unctad.org/wds/TableViewer/tableView.aspx?ReportId=170026>)

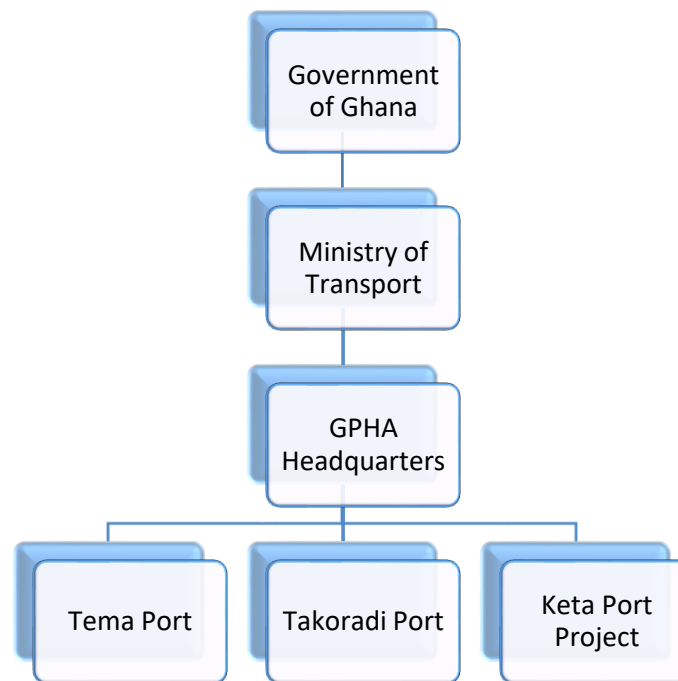
1.2.2 Tema Port: Organisation, stakeholders and Functioning

1.2.2.1 Organisation

Ghana's ports are state-owned, with no involvement of the municipalities where they are located. The Ministry of Transport provides the policy direction whilst its agency, the Ghana Ports and Harbours Authority (GPHA), is mandated under Ghana's Provisional National Defence Council Law (PNDCL 160) of 1986 to build, plan, develop, manage, maintain, operate, and control all ports in Ghana. The GPHA runs three ports, namely Tema. Takoradi and Keta (yet to be operational) as business units with their own management who report to the headquarters. It has

other related businesses like the Tema Shipyard and Drydock, Transit Sahelian Liaison Office in Burkina Faso, Tema GPHA Clinic, Tema International Maritime Hospital (IMaH) and Takoradi GPHA Hospital. Figure 2 shows the political structure of GPHA and its ports.

Figure 2: Political Structure of GPHA and Its Ports



Political interests are embedded in the port operations in several ways. One of them is through government control and regulation of the port, where political leaders use their power to influence the allocation of resources, the selection of operators, and the setting of fees and tariffs. The dissertation takes such influence into account in the allocation of stevedoring licenses, and in the case of Meridian Port Services (MPS) terminal operating contract as well as in the IT vendor selection for the paperless port project. The port is also a premium employer where political elites seek employment for their supporters and kins.

Furthermore, regional port competition arising from international trade and globalisation results in political interests embedded in ports' operations. The dissertation articulates this in the form of

the Port Authority being involved in port operations as regulator and operator to make up for the inefficiencies of the indigenous private stevedores to keep the port competitive in the region. At the same time transnational terminal operators get involved as preferred operators over local investors by international transaction advisers for large scale terminal projects.

Lastly, national security and defence play a role in political interest in the operation of ports, as central government and/or its agencies look to exert control over the flow of goods and people in and out of their countries for reasons of security, but also for rents.

Tema Port was commissioned in 1962 as part of a port-industrial-commercial-residential complex plan by the first President Dr Kwame Nkrumah. It is the largest of the two ports in Ghana, the other being the Takoradi Port built in the colonial era. It handles approximately 85% of Ghana's trade. The port is located about 30 km east of Ghana's capital Accra (see Figure 1). With an average of 1593 vessel calls per year from 2013 to 2022, the cargo throughput has risen from 12,180,615 to 19,688,304 tonnes in the same period.

Tema is a leading port in West Africa and a gateway to the landlocked countries of Burkina faso, Niger, and Mali where it competes favourably with the ports of Abidjan, Lomé, Cotonou, Dakar, and the Lagos' ports of Lekki and Apapa. Tema's proximity (see figure 1) to its neighbouring ports of Abidjan (554km away), Lomé, (181km away), Lagos (352km away), and Dakar (about 3117km) creates a potentially highly competitive environment for the transit trade and transshipment hub status.

Figure 3: Geographic location of the selected West African ports



Source: <http://www.skuld.com>

Compared to other African ports in terms of the container trade, Tema ranks amongst the top five African ports on the UNCTAD liner shipping connectivity index (UNCTAD LSCI). A feat achieved in 2019. This is the result of a dedicated container terminal – a US\$1.5-billion investment made in 2015 and inaugurated in July 2019 (Lawer, 2019) by Meridian Ports Services (MPS)- a consortium made up of the Ghana Ports & Harbours Authority (GPHA), otherwise known as the Port Authority, and Meridian Port Holdings (MPH), which is made up of APM Terminals and Bolloré Logistics, with MPH as the majority shareholder with 75% of shares. The terminal is capable of handling an annual capacity of 2 million 20-ft. equivalent units (TEUs), with five off-dock terminals dedicated to specific goods and 22 private indigenous stevedoring companies operating in the port.

1.2.2.2

Stakeholders

The Port of Tema attracts many actors who are either service providers or users of the port. Hence, the efficient and effective processing of goods through the port is not only affected directly by port policies, but also by those of other sectors that have a presence in the port by law. The vast number of actors pursuing various activities makes for a complex interaction that causes tensions sometimes. *Table 2* details the groupings of port actors in Tema.

Table 2:Port stakeholders by groups

State Agencies from various ministries dealing with taxes, public health and safety	Port Authority, Customs Division of the Ghana Revenue Authority (GRA), Port Health, Ghana Maritime Authority (GMA), Food & Drugs Authority (FDA), Ghana Standards Authority (GSA), National Security, Ghana Shippers Authority (GSA), Environmental Protection Agency (EPA)
Logistics Providers	Freight forwarders, Shipping lines, Haulage companies, Dock Labour Companies, Warehouse providers, Off-dock terminals, Ship chandlers, Waste collectors, Cargo handling companies. Banks, Ghana Link (providers of the Integrated Customs Management System)
Shippers, Traders and Industries	Association of Ghana Industries (AGI), Ghana Union of Traders Association (GUTA), and Shippers.
Professional Associations	Ghana Institute of Freight Forwarders (GIFF), Chartered Institute of Transport & Logistics (CILT), Ship Owner and Agents Association of Ghana (SOAAG)

1.2.2.3 How the Port Functions

Ghana's ports function as hybrid ports – a port governance system where the port authority competes with the private operators it licenses to handle cargo. It is a middle ground between a comprehensive or service port where the port authority operates the port as part of the public service and the Landlord Port where the port authority leases out land for private operators to operate and pay rents.

In Tema, the port performs the cargo handling function with MPS and twenty other indigenous cargo handling companies licensed by GPHA. Ideally, the shipping lines must choose who should handle their cargo, but that had been subject to negotiations in Tema to satisfy all interested parties where contractual obligations allow it. Before 2019 when the new container terminal concession commenced, 70% of containers would go to MPS while the port authority allocated the rest to itself and the indigenous cargo handling companies via a quota system. However, the concession agreement for the new MPS terminal allocates 100 per cent of the containers to MPS, something that inflamed tensions between GPHA, the maritime and dockworkers union, MPS, and political parties as a new government condemned the old one that signed the agreement for signing an unfair deal.

Besides cargo handling, port activities mainly center around the clearance of cargo through Customs via the Integrated Customs Management System (ICUMS), which is an electronic single-window platform for processing customs declarations and dealing with other state agencies. Shippers and shipping lines would use ICUMS to submit required documentation to government agencies. The single window system was introduced in 2001 as the Ghana Community Network (GCNet). The system has been subject to political conflicts over the years culminating in ICUMS, which built on the successes of GCNet to improve performance at Ghana's ports. The MPS

Terminal also provides digital platforms for truck appointments, payment, and other services to make Tema one of the efficient and effective ports in West Africa.

1.2.3 Why Study Tema Port?

Post-independent Ghana pursued a vision of expanding and diversifying the Gaian economy through industrialization, with the city of Tema and the port as the reference point. Ghana's struggle to see the vision materialize is well documented. The development of Tema's port-industrial-commercial-residential complex by Dr Kwame Nkrumah in 1962 marked Ghana's economic promise (Chalfin, 2010). The pioneering works of Hilling (Hilling, 1977, 1969, 1966) and Chalfin (Chalfin, 2014, 2010) provide an excellent insight into the building of Ghana's second port in the city of Tema to act as a catalyst for industrializing Ghana. Originally conceived as an integral part of the Volta River project, an electricity-producing dam with the aluminium smelter to be located at Tema (David Hilling 1966), Tema Port has become a site for testing the complex forces of globalization, state, and grass root imaginaries.

The IMF structural adjustment programmes in the 1980s were the beginning of the devolution of government-owned enterprises to the private sector in Ghana. It was not until late 1990s that the ports became a subject of devolution through the Ghana Trade and Investment Gateway Project (GHATIG) (hereafter called the Gateway Project). The project, which commenced in 1999, aimed at removing constraints to trade development, exports and foreign direct investment for industrial and infrastructure development (World Bank IEG, 2013b). In line with the roadmap, port reforms were initiated to complement the initiatives made in the trade and industry sectors.

1.3 Theoretical Framework

The objective of this dissertation is to explore port stakeholders' conduct during port reforms in Ghana aimed at achieving overall efficiency and effectiveness in its major Tema Port. I study the evolution of institutions, power distribution, and rents by state and non-state actors regarding technological interventions such as the single window system and the newly constructed ultra-modern container terminal. I ask why there is consistent political interference and tensions amongst stakeholders at the port after two decades of reform?

The goal of this section is to provide a theoretical foundation for the central arguments of the thesis and to clarify the theoretical connections implicit in the papers. The theoretical discussions focus on salient elements that are relevant to the thesis' claims. These discussions are consistent with the thesis' overall interpretive stance, and they use the notion of political settlements as a connecting thread to link port-related sociotechnical phenomena to underlying national and organizational orientations. This section sets the stage for appreciating the thesis' chosen approach to investigate the underlying political settlements in port reforms in developing countries.

To explore the question above, this dissertation is guided by constructivism, critical discourse perspective, and interpretivism. Constructivism is a philosophy of knowledge that argues that human knowledge is constructed through individual and collective experiences, and that these constructions are influenced by social and cultural factors. This philosophy is reflected in the study's focus on understanding the socio-technical, institutional, and political factors that mediate port reform and performance at the Tema Port in Ghana, and on the role of state and non-state actors in shaping this process.

The study is also informed by a critical discourse perspective, which seeks to understand how power relations and social structures shape the experiences and realities of different groups of people. This perspective is shown in the study's focus on understanding how different groups of stakeholders, such as port managers, politicians, and IT vendors, shape the reform process.

Lastly, the study was informed by interpretivism, which is a philosophy of social science that emphasizes the importance of understanding the meanings and perspectives of the actors being studied. This philosophy is reflected in the study's use of qualitative research methods such as in-depth interviews and document analysis to gain an understanding of the factors that mediate the process of port reform from the perspectives of the actors involved.

1.3.1 Theoretical perspectives applied in port studies

Neoliberal port reforms have contributed to conflicts in ports between public and private interests (Galvao et al., 2016). Castillo-Manzano et al. (2016) found that recent legislative measures in Spain that increased the liberalization of port charges led to political conflicts and a decline in inter-port competition. Parola & Maugeri (2013a) identified various types of conflicts arising in ports, including social, institutional, operational, and land use conflicts, and suggested an agenda for further research on the nature and dynamics of these conflicts.

Scholars researching African port have used two main theoretical approaches and concepts to address or make sense of conflicts in African ports. They are action research (and its related constructs) which aim to address the problem and political settlement (and its related constructs) which aim to explain the problem.

The last five years have seen a growing consensus on the need for sustainable port development to find the right balance between human, environmental, and economic aspects (Vellinga et al.,

2017) using the soft systems methodology. This has led to an emerging trend in action research approaches to address and make sense of specific African ports. These approaches have also paved the way for topics such as environment, labour and controversies surrounding infrastructure or digital platforms, hitherto not discussed or researched in studies on African ports. The exemplary works of Barnes-Debban et al. (2017) and Vellinga et al. (2018) are instructive in this regard. Barnes-Dabban et al. (2017) employed Weick's (Weber & Glynn, 2006) institutional mechanism affiliated with sense-making as a conceptual tool to address environmental reforms in the Port of Monrovia, Liberia. Sense-making is intimately interconnected with the local institutional context. This approach brings together stakeholders who sometimes work together and sometimes against each other to discuss and arrive at a common conclusion about the problems and the options available for improvement. The port economics literature finds merit in incorporating the concerns and inputs of stakeholders into planning activities. It helps port authorities avoid conflicts (Dooms et al., 2013; Notteboom et al., 2015; Parola & Maugeri, 2013).

Political settlement framework has emerged as a dominant lens to make sense of specific African ports. Political settlements have been used by Lamarque (2019), Hönke & Cuesta-Fernandez (2017), and Fraser & Notteboom (2015) to explain some of the complexities of politics in African ports. Fraser & Notteboom (2015) found that different locally embedded port institutional structures do matter in port competition and have shaped and mediated port development in Southern African ports. Lamarque (2019) examined the distribution of power among public, private, and criminal interests invested in Mombasa Port and found that the inefficiency of the port infrastructure is a result of the government's political interests, which prioritize control over efficiency.

Hönke & Cuesta-Fernandez (2018) use of controversies approaches to probe ‘party-coloured’ understandings of the ‘political’ economies at the Port of Dar es Salaam opens our eyes to new ways to reveal more diverse and contested landscapes. A controversies approach involves paying attention to moments of controversies or contestations around technologies and regulations that supposedly govern logistical infrastructure. According to Hönke & Cuesta-Fernandez (2018), *“focusing on these disputes contributes to the understanding of logistics and (port) infrastructure both by (1) foregrounding questions of politics over those of governance and powerful logistical assemblages and (2) emphasising processes as fundamentally open-ended”* (p 251).

Ghana’s port reform process exhibits similar characteristics to the studies in Kenya, Tanzania and Southern Africa. Therefore, in line with the literature, I adopted the political settlement framework as the overarching framework underlying the concepts, methodologies, and theories used in the four articles and explain how they are related.

1.3.2 Political Settlements Theory

The evolution of Ghana’s port reforms meets the criteria of the political settlement framework defined as a combination of power and institutions that is mutually compatible and sustainable in terms of economic and political viability (M. H. Khan, 2010). It posits that political context or underlying power dynamics shape institutional and policy performance and a society’s development trajectory (Behuria et al., 2017a; Kelsall & Vom Hau, 2020). Political settlements analysis is useful in this study to clarify vague technocratic formulations like ‘best practices’ and ‘stakeholder buy-ins matter’ in approaches to policy advice (Kelsall & Vom Hau, 2020) such as the landlord port system dominant in port reforms. Most importantly, the framework places economic and political change process specifically within global capitalism which is the domain of port reforms (Behuria et al., 2017a).

Implementation of port reforms is affected by local/national institutional frameworks, resulting in implementation asymmetries (Ng & Pallis, 2010). However, port reform under neoliberal reforms encompasses external policy ideas and actors. Often, those with power only buy into external policy ideas when they solve a pressing political problem, an existential crisis, or they fit their ideological frame. Ideas are central to how political settlements function, are maintained, and how they shape prospects for development. These include ideas about nationhood, who belongs, redistribution of wealth and resources, and the relationship between state and capital (ESID, n.d.). Bell (2015) asked a key question which this dissertation attempts to answer. How, and with what interventions, can external actors change political settlements?

In this study, the political settlement framework helps us understand how the distribution of power and resources among political elites has influenced port reform and impacted performance in Ghana. It highlights the taking of turns by the two leading political parties to control the port as a way of deriving resources and rewarding party clients and financiers through contract awards, tender negotiations, issuance of licenses, abuse of customs regimes, employment amongst others; and the tensions arising because of global shipping and terminal operators' increased show of power in port operations.

The framework re-emerged out of Mushtaq Khan's work in the mid -1990s following works by Melling (1991) to address two issues. First, why policies and institutions that worked well in some contexts appeared to achieve much poorer results in others. The second is why different policies and institutions appeared to be effective in solving similar problems in different contexts (Khan, 2018). In port studies, Ng & Pallis (2010) noted that generic solutions such as the landlord port governance system are not always applicable in different countries due to the influence of local/national institutional frameworks and political traditions.

There are two schools of study that have attempted an explanation as to why this happens, the new institutional economics (NIE) and political economy analysis. One thing they have in common is the acknowledgement that the developing country context is different from developed countries. Just like Khan, North et al. (2009) distinguishes between limited access orders found in developing countries and open access orders found in western liberal democracies. According to Franke & Quintyn (2012), North et al describe developing economies as *“limited access orders where the elite contain conflicts through rents creation from limiting entry to the economic and political system and the society as characterised by a de-facto non democratic political system, few organisations which are mostly associated with the state, small and centralised government and a predominance of social relationships organised along personal lines. On the other hand, open access orders sustain stability through political and economic competition. These societies are characterized by a wealth of organizations, a big, decentralized government, as well as “widespread impersonal social relationships, governed by rule of law, secure property rights, fairness, and equality—all aspects of treating everyone the same,” leading to sustained political and economic development”*

However, NIE attributes the differences in performance to differences in institutional structure across countries while political economy analysis point to different political settlements with the argument that institutional reform is not only a technical issue but entails conflict and politics (Behuria et al., 2017a). An important distinction between the new institutional economic approaches and political settlements is that the latter recognizes that where power is disbursed outside formal institutions, this does not necessarily drive changes in the formal institutional structure. This means changes in distribution of power are not necessarily aligned to formal regime change.

According to Di John & Putzel (2009), there are some common characteristics of political settlements that stand out in the literature. First, political settlements manifest themselves in the structure of property rights and entitlements, which gives some social actors more distributional advantages than others, and in the regulatory structure of the state. This result can be achieved by imposition by authoritarian regimes, outcome of compromises between factions or pluralist bargaining arrangements. Second, political settlements are shaped by political organisation (political parties), which can have a massive impact on both the consolidation of the settlements and the extent to which a settlement promotes development enhancing actions. Third, political settlements can be inclusive or exclusive, determined by analysing the distribution of rights and entitlements. However, inclusivity does not necessarily lead to development. Lastly, political settlements is embedded in bargains and is not a mere common understanding between elites. Di John & Putzel, (2009), emphasizes bargaining as the process that produces the outcomes among contending elites or social groups and classes.

1.3.3 Application of The Political Settlements Framework In Africa

The works of Behuria et al (2017) and (Gray, 2019) are seminal works that highlight the application of political settlements framework in Africa. Whilst the framework is often used to describe power distribution and institutions at a high-level, it can be applied to particular regions and sectors.

Behuria suggested starting with the impact of capitalism on institutions and power taking into cognisance colonialism and the limited productive transformations that resulted after that era. Historical evolution of power is important to explain the structures that promote clientelism in developing countries. Hence, political settlements studies must assume that power is rooted in history (Bierschenk & Sardan, 2014). It is important in the case of horizontal distribution of power

where the power of excluded factions may be strong or weak (Khan, 2010) to note the political outcomes of moments of intensive change where critical ruptures - a major event or confluence of factors, which disrupts the existing balance of political and economic power in a nation (Acemoglu & Robinson, 2012) - have structured new divisions of power. Another factor to consider is legitimacy in cases where the power distribution is vertical – referring to the relative power of higher compared to lower factions within the ruling coalition (Khan, 2010). Lastly, it is important to determine the relationship between the ruling coalitions and the economic actors in order to ascertain how the political settlements have been and are financed. This will often involve analysing the ownership structure within particular sectors.

1.3.4 Reforms, the State and Business

Neo-liberal reforms open up a country to private businesses who may or may not inure to economic development depending on their relationship with the state. The relationship between business and the state varies across different countries and is influenced by political, economic, and cultural factors. Maxfield & Schneider (1992) highlight the relationship as being either collaborative or collusive. While there is the possibility of growth enhancing relations between governments and business. There is also the possibility of collusion for rent-seeking. Reforms towards market liberalisation in developing countries offer capitalist opportunities to abuse their market powers in economies with low regulatory oversight especially where public monopolies are diversified to private entities.

Regime change can lead to significant shifts in state-business relations and the relations can also create both opportunities and constraints for the economy (Lim et al., 2021). Hillman & Keim (1995) suggests that differences in business-government relations across countries can be better understood by examining the institutions through which they interact, including formal and

informal constraints. The most common obstacles the state presents to businesses are related to taxation, regulation and corruption as revealed by Brunetti et al's (1998) survey of private organisation in 65 countries. It follows that they will also be the means by which the state can collude with businesses to forestall growth.

Often bureaucrats will be at the forefront of state-business relationships. Bureaucratic corruption has been an important constraint to policy reform in Africa (Mbaku, 1994). Donor-driven reforms in developing countries are often targeted at dismantling bureaucratic corruption. However, bureaucrats are also the implementers of the reforms, hence they find ways to manipulate the process to ensure that they continue to maintain a monopoly on power. The result of this Whitfield (2011) describes as growth without economic transformation in her study of Ghana. Oduro et al. (2014) note that the Ghana's system of competitive clientelism undermines public institutions and has a deleterious effect on public institutional efficiency which is leading to inefficiencies in the provision of public goods and social provisioning. The features of the system include a patrimonial electoral competition rather than being programmatic; a dysfunctional and weak bureaucracy ; ineffective checks and balances and commitment mechanisms by the state; where rent offers the currency of politics and the foundation of stability. Other features such as a strong opposition party and strong lower-level factions within the ruling coalition pushes political parties to pursue and implement policies that have a short term horizon, that do not significantly shift the allocation of resources towards building productive sectors (Whitfield, 2011).

1.3.5 Link to Concepts in Articles

I adopted the framework to understand the relationship between the economic change sought by port reforms and political order, where the economic change is explained as resulting from accumulation and incentives that can be shaped in different ways by ideas, formal and informal

institutions, and the distribution of power (Behuria et al., 2017b). Applying the framework to a global phenomenon such as port reforms is apt for two reasons. First, the mixed results of port reforms around the world, particularly in Africa, show different causal mechanisms at play that can be explained by the framework. Secondly, it has the potential to provide new insights into the variations between the political economies in Africa (Gray, 2019).

The theories, frameworks, concepts and methodologies used in this study, such as social construction of technology (SCOT), Interpretive flexibility, soft system methodology (SSM), sociotechnical imaginaries (STI), and institutional change theory are relevant to the overarching political settlement framework because they help to explain the behavior of state and non-state actors within the broader institutional and political context of Ghana.

1.3.5.1 *SCOT and Interpretive Flexibility*

In article 1, the framework and concept of social construction of technology (SCOT) and interpretive flexibility used are related to political settlements in several ways. SCOT is a theoretical framework that emphasizes the social and cultural factors that shape the development and use of technology. It suggests that technology is not a neutral object, but it is shaped by social factors such as power, interests, and values.

Political settlements play a critical role in shaping the social and cultural factors that influence the development and use of technology. They determine who has the power to shape technological development and use, and how this power is exercised. For example, in contexts where power is highly centralized and controlled by a small elite, technological development and use are likely to reflect the interests and perspectives of that elite. On the other hand, in more pluralistic contexts, technological development and use may be more diverse and reflect a wider range of perspectives and interests.

Interpretive flexibility is a concept that is closely related to SCOT. It refers to the idea that technologies can be interpreted and used in multiple ways, depending on the social and cultural context in which they are embedded. The concept of interpretive flexibility highlights the importance of context in shaping the development and use of technology.

In the context of political settlements, interpretive flexibility can be seen as reflecting the diversity of perspectives and interests that exist within a particular context. It suggests that different actors may interpret and use technology in diverse ways, depending on their position within the political settlement and their interests and values. This can lead to conflicts and tensions over the development and use of technology, particularly in contexts where power is contested.

Overall, the concepts of SCOT and interpretive flexibility are closely related to political settlements because they highlight the social and cultural factors that shape the development and use of technology, and the diversity of perspectives and interests that exist within a particular context. By understanding these factors, it is possible to gain insight into the distribution of power and resources in a particular context and the dynamics of technological development and use.

1.3.5.2 Soft Systems Methodology

The SSM used in article 2 is a qualitative problem-solving approach that involves identifying and addressing complex social problems through a process of structured inquiry. It is particularly relevant in situations where there are diverse stakeholders with different perspectives and interests. It can be used to identify the various actors involved in the reform process and how they interact with each other and with the broader political settlement to shape the process and its outcomes. When applied to the political settlement framework, they provide a more nuanced understanding of how power and resources are distributed among political elites in Ghana and how this shapes the process of port reform and its impact on performance.

It acknowledges the importance of understanding the wider context within which problems exist. It recognizes that social problems cannot be addressed in isolation, but must be understood within their broader political, institutional, and social contexts. In this sense, SSM can be used to explore how different political settlements and distributions of power and resources impact the process of port reform in Ghana.

In the context of this study, SSM can be used to understand the complex social problems that arise in port reform in Ghana. It can help identify the different perspectives and interests of stakeholders involved in the process, including political elites and non-state actors. SSM can be used to facilitate a structured inquiry process that considers the political settlement framework and the broader institutional and political context within which port reform takes place.

1.3.5.3 Political Entrepreneurship

Political entrepreneurship is often seen as a key driver of political settlements, particularly in contexts where there is a high degree of political instability and uncertainty. Political entrepreneurs are individuals who use their political power and influence to create or exploit opportunities for personal or collective gain. They may use a variety of strategies, including coalition-building, mobilization of popular support, and co-optation of opponents.

In the context of political settlements, political entrepreneurs may play a critical role in shaping the terms of the settlement and ensuring that their interests are represented. They may work to create or exploit opportunities for institutional change, such as through the introduction of new policies or the establishment of new institutions. At the same time, they may also work to resist or undermine institutional change if it threatens their interests.

Political entrepreneurship can thus both facilitate and constrain the development of political settlements, depending on the interests and strategies of the political entrepreneurs involved. Some scholars argue that political settlements are inherently unstable and subject to ongoing renegotiation as political entrepreneurs seek to advance their interests. Others suggest that political settlements can become entrenched over time, particularly if there is a high degree of consensus among the key actors involved.

1.3.5.4 Socio-technical Imaginaries

STIs refer to the collective visions or shared images of desirable futures that are held by a particular social group. They are rooted in cultural and social norms and beliefs, and they are shaped by broader political and institutional structures.

In the context of political settlements, STIs are related to the broader social and political norms and beliefs that shape the distribution of power and resources. STIs can be seen as a manifestation of the broader political settlement and the social norms and values that underpin it. In this sense, STIs are not simply a product of individual preferences or technological capabilities, but they are embedded in broader social and political structures.

Political settlements shape the context within which STIs emerge and evolve. They determine who has the power to shape STIs and how they are translated into policy and practice. For example, in contexts where power is highly centralized and controlled by a small elite, the STIs that emerge are likely to reflect the interests and perspectives of that elite. On the other hand, in more pluralistic contexts, STIs may be more diverse and reflect a wider range of perspectives and interests.

Overall, STIs are intricately linked to political settlements because they reflect the broader social and political norms and values that shape the distribution of power and resources. By

understanding the STIs that underpin different political settlements, it is possible to gain insight into the social, cultural, and institutional factors that shape the distribution of power and resources in a particular context.

1.4 Research Methodology

The dissertation is qualitative, and it is a shift from the quantitative approach of analysing ports by considering the socio-technical and political environment, especially the conduct of individuals and institutions that affect the port. The study adopted two complementary approaches. First it adopted an action research design which “describes a global family of related approaches that integrate theory and action to address important organisational, community, and social issues together with those who experience them” (Coghlan et al., 2017). These include socio-technical systems, soft system methodology, stakeholder analyses, and institutional change theory. All these methods are in line with the action research design, which is an iterative and reflective process in which the researcher is actively involved in the situation being studied and aims to improve practice. The study adopted this approach for two reasons. First, it required the researcher to be on the ground as events unfolded in the single window implementation process and the container terminal construction at the Tema Port, providing unique perspectives on the reform process. Secondly, the method is used as a system of enquiry to pursue meanings and interpretations socially constructed by port stakeholders about digital technologies including large scale infrastructure in the port.

Practitioners typically conduct action research to improve their own practice. However, there is a limitation when a third party - the researcher - is not a practitioner or is not mandated by authorities in the field where the study is taking place to improve the situation. In such cases, while

the researcher may have the collaboration of stakeholders to go through the processes of action research, the results are out of the researcher's control.

As a result, the researcher in this case also employed case study research to provide a more comprehensive and nuanced understanding of the socio-technical, institutional, and political factors that mediate port reforms at the Tema Port in Ghana. Case study research is useful when a holistic, in-depth investigation of a phenomenon within a real-life context is needed and when the researcher has little control over the events. Through an interpretive case study of the single window implementation and container terminal construction, I gained an understanding of the power play by state and non-state actors. It focused on the evolution of the port reforms, the interventions made, and the resultant controversies engendered around Information Technology, including the container terminal development in the Tema Port. It also allowed for theorising digital transformation as institutional change and reform achieved through the mediation of state and non-state actors.

Another approach used in this study is an institutional analysis approach. This approach focuses on understanding the formal and informal rules, norms, and practices that shape the behaviour of organizations and actors within a specific institutional setting. This involved collecting data through in-depth interviews, document analysis, and observations, and analysing the data through the lens of institutional theory to understand how the formal and informal rules, norms, and practices shape the reform process.

Finally, the researcher conducted a content analysis of news articles and official documents to understand the discursive framing of the reforms and to triangulate the findings from interviews and observations.

1.4.1 Data Collection

1.4.1.1 Preliminary Data Collection

The first steps of this research were to gain the support of the authorities in charge of the port and trade sectors, building a network, identifying data sources, and to listen to the critical actors in the sector for pointers on what is considered essential issues in the implementation of a digitally enabled port (paperless port). The authorities, purposely selected were the Ministry of Transport (MOT), Ministry of Trade and Industry (MOTI), Ghana Ports and Harbours Authority (GPHA) and the Ghana Institute of Freight Forwarders (GIFF). The strategy was to start by introducing the research to the gatekeepers to gain validation for the proposed research objective and to ascertain relevancy to them. The assumption was that ‘efficiency’ in the port is relevant and a priority for the government that owned the port.

We established a prima facie basis for our assumption by having unstructured interviews with the General Manager for Marketing and Corporate Affairs and General Manager for corporate planning of the Ghana Ports & Harbours Authority (GPHA), the Director for Policy Planning, Monitoring and Evaluation at the Ministry of Transport (MOT), the Chief Director at the Ministry for Trade and Industries (MOTI) and a council member of the Ghana Institute of Freight Forwarders (GIFF) and International Federation of Freight Forwarders (FIATA), the most prominent freight forwarder association in Ghana representing shippers. The managers of state institutions were known to be responsible for implementing governments policies and imaginaries in the port and trade sectors.

These unstructured interviews focused on eliciting answers to one fundamental question based on the assumption that all port stakeholders desire an efficient port. If all port stakeholders wanted the port to be efficient, why was it taking so long and why had it not been achieved to stakeholders’ satisfaction despite adequate investments in port facilities and trade facilitation?

Although efficiency as a result of reforms was the key focus of the study, the idea generation stage exposed the need to consider the question: for whom is the port being made efficient? Considering the myriad of stakeholders involved in ports, this was an important question whose importance is reflected in the controversies over implementing the paperless port agenda.

1.4.1.2 Data collection instruments, description, and relevance to articles

From the onset, a qualitative research strategy of triangulation was adopted, considering the political sensitivity of the issues at stake and the need to test the validity of all data through a convergence of information from different sources. The methods of data collection were also varied for the same reason. The empirical data for this research were collected from six sources. The primary sources included workshops, in-depth interviews, focus groups, and observations. The secondary sources were reports and media publications as well as academic literature. Some were collected in real-time through physical meetings and events and from monitoring live interviews of selected personalities by the media as the debates and tensions regarding the single-window technology and the issues surrounding the new container terminal unfolded. The data were collected from 2018 to 2021 from four field trips and three virtual interviews. Using multiple data sources and methods is vital for a comprehensive understanding of the complexities regarding the conduct of stakeholders. In particular, information from top government officials on media platforms about the subject helped to bring in the governments/politicians' perspective, which would have been otherwise difficult to obtain.

Table 3: Summary of data collection instruments, description and relevance to articles

Instruments	Description	Relevance to articles
Workshop	One workshop that brought together 35 participants representing 14 port stakeholder organisations from the private, public sectors, associations, professional groups, and journalists.	Data used in all four articles
Focus Groups	Four (4) focus group sessions.	Data used in all four articles
In-depth interviews	Forty-six interviewees of major stakeholders/port users in 53 semi-structured interview sessions. There were follow up interviews with seven (7) interviewees making the total.	Used in all four articles
Scholarly articles	Academic articles from disciplines such as political economy, African studies, geography, port studies and information systems.	Used as background data in all articles
Institutional reports	Reports from the World Bank, UNCTAD, Association of Ghana Industries and GIFF.	Used as background data and anecdotal evidence in all articles
Media publications	Media reports from local and international publishers retrieved from Lexis Nexis (LexisUni) and Factiva.	Used in all articles
Observation (Qualitative)	Recorded notes based on observations at the Tema Port, Meridian Port Services, berthing meetings, and lectures.	Data used in all four articles

1.4.1.3 Data Collection methods and Description of Data

The researcher's role as lecturer in a maritime university and as member of the Transport Sector Working group at Ghana's Ministry of Transport provided a strategic position to observe and follow the implementation of the paperless port policy. This position offered frequent interaction with industry practitioners and their experiences and provided access to the relevant sources of information in the state agencies responsible for the implementation of the policy and the users of port. This position informed the adoption of action research design and to remove any biases supported combined the approach with case study research.

We invited relevant port stakeholders for a workshop in March 2019 at the University of Ghana in Accra where we introduced the broader research project, Port Efficiency and Public Private Capacity (PEPP) to the port stakeholders. We compiled the list of participants through snowballing. Contacts to relevant stakeholders were provided by the state agencies we engaged

in the preliminary stage of the research. The institutions and individuals that participated were state regulatory agencies such as the Ghana Revenue Authority Customs Division, the Ghana Standards Authority, Ghana Shippers' Authority (Shippers representatives), and the Ghana Maritime Authority. Also present were Westblue Consulting, one of the digital solutions providers to the state, MPS, the only private on-dock terminal operator, Amaris Terminal, an off-dock terminal operator, Chartered Institute of Logistics and Transport, a professional body, the Maritime and Dockworkers Union, Ghana Institute of Freight Forwarders (GIFF), journalists, advocacy group, and a private consultant. We requested at least two representatives from each organisation.

At this meeting, we recorded 35 attendees from 14 institutions, although the photos and videos showed more than that number indicating a lapse of recording on our part. However, it did not affect the quality of the data collected. The workshop allowed the researcher to gather information about the paperless port implementation process at the Tema Port and to understand the challenges and controversies that the process was encountering by observing the arguments made by participants.

Following the stakeholders meeting, we identified potential interviewees from the participants which included IT vendors, terminal managers, and representatives of professional bodies like CILT and GIFF. Aside, the participants we interviewed port users such as shipping line managers, shippers and freight forwarders. We engaged them in in-depth semi-structured interviews that lasted between one and two hours, covering a range of topics covering port efficiency, digitalisation, and capacity building. The interviews captured the interviewees' experiences and understanding of their work and their perspectives on the GNSW and its implementation and the ensuing contractual controversy (that was unravelling at the time), trust in the government's vision, port governance, public-private partnerships, their perception of how the port should operate,

communication and their interests and challenges. By making the questions unstructured and open-ended, interviewees could describe, evaluate, or express their views about an act, event, or person.

At the workshop in 2019, we grouped participants into three focus groups according to their preference, ensuring as far as possible that each organisation had one representative in each group. The idea was to have equal representation and an opportunity to collectively identify the bottlenecks to efficiency and the issues they would prefer to address in each of the three thematic areas – port service economy, port digitalisation, and capacity development. In the digitalisation focus group, we asked the stakeholders to share what their role was in the implementation of the paperless process and their experiences so far. This exercise provided information on the efficiency of the port and the bottlenecks that needed to be addressed. Further, we sought to determine two things from the stakeholders:

1. What was at stake for the stakeholders at Tema Port with implementation of the paperless port policy and the building of the new container terminal?
2. What hopes, fears and expectations were expressed about the single window system and port expansion?

1.4.1.4 Reflections on the Fieldwork

1.4.1.4.1 Dealing with biases

The researcher acknowledged that being a part of the system that was under study, held biases that may impact the research. Being part of a larger research team helped in containing the biases. That position also afforded the opportunity to know the biases that existed in the port stakeholder community under study and to address them. The diverse fields of study represented in the research group and line of questioning from the other researchers called for a reflection on my own assumptions, values, and biases and made me consider alternative viewpoints and interpretations.

Further, to avoid biases, this study used multiple qualitative sources of data, including interpretations from quantitative study done by a member of the research group. To ensure the research is comprehensive and captures multiple viewpoints, we sourced data from different stakeholders and perspectives. We involved diverse stakeholders in the research process, including those who may have different perspectives, experiences, and values. This helped to ensure that the research was inclusive and captured the complexity of the phenomenon being studied.

In addition, we maintained transparency throughout the research process, sharing the methods, data, and findings with stakeholders and seeking feedback and input. This helped to ensure that the research was credible and trustworthy. It also helped to address biases that existed in the port stakeholder community that was studied.

1.4.1.4.2 Opportunities

The initial dependence on professional networks resulted in a natural snowballing process of identifying other relevant stakeholders as sources of information. Having access to stakeholders from the state, private sector, and shippers was critical in validating the data generated. At the preliminary data collection stage, our first visit was to the Ministry of Transport where the Minister walked in on us while we were talking to the director of Policy Planning, Monitoring and Evaluation (PPME) and expressed interest in the research on hearing our objective.

The number of state institutions, private institutions, professional bodies (all represented by at least two people each), and individual consultants and journalists who attended the stakeholders meeting bore witness to the cooperation received. The reason can be attributed to the topic being essential to the stakeholder community as the events were unfolding at a very significant period in

Ghana's maritime history. The research period coincided with three significant events that generated public debate. The first was the implementation of the paperless port clearance system declared by the vice president in May 2017; the second was a plan to change the service provider and software that enabled paperless clearance of goods at the port; and the third was the construction and impending inaugural of a new privately operated container terminal. The last two had been plagued with allegations of procurement and contractual issues fiercely debated nationally by the two dominant political parties and the port stakeholders with the terminal facing labour agitations as a result of the contract.

The stakeholder meeting also filled a communication gap with the stakeholders, who had been yearning to share information. As part of the soft systems methodology (SSM) process to identify the port's problem situation, participants mentioned communication as a critical factor that was lacking in improving efficiency at the port. So, it was no surprise that when they all worked together to delineate the problem and proffer accommodations in the focus group, they offered very insightful data.

The study had answers from the political side from live interviews on the port authority's official TV programme, Eye on Port, where the controversies regarding the single window system and the new terminal played out. A content review of newspaper articles on Tema Port also provided an angle from the government that was key in juxtaposing with other data.

1.4.2 Summary of research methodology and data analysis in the articles

The four articles that make this dissertation are standalone, but are intended to contribute the central arguments. Even though, the articles are situated in port reforms in developing countries, the claims made are transdisciplinary in nature and have been influenced by diverse fields such as port economics, information systems, sociology, political economy, anthropology, and

organisational studies. The research methodology and data analysis varied based on the research questions in each article, the phenomena under study (that was evolving at the time of data collection), and the data type. They are as follows:

Article 1: The social-political embeddedness of import clearance: 20 years of digital transformation at Tema, Ghana

This article provides an introduction to the empirical setting of the study and introduce a critique of how the narrative around digital solutions are seen as nonpolitical drivers of transformation in ports in developing countries. The study traces and analyses the protracted process of digital transformation in Tema based on the Ghana National Single Window (GNSW) implementation.

This study sought to understand how after 20 years of implementation of the Ghana National Single Window project, the system had not achieved full automation, but widespread reports of political and human intervention and discretionary power leading to inefficiencies. Based on the initial assumption posed in a question form: ‘if efficiency is relevant to all stakeholders, why has it taken so long to make the system work optimally?’, the study sought to unearth the power play by state and non-state actors during the digital transformation process by following how the process had evolved. Due to the several attempts made by government and state agencies to intervene in the process at various times, the article used multi-case studies approach assuming each intervention as a case.

The study combined secondary information, interviews, and observations from a professional point of view to make inferences from actions observed in the evolution of the port reforms, the interventions made, and the resultant controversies engendered around the single window customs

clearance system. The study used reports and evaluations from the funder of the Gateway Project (the World Bank) as well as observations and media report to present a chronological narrative of events. Amongst other questions, we asked participants at the workshop and in follow up semi-structured interviews, why the state and its agencies are introducing new platforms despite GCNet's ability to provide the services required. The answers provided pointed to rent seeking behaviour by state agencies and politicians which gave insight into the socio-political and institutional factors that mediated the process.

To cover all grounds and be able to synthesise the narrative of how the port reform had evolved, we turned to official statements and reports from professional associations like the Ghana Institute of Freight Forwarders (who are major port users) obtained from the GIFF website. I also accessed media accounts of what was happening on the ground to ascertain the positions of inaccessible politicians and information from sources on the phenomenon that had unfolded. I utilised the LexisNexis (now UniLexis) database to curate media reports from the year 1980 to 2019 with the search term 'Tema Port'. From this broad search term I uploaded the results into NVIVO qualitative analysis software to organise, explore, and analyse the publications. For this article I coded for 'Tema Port' and 'Ghana National Single Window' and 'paperless port'. We synthesised the information from these diverse sources to arrive at our findings and draw conclusions.

Article 2: De-politicization of digital systems for trade facilitation at the Port of Tema: A soft systems methodology approach

If article 1 took a historical perspective, in article 2, we sought an in-depth understanding of issues surrounding the implementation of full automation of the single window system in real-time. Hence, we adopted the qualitative research method of a case study. The case study also

helps portray the complexities, interactions, and occurrences that explain the how what and why. They help investigate complex social units involving multiple interests (Behar-Horenstein, 2018). To avoid the reported disadvantage of lack of reliability, validity, and generalizability and to ensure the trustworthiness of the findings, the data was collected from different sources using different methods that validate the accuracy of the results- a technique known as triangulation. Further, the researchers presented the findings of the study to participants to authenticate the accuracy.

In addition, working in a large research group provided the opportunity to use peer debriefing as a tool to enhance credibility further. Discussing observations, impressions, and primary findings from interviews, focus groups, and documentary evidence with co-researchers was a practical way to corroborate findings and ensure dependability.

To get information as the implementation of the ‘paperless port’ unfolded, we purposefully got the state authorities involved from the onset. These were policymakers and regulators. We conducted semi-structured in-person interviews with knowledgeable persons actively involved in the implementation of the paperless port policy. Thus, managers of the Ghana Port and Harbours Authority (GPHA), Ministry of Transport, Ministry of Trade and Industry, Ghana Maritime Authority (GMA) and Customs Divisions of the Ghana Revenue Authority. We also interviewed lecturers at the Regional Maritime University (RMU), one member of the Ghana Institute of Freight Forwarders (GIFF) executive committee, managers at three shipping lines, and three managers at Meridian Port Services.

Several others were reached by attending the port’s famed Berthing Meetings, which was introduced to us by a student (staff of the Ghana Maritime Authority) when we attended selected post-graduate course lectures at the RMU and GIFF. Some industry practitioners in managerial and supervisory positions in the class were interviewed. The berthing meeting is held twice a week

by the Port Authority to allocate berths and service providers like stevedores to vessels arriving and leaving. The Harbour Master or Chief Pilot chairs this meeting. Here, all interested parties in the maritime industry are represented. It presented an excellent opportunity for the random selection of relevant participants for semi-structured interviews. The platform also helped in locating more interviewees through snowballing. Snowball sampling is a robust sampling method used by qualitative researchers to generate a pool of participants for a research study through referrals made by individuals who share a particular characteristic of research interest with the target population. It is also called chain sampling or chain referral sampling (Crouse & Lowe, 2018).

Preliminary interviews showed that the individual stakeholders' 'mental pictures' of the Tema Port situation revealed a complicated problem that often resulted in controversies, the basis of which systems thinking can untangle. Therefore, I adopted the Soft Systems Methodology (SSM) to map the key stakeholders, power and authority centres, and interrelations in the Tema Port to analyze their responses to implementing the GNSW and the port expansion project expressions of their worldviews. Further, it provided the opportunity to identify clashing interests and work towards accommodations.

Systems approaches such as SSM explain the dynamics, interconnectedness and relationships that make up a system. Lately, scholars have used the process with action research in port settings in the Sub-Saharan African (SSA) region. The use of systems approaches has gained popularity in many academic disciplines such as medicine, social sciences, economics, Information Systems, and engineering. The advantage of soft systems approaches is their ability to structure complex situations without exempting the environment and people when considering the issues and allowing accommodations. In the last five years, a growing consensus has recognized the need for

a systemic way of thinking about sustainable port development by finding the right balance between human, environmental, and economic aspects (Vellinga, Slinger, Taneja, & Vreugdenhil, 2017). Barnes-Dabban et al. (2017) and Hönke and Cuesta- Fernandez (2018) have used action research approaches of ‘sensemaking’ and ‘controversies’ to better understand African ports. We used SSM to ensure that the participants, collectively, can define the problems of national single window implementation and the port expansion project at the Tema Port.

The Port Economics literature also finds merit in incorporating the concerns and inputs of stakeholders into planning activities. The involvement of stakeholders helps port authorities avoid conflicts (Dooms, 2019). Vellinga et al. (2017) further argued that involving local stakeholders in planning port projects could enable port authorities to co-create value, i.e., create mutual interests and shared values to ensure a sustainable future for the port and the surrounding communities.

Article 3: Political Entrepreneurship and Public Sector Digital Transformation: Evidence from A Developing Country

We researched Ghana’s Customs and port industry from 2018-2021, a period that was significant because of the intense involvement of political entrepreneurship in digitalization initiatives. We collected the data in three rounds of field work that formed part of the larger funded research project known as “Port Efficiency and Public Private Capacity” (PEPP) in Tema. The data was collected between 2018 - three months after the 1st September 2017 deadline for GNSW implementation - and 2021, a year after a national election. The end year was significant because it was widely known among port community members that new political mandates in Ghana often brought significant changes to port and customs authority leadership and operations. We obtained data through interviews, observations, and documents and supported this evidence with focus group discussions.

At the commencement of the PEPP project, we invited relevant stakeholders from the port and trade sectors of Ghana to a workshop based on a list solicited from by the Ministry of Trade and Industry, Port Authority and the Ministry of Transport in preliminary meetings to introduce the project to the authorities. The invitation to the workshop and focus group discussion held in Accra in March 2019, specifically, asked for two relevant persons related to the digitalization process at the port (see appendix 1 for list of focus group participants). Following the workshop which took place on March 19th, 2019, we followed up and interviewed 12 persons representing various associations, IT vendors and the state on different occasions. Two (2) managers of the port authority in charge of corporate planning and marketing respectively who were absent at the workshop were also interviewed because they were responsible for liaising with government regarding the digitalisation process at the port.

To get a balanced view of the issues arising in the implementation of the digital system, we randomly interviewed 25 port users including freight forwarders (10), managers of shipping companies (2), Shippers (8), and senior customs officer (2) (speaking on their own behalf). We also interviewed academics (4) to get an objective view of the issues at stake. The academics teach at the Regional Maritime University (RMU) and the Ghana Institute of Freight Forwarders Educational Unit and often interact with student workers from the trade and maritime industry and supervise their dissertations on these same issues. Some of them serve on industry and government committees. Hence, they were a reliable source of information.

To link the paperless port implementation and the role of the Vice President, I used the Factiva database to find media accounts of the paperless port process. I searched for news articles published between January 2017 to December 2021 with the keywords ‘Bawumia’ and ‘paperless’. The search result produced a sample of 348 articles and news statements.

I also monitored selected live episodes of the official public TV informational programme of the Ghana Ports and Harbours Authority (GPHA), known as ‘Eye on Ports’. Through ‘Eye on Ports’ discussions and debates involving state agencies, civil society groups, professional associations, and government officials, I documented the official positions of the state through high-ranking state officials and the state agencies, challenges and alternative proposals and stands of civil society, trade and industry associations, and the shipping public in general. The source of data was valuable as key personnel in some of the state agencies in charge of the paperless port were inaccessible to the researchers due to the politization of the issues surrounding the paperless port project.

I employed content analysis of the news coverage on the VP’s public activities to promote digitalization and his role in the paperless port project implementation as our primary analytical tool. Using the qualitative research software QDA Miner lite, I organised and coded our data deductively (according to the theoretical constructs identified through our literature review) and inductively (paying attention to new themes not captured by our theoretical frame). The codes were triangulated with the interviews, focus group discussions, and media observations.

Article 4: Gateways and Transshipment Hubs: National and Global Narratives of Port Development as Socio-technical Imaginaries

This study used thematic media analysis to identify the socio-technical imaginaries formulated and performed in connection with the port expansion project in Tema Port. We triangulate the media content with state policies, report from the World Bank which sponsored port reforms in Ghana, interviews, and focus groups. Thematic analysis is a method for identifying, analysing, and reporting patterns (themes) within data (Braun & Clarke, 2006) and interprets various aspects of the research topic (Boyatzis, 1998). Thematic analysis involves an active process of reflexivity,

where a researcher's subjective experience plays a central role in meaning-making from data. In the following section, we present the context of the study, the data, and our analytical approach.

With the objective of looking for socio-technical imaginaries in the Tema Port expansion discourse, we first captured prominent and visible voices in media content. For this, we used the Factiva database to identify media accounts of the port expansion project and its perceived impact. Specifically, we identified articles published between the announcement of the expansion in January 2016 and May 2021, which mentioned 'Tema Port' in conjunction with the following 'development', 'future', 'global', 'technology', 'digitalisation', 'digital' 'strategy', and 'international'. The search returned a sample of approximately 1579 articles and news statements from both local and foreign news outlets curated by Factiva. Due to the limit placed on the number of downloads allowed per day by Factiva, it took 16 days to complete the search from 2nd May – 18th May 2021. The restriction was beneficial because it allowed us to scan through the topics and contents of the daily downloads to familiarise ourselves with the content. We looked for quotes from 'powerful' or influential voices in the country such as the president, ministers of state, representatives of international development partners, port authority, state border agencies, shipping lines, terminal operators, shipper associations and other service providers that suggested the future role of the port.

We found that the most powerful voices used the word 'transhipment'. This evoked our curiosity because it was in sharp contrast to the port reform objectives set in the Ghana Gateway Project that worked towards a gateway port. Hence, we searched for 'Tema Port' AND 'Transhipment' and had 29 hits. Next, we uploaded all the data from factiva to the qualitative data analysis software - Nvivo 12 and coded for 'transhipment' to tease out all the quotes that mention transhipment. The sample was developed to be broad enough to cover a potentially diverse range

of themes yet small enough to be managed qualitatively so that manifest content and latent meaning could emerge from the analysis (Reese & Shoemaker, 2016).

We juxtaposed the data from the media analysis with the policy documents to identify stated imaginaries and their sources. We read the objectives and summaries of Ghana's policy documents over the years including the Seven Year Development Plan, Ghana Vision 2020 plan, and the Ghana Beyond Aid policy. We perused the significant report by the World Bank on the Ghana Trade and Investment Gateway Project (GHATIC) which underlies Ghana's port, industrial and trade reforms in the 90s.

We also had an extensive semi-structured interview with a former Director General (DG) of the Ghana Ports and Harbours Authority during whose tenure the construction of the new terminal began. Interviewing him was important because, during his tenure as DG, he had proposed a nationalistic idea of a Port Development Fund (PDF) meant to support indigenous investment in Ghana's ports. Such a voice represents the dissenting voices who envision port development as a tool to safeguard national interests.

While analysing the data, we also noted 'who' was making the statements and what institution they represented. This was important to ascertain whose imaginary they were projecting – i.e., whether they were projecting or protecting STIs formed by the state/national (if any) or global transnational corporations with neoliberal ideologies or that of some stakeholder group or individual. We identified three groups of institutions that propagated the themes identified in the data. They are the state, transnational shipping/terminal operators, and grassroots group whose everyday lives are connected to the port like labour and the DG of the port of authority. The idea is that these imaginaries – which sometimes conflict with or reinforce each other can be identified, analyzed, and compared.

Having identified gateways and transshipment as socio-technical imaginaries from the policy documents and media contents, respectively, we reflect on the policy objectives, evaluation reports, quotes of prominent voices, the literature, and the actions taken to inductively identify tensions and interpret the expectations vis-à-vis what the literature says about gateways and transshipment hubs.

1.5 Key Findings and Conclusion

This section highlights the key findings from the four articles reported in the research. This is followed by the central argument, advances in literature, implications, limitations, and future research.

Article 1 is entitled ‘The social-political embeddedness of import clearance: 20 years of digital transformation at Tema, Ghana’ and aims to answer the first question: “How do port stakeholder interests affect decisions and outcomes in the digital transformation process?” It employs the concepts of ‘interpretive flexibility and ‘relevant social groups’ from the Social Constructivist Theory of Technology to explain why the anti-corruption potential of IT demonstrated in some countries is not realised in many developing countries, using multi-case studies based on the implementation of the Ghana National Single-Window (GNSW) digital platform at the Tema Port. The empirical findings reflected the interpretive flexibility that moderates the dichotomy between technological determinism and social constructivism. The study identified the frictions and interlinkages of non-technological factors affecting port efficiency.

Article 2 is entitled ‘De-Politicization of Digital Systems for Trade Facilitation at the Tema Port: A Soft Systems Methodology Approach’ and aims to answer the second research question: “What meanings underlie controversies surrounding the implementation of the national single

window and new port terminals?” The paper builds on article 1’s insight about the influence of stakeholders’ interpretations of the impact of technology on the observed tensions in the implementation of the Ghana National Single Window. It explores meanings embedded in controversies surrounding the implementation of the GNSW and the new port terminal and how these meanings help explain port stakeholders’ fears, hopes, and expectations. In doing so, we identify the key stakeholders of the port and their relations. The article employs soft systems methodology (SSM) to unearth meanings underlying controversies in the digital transformation process. We found that the controversies are the result of resistance to arbitrary awards of contracts to IT vendors (all without evidence of competitive bidding) over each political cycle. Furthermore, state agencies introduced online systems at a cost adding to the cost of doing business at the port which increases the cost of transacting business at the port.

Article 3 is entitled ‘Political Entrepreneurship and Public Sector Digital Transformation: Evidence from A Developing Country’. The article aimed to answer the question: What is human agency’s significance in digital transformation? The paper focuses on human agency such as a political entrepreneur and their influence on facilitating changing institutions in port reforms. Through triangulation of interviews, media content and focus group discussions, we probed to get an understanding of the role of the Vice President in eliminating institutionalised paper processes in the port. The idea of strong institutional structures has been pitted against agency or ‘strong men’ in developing countries. Political actors are known to influence digitalization and modernization reforms, however, little is known theoretically about how their involvement might positively contribute to digitalization and modernization of the public sector. Article 4 contributes to the literature by showing that given the enabling environment, which may include technological,

legal and political affordances, and human agents, can be as instrumental in achieving positive results as they are in producing negative ones.

Article 4 entitled ‘Gateways and Transshipment Hubs: National and Global Narratives of Port Development as Socio-technical Imaginaries’ aims to answer question three: “How do national and global narratives of port development intersect, and what are the implications of these intersections for port development?” This article focuses on how imaginaries interpreted, performed, and exercised by powerful individuals, state and non-state actors shape the direction of port development. By drawing on the concepts of socio-technical imaginaries, gateways and transshipment hubs, we deepen the understanding of the contributory factors to conflicts in ports. We do this through a discourse analysis of state policy, media content on discourses surrounding the port expansion project and interviews. The literature (Galvao et al., 2016; Parola & Maugeri, 2013a) points to neo-liberal reforms and the dominance of the landlord port management system as the basis for tensions in developing countries with the power of transnational corporations such as international shipping lines and terminal operators increasing over the state and its agents. However, constructs such as gateway connect port operations to national ideals and development pathways while transshipment port does not (Bird, 1980; Tandini, 2022), therefore their everyday usage and application by different powerful groups have a degree of influence on tensions that arise during the reform and forms part of the power and authority struggles in a reform. Article 3 advances this argument as a contribution to the port reform and social order literature.

Table 4: Overview of the four articles of PhD Dissertation

Article	Key findings	Theoretical contributions	Practical Implications
Article 1	An empirical and exploratory study reveals that there are political drivers of port reforms, a factor that is lacking in the literature in port studies.	Confirms that interpretive flexibility moderates the dichotomy between technological determinism and social constructivism.	To reduce ineffectiveness in the port, policy makers must recognise that the social embeddedness of the digital tools, matter more than the purchase and implementation of new technologies.
Article 2	<p>We find through the SSM that</p> <ol style="list-style-type: none"> 1. controversies that arise in the implementation of technology lie outside the technical aspects. 2. the contracting of new IT vendors by succeeding governments is a compromise of the very objective of installing the technological artefact, which is to curb corruption. 	<p>Contributes to the literature on social embeddedness of technology by showing that</p> <ol style="list-style-type: none"> 1. methodologies that involves engaging stakeholders can reveal the underlying causes of controversies that impact the implementation process. 2. State regulatory and border agencies. Often left out in the literature are key players in the political and economic context. 	<ol style="list-style-type: none"> 1. Identifying the underlying causes of controversies regarding technology implementation can determine if another political cycle will consolidate the gains made or unsettle the settlements agreed earlier. 2. History shows that interventions by powerful individuals have not lasted hence there is the danger of reversal of the digitalisation agenda in the port if not backed by some legislation.
Article 3	We find in this article an exception to the interventions by powerful people in the port where a human agent in the form of a	Contributes to the literature by showing that given the enabling environment, which may include technological, legal	Bureaucracies are affected by donor-driven reforms which are sometimes at variance with the mandates and policies of the state.

	political entrepreneur succeeded in ensuring digital transformation in the port.	and political affordances, human agents, more so politicians, can be instrumental in achieving positive results as they are in producing negative ones.	
Article 4	We find that the state's imaginary of an export-led economy backed by a gateway port has gradually give way to the idea of a transshipment port with critical implications for society, creating tensions.	Contributes to our understanding of conflict and power redistribution during the port reform process by highlighting how the inherent meanings, focus and positionality of ports acting as gateways or transshipment hubs impact long-standing socio-technical imaginaries of a state's development path and power dynamics.	<ol style="list-style-type: none"> 1. Sociotechnical Imaginaries of powerful stakeholders' must not be ignored but studied as they chart the course of port and national development. 2. Concepts should be used in their context right as their conceptual meanings and their interpretation when put in action may not be what was intended by policymakers creating tension between defenders of the policy and the realities.

1.5.1 Central Arguments

The central argument of this dissertation for which it aims to contribute to our knowledge of port reforms that port reforms are not only steeped in the institutional characteristics of local/national institutional frameworks and political traditions resulting in implementation asymmetries. They are also influenced by powerful individuals and external groups; and by perceptions, imaginaries, and concepts interpreted, performed and exercised by powerful individuals, state and non-state entities. These considerations are often lacking in the literature.

The process of port reform is understood in this dissertation as port modernisation which involves a change of governance structure and the implementation of technology including the single window system and a new port terminal; and theorised as follows:

Firstly, IT implementation in port reform is considered a panacea for stamping out inefficiencies in port processes and alter dysfunctional institutionalised practices. Such expectations are countered by multiple and broader local/national institutional forces that influence and are influenced by state agencies at the port, political entrepreneurs, and transnational shipping and terminal operators. Such plurality of institutions at the port underpins conflict and politics observed in port reforms and trump the technical issues of technology implementation. Given, the right conditions, political and institutional entrepreneurs who are usually suspect in unsuccessful reforms in developing countries can facilitate the implementation process by removing bottlenecks.

Secondly, new introductions of technological solutions and election cycles are moments of political raptures - major event or confluence of factors, which disrupts the existing balance of political and economic power in a nation-. They are moments of intensive change, an opportunity for a shift in political settlement at the port. Rather than displace the old port governance model, a hybrid form emerged to mitigate the effect of neoliberal reforms and protect national sovereignty which is under threat from powerful transnational companies. Again, rather than consolidating gains made towards serving local needs of the people and industries envisaged in the national gateway imaginaries, the function of the new terminal is altered through the imaginary of transshipment and benefits appear to accrue to the operators and shipping lines.

1.5.2 Theoretical Contributions and Relation to Broader Port Studies

The study makes significant contributions to various fields of literature. Specifically, the study first situated port policy and studies conditions on the ground among stakeholders and the broader state logic. By drawing concepts and theories from information systems (IS), international relations (IR), and literature on politics, the study provided an understanding of how the state, state actors, and private organisations conduct themselves in matters of contracts, procurement, and devolution of power and authority at the port. The study focused on the interconnectedness between governance structure, interests, expectations, and attitudes of port stakeholders to examine the actual conduct of stakeholders towards digitalisation and port infrastructure development that mediate between port reform and port performance. By posing the question ‘What are your expectations and fears?’ to different stakeholder groups, we got a glimpse of who and what the proponents and takers of digital transformation are.

Second, our findings highlight how and why digital transformation might succeed in the developing countries’ public sector contrary to overwhelming evidence of abysmal results. Most importantly, while many studies focused on failures, the IS literature has rarely focused on agency and its role in transforming institutions.

Third, the port studies literature leaves out regulatory and border agencies, a vital port user group that is crucial to the effectiveness of the port. This study contributes to the literature by focusing on state regulatory and border agencies, the primary service providers to shippers at the port. The inclusion of the regulatory and border agencies as a unit of analysis presents us with an opportunity to holistically elaborate on the political and economic context of the port that is significant in the case of Africa.

Fourth, by virtue of the dual efforts (in terms of efficiency and effectiveness) required to achieve the improved port performance, we discover that the two key constructs of digital transformation (DT) and IT-enabled organisational transformation (ITOT) are realised simultaneously in one sector and by extension in multiple organisations depending on the level of IT uptake and adoption of individual firms. The introductory part of this dissertation shows an already high level of technology adoption in the terminals bringing about efficiency by the terminal operators and port authorities. Article 4 shows that to complete the requirements of port performance by being effective, the terminals, port authority, and shipping lines changed their value proposition by introducing a paperless single window system.

Fifth by employing multidisciplinary concepts from IS and IR, the study expanded and advanced the analytical perspectives used in port reform and performance literature through empirical work at the Tema Port. The approach contributes in a distinctive way to conceptual thinking on the conduct of port stakeholders towards achieving efficiency in the developing country context more broadly, a fusion lacking in the literature on ports.

Sixth, this study mapped the conduct of stakeholders within the established governance and regulatory environment. Mapping these actions provided a deeper insight into how contemporary port governance can impact how stakeholders negotiate and justify their inclusion in a vision or imaginary of an efficient port.

Lastly, the study captured port stakeholders' perceptions, mental pictures, expectations, and fears at introducing technologies in the import clearance process and a new ultra-modern container terminal, all meant to improve port efficiency. Capturing these individual visions and imaginaries provided novel empirical and conceptual insights that can help advance the discussions about ports in the backdrop of the fourth industrial revolution. Moreover, because this study draws on

empirical work and findings from a context different from the dominant eurocentric literature on efficiency in ports, it advances the understanding of the social dimension and human agency to efficiency in ports induced by technology.

1.5.3 Implications and Recommendations for Policymakers

The dissertation suggests several implications and recommendations for policymakers and implementers of port policies. Understanding the nuances of stakeholder conduct will help in engagements with stakeholders on policy direction, marketing, and investment strategies.

This research demonstrates that the effects of port reforms last far beyond the era in which they are conducted. New interventions that stick to or deviate from an accepted plan elicits positive and negative actions from different stakeholder groups depending on the loss or benefit that accrues to them. It is important for the sake of consistency with state imaginaries to engage and update all stakeholders on the phases of and its implications for them. For example, a fascinating question, port users experiencing high charges asked is, why have modern terminal investments brought efficiency in port operations but not resulted in cost reduction? The answer lies somewhere in the original vision of the GHATIG, reiterated by one of the interviewees, the project manager of the MPS terminal construction. He answered that ports need an industrial/vibrant economy, and the industrial/vibrant economy needs ports. However, the industrial base must be large enough to create the terminal's economies of scale to reduce prices. Hence, the GHATIG vision of an efficient port (and other border agencies) was supposed to be catalysts to attract FDI into the Free Zone enclave adjacent to the port. A snapshot of the port shows a very efficient terminal operation, coupled with a single-window system, delivering a commendable level of service but not yet fulfilling the ultimate needs of the government and users, which is to lower

costs for businesses and individuals that will attract FDIs to boost employment and technology transfer, among other benefits.

The abovementioned situation begs the question, who is the real beneficiary of the efficiency gains made at the port? When asked about Terminal 3, the three leading shipping lines, Maersk, MSC, and ONE, were excited about the level of service they were receiving and the technological integration ensuring fast vessel planning, loading, and discharging. MPS has seen a steady increase in container throughput, especially for transshipment cargo, with resultant revenue increases for the consortium and, by extension, the state in import duties. The government and MPS hail this achievement as an emerging regional hub and preferred port in West Africa. However, the fixation on hub status and accolades for the port's achievements seem to overshadow the port authority's delicate social 'balancing act' and mechanisms to reduce the cost of doing business at the port. Scholars are unanimous in identifying poor regulation, stakeholder management, and lack of expertise in port policy action, given global trends as causes of the problem (Abayomi, 2017; Akinyemi, 2016; Debie, 2012). The wake-up calls come in frictions, conflicts, and sometimes controversies.

1.5.3.1 Implications for Port Performance

This dissertation shows that various stakeholder groups' expectations and conduct may impact port performance. While the relationship between port reforms and performance is gradually being established in port studies, the influence of social agents is not widely explored. This dissertation incorporates socio-technical, institutional, and political dimensions to bridge the gap in the literature between port studies and the social sciences and thus advance trans-disciplinary thinking on port development, a fusion lacking in the extant literature on ports.

The blanket use of the term efficiency can cause the authorities to take their eyes off the cost reduction goal that must attract FDI. Efficiency measures operational and financial performance, while effectiveness measures user satisfaction. Colloquial language or wording can create misunderstandings that may lead to conflicts between the state touting an efficient port and other port users who may not be as satisfied. Besides this exciting finding, the study broaches the topic of the human element and stakeholder interests. The idea of ‘profitable inefficiency’ observed by Lamarque, (2019) in Mombasa Port shows that a port, when inefficient, can be effective for one group of port users and vice versa. The observation is similar to the practice in Tema Port, where Addo & Avgerou (2021) reported 20 petty corruption instantiations by street-level customs officers, senior customs officers, political actors, and freight forwarders or shippers’ representatives influencing customs officers.

1.5.4 Limitations and Future Research

This dissertation provides new insight into stakeholder conduct in port reforms, however, there are some limitations that provides insight into future research direction which are discussed in this section.

Firstly, in the interviews and focus group meetings several port users repeatedly mentioned that costs increase whenever new technology is introduced by state and non-state actors as part of port business. More research is needed to verify and ascertain the trend over the last couple of decades, with critical points of interest being the GNSW and Terminal 3.

Secondly, a report by the Ghana National Chamber of Commerce & Industry (2017) shows that freight forwarders received the highest amount of all payments made in the ports. How they dominate the cost structure needs probing; ironically, they are at the forefront of complaining about

the high cost of doing business at the port. A further study into this will be a worthy contribution to the literature.

Lastly, the presence of multinational terminal operators in ports in neighbouring West African countries, proximity of West African ports to each other, a large contestable hinterland in the Sahel region, and prohibitive costs of port transactions need further research to understand why terminal operation costs are not decreasing despite the perceived competition among port terminals in the sub-region.

1.5.5 Overall Conclusions

Overall, this dissertation makes a significant contribution by offering a detailed understanding of port stakeholders especially by including the regulatory and border agencies, a vital port user group that is crucial to the effectiveness of the port and often left out in the literature. With this dissertation, I set out to answer the question how more focus on effectiveness and the perspective of various port users may contribute to the improvement of port performance. The combination of new key findings in four articles leads me to the overall conclusion that we need to pay more attention to qualitative data on port users' past experiences and imaginaries as formulated by themselves and presented in media.

The study highlights the role of the gateway and transshipment socio-technical imaginaries as key sources of conflict over sovereignty and the implications of political interference on implementation of port reforms. This dissertation contributes to the literature by showing how perceptions, imaginaries, concepts and power are interpreted, performed and exercised by powerful individuals, state and non-state actors, to shape the direction of port development.

Lastly, I show that situating port reforms in the broader national context to holistically elaborate on the political and economic context of the port is significant not least in the case of Africa. The Port of Tema was used to highlight the testing and reshaping of Ghana's underlying political settlements. Together the four articles suggest new insights for port policy and reforms.

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Part B: Articles

Chapter 2: Article 1

Aryee, J. Andersen C. and Hansen S. A (2021), The social-political embeddedness of import clearance: 20 years of digital transformation at Tema, Ghana, *World Customs Journal*, vol. 15, no. 1, pp 3-14

The Social-Political Embeddedness of Import Clearance: 20 Years of Digital Transformation at Tema, Ghana

Abstract

Social structures embed technologies, which people use in the implementation of national single window digital platforms. We argue that stakeholder interests determine digital transformation – with people being the key to understanding how digital platforms change or do not change the environments into which they are introduced. In our multicase studies based in the Port of Tema, Ghana, stakeholders have divergent opinions about technology, which causes conflicts. Our empirical findings reflect the interpretive flexibility that moderates the traditional dichotomy between technological determinism and social constructivism. By employing the theory of sociotechnical systems, we identify the frictions and interlinkages of non-technological factors.

Status: Published

2. Introduction

Customs throughout the world has digitalised many of their operations for efficiency and transparency. However, if efficiency is relevant to all stakeholders, why is there a lack of commitment to make the system work most effectively? Based on an analysis of a series of successive cases from Ghana import clearance, we argue that the procurement of new digital systems is highly politicised. This reflects the social embeddedness of technology, which can explain why systems may be more or less successfully implemented regardless of their immediate utility. For political and other reasons, people may not engage with or support the implementation of new systems and, therefore, obstruct or lessen the potential positive impact. Key users may also fail to see the benefit of, yet another system procured, which requires investments of time and money unproportioned with the perceived benefit.

2.1 Background

The Port of Tema, Ghana, is a leading port in west Africa and a gateway for the landlocked countries of Burkina Faso, Mali and Niger. With a new container terminal opened in June 2019, the port aims to secure for itself the position of the preferred port of call for large vessels bound for west Africa. Following a worldwide trend of digitalisation of port operations and trade facilitation, the port is central in public discourse concerning the introduction of new digital platforms changing the *modus operandi* of the port authority, government agencies and other stakeholders. In September 2017, the vice-president's office announced the introduction of a paperless port system by the government of Ghana to curb corruption without mentioning that plans and projects to digitalise import clearance had been ongoing since 1998. During the last two decades, a chequered story of successes and failures in implementing digital technologies has

spurred public interest because of high expectations to digital transformation in customs clearance procedures.

This study traces and analyses this protracted process of digital transformation in Tema. Our starting point is that digital transformation occurs within sociotechnical systems in which social reality is coproduced in the interface of technological hardware and people's social attributes and interests (Leonardi, 2012). Applying Pinch and Bijker's (1984) social constructivist idea of interpretive flexibility, as modified by Sahay and Robey (1996), we analyse cases representing technological interventions in the customs clearance process since 1998. We aim to understand how stakeholder interests affect decisions and outcomes in the introduction of digital platforms and argue that the vigorous stakeholder politics played out around digitalisation run counter to the public discourses that narrate digital solutions as non-political drivers of port transformation in Tema. This discourse has reinforced the perception that the reason for digitalisation is to eliminate the human factor. Based on our findings, we argue that even if digital technology may potentially eliminate the human factor, humans are an integral part of the politics of procurement, which affects the success of the implementation.

2.1.1 Digitalisation in customs clearance and the Ghana national single window

In customs clearance, the single window concept gained popularity in the new millennium. The World Customs Organization (WCO) defined it as *"a facility that allows parties involved in trade and transport to lodge standardised information and documents with a single-entry point to fulfil all import, export, and transit-related regulatory requirements?"* (United Nations Centre for Trade Facilitation and Electronic Business [UN/CEFACT], 2005, p. 7). The argument is that if the information is electronic, then individual data elements only need to be submitted once, potentially saving users time, which is a key measure of efficiency. According to the WCO, countries reap

fuller benefits using information and communication technology (ICT) and dataset standards commonly accepted by the relevant public and private stakeholders (World Customs Organization [WCO], 2012). Blockchain technology is now emerging as the next key technology to improve trade facilitation, as in the case of Maersk's TradeLens platform (Milne, 2018) and CargoX offering digital shipping documents.

For security and trade facilitation, many ports have moved from manual to digital processes, employing powerful scanners to detect contraband goods and false declarations. De Wulf and Sokol (2004) present case studies showing a common motivation for digitalising customs processes. In the Philippines, Turkey, Uganda, Morocco, Mozambique and Peru, digitalisation happened as part of customs reforms. In Turkey, besides reforms, there was also the need to bring customs legislation and administrative structures in line with European Union (EU) standards. From 1998, Ghana pursued customs reform to complement an initial trade reform meant to improve the investment climate, which posted results below expectations. What is common among the countries mentioned is that politicians insisted on these reforms, primarily to curtail corruption in the customs authority, which led to the loss of revenue.

The Ghana National Single Window (GNSW) is an online portal that provides a comprehensive set of services to the trading community. It is a secure trade platform that facilitates the exchange of information between the Government of Ghana and the logistics community. The platform reduces the need for data to be entered multiple times – instead, it can be exchanged and re-used electronically, achieving faster, more accurate results and making it easier to comply with Government of Ghana requirements.

The GNSW consists of TradeNet Services, eTax services and eRegistrar Services. TradeNet permits the logistics community to exchange trade-related documentation electronically with all

agents involved in trade-related processes. eTax allows taxpayers to register for a tax identification number, manage their profile, submit tax returns online, and make electronic payments to settle liabilities. A tax identification number is required for all importers wishing to bring goods into Ghana. eRegistrar allows investors to register their businesses online and pay associated fees electronically. During business registration, the new company automatically receives a tax identification number – a requirement for all importers wishing to bring goods into Ghana. Also, integrated into the GNSW is a module, named eMDA, that connects shippers with the Ministries, Departments and Agencies (MDAs) electronically, as well as the Ghana Integrated Cargo Clearance System (GICCS). eMDA allows online submission, processing, approval and distribution of a wide range of trade-related documentation by ministries, departments and agencies. GICCS, on the other hand, has modules that allow submission of the manifest and payment-related processing. The logistics module has cargo tracking, container transfer, delivery order submission and tracking features.

2.2 Theory: interpretive flexibility and stakeholder interests

The latest scholarly publication on digitalisation at the Tema Port is by Amankwah-Sarfo et al. (2018), who analyse the paperless port as a boundary object. Their findings show that the digitalisation of import clearance procedures can improve efficiency in customs clearance, increase government revenue, and reduce port-related corruption. This narrative is not new and is a widely accepted ability of digital technology as applied in ports, including e-governance systems, e-management, e-services and e-democracy (Al-Shbail & Aman 2018, Asogwa 2013, Imam & Jacobs 2007). However, Amankwah-Sarfo et al. (2018) focus only on the Tema narrative promoted by the implementing authorities. Their claims represent that of a section of the producers of the

digital hardware artefact and the implementers; however, they do not represent other stakeholders, such as those deciding on acquisition and procurement.

To allow us to include other stakeholders, we draw on the social constructivist theory of technology (SCOT), which provides us with two key concepts that we use to explore the interface between digital platforms and stakeholders. The first is the concept of ‘interpretive flexibility’. Interpretive flexibility expresses the idea that cultural assumptions among and between the relevant social groups shape different interpretations of technological artefacts such as digital platforms. Interpretive flexibility underscores human agency in the sense that the meaning of a given technology is never fully fixed. It is a well-known empirical fact that identical technologies have different impacts depending on social and cultural contexts. The notion of interpretive flexibility serves to explore the dynamic interface between technology and social context (Fulk, 1993; Bijker et al., 1993).

The second concept we employ is the notion of ‘relevant social groups,’ which consist of *“all members of a certain social group [who] share the same set of meanings, attached to a specific artefact”* (Pinch & Bijker, 1984, p. 30). The relevant social groups are those groups whose agency gives meaning to a given artefact. At its most basic, it is the producers and users of a given technology, but within those broad categories, subgroups exist, such as competing producers and users with different political or socio-economic statuses and interests. Focusing on relevant social groups offers a way of identifying and analysing competing stakeholder interests in the interface between digital platforms and social context. Assessing the impact of digital platforms in import clearance requires attention to the fact that such technologies are embedded in social processes. Therefore, we explore the interface between digital platforms (the hardware) and the people. Our analysis seeks to unravel and identify stakeholder interests among the relevant social groups at the

Tema Port, paying attention to interpretive flexibility and its limits (Klein & Kleinman, 2002; Sahay et al., 1994).

For our analysis, we used the sources mined from the LexisNexis database, conducted semi-structured interviews with key stakeholders at the port, and data generated from a stakeholder's workshop at the University of Ghana in Accra, Ghana, in 2019. The focus group had representation from Ghana Standards Authority and Ghana Shippers Authority (shippers' representatives), West Blue Consulting (one of the digital solutions providers to the state), and Meridian Port Services (the only private on-dock terminal operator). Also present was Amaris Terminal (an off-dock terminal operator), the Chartered Institute of Logistics and Transport (a professional body), and the Maritime and Dockworkers Union. The plenary session had other representative groups such as journalists, an advocacy group, private consultants, and state agencies such as the Ghana Maritime Authority, who also contributed to the discussion of digital solutions to import clearance. Moreover, for two months, we conducted semistructured interviews with key stakeholders such as customs, the port authority, and freight forwarders. Furthermore, we attended selected lectures at the Regional Maritime University and the Ghana Institute of Freight forwarders (GIFF) to better understand the stakeholders' background and the issues relating to the GNSW in the Tema Port. We will now zoom in on three specific cases to demonstrate the workings of stakeholder politics.

2.3 Evolution of digital transformation in Tema

The World Bank and other interested parties reviewed Ghanaian trade reforms introduced in the 1990s and found that they needed the support of reforms of other sectors to achieve their objectives. This gave birth to the project dubbed the Ghana Trade and Investment Gateway Project,

referred to hereafter as the Gateway Project. The project sought to transform and improve the operational efficiency of frontline agencies such as the Ghana Ports and Harbours Authority, Ghana Immigration Service, Customs Excise and Preventive Service, Ghana Investment Promotion Centre, and Ghana Free Zones Board that interact with trade, businesses, and people entering or leaving the country (De Wulf, 2004). The aim was to make Ghana the Gateway to West Africa and the preferred destination for investments in West Africa, a vision which still permeates government policies in Ghana to date. A notable result of the Gateway project was the reform of the Port Authority from a service port to a quasi-landlord port that allowed increased private participation in port operations and the creation of the GCNet.

GCNet is a joint venture company with shareholders consisting of SGS (Société Générale de Surveillance) (60 per cent), the Customs Division of the Ghana Revenue Authority (20 per cent), the Ghana Shippers Council (10 per cent), and two local banks (each 5 per cent). GCNet operates under a service agreement with the Ministry of Trade and Industry, under which they installed and operated the Electronic Data Interchange system called TradeNet and the Ghana Customs Management System (GCMS) (De Wulf, 2004). GCNet rolled out a system modelled after Singapore's famous TradeNet, a single window platform where all stakeholders, state agencies and private service providers submit and access information. According to De Wulf (2004), many customs and import processes were automated, simplified, and improved, which contributed to cost savings for businesses, better collection of customs revenues, and speedier processing of container traffic through the Tema Port.

GCNet marked the beginning of the digital transformation in the import clearance processes in Ghana. However, the digitalisation of customs processes was not all rosy. As De Wulf (2004) points out, changes in government around the time of incorporation, change in legislation

to accommodate automation in customs operations, as well as commitment issues on the part of the newly formed government and customs leadership meant that the project was delayed until 2002, when the government had settled and given its blessing to the project. GCNet linked the systems of several other government agencies involved in the clearance process using its eMDA platform. It was the harbinger of the current single window system. However, they faced challenges of non-cooperation even from some of its shareholders, but they continually invested in the system and built capacity.

In September 2015, the Government of Ghana contracted West Blue Consulting. Their introduction was met with opposition within both government ranks and other stakeholders due to alleged procurement breaches. Here, the changes in the interpretations of single relevant social groups and the diversity of interpretations among different social groups determine the outcome of the implementation process. After West Blue was contracted (by the Ministry of Finance) to take over the functions of Destination Inspection Companies (DICs), the company operated hand-in-hand with GCNet (under contract with the Ministry of Trade and Industry) as a technology solutions provider for Ghana Customs. They have since introduced new modules to improve the import clearance process. Whereas the two companies try to convince the public that their softwares work seamlessly in delivering the GNSW platform, some stakeholders have often referred to it as ‘Single Windows’; some in jest, but others quite seriously when they encounter problems with the system.

West Blue has proven its mettle, but they have had to justify its introduction into import clearance at various forums. This statement by the CEO of West Blue is one of them:

“This 2nd phase of the single window system takes the project much further by extending the National Single Window automation and integration approach to all government agencies and

private sector operators involved in international trade, utilizing existing systems and infrastructure wherever this is efficient and effective. A key feature of the 2nd phase is the fully automated and paperless ‘single entry point’ to facilitate the single submission – by businesses – of the required trade information for processing by government agencies and private sector operators, and the receipt of the relevant responses through a seamless and easy to use service”. (Organisation for Economic Co-operation and Development [OECD], 2017, p. 2)

The reference to a second phase had never surfaced in any discourse when GCNet was the single service provider of technology to customs. Apart from the suspicion of procurement breaches by government, the initial opposition to West Blue’s contract partly reflects a section of the relevant social group interpreting this as a replacement of GCNet with West Blue. Some held that GCNet could be improved if the authorities did not frustrate their effects. Others preferred the status quo and did not want to rock the boat after years of co-creating solutions at the port with GCNet.

Other state agencies have added more providers and platforms since 2015. Amidst heavy resistance from freight forwarders and shippers, in 2015, the Ghana Shippers Authority first introduced the Advanced Shipment Information (ASHI) policy, which is an electronic platform to receive pre-arrival cargo information in advance. The protestors argued that it is costly for the shipper. The Ministry of Transport later suspended the policy with the view that further capacity building is required to give the protestors a good understanding and, hence, acceptance. However, in an interview with *The Chronicle* (2016) newspaper, the CEO of Ghana Shippers Authority stated: *“Due diligence and stakeholder consultation was made before the introduction of the policy, hence, I cannot fathom why the severe objection exhibited by a cross-section of players*

within the industry". This statement indicates a mixture of problems, including wrong targeting and socio-political underpinnings.

However, a change in government following the 2016 election saw the policy resurface in another form called Cargo Tracking Note (CTN) – very popular in many parts of Africa. This time, it was to be in the realms of the Ghana Revenue Authority but to be implemented by a private company called CTN Ghana Limited. The government's justification for its introduction and rebuttal for the issues raised by other stakeholders was that those opposing it were nation wreckers who were apprehensive that their illegal activities such as under-invoicing would be blocked by the introduction of CTN. The proponents of CTN alleged that the nation was losing too much money due to these irregular activities. However, the GIFF, the main users affected by the new systems, insisted that the statistical reports from the Single Window platform showed otherwise. GIFF (Ghana Institute of Freight Forwarders [GIFF], 2018) stated in a position paper that:

"It should be noted that GIFF is in no way kicking against the established objective of the Cargo Tracking Note. What we find difficult to understand is the parallel path being charted, the legality of the scheme and the needless cost that it comes with. We present this piece to enhance the conversation at norming a system that will deliver at the optimum ensuring a win-win situation for the State and Citizenry". (p. 4)

As it stands now, CTN is an anomaly in the single window import clearance process because it is a stand-alone system. The United Nations Economic Commission for Europe (UNECE) defines single window as *"a facility that allows parties involved in trade and transport to lodge standardised information and documents with a single entry point to fulfil all import, export, and transit-related regulatory requirements. If information is electronic, then individual data elements should only be submitted once"* (UN/CEFACT, 2005). The vice-president's office

suspended the CTN implementation twice in 2018. In principle, the ASHI/CTN offers rather simple technical solutions that have been tried and tested in other countries. However, competing interpretations over what the technical solution is and what problem it is intended to address – to stop ‘nation wreckers’ or intentionally add a costly layer to the clearance process – created conflicts among relevant social groups and frustration over a situation which the GIFF report (GIFF, 2018) describes as a ‘parallel path being charted’.

We see how stakeholder interests and digital transformation are intertwined. GCNet was formed to modernise customs by providing IT infrastructure and systems. The Destination Inspection Companies also handled the core functions of customs contracted to use their technology and databases to provide the service. GCNet collaborated with the DICs until 2007, when a new government awarded a contract to Bankswitch Ghana Ltd to deliver the services the DICs were providing. The state news portal Graphic Online (Abbey, 2015) reported Bankswitch to have convinced the government that they would be able to collect more revenue for them with its system than the DICs were doing. This generated the debate as to why Customs was not allowed to perform its functions but rather pay a share of the country’s revenue to third parties to offer the service. It is widely quoted that the WCO frowns upon the practice of countries contracting core customs services to private companies. It simply means the country does not need its customs administration so it must disband it (Abbey, 2015). Bankswitch piloted its system through 2008. However, in 2009, another government came into power and abrogated the contract of Bankswitch citing non-performance and a duplication of the activities of GCNet and the DICs (The Ghanaian Chronicle, 2015).

In 2015, the same government in its second term of office (but under a new president after the demise of the first term president) contracted West Blue Consulting to provide technical

assistance to Customs to take over their core function of classification and valuation (The Ghanaian Chronicle, 2015). This, effectively, ended the operations of the DICs. Subsequently, the two major IT solution providers (that is, West Blue Consulting and GCNet) became the joint operators of the Ghana National Single Window system. The mandate of West Blue Consulting is from the Ministry of Finance to work for the Customs Division of the Ghana Revenue Authority, while GCNet derives their mandate from the Ministry of Trade and Industry. The official narrative had been that the two are collaborating well in providing the service, but as noted, stakeholders have described the Single Window as ‘Single Windows’, because they face problems transacting business seamlessly. Concerning the two service providers, GIFF (2017) alleges that:

“Compromising to deliver that integration has the element of rendering one of them redundant on certain fronts. A case in point was when the Import Declaration Form (IDF) module had to be plucked off the GCNET platform unto [sic] Ghana’s Trading Hub (PAARS) [of West Blue]. Another classic case is the call of Manifests onto the PAARS platform [of West Blue] creating anxiety within GCNET who used to house the manifests. The two scenarios above ‘justifies’ [sic] the turf war because one can only survive if their bargaining chips are intact, but whiles [sic] they are at it, trade facilitation as well as port efficiency suffers with its attendant cost!” (Systems Integration section, paras 3–5)

The new and increased cost is a key complaint among users of the system(s); however, the duplication of functions appears to be equally problematic.

In March 2018, the Ministry of Trade and Industry awarded a new provider, *Ghana Link Network Limited*, a USD\$ 40 million 10-year single window contract to provide paperless services at the port. The new system, known as UNIPASS, was apparently, an adaptation from the Customs UNI-PASS International Agency (CUPIA) of Korea, whose benefits have been enumerated by

Choo & Nam (2016). Headed by the vice-president, the Economic Management Team (EMT) had scheduled the implementation of the UNIPASS Single Window System to commence on 1 January 2019. However, it suspended implementation after stakeholders registered their disapproval. Shippers contend that the UNIPASS deal was costly. To support this response from the stakeholders, a prominent news portal in Ghana (Acquah-Hayford, 2019) reported that UNIPASS would be more costly to the shipper than GCNet and West Blue combined. Freight forwarders interviewed in Tema in February 2020 were suspicious of any new contract for technological services insisting it would increase their costs due to bad contracts and duplication of services. Moreover, Acquah-Hayford (2019) reported that after a UNIPASS system demonstration, participants were not convinced that the system differed from that offered by GCNet and West Blue. Subsequently, West Blue has sued the operators of UNIPASS for cloning their software and redirecting social media links in the demonstration of the UNIPASS platform (Business and Financial Times, 2019). Ghana Ports and Harbours Authority officials interviewed had the opinion that further improving the combination of GCNet and West Blue is a feasible option.

2.4 Eliminating the human factor

The cases reveal the stakeholder politics involved in the protracted introduction of single window technologies. What are the implications of this for how we understand digital transformation processes in Tema? Firstly, it is important to note that this insight into stakeholder politics runs counter to widespread discourses on digitalisation, which tout digital platforms as an ‘agent of change’ independent of the politics of local contexts. As the historian of technology David Nye rightly points out, technology is misleadingly seen as something ‘that comes from outside society, like a meteor, and has an immediate effect, almost like a natural force’ (Nye, 2007, p. 234). In the case of digitalisation in Tema, meteor-type claims about the impact of digital

platforms flourish as when the Bolloré and MPS Terminal operators insist that the Tema Port expansion and the new ICTs introduced will ‘bring a host of upgrades within the systems and information teams, which is a huge boost to the Ghanaian talent pool. This transfer of knowledge to Ghanaians will secure the future for generations to come’ (Bolloré Transport & Logistics, 2016, 6:33). We need to treat such claims on the impact of digital platforms cautiously. Indeed, the statements significantly downplay the critical way, in which specific social contexts and stakeholder interests have shaped and continue to shape the implementation and use of ICTs in import clearance.

Relevant social groups confront each other and define meaning through their interpretations of digital solutions to perceived challenges. Most stakeholders at the Tema Port express a shared expectation of a technological-determined solution to curtail corruption in various forms and prevent political interference. For example, the Ghanaian Government touted the paperless port as a system that would, inadvertently, reduce corruption and increase government revenue. The claim illustrates the technological determinism adhered to by many stakeholders at the Tema Port. However, unmet expectations lead to conflicts and blame games among different social groups. For instance, when the Customs Division of the Ghana Revenue Authority was not able to meet revenue targets even after the introduction of the paperless system, the government blamed the customs officials and the customs officials, in turn, blamed the government. This resulted in a rift which has so far culminated in the staff holding a meeting to register their displeasure with government in 2019 (Ibrahim, 2019).

Where we do register a convergence of opinion is in fact that the solution to efficient import clearance consists of getting rid of human interference, which reinforces the idea of a technological

fix. The statement below illustrates the sentiment of the largest freight forwarding association, the GIFF, on the digital transformation process. Of a system that is termed paperless, they write:

“Solutions which have been delivered today still have a lot of human intervention and this allows for a lot of discretion. This is where the problem is, because this allows the ‘system’ to choose and pick which solution to give who [persons] is on the most ‘favored list’. Why should two traders buying from the same source, on the same conveyance be handed two contrasting outcomes? This does not bode well for COMPLIANCE!” (GIFF, 2017, Migraines with Automation Efforts section)

The founder of West Blue Consulting expressed a similar view in her application to the OECD for funds to support the GNSW: *“The GNSW also reduces, to the maximum extent possible, the human interface in trade transactions, allowing most processes to be undertaken automatically. This greatly increases transparency and reduces the possibilities for irregular interventions and payments”* (OECD, 2017, p. 2). The two statements illustrate the shared expectations of a technical service provider and the users that good technology eliminates bad human influence. The statements by GIFF and the founder of West Blue Consulting describe human intervention as a problem, automatically fixed by a supposedly neutral technology.

The identification of the human factor as the underlying problem that technology must fix further amplifies the deterministic perception of technology as a force free of human interest. However, such macro-level expectations and explanations fail to capture the specific tensions among the relevant social groups that we identified at Tema. The interference of and deferment to political powers is evident. For example, TV3 of Ghana (a Ghanaian television network) recorded this statement made by one staff member, supported by her colleagues, at a staff meeting of the Customs Division of the Ghana Revenue Authority (GRA):

“They [referring to politicians/government] are creating enmity between us [staff]...there are some people who came through political appointment who have their children as clearing agents [Customs House Agents] and they use exemptions to clear goods. Is that not a conflict of interest” (Ibrahim, 2019). The statement confirmed the role of politics in their work and the row that ensued between the government and GRA staff regarding shortfalls in revenue generation.

Observations made and confirmed by the interviews with stakeholders reveal that state agencies introduce systems to maximise their revenue and facilitate their work and trade but unintentionally add to the overall cost of doing business at the port. In March 2019, stakeholders present at our focus group discussion explained that some government border agencies had been elevated from Councils and Boards to Authority status, weaning them from the government budget and/or payroll and giving them the autonomous power to charge fees and generate revenue to sustain themselves. According to GIFF and the Ghana Ports and Harbours Authority, in a bid to generate funds for their operations, they cause undue delay and increase the cost of doing business by imposing fees (Ghana National Chamber of Commerce & Industry, 2017) which, clearly, expresses the concern of the shipping community. The point we emphasise here is not the legitimacy of the concern but rather that digital solutions presented as neutral tools eliminating the human factor amplify tensions between stakeholders.

2.5 Conclusion: new providers in the old game

With the recent UNIPASS contract, digital transformation remains, at best, an unfinished business. Analysing the protracted process of digital transformation, we have focused on cases where new technologies and often new service providers have been engaged by the government of Ghana to illustrate the underlying politics associated with the GNSW. We have highlighted the

interpretive flexibility that exists among the relevant social groups and their interests and how politics influence these interpretations. This interpretive flexibility and interest gerrymandering reflect turf wars among state agencies with the constant engagement of new service providers by changing governments and differing measures of resistance and support from shippers for new technological introductions/or companies. Our findings support the World Customs Organization's interpretation that outsourcing key functions to private companies undermines the legitimacy and effectiveness of the national customs institution to collect revenue.

In our introduction, we posed the question 'If efficiency is relevant to all stakeholders, why is there a lack of commitment to make the system work optimally?'. Our findings propose that, on the one hand, the state is suspicious of its citizens, and on the other, its citizens are suspicious of the state, producing a situation where the elusive aim is to eliminate human interference through digital technology. Our analysis suggests, however, that any solution to ameliorate low revenue generation by Ghana Customs lies in recognising the social embeddedness of the digital tools, which new providers have given far less attention than the purchase and implementation of new technologies.

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Chapter 3: Article 2

Aryee J and Hansen A.S (2022), De-Politicization of Digital Systems for Trade Facilitation at the Tema Port: A Soft Systems Methodology Approach, Case Studies on Transport Policy Journal, Vol. 10, Issue 1, pp. 105-117

De-Politicization of Digital Systems for Trade Facilitation at the Tema Port: A Soft Systems Methodology Approach

Abstract

The Ghana National Single Window has become the focus of attention over its potential to move goods swiftly. However, since its inception in 2002, the controversies surrounding the implementation suggest issues beyond trade facilitation. The Information Systems literature primarily ascribes the controversies to resistance to technology. By adopting the Soft Systems Methodology (SSM) as a learning process for understanding port stakeholders' relations and attitudes, we explore the controversies to determine the meanings port stakeholders attribute to them. We combined SSM with interviews, media content analysis and focus groups, made possible by snowballing. The responses were analyzed using rich pictures and validated through a conceptual model. The results reveal a fragmented government where ministries, agencies, and personalities assert power in single-window implementation through IT vendor contracts. The situation results in a high cost of doing business at the port for shippers due to non-transparent and questionable contracts. The public's attitude towards the controversies reflects fears, hopes, expectations, and legitimate concerns about important political and social goals. Using SSMs focus on relations and attitudes, we can document how controversies attributed to new technology is not a question of technology but of perceived political interference.

Keywords: Soft systems methodology, Maritime industry, Single window, Ports, Politicization

Status: Published

3. Introduction

The digitalization of terminal activities and the cargo clearance process should ensure the competitiveness of ports. Digitalization is the process of leveraging digitization to improve business processes. Digitization is turning analogue or paper-based information (physical format) into a digital format. This process can be automated to have an impact expressed as digital transformation (Burkett, 2017). However, this is different from the automation of equipment. In ports, terminal automation is gaining popularity around the world. Terminal automation relates to the automation of equipment and digitalizing the exchange and processing of information amongst many stakeholders in specific port processes (UNCTAD, 2018). On the other hand, digitalization refers to information processing that is achieved through platforms such as National Single Windows (NSW), Port Community Systems (PCS) and Maritime Single Windows (MSW). These platforms are widely used to improve efficiency and reduce the cost of doing business at ports by a single entry of information accessible by relevant companies and state institutions.

The NSW is a facility that allows parties involved in trade and transport to lodge standardized information and documents with a single-entry point to fulfil all import, export, and transit-related regulatory requirements (United Nations Center for Trade Facilitations and Electronic Business, 2005). Unlike the other two digitized port-specific platforms, the NSW is an economy-wide concept usually operated by the trade ministry or finance ministry or their assigns. It is applicable in other areas such as airports and free-zones management with more comprehensive functions, including tax administration. Maritime Single Windows facilitate electronic information exchange between ships and ports-a mandatory requirement for states as per the Convention on Facilitation of International Maritime Traffic, 1965, as amended (FAL Convention) of the International Maritime Organization that came into force on 8th April 2019.

The convention recommends the use of MSW for electronic information exchange. A Port Community System is the technological platform that enables networking between the public and private agents and entities involved in the ship and cargo services offered by ports (Caldeirinha et al., 2020). PCS are community-owned systems with heterogeneous stakeholders that include terminal operators, carriers (ocean, road, and rail), freight forwarders, enforcement agencies (i.e. customs), port authorities, and various lobby groups (including workers' unions, environmentalists, and other policymakers) (Srour et al., 2008).

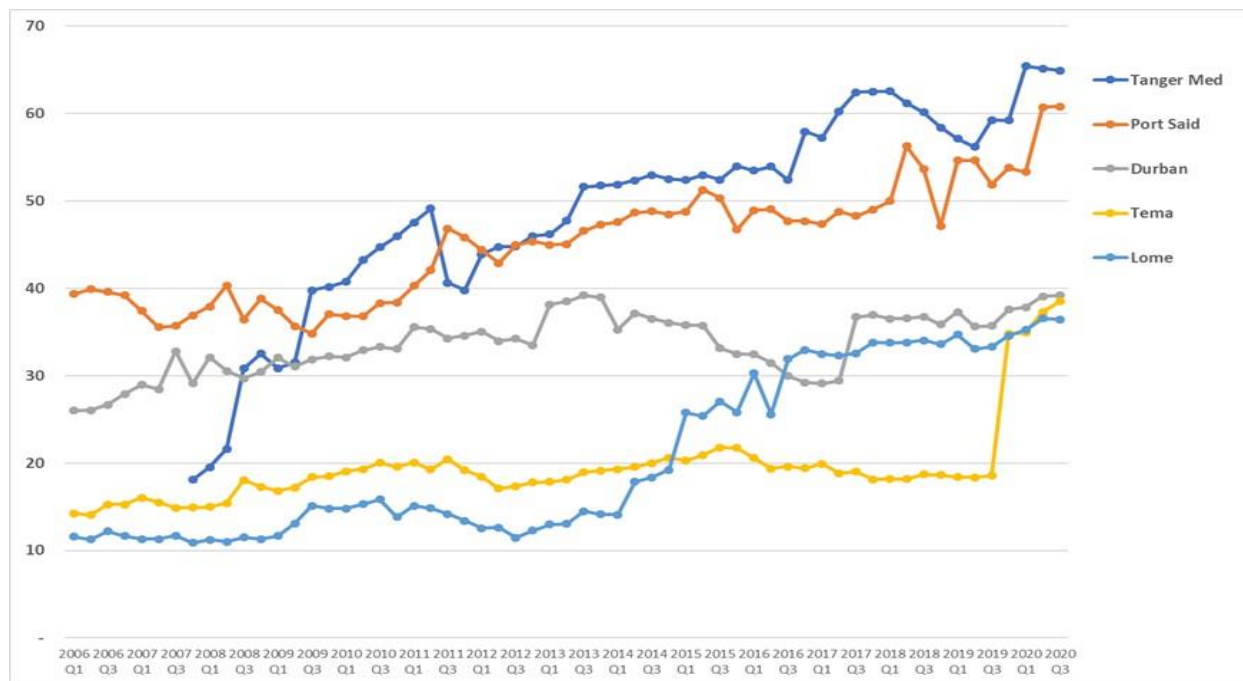
However, the Information Systems (I.S.) literature (see Heeks, 2002, for more details) confirms that electronic platforms have mostly failed to produce the intended results in developing countries. The reasons are varied. Resistance to technology is a popular reason for the failure. Another contemporary reason is technological determinism upheld by many governments without regard for economic and social-political embeddedness (Aryee et al., 2021a). In Ghana, introducing the Single Window platform and building an ultra-modern terminal at the Tema Port had raised scepticism among stakeholders and resulted in several controversies involving Government, shipper representatives, labour, and private organizations. We define controversies as disputes that emerge around technical matters, questioning technical fixes and standard narratives about infrastructure. There are many meanings to these controversies (Osei-Owusu et al., 2020) that can provide insight into the implementation of landmark digitalization efforts in the Tema Port. We set out to explore the meanings embedded in controversies surrounding the implementation of the Ghana National Single Window (GNSW) and port expansion project and how these meanings help explain port stakeholder fears, hopes and expectations at the Tema Port.

3.1 Study Area

The Tema Port is the largest of Ghana's two ports. Tema is a leading port in West Africa and gateway for Burkina Faso, Mali and Niger landlocked countries. It handles approximately 85% of Ghana's trade. Its reach extends to the Sahel region, competing favourably with Abidjan, Lome, Cotonou, and Dakar ports for transit trade. From 6 million tons of cargo in 2000, the port handled 19 million tons in 2020. Transit cargo formed 2% of the total in 2000 but increased to 8% of the total traffic in 2020.

As part of the economic reform agenda, Tema saw its first dedicated container terminal in 2004, operated by Meridian Port Services (MPS) Ltd in the first-ever container terminal concession agreement signed by the Ghana Port and Harbours Authority (GPHA). MPS is a joint venture between the Bollore and APM Groups owning 70%, and the Port Authority holding 30%. The two-quay terminal had an annual capacity target of 500,000 TEU by 2010. Tema's unique adaption of neo-liberal practices nuanced with nationalism underlines its steady growth in keeping with changes in global trade (Chalfin, 2010). Container traffic in 2000 was a mere 166,963 TEU. By 2008, the expected capacity of 500,000 TEUs had been exceeded, prompting expansion plans. In 2019, MPS commissioned a new container terminal with an annual capacity of 2 million TEUs. Almost immediately, the terminal started receiving post-Panama vessels. With the average size of ships calling increasing, the port performance on the Liner Shipping Connectivity index improved, as shown in Figure 4, establishing the port's position as the preferred port of call for large vessels bound for West Africa.

Figure 4: Top 5 African Ports on UNCTAD's Liner Shipping Connectivity Index



Source: Review of Maritime Transport 2020

The Tema Port represents the new progressive ports in Africa. In the words of Chalfin (2010), the Tema Port lays bare the complex forces at stake in revitalizing the maritime frontiers across Africa. Tema reflects the everyday challenges of Sub-Saharan African (SSA) ports where state agencies, indigenous capital, the world's leading shipping and logistics conglomerates, and individuals invest and/or extract rent in them.

3.1.1 Case Study: Ghana National Single Window

The implementation of a Single Window is a complex undertaking. The task of coordinating multiple government agencies, reviewing laws and standardizing data, amongst others, is daunting. Implementing the Ghana National Single Window project to facilitate the clearance of goods is a technological introduction that has courted controversy at various stages since its introduction in 2002. We can best appreciate the timing and nature of the disputes by

looking at the historical account of Single Window implementation in Ghana. The idea of introducing an Electronic Single window system began in 1998, towards the end of the Rawlings government but crystallized and took off in 2001 under the Kuffour administration after two years of stalling.

In 2001, Ghana Community Network (GCNet) Ltd came into being as a joint venture company with shares held by Societe General de Surveillance SGS (60%), Customs Division of the Ghana Revenue Authority (20%), the Ghana Shippers Council (10%), and two local banks (each 5%). GCNet installed and operated an Electronic Data Interchange system called TradeNet and the Ghana Customs Management System (GCMS) (De Wulf & Sokol, 2004) under a service agreement with the Ghana Ministry of Trade and Industry. GCNet rolled out a system modelled after Singapore's famous TradeNet, a single-window platform where all stakeholders, both state agencies and private service providers, submit and access information. According to De Wulf and Sokol (2004), many customs and import processes were automated, simplified and improved, contributing to cost savings to businesses, better collection of revenues and speedier processing of container traffic through the Tema Port.

GCNet, as the Ghanaian version of the Singaporean Tradenet software system, came to be known (named after the first IT vendor of the system in Ghana) and emerged out of the need to modernize customs by the provision of IT. infrastructure and systems. Destination Inspection Companies (DIC) handled the Ghana Customs' core functions of classification and valuation. The Ministry of Finance contracted them to use their technology and databases to provide a valuation of goods at the ports to determine shippers' tax liability. GCNet collaborated with the DICs until 2007 when a new government headed by Kuffour awarded a contract to Bankswitch Ghana Ltd to replace the DICs. The state newspaper's online portal, Graphic Online (Abbey, 2015), reported that

Bankswitch convinced the Government that they would collect more revenue with their system than the DICs were doing. The engagement of Bankswitch generated controversy as to why Ghana Customs was not allowed to perform its core functions but instead paid a share of the countries' revenue to third parties to offer the service. Outsourcing customs duties is a practice the World Customs Organization frowns upon (Abbey, 2015) because it signals that it does not need its customs administration. Bankswitch piloted its system through 2008.

The party in power lost the 2008 elections, and the opposition led by Prof. Evan Attah-Mills won. In 2009, the new Government abrogated the contract with Bankswitch, citing non-performance and duplicating the activities of GCNet and the DICs (The Ghanaian Chronicle, 2015). In 2012, Prof Mills passed on in his third year in office, and his vice president, Mahama, took over as president and, subsequently, won the election the same year. In 2015, the Mahama government contracted Westblue Consulting to provide technical assistance to Ghana Customs, eliminating the DICs. But, again, the core function of classification and valuation eluded the customs administration. Subsequently, the two major IT Solution providers, i.e., Westblue Consulting and GCNet, became the Ghana National Single Window joint operators. Westblue Consulting's mandate was from the Ministry of Finance to work for the Customs Division of the Ghana Revenue Authority, while GCNet derived its mandate from the Ministry of Trade and Industry.

The Mahama administration lost the 2016 election to the opposition party led by Akuffo-Addo. Immediately after taking office, the Vice President embarked on a comprehensive digitalization agenda for the country's public services. The GNSW project, which was partially manual due to the non-cooperation of the Other Border Agencies (OBA) and resistance from within customs (Addo, 2017), was a priority. In September 2017, the Vice President declared the

Tema Port a paperless port and tasked GCNet, Westblue Consulting, Customs, the Port Authority and other border agencies to ensure a complete digitalization of clearance processes and payments to curb corruption and fraud. The technical aspects worked within a couple of weeks, with stakeholder sensitization and training ongoing and reports showing a working system and improvement in the time and cost of clearing goods from the port (Amankwah-sarfo, Boateng, Effah, & Boateng, 2018). However, only one year into implementing the ‘paperless port’ project, in March 2018, the Ministry of Trade and Industry awarded a new provider, Ghana Link Network Limited, a \$40 million 10-year single window contract to provide paperless services at the port. Similarly, Ghana Link Limited was one of the DICs relieved of its duties with the introduction of Westblue Consulting in 2015.

In 2020, the new system, UNIPASS, an adaptation from CUPIA of South Korea (Cho & Nam, 2016), replaced TradeNet run by GCNet and Westblue Consulting. At present, the adopted UNIPASS has been named the Integrated Customs Management System (ICUMS) as the system used for lodging any transaction with Customs and Ghana Link Network Services (hereafter known as Ghana Link) is now the only operator or IT vendor offering end-to-end service on behalf of Customs.

In all, we identified four IT vendors of the GNSW over the last 20 years (five if we include the DICs). There has only been one significant change in software/technology since its inception. GCNet served from its inception until 2020 but has had to collaborate with one or two other IT vendors like the DICs, Bankswitch and Westblue Consulting at different times, especially after every change of Government until the Government of Ghana (GoG) replaced them with Ghana Link in 2020. All these new introductions of IT vendors met with controversies that primarily

played out in the media. Hence, this paper aims to unearth the meanings attributed to these demonstrations by various parties, alluded to by (Osei-Owusu et al., 2020).

3.2 Research Design

This paper forms a part of one of the three themes of a larger research project on Port Efficiency and Public-Private Capacity in the Tema Port sponsored by the Danish Foreign Ministry. The themes, namely, Port Service Economy, Digitalization and Capacity Building, were carefully chosen after deliberations among team members and project advisors. The three themes were found to be interconnected in the port's bid to improve efficiency. This paper focuses on the digitalization theme, specifically the Ghana National Single Window implementation and port expansion project at the Tema Port. Concentration on the GNSW and the port expansion were significant for three reasons. First, the port literature on African ports shows that technical efficiency relating to quayside operations has improved considerably in Africa, but other problems like hinterland and logistics infrastructure and services are still lagging. Secondly, the research was conducted when the Government declared the port as a paperless port and was changing IT vendors who operated the national single window system amidst disputes. Thirdly, the period coincided with completing Tema's new and highly digitalized container terminal (Terminal 3). Hence, researching the digitalization of the single window was an opportunity to observe the controversies surrounding vital milestones in the Tema Port unfold.

The study adopts the qualitative research method of a case study. The case study was preferred because we sought an in-depth understanding of a phenomenon as it occurred in real time. The case study also helps portray the complexities, interactions, and occurrences that explain the how, what and why. They help investigate complex social units involving multiple interests

(Behar-Horenstein, 2018). To avoid the reported disadvantage of lack of reliability, validity and generalizability and to ensure the trustworthiness of the findings, the data was collected from different sources using different methods that validate the accuracy of the results- a technique known as triangulation.

Further, the researchers presented the study's findings to participants to authenticate the accuracy. In addition, working in a large research group provided the opportunity to use peer debriefing as a tool to enhance credibility further. Discussing observations, impressions, and primary findings from interviews, focus groups, and documentary evidence with co-researchers was a practical way to corroborate findings and ensure dependability.

It was important to purposefully target relevant state agencies, policymakers, service providers, and regulators such as the Ministries, Departments, and Agencies in collecting the data. We conducted semi-structured in-person interviews with knowledgeable persons identified by the institutions we had selected. Thus, managers of the Ghana Port and Harbours Authority (GPHA), Ministry of Transport, Ministry of Trade and Industry, Ghana Maritime Authority (GMA) and Customs Divisions of the Ghana Revenue Authority. Lecturers at the Regional Maritime University (RMU), one member of the Ghana Institute of Freight Forwarders (GIFF) executive committee, managers at three shipping lines and three managers at Meridian Port Services were also purposely interviewed in addition to government agencies. Several others were reached by attending the port's famed Berthing Meetings, which was introduced to us by a student when we attended selected post-graduate course lectures at the RMU and GIFF. Some industry practitioners in managerial and supervisory positions in the class were interviewed.

The berthing meeting is held twice a week by the Port Authority to allocate berths and service providers like stevedores to vessels arriving and leaving. The Harbour Master or Chief

Pilot chairs this meeting. Here, all interested parties in the maritime industry are represented. It presented an excellent opportunity for randomly selecting relevant participants for semi-structured interviews. The platform also helped in locating more interviewees through snowballing. Snowball sampling is a robust method used by qualitative researchers to generate a pool of participants for a research study through referrals made by individuals who share a particular characteristic of research interest with the target population. It is also called chain sampling or chain referral sampling (Crouse & Lowe, 2018).

Preliminary interviews showed that the individual stakeholders' 'mental pictures' of the Tema Port situation revealed a complicated problem that often resulted in controversies, the basis of which systems thinking can untangle. Therefore, we adopted the Soft Systems Methodology (SSM) to map the key stakeholders, power and authority centres, and interrelations in the Tema Port to analyze their responses to implementing the GNSW and the port expansion project expressions of their worldviews. Further, it provided the opportunity to identify clashing interests and work towards accommodations. Systems approaches such as SSM explain the dynamics, interconnectedness and relationships that make up a system. Lately, scholars have used the process with action research in port settings in the Sub-Saharan African (SSA) region. The use of systems approaches has gained popularity in many academic disciplines, such as medicine, social sciences, economics, Information Systems and engineering. The advantage of soft systems approaches is their ability to structure complex situations without exempting the environment and people when considering the issues and allowing accommodations. In the last five years, a growing consensus has recognized the need for a systemic way of thinking about sustainable port development by finding the right balance between human, environmental and economic aspects (Vellinga et al.,

2017). Barnes-Dabban et al. (2017) and Hönke and Cuesta-Fernandez (2018) have used action research approaches of ‘sensemaking’ and ‘controversies’ to better understand African ports.

We used SSM to ensure that the participants, collectively, can define the problems of national single window implementation and the port expansion project at the Tema Port. The Port Economics literature finds merit in incorporating the concerns and inputs of stakeholders into planning activities. Furthermore, the involvement of stakeholders helps port authorities avoid conflicts (Dooms, 2019). Vellinga, Slinger, Taneja, & Vreugdenhil (2017) further argued that involving local stakeholders in planning port projects could enable port authorities to co-create value, i.e., create mutual interests and shared values to ensure a sustainable future for the port and the surrounding communities. Figure 5 below shows the research plan and methodological framework.

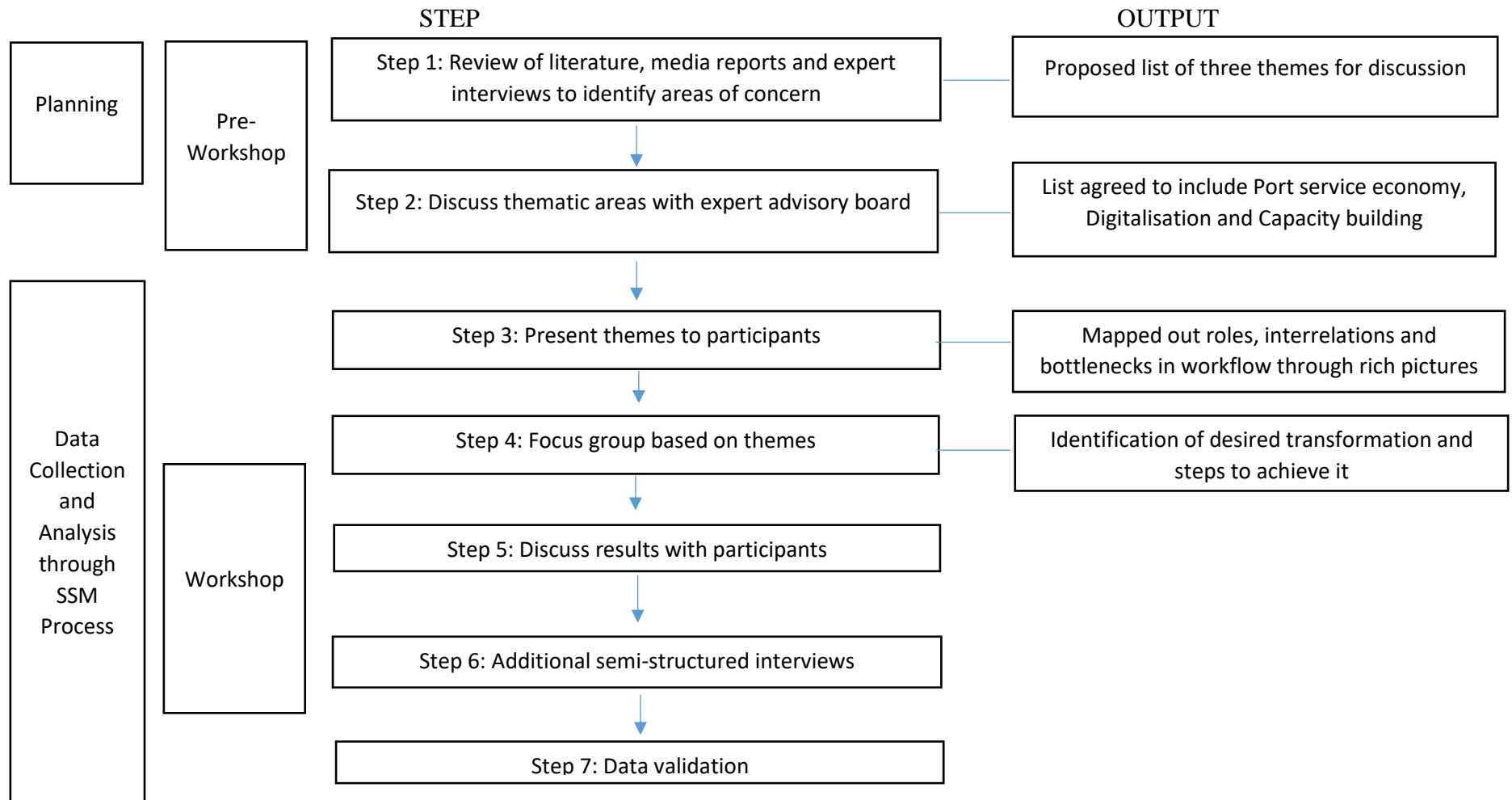
In the following sections, we present the case, explain Soft System Methodology, and apply the SSM learning process to our case. Finally, we discuss the findings and indicate the implications of our findings for practice, policy and international scholarship.

3.3 Soft Systems Methodology

Soft Systems Methodology (SSM) is a widely used qualitative research methodology based on systems thinking theory and action research. It is a learning and enquiry process aiming to improve a social situation (Nair, 2015). SSM is a cyclic learning system that uses models of human activity to explore the actors in the actual world problem situation, their perceptions of that situation, and their readiness to decide upon purposeful action that accommodates different actors’ perceptions, judgments and values (Železnik, Kokol, & Blažun Vošner, 2017). In SSM, the world is considered complex or problematic, but we can tackle the complexity by applying SSM, created

as a learning system. The system is not assumed to exist in the real world. The systemness is in the process of learning and tackling the problem.

Figure 5: Research plan and methodology framework



Peter Checkland developed SSM to make up for the limitations of the systems engineering approach, which was considered deficient in dealing with the social and cultural dimensions (Checkland, 2000). Checkland distinguishes ‘soft systems’ from ‘hard systems’ like systems engineering. ‘Hard systems’ tend to be goal-seeking, assume the world contains systems that can be engineered, considers systems models to be models of the world (ontologies), and writes in the language of ‘problems’ and ‘solutions.’ It has the advantage of using persuasive techniques in problem-solving, but may lose touch with aspects beyond the logic of the problem. On the other hand, soft systems are oriented to learning, assume the world is problematical, but can be explored using systems models, consider system models to be intellectual constructs, and talk in the language of ‘issues’ and ‘accommodations’ (Lane, 2019). He argues that it has the advantage of including the human element of problem situations, and all stakeholders can use it at a sitting in rethinking problem situations.

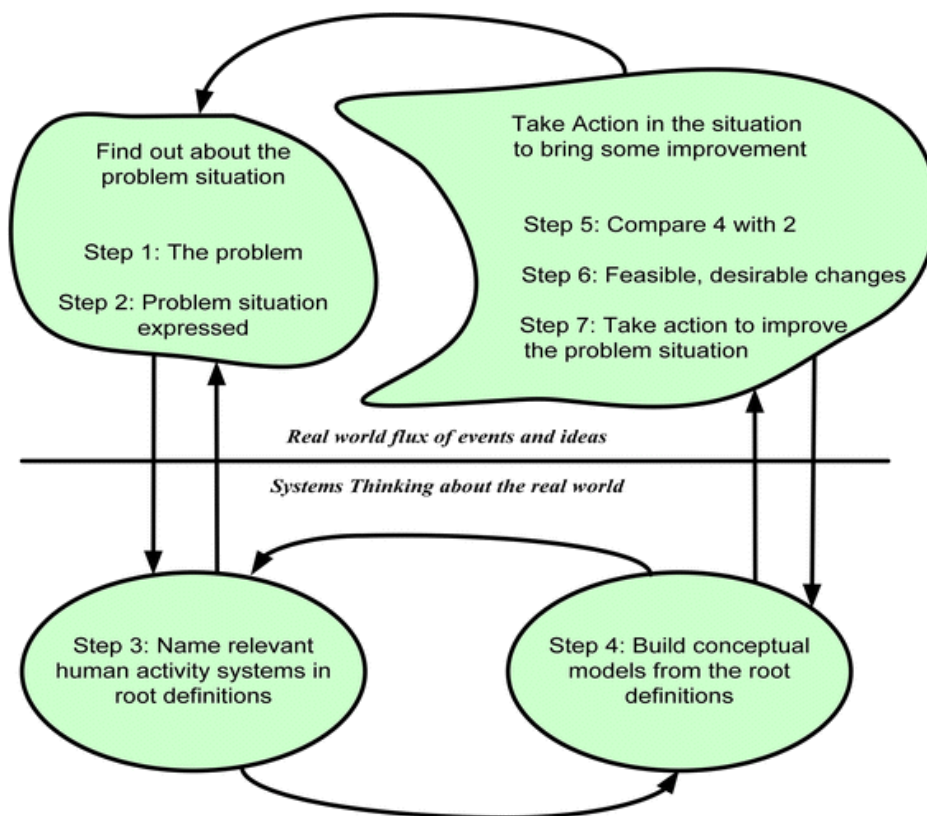
SSM addresses ‘Soft’ problems, also known as ‘wicked’ problems or ‘messes’. The phrase ‘wicked problems’ demonstrates difficult or impossible issues because they address complex social interdependencies (Kamari, Corrao, & Kirkegaard, 2017). ‘Hard’ problems, which are structured and well-defined, are predictable, whereas people’s interactions introduce complexity resulting in unstructured and ill-defined problems (Checkland, 2000; Kamari et al., 2017; Proches & Bodhanya, 2015). SSM helps this situation as it functions as an interrogative device that enables debate amongst concerned parties, accommodates different worldviews of participants of the process, and later communicates possible solutions or ‘accommodations’.

Houghton (2013) found that both outcomes, whether problem-solving or simply learning, can be elusive when he used the methodology to develop a strategic plan for a young start-up company. As the problem structuring exercise occurred, the critical stakeholders’ problematic situation and worldviews began to change in the case study. Hence, two principal owners who had earlier agreed on the company’s strategic direction formed new worldviews

of the problem with no accommodations. Houghton concluded that the methodology adapts itself to the situation through the interpretive lens of the actors. Hence, it should not be thought of as a problem-solving tool but as a way of learning about the problem. In essence, the methodology may fail at reaching immediate solutions or accommodations but fulfils an essential task of creating meaning and structure upon which a debate leading to change can rest. Based on Houghton's finding, we do not intend to use SSM to solve a problem as a consultant or practitioner will do. However, as researchers, we planned to harness its strength as a learning process and its ability to bring all interested parties to the table to collectively identify and put into context the problems affecting the national single window project's implementation. Hence, giving us new meanings and provides a more explicit structure revealing new understandings of what is happening at the Tema Port with GNSW.

Checkland (2000) proposes seven stages to implement SSM as illustrated in Figure 6 below.

Figure 6: The SSM Process Structure



Source: Abuabara, Paucar-Caceres, Carmen, Belderrain, & Burrowes-Cromwell (2017)

The following steps are adapted from Nair (2015).

1. *Finding out about a problem situation, including culturally/politically*

The process begins with exploring the problem situation, including culturally and politically, by identifying the issues. The way to do this is through rich pictures, which tell the story better than words.

2. *Formulating some relevant purposeful activity models*

Stage 2 is the formulation of relevant purposeful activity models based on specific worldviews. There is a need to define the purposeful activity to be modelled first. These definitional statements, called 'root definitions', are constructed around an expression of purposeful activity as a transformation process (Checkland, 2000). These can be structured using other constructs such as CATWOE, PQR and Conceptual Models.

CATWOE stands for

- Customer (those people who are the recipients of the system's output);
- Actor (the people who perform the activities of the system);
- Transformation (the change that the system brings about);
- Worldview (the viewpoint that justifies the activities of the system);
- The owner (the person or system who can create, change or destroy the system) and
- Environment (external systems or constraints that must be taken as given).

According to Checkland (2000), PQR represent what does the system do (P)? How does it do it (Q)? Why does it do it (R)? Hence, a root definition (R.D.) can be written as: "A system to

do P by Q to R”. Conceptual models (CM) model the activities that the root definition must necessarily undertake and their relationships. The conceptual models are created from the root definitions, the PQR formula, and the CATWOE. He further states that a ‘system’ in SSM terminology refers to the conceptual models illustrating the ideal set of activities required for a necessary transformation, not actual reality.

3. Debating or exploring the situation using the models

The models are used to structure debate about the situation. Dialogue occurs as stakeholders compare the real world with the models. We have discussed this with stakeholders individually during 2020; however, due to COVID19, we have chosen not to repeat focus group interviews. What we seek from the discussion is

- (a) changes that would improve the situation and are regarded as both desirable and (culturally) feasible *and*
- (b) the accommodations between conflicting worldviews, which will enable action-to-improve to be taken.

4. Taking action in the situation to bring about improvement

The final stage in the SSM process is to take action. The action consists of defining and implementing necessary measures with the aim that the changes have to appeal to the people in the situation, taking into account their unique history and worldviews.

3.4 Results

In this session we present the results of the stakeholder engagements.

Stage 1: Exploring the Unstructured Problem Situation

We set out to explore and find meaning in controversies involving Government, government agencies, freight forwarders, information technology vendors, customs, shipping lines, terminal operators, shippers, and trade associations concerning the Ghana National Single Window implementation and port expansion project. The data gathering comprised first conducting preliminary unstructured interviews with the Ghana Ports and Harbours Authority (GPHA), Ghana Maritime Authority (GMA), Ministry of Trade and Industries, Customs Division of the Ghana Revenue Authority, Ministry of Transport and the Ghana Institute of Freight Forwarders (GIFF) to gain various perspectives of the problem situation. Further, we took note of documented statements and quotes made by Ghana Customs, ministers of state, leaders of freight forwarders associations such as GIFF and the Association of Customs House Agents of Ghana (ACHAG), and state agencies such as the Ghana Standards Authority in newspapers and on the official T.V. program of the Port Authority named 'Eye on Port' aired on national television weekly. Studies additionally backed these by other academics and international development agencies such as the Worldbank to provide a historical background to the present problem situation. All of this was to get a global picture of the situation.

A stakeholder workshop was organized in March 2019 at the University of Ghana in Accra to consolidate the various views. Forty-One (41) participants representing state agencies, professional bodies, academics, consultants, terminal operators, journalists, trade unions, civil society, a trade facilitation advocacy group and private consultants took part in the workshop. A notable institution that was absent was the GPHA representative because of miscommunication, but we made up for it by interviewing them several times over the research period. In the invitation, we indicated that the institution sends at least two people. Having at least two representatives from each participating organization ensured adequate representation in the planned parallel focus group discussions after the plenary. The choice of the focus group

to belong to was left to the participant. This ensured that they chose a group where their expertise was most helpful.

The workshop's opening session appraised participants about various perspectives gathered from preliminary interviews, documentary evidence, and media reports. Following the opening session, participants chose one of three focus groups namely, port service economy, digitalisation and capacity building.. At this stage, we concentrate on the Digitalization theme, which is the focus of this paper, albeit with some apparent links to the other themes of the broader research on port efficiency. The Port Digitalization focus group that represents the group meant for this study had eleven (11) representatives from the Meridian Ports Services (only On-Dock Container Terminal Operator in Tema), Amaris Terminal (off-dock Container Terminal), Ghana Shippers' Authority, Westblue Consulting, Ghana Community Network Ltd (GCNet), Ghana Institute of Freight Forwarders (GIFF), Chartered Institute of Logistics and Transport (CILT), Ghana Standards Authority, Ghana Maritime Authority, Customs Division of the Ghana Revenue Authority and Mediterranean Shipping Company. The representation was adequate since these organizations represented the service providers and the users of the GNSW.

We gave each participant in the digitalization group sticky note pads to write out answers to the questions:

1. What is at stake for the stakeholders in the Tema Port?
2. What are your hopes, fears, and expectations concerning digital platforms in Tema Port?

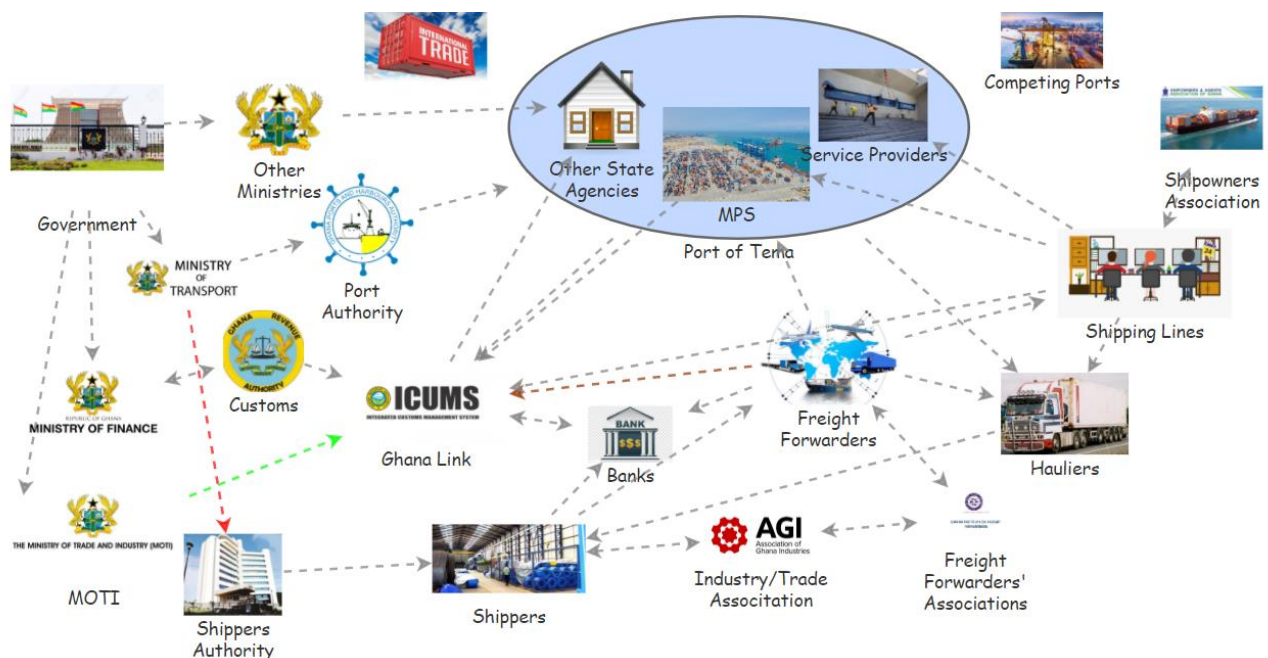
Participants mapped out their role at the port and the problems they encountered. The findings were presented when the plenary reconvened with the other two groups joining. This way, the researchers had validation from the other participants in the 'Port Service Economy'

and ‘Capacity Building’ groups. The critical points of the discussion are listed in stage 2. We sought to identify the known (what) to help us understand the unknown (why) soft tissues through the SSM.

Stage 2: Expressing the Problem Situation

We analyzed the stakeholders’ inputs at the SSM workshop and data from the focus group and individual interviews using a rich picture shown in Figure 7. The rich picture depicts our understanding of the port environment and the centres of power and authority. It is a way to make our thinking process transparent.

Figure 7: Rich Picture of the Tema Port depicting stakeholder interrelations, power and authority centres and concerns



Source: Own Illustration

On the left side, the rich picture shows a port where the centre of power and authority is the Government represented by several border agencies, including the Port Authority and Customs. The Government is also inextricable from the political party in power, as evident in (Aryee et al., 2021a). The arrows pointing to ICUMS shows the centrality of the GNSW. Although ICUMS is a collaborative platform, the centre of authority is Customs. On the other side, we see freight forwarders assume a lead role in facilitating shippers' and industry/traders' interaction with the Government through ICUMS, shipping lines, terminal operators, banks and other service providers. This explains why many controversies have been between freight forwarders and Government or political power (see Aryee et al., 2021).

Table 1: Problem Situation Expressed in Literature, Interviews and Workshop/Focus Group

	Issues based on interviews, workshops and focus group
Delays and Cost	Downtimes in digital platforms cause delay and cost Poor internet connectivity New technologies often increase the total cost of a transaction
Separate contract of affreightment from clearance process	Rigid requirement for container terminals to release containers only after customs and shipping line release causes delays that is a bottleneck for an otherwise efficient terminal operating system.
Political Interference in Governance of the GNSW	Political agreements erode gains made with digitalized systems. Political decisions on technology and technology vendors that exclude stakeholders Bad contracts and concessions give operators of digital platforms super-profits at the expense of users. Need to enhance stakeholder participation Need for a stable system that does not get influenced Customs shy away from ownership of the GNSW
Capacity Building	Capacity-building efforts by the state and private entities often ignored indigenous stevedores and shore handling companies

	Low skills of state officials that use digital platforms. Need for capacity building for them
Labour	Development of labour skills to provide advanced maritime services
Other Costs	State Agencies use the port as a cash cow

Source: Own Compilation

The data from interviews, focus group discussion, and the stakeholder workshop's learning process identified inefficient service delivery as a significant concern for all. A representative from the Ghana Shippers' Authority told about a DHL flight that had to fly empty because of the downtimes of the GNSW. Westblue representative, in support of the shipper's representative, opined that time is a cost that usually does not show up on the bill. Downtimes have far-reaching cost implications like demurrage and rent for storage space.

Shippers and freight forwarders interviewed complained about transaction cost for using digital systems as another cost that comes with introducing digital platforms in the port. At the focus group, the GSA representative mentioned that the GNSW and other technological interventions in the port had often increased total costs to shippers as transactions via digitized platforms are expensive. Participants commenting on the issue blamed the situation on political agreements signed with technology providers for the high price that eroded the efficiency gains of technology.

Participants of the workshop, interviewees and the literature identify another significant contributor to the high cost of transacting business at the port. State agencies operating at the port are mainly concerned with generating revenue, having been weaned off the government payroll and given autonomy to generate their funds. The agencies have imposed various fees on imports and exports where a trade transaction required their services. The agencies are also identified as the cause of delays at the port.

The Government is central as it oversees the port and the other border agencies. It controls who should be contracted to operate the GNSW, what software or technology should be implemented, and which government agency should lead in the implementation. The Government also approves charges of border agencies.

Regarding the controversial debate of changing the GNSW operator and the software, a media content analysis showed that the representatives were divided along political lines. The rich picture also shows three groups of Shippers' representatives: the Ghana Shipper Authority, Freight forwarder associations, and trade and industrial associations. The Ghana Shippers Authority represent shippers who are primarily private formal and informal shippers. This position places the Shipper's Authority in a conflict of interest position regarding shippers' position on controversial issues (Amanfu, 2016). The conflict situation, which one interviewee calls 'an anomaly', is indicated with a red arrow. A critical issue that came up frequently in the interviews was the ability of the Government to add service providers to the GNSW at will. Usually, the Ministry of Trade, shown in the green arrow in Figure 7 superimposes Customs - an agency under the Ministry of Finance. Of utmost concern was the impending change of the software and service providers from GCNet and TradeNeT to Ghanalink and ICUMS.

The following section will outline this perspective through a rigorous and structured conceptual model development beginning with the root definition and the mnemonic CATWOE.

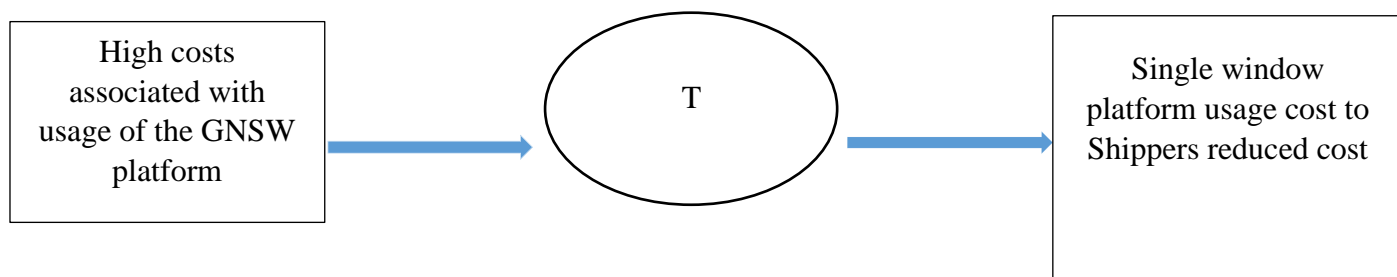
Stage 3 CATWOE and Root Definition

At this stage, we formulate relevant purposeful activity models based on the worldviews expressed in table 1. We used the CATWOE mnemonic as constructs of a transformation process to arrive at the 'root definition'. CATWOE stands for Customer, Actor, Transformation, Worldview, Owner and Environment. Thus,

- C Shippers (Businesses and individuals) and the public who bear the ultimate cost.
- A Port Stakeholders including Government of Ghana through its ministries, departments and agencies
- T To reduce the cost of Ghana National Single Window platform transactions
- W Customs ownership and operation of the single window will reduce political influence in contracting third-party IT vendors, which will reduce the cost associated with GNSW
- O Seat of Government (Presidency)
- E Gatekeeper state where political power dominates the bureaucracy with powerful political lobbying by private operators and political party affiliates for contracts

The root definition is the statement that defines what should be done, how to do it and why is it to be done. It expresses the transformation that is required as shown in Figure 8. We express it as follows based on the CATWOE: *A stakeholder owned system, to reduce GNSW related costs for shippers at the Tema Port, who currently experience high cost of transacting business at the port by eliminating political influence under the constraint of powerful political lobbying by private operators and political party affiliates. The transformation is illustrated in Figure 8.*

Figure 8:Transformation model



Own Illustration

The next stage of the SSM is the development of a conceptual model.

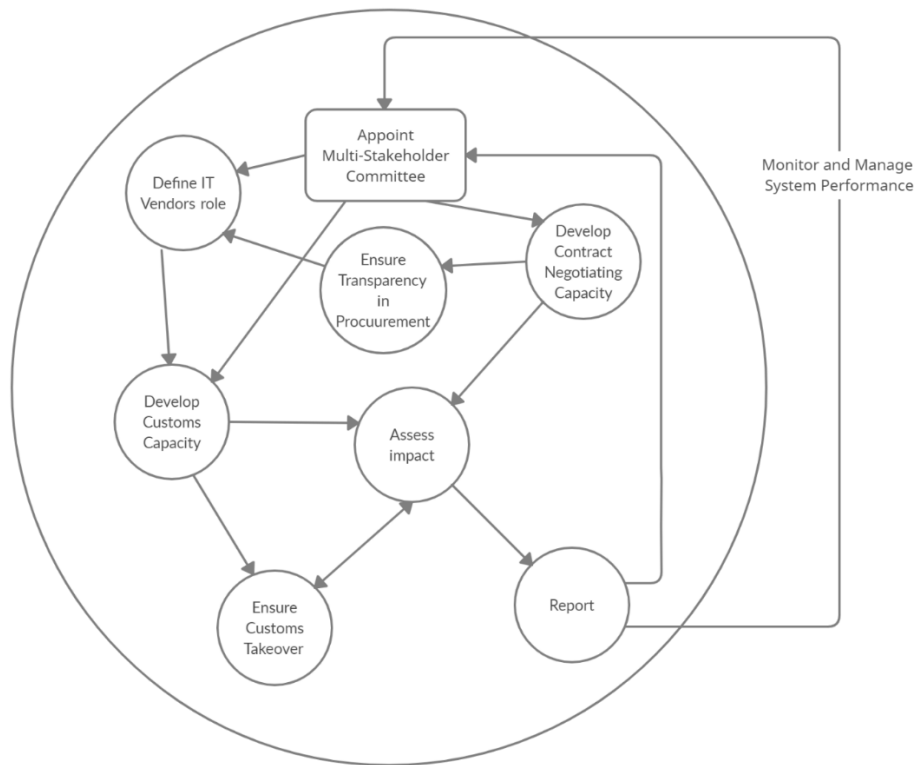
Stage 4: Conceptual Model

According to Gasson (2013), a conceptual model identifies and analyses the activities needed to be performed by the actors to achieve the desired transformation. It is expressed in the language of ‘What?’. What activities are required to achieve the objectives of the system? They must also have a measure of success, means of monitoring and feedback results

Based on the root definition, we made a list of activities we perceived necessary for the transformation desired by the stakeholders. They are:

1. Appoint the multi-stakeholder National Trade Facilitation Committee as the decision-making body of the GNSW implementation to balance political power
2. Define the role of private IT vendors as technical support to the Customs Authority
3. Ensure transparency in procurement processes for IT Vendor services
4. Develop the capacity of technocrats to negotiate contracts
5. Develop the capacity of Customs authority
6. Ensure the gradual take-over of the mandate of classification and valuation by Customs over from private IT vendors
7. Assess the impact of capacity development in contract negotiation on the cost
8. Assess the impact of customs control on cost
9. Report back to the public (see Figure 9)

Figure 9: A conceptual model relevant to shippers' cost reduction



Source: Own Diagram

Stage 5: Compare conceptual models with the real world

To further validate the accuracy of the desired transformation indicated in the conceptual model, we presented our deductions from our stakeholder meeting and focus group discussions in June 2019 and documented materials to subsequent interviewees from April 2019 through March 2020. In addition, we presented the findings to representatives of institutions who participated in the 2019 focus group in April 2021, albeit with some absentees. The four representatives of GCNet and Westblue Consulting were absent because they no longer worked in the maritime sector after Ghana Link Ltd. Replaced the company. We had 6 out of the 11 participants represented. One participant from the Chartered Institute of Logistics (CILT), Ghana Institute of Freight Forwarders (GIFF), one representative who represented GIFF in 2019 was now also a member of the implementing committee of ICUMS and the National

Trade Facilitation Committee, A Maritime Journalist from the Daily Graphic (the State-owned Newspaper) and two others from private logistics company and trade facilitation advocacy entity made up the list.

The participants agreed that the transformation and processes outlined to achieve them is valid. They seek less political influence and more stakeholder engagement in implementing the GNSW to ensure certainty without the risk of changes by succeeding governments. Elaborating on how this affects them, the frequent change of IT vendors was problematic to stakeholders, notably the port authority, shipping lines, freight forwarders, terminal operators and ultimately, shippers. These entities must go through expensive IT configurations and training to attain system compatibility with any new introduction of vendors or operators of the GNSW. The cost burden is ultimately transferred to the shipper and the general public who buy imported goods. However, according to participants, the real issue is the uncertainty of how long this political rally of vendors or operators will continue. Political will is critical in closing the gap between the conceptual model and the real world. The process of SSM ends for our research and stakeholders because enforcing political will is beyond our influence. Gasson (2013b) suggests that in this case, where the implementation of activities required for transformation lies elsewhere, it should be considered that the people involved in the system are satisfied with the changes and view them appropriately. Hence, an analysis of the desired transformation feasibility is required to ensure it will work.

Stage 6: Feasibility of Desirable Change

Hersh (2002) describes three possible changes at stage 6 of the SSM, i.e., structural change, procedural change and attitudinal change. The Vice President's famous 'paperless port project' resulted in greater collaboration between Customs and the other border agencies (OBAs), and the number of OBAs that inspected goods on arrival was cut down from 16 to 3. The support

shown by the shipping community despite the controversies surrounding it and the short time frame of its implementation in 2017 shows that the industry endorses change for an efficient GNSW.

Gasson (2013) proposed that the feasibility must be understood as cultural feasibility, technical feasibility, the dependency between work-systems and technical systems, and a win-win for all.

- Cultural feasibility: what is acceptable to the people working in this part of the organization (from their perspectives)

The human factor has been why stakeholders have preferred a digitalized system since the late 1990s. The Vice President's declaration of the paperless port in September 2017 was because some people explored loopholes in the manual aspects that existed in the GNSW until then. For example, the physical inspection of goods offered an opportunity for some customs officers and officers from the OBAs to extort rent from importers or connive with the importer to cheat the Government of the proper duties to be paid. The Government also has the interest in generating more revenue. The Shipping lines, logistics companies and the Port Authority's service providers need the Tema Port to be competitive in the West African sub-region. Shippers on the demand side favour electronic systems to avoid delays and costly illegal facilitation payments. According to Aryee (2011) and the Worldbank (n.d.), the ideal time and situation for reforming a port are when all three forces of competition, political push and community pressure are present simultaneously.

Evidence from the Aryee (2011) study shows that pressures from the global economy, shippers, shipping lines, terminal operators, and the Government, as shown in Figure 10, have shifted cultural behaviours to affirm the three forces effect. The change had already begun due to global pressures from the international trade and supply chain system and the government

system, in which the GNSW system operates for clearance of goods to be efficient and make ports and international trade participants and the country competitive on the world market.

Figure 10: Single Window System as part of a Wider System consisting of the International Trade System and Government System.



Source: Own Illustration

Figure 10 is based on Ackoff's (Problemjäger.com, 2018) three steps in synthesis, which proposed that systems should be studied as part of a broader system, try to get an understanding of the more comprehensive system and then disaggregate the knowledge of the wider system, into an understanding of each part by identifying its role and function in the system. For example, the GNSW at the Tema Port is part of the government system, which operates within the global economy's international trade and supply chain system. Hence, it depicts the port's pressures to be competitive and the pressure to increase revenue generation for the state through the port.

The financial and operational benefits of global private participation in infrastructure development and service delivery evidenced by the global terminal operators and shipping

lines; and the diversification and globalization of investors and operators in the port industry (Worldbank, n.d.) is a critical driving force towards the implementation of a single-window system.

- Technical feasibility (what it is appropriate to support with computer technology and what should be left as a manual process, and what is it possible to computerize?):

The stakeholders saw no argument about the capabilities of TradeNet run by GCNet and UNIPASS of Ghana Link. The IT vendors showed technical readiness when the Vice President declared a paperless port. It took GCNet and Westblue a couple of weeks to make the modules available for joint inspections by the border agencies to cut inspection time down. Also, scanners' used to inspect goods already existed, with a minimum number of containers having to undergo physical inspection upon being flagged by the scanners and based on existing protocols on inspection and examination of goods by customs.

- Dependencies between work-systems and technical systems

After twenty years of GNSW operations, the human attitude towards work and technological change still exists among customs officers and some deviant freight forwarders and importers. Nevertheless, the consensus of the shipping community is that the electronic Single Window clearance has come to stay. With the systems in place, the hard work of changing stakeholders' attitudes continued, albeit partially hampered by the lack of political will to deal with perpetrators of corruption.

- Win-win: does the change make life easier for people?

The proposed transformational change to reduce the cost of port transactions does not necessarily produce losers. On the contrary, a cost reduction can potentially increase trade volumes through the port, providing a win-win situation. It gives room to satisfy all parties without compromising the shipping community's efficiency or service providers' and shippers-

needs. For the politicians who want to contract IT vendors to offer technical support to customs, that can be done without tasking the shipper to pay for their services. The difference is that the IT vendors no longer would perform customs functions. They are not the software's proprietary owners and operators but only offer technical support to Ghana Customs. Implementing the proposed changes ensures that the abrogation of their contract by politicians does not affect stakeholders.

Stage 7: Take action to improve the problem situation

The study does not afford the power to intervene directly in the problem situation. However, we make an indirect impact by briefing participants and relevant stakeholders about recommended changes.

3.5 Discussion

The SSM learning process, the focus group, one-on-one interviews, and reviewed literature helped decipher the meanings, known as worldviews in SSM parlance, behind the Ghana National Single Window's controversies. Certain factors have emerged from the study that helps explain the problem situation that underlines the controversies.

3.5.1 Governance of the Ghana National Single Window

The primary cause of controversy concerning the GNSW is how politicians appoint IT vendors to manage the GNSW without due process and stakeholder involvement. Evidence shows three operators have to manage the GNSW, with each elected Government contracting a new operator over three political election cycles. The Government affects vendor changes through either the Ministry of Finance or the Ministry of Trade & Industry (MOTI), collaborators in the trade space.

The green line in the rich picture (see Figure 7) connecting the Ministry of Trade and Industry (MOTI) represents their role in selecting a vendor for the Customs Division of the Ghana Revenue Authority, the custodians of the Ghana National Single Window platform. Participants at the workshop in 2019 perceived this as one example of political influence that manipulates state agencies. The reason is that the MOTI, although the originator of Ghana's single window initiative, has no direct supervisory role over Customs, which is under the Ministry of Finance, yet has contracted vendors for customs since the inception of the single window in 2002. In the meeting with participants to authenticate the transformation envisaged by stakeholders, one participant who is a member of the National Trade Facilitation Committee revealed that the function of a lead agency has been elevated to the Vice President's office as per the governance structure enshrined in law by an act of parliament.

The Government's announcement of a new vendor to take over from GCNet and Westblue was a shock to many because it came to a couple of months after the Vice President declared a paperless port and the subsequent improvement in the GNSW. The action prompted suspicions of factionalism in the Government. Many rejected the sole sourcing of these contracts since there was no urgency nor a lack of IT Vendors capable of installing and managing the chosen software as the procurement laws require. Civil Society group IMANI Africa has accused the Senior Minister of interfering in the process (IMANI Africa, 2020) and arbitrarily handing over the control of the GNSW to another party without cause or reason (IMANI Africa, 2017). The Minister of Transport, responding to questions from parliamentarians about why GCNet was replaced with ICUMS during his vetting for the second term of office on live television on 27th February 2021, explained that he had no idea why they were changed since it does not fall within his mandate or that of the port authority but rather the ministries of trade and finance (Cititube, 2020). The situation reflects the multi-ministerial oversight of the maritime sector's digital transformational agenda – and how it can serve unaccountability.

In the validation meeting, the Chartered Institute of Logistics and Transport reiterated that the GNSW platform has been robust and must be separated from the managers in the discourse. Governance emerges as the bone of contention in the controversies.

The practice of politically influenced contracts in the GNSW implementation is not an isolated situation. It appears to be an established practice in Ghana's political setup. Interviews with the Port Authority and Maritime Labour Services revealed that indigenous stevedoring companies and Labour Supply Companies have their faith tied to the tenure of political parties. The port authorities attributed inefficiencies in port operations to the poorly equipped stevedoring companies with limited human capacity and skill who fail to invest because of the uncertainty of the contracts after the political cycle of four years or eight years if their party retains power. They are forced to license them due to pressure from political party affiliates and heads appointed to the port. The operations manager of one of the companies puts it this way: *"I do not know the owners of the company I work for...our fortune is tied with the party in power, so we must make the most of it now"*. The controversy regarding the GNSW is a subtle pushback on this practice by the political authority to extract rent through their affiliates.

3.5.2 Trade Transaction Cost

Trade transaction has become a critical issue in the debate on a national single window. Interviewees and the focus group mentioned problematic the increasing direct usage cost (i.e., service fees paid by the system's users) and logistics (indirect) costs because of digitalization. The cost argument is twofold. The statement made by the representative of the Ghana Shippers Authority and supported by Westblue in the focus group (see Table 1) emanates from historical antecedents. (Aryee et al., 2021a) recounts the introduction of standalone digital platforms by state agencies, such as the Advance Shipping Information platform and Cargo Tracking Note despite the National Single Window's affordance to perform those functions. Therefore, the

direct cost can be explained in two ways. First, accumulated charges because the proliferation of digitalized platforms demand a service fee. Secondly, cost increments due to inflated contractual amounts negotiated between the government and the IT Vendors. In addition to the direct cost is indirect costs because inefficient process digitalisation leads to higher trade transaction costs via lack of transparency, predictability and cargo clearance delays.

3.5.3 Stakeholder Participation in Decision Making

It emerges from the validation meeting that article 2 of the Trade Facilitation Agreement enjoins states to offer the opportunity for traders and other interested parties to comment on any new introductions to the trade ecosystem (Trade Facilitation Agreement and Protocol of Ratification, 2014). The opaque way IT vendors are selected without any competitive bidding process gives credence to the unilateral decisions that affect shippers and the public. The involvement of stakeholders ensures transparency, accountability and value for money in contract transactions and helps avoid conflicts. GIFF has emerged as the advocate for shippers and the larger public in engaging with the Government and its agencies (see Aryee et al., 2021). Asked why the Ghana Shippers Authority does not argue for such engagement on behalf of shippers, participants at the validation meeting pointed to their role as a state agency that cannot be adversarial to the Central Government that appoints the Chief Executive Officer. This situation is reflected in the rich picture as a bottleneck depicted by a red arrow.

Interviewees and participants raised other issues, such as the customs mandate at the validation meeting with the belief that the Customs authority assuming their legal mandate of classification and valuation can help reduce the cost to the country and shippers that accrue to the benefit of a private entity. However, this concern is subservient under political authority, explained by the gatekeeper state theory. A gatekeeper state is one in which political leaders dominate bureaucrats, unlike developmental states where the opposite is true (Hillbom, 2012).

3.6 Conclusion

We set out to explore the meanings embedded in controversies surrounding the implementation of the Ghana National Single Window (GNSW) and port expansion project and how these meanings help explain port stakeholder fears, hopes and expectations at the Tema Port. To begin with, we provide a series of events around the GNSW and port expansion that recurred four times over four political cycles as background that warrants exploration to extract meanings from their occurrence. Fears, hopes and expectations reflect human emotions or worldviews, which are diverse and prone to conflict of interests. Therefore, we adopted a qualitative approach that builds consensus in arriving at a possible accommodation.

Data collection, analysis and presentation were accomplished using the soft systems methodology. A process that helps untangle difficult situations involving people by finding accommodations between the different world views. We began with a review of the literature and expert interviews, where we identified that the controversies concerning the GNSW and Port expansion were not technical but socio-political. We followed with a workshop and focus group discussion of relevant stakeholders on gathering further information. Following the workshop and discussions, the roles, interrelations and bottlenecks in the workflow of port stakeholders were mapped out. The data was analyzed through the various stages of the SSM process, including rich pictures, root definition, CATWOE, PQR and a conceptual model. Further interviews and a validation meeting with relevant stakeholders confirmed the result and desired change.

The study revealed meanings of controversies, which we deciphered from the worldviews of workshop participants, focus group discussions, interviews and findings from documentary evidence. These meanings include suspicion of corruption in contract awards to

IT vendors (all without evidence of competitive bidding), which increases the cost of transacting business at the port.

First, we can deduce that the frequent contracting of new vendors by succeeding governments is evidence that procurement of IT vendors is a compromise of the objective the installation of the technological artefact sought to forestall.

Secondly, we know that controversies related to technological change are not always associated with technological artefacts. In the study, technology only changed in 2019 after 18 years of operation, and all the controversies were related to socio-political concerns. The SSM learning process revealed that the controversies have been about the system's politicization to the point that, over three eight-year political cycles spanning two decades, every elected Government has contracted a new vendor to work with customs. Except for the controversies surrounding resistance to change and initial technical challenges on the first introduction of the Ghana National Single Window project, all other controversies were related to introducing a new system operator.

Lastly, we can conclude, based on our evidence of the modules activated after the Vice President's declaration of a paperless port in May of 2017, that GCNet's TradeNet did not receive the needed Government support to ensure a single end-to-end window for Ghana that meets user needs and enhances trade facilitation. This finding further contributes to Addo's (2017) results of the capabilities or affordances in TradeNet underutilized. However, UNIPASS seems to be enjoying that support from the Government of Ghana presently.

In general, the findings correspond to Jasper's (2017) argument that the public's attitude towards technology either reflects fears, hopes and expectations or legitimate concerns over the public's important political and social goals. His study investigated the lifecycle of controversies surrounding nuclear energy's introduction in France, Sweden and the USA and

how politicians handled them at each stage. He argued that technological controversies reflect disagreement over basic political and social choices rather than merely irrational fears inspired by the mass media. In a sense, this study confirms the argument that the public and businesses have legitimate concerns over important political and social goals in the case of the GNSW. Political influence in contracting IT vendors is costly to businesses. Our investigation clearly shows that all agree to have the GNSW, but optimizing user satisfaction should be more central to the decision-makers' consideration.

3.6.1 Implications

Firstly, practically, if the transformation required is not achieved, there is no guarantee that ICUMS will be the last technology/software for the GNSW, and Ghana Link may not survive as an IT vendor during their 10-year contract

Secondly, concerning policy, Hersh's proposal of three changes required for the sustainability of change is inadequate for the case of the GNSW. While the Vice President's influence amounted to procedural and, to a lesser extent, structural change, his intervention is not sustainable based on experience from a similar change by the late President Mills in 2012 (Kwaku Antwi Otto, 2011). Already, some agencies are negotiating their way back into the inspection team. For example, the veterinary service argues for their inclusion in inspections amidst the COVID-19 pandemic (Ghana Ports & Harbours Authority, 2020). As pointed out by (Addo, 2017) and depicted by the rich picture Figure 7, GCNet (and possibly the other IT Vendors) had affordance for complete automation and rationalization of inspection of goods by government agencies to reduce the time and cost of clearing goods. However, due to turf wars, they never had the cooperation of the OGAs that used their legal mandates as an excuse to increase revenue through charges for their services. To compel the other government agencies to integrate and collaborate, there is a need for legal change that ratifies the rationalization of inspections, in addition to the changes identified by Hersh. The study

proposes that the single window project will benefit from legal changes that compel the OGAs to integrate and collaborate at the ports and other borders.

Lastly, our paper contributes to the ongoing debate on the socio-technical embeddedness of Information Systems and knowledge in the following ways:

- The paper reported on a systems enquiry into the complexities of implementing the Ghana National Single Window at the Tema Port. The inquiry process produced output, such as a conceptual model to improve the implementation process for the participant stakeholders.
- Applying SSM helped reveal specific meanings attached to controversies surrounding a technological artefact in a developing country. The study also revealed that the answers to these controversies lie beyond technology.

3.6.2 Limitations

1. Because this is research and not a consultancy for the state or any other agency, we cannot compel participants to follow through with agreed accommodations and recommendations.
2. The last stakeholder meeting to validate some of the findings was attended by 6 of the 11 who participated in the focus group discussion. The number reduced at the validation stage because 4 of them who worked with GCNET and Westblue (former Single Window operators) had lost their jobs at the loss of their companies' contracts.

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Chapter 4: Article 3

Aryee, Jonas and Addo, Attah (Submitted to Journal), Political Entrepreneurship and Public Sector Digital Transformation: Evidence from A Developing Country

Political Entrepreneurship and Public Sector Digital Transformation: Evidence from A Developing Country

Abstract

Successful digital transformation in the public sector has been occasionally linked to the influence of notable political leaders. However, little is understood about how or why political actors might enable digital transformation in the public sector, which is known to be a difficult setting for change due to factors such as vested interests, local politicking, corruption, user resistance, and organizational inertia. Viewing digital transformation in the public sector as part of a process of institutional change that requires institutional work from key actors, we draw evidence from a case study of ‘paperless’ reforms at Ghana’s ports to explain how and why digital transformation might succeed through political entrepreneurship. The paper contributes a theoretical understanding of the role of political entrepreneurship in facilitating digital transformation through actualisation of technology affordances.

Keywords: *digital transformation, public sector, political entrepreneurship, developing countries, affordance actualization*

Status: Under review with The Information Society Journal

4. Introduction

Various public sector reform initiatives have been pursued in developing countries to achieve efficient, effective, and results-oriented services necessary for a modern state (Bell & Hindmoor, 2009; United Nations, 1998). Such reforms have included information technology (IT) implementations (De & De', 2007; Schuppan, 2009; The World Bank Group, 2004a; World Bank Group, 2016a) and have typically been framed as digital transformation or modernization initiatives (Bhuiyan, 2011; Introna et al., 2010a; Margetts et al., 2010). In the IS literature, digital transformation has often been used synonymously with ITOT . However, recent literature has highlighted significant differences (Wessel, Baiyere, Ologeanu-Taddei, Cha, & Jensen, 2021). Digital transformation goes beyond IT-enabled services and involves using digital technology to (re)define an organization's identity and value proposition. Conceptually, digital transformation is distinguished from ITOT, which uses digital technology to support an existing value proposition and reinforce an existing organizational identity (Wessel, Baiyere, Ologeanu-Taddei, Cha, & Blegind Jensen, 2021).

In the context of public organizations in developing countries, digital transformation and modernisation can be understood as part of the processes of institutional change from what Weber (2018) called 'traditional' administration; characterised by personalised, *ad hoc* and unfair processes, towards 'modern' rule-based, impartial, and service-oriented forms enabled by digital technologies. Such understanding helps to explain why although digital initiatives have progressed throughout the developing world, intended transformation seldom materialises. Project sponsors such as the world bank have reported disappointments (The World Bank Group, 2004b). Of the 145 countries that undertook donor-sponsored public sector reforms between 1998 and 2008, most with a digitalization component, about half failed to improve on indices of organizational effectiveness (Andrews, 2013).

In tune with such pessimistic outcomes, the Information Systems (IS) literature has challenged the potential of IT to improve the public sector (Kraemer & King, 2006). In the public sectors of developing countries, peculiarities of the development context further exacerbate the challenges inherent in the public sector (Heeks, 2002a; Schuppan, 2009). Moreover, despite a handful of successes (De Wulf, 2005a; Krishna & Walsham, 2005; World Bank, 2005), technology has been frequently shown to reproduce certain traditional practices and dysfunctions rather than reform them (Davis, 2004a; Introna et al., 2010b; Masiero & Prakash, 2015; Toyama, 2015).

Traditional practices are difficult to change because they are institutionalised, which is to say, they are “*stable, repetitive and enduring*’ and ‘*infused with value beyond the technical requirements of the task at hand*” (Oliver, 1992; Windsor, 2004). Digital transformation attempts to change such traditional practices, but in the public sector context in developing countries, “*change seems almost to contradict the meaning of institution*” (Scott, 1981). The public sector follows its historical traditions and has organizations that may be structurally similar but are institutionally distinctive (Hyden, 2010; Lalenis et al., 2002; Meyer & Rowan, 1977; Painter & Peters, 2010). Given such solid institutional foundations of technology-driven change in developing countries, we focus this study on the institutional nature of digital transformation by looking closely at how digital transformation might be institutionally enabled in public organizations to achieve transformation goals.

Although various studies have examined the institutional character of IT (Gosain, 2004; Hernández-González et al., 2004a), and its potential to break down old and form new institutional arrangements in the public sector settings of developing countries (Asangansi, 2012; Masiero & Prakash, 2020), there has been less research into the various types of institutional work and agency involved in such change. In this paper, we examine the significance of human agency in institutional change through the theoretical lens of political entrepreneurship (Jarvis & He, 2020a)—a means by which institutional workers with political power might perform the

institutional work needed to facilitate successful digital transformation in the public sector. We chose to investigate political entrepreneurship in developing countries because, unlike developed countries' public sectors, developing country public sectors are highly politicised and susceptible to the influence of powerful political actors (Brierley, 2020, 2021; Charlton, 1991). Nevertheless, although political actors are known to influence digital transformation and modernization reforms (Addo, 2021a; Sangmpam, 2007; Senyo et al., 2020), little is known theoretically about how their involvement might positively contribute to digital transformation.

The question is vital because governance and administration problems of countries in developing regions like Africa are often cast in polarised terms of agency (humans) versus structure (institutions). For example, President Barack Obama famously said during a speech to the Parliament of Ghana that "*Africa does not need strongmen, it needs strong institutions*" (Obama, 2009). Such simplified understanding does not attend to the nuanced role strong leaders might play in establishing strong institutions, for example, through digital transformation and building robust sociotechnical systems that could withstand the whims of opportunistic bureaucrats. Singapore's post-independence institutional and bureaucratic transformation under strong leaders like Prime Minister Lee Kwan Yew are reminiscent of such potential (Pye & Yew, 2001).

This paper draws on empirical evidence from the paperless initiative at Ghana's ports between 2016-2020. Notably, we focus on Ghana's Vice President at the time, Dr Mahamudu Bawumia (the protagonist in our narrative, hereon referred to as 'Dr Bawumia')— who championed paperless transformation as part of his broader agenda to digitalise the public sector. This paper outlines the successes achieved through Dr Bawumia's interventions at the ports to theorise the role of political entrepreneurship in digital transformation in the public sector of a developing country. The rest of the paper proceeds as follows. We present a theoretical framework of digital transformation in the public sector of developing countries as a process of institutional

change that requires institutional work by an agent engaged in political entrepreneurship (i.e., a political entrepreneur). We next present our method, findings, and theorization before concluding with implications of our research and suggestions for further research.

4.1 Theoretical Background

Dysfunctions and inefficiencies have typically plagued the public sector in developing countries because of its complex colonial and post-colonial history (Erdmann & Engel, 2006; Jackson & Rosberg, 1982; La Palombara, 1967; Mosher et al., 2009; Van de Walle, 2001). Dysfunctions such as bribery and corruption (Fortin, 2013; Mbaku, 1996), red tape (Bozeman, 2000; Goodsell, 2000; Guriev, 2004), incompetence (Hood & Lodge, 2004; Kamoche, 1997), and politicization (Dasandi, 2014; Peters, 2010) have come to characterise public organizations in developing countries. Given its potential to drive organizational and societal change, digital transformation has been linked to reform models that have been tried in the public sector of developing countries, including New Public Management and the Washington model of good governance (Heeks & Mundy, 2001; Kettani & Moulin, 2014; McCourt, 2001; Polidano, 2001; Sarker, 2006). Sector and organization-specific reform initiatives in many developing countries also typically involve elements of digital transformation (Addo & Senyo, 2021; Davis, 2004b; Masiero, 2015).

Digital transformation has been linked to modernization and national development due to the potential for change across societal and organizational levels (Faik & Walsham, 2013; Sein & Harindranath, 2004). Such change initiatives in the public sector of developing countries are associated with both top-down and bottom-up processes (Addo, 2021a). Much is known about top-down influences through which developing country public sectors are shaped by global development organizations such as the World Bank and other members of the United Nations (UN) system (Park, 2017; World Bank Group, 2016b), or international organizations to which

governments or public organizations might belong such as the World Customs Organizations (WCO) or World Trade Organization (WTO) (Michael et al., 2010; Staple, 2002).

Decades of IT implementation studies in developing countries have also shed light on bottom-up processes of digital change in the public sector, notably concerning challenges of the organizational and broader context (Brown, 2005; Heeks, 2002b; Madon, 1993), the role of individuals and collectives such as IT vendors, consultants and change management experts (Saint-Martin, 2000a), as well as the role of street-level bureaucrats who interface directly with members of the public (Addo, 2016; Addo & Avgerou, 2021b; Addo & Senyo, 2021; Andersen, 2006).

However, little is known about the role played by government and political figures in processes of digital transformation in the public sector of developing countries, although it is widely believed that reforms in the public sector rely on political champions for success (Andrews et al., 2010, 2008). There are examples of digital transformation initiatives worldwide whose success has been linked to the influence of political leaders. For example, in Singapore in the 1980s and 90s, the Prime Minister, Brigadier General Lee, was instrumental in the digital transformation of the port system and the entire government bureaucracy (Business Times, 1986a; Quah, 2018; Wee, 2015). In the United States since 1993, the National Partnership for Reinventing Government was credited to the leadership of President Bill Clinton and Vice President Al Gore (Fountain, 2001). In India, the Aadhaar digital identity initiative, the world's largest public sector IT project of its kind, was linked to Prime Minister Modi and his vision for social inclusion and reformed public services (Avgerou & Addo, 2017; Chin et al., 2015; Varma, 2014).

Certain roles of political actors are relatively obvious. For example, being project sponsors or champions for digital transformation projects (Kamal, 2010; Neufeld et al., 2007), visionaries

who articulate a future of change (Business Times, 1986b; Gagliardone, 2014a), and resource allocators who guarantee funding and the continuity of given initiatives (Dhoot & Rajshekar, 2014; Tewari, 2014). Other roles, such as their influence in transforming outmoded practices into modern digitally transformed ones, are less clear. In developing countries where traditional practices in the public sector are notoriously challenging to reform (Brinkerhoff & Brinkerhoff, 2015; Schacter, 2000), institutions are weak, dysfunctional or non-existent (Khan & Gray, 2006; Neshkova & Kostadinova, 2012), and vested or corrupt interests routinely oppose change (Addo, 2016; Peterson, 1998), the role of political actors in changing practices across the public sector might take on heightened significance. Although power and politics have been studied in IS, it has mainly been approached from an organizational perspective involving actors within a project group rather than political actors *per se* (Jasperson et al., 2002; Lin & Silva, 2005; Silva, 2007). Other studies have looked at how political actors pursue their interests through technology and digital initiatives (Gagliardone, 2014b) rather than how and why political actors influence the transformation of established practices being targeted with such initiatives.

4.1.1 Digital transformation and institutional change in the public sector of developing countries

Deeply rooted institutions have been associated with the expectation failures of information systems-driven change in the public sector of developing countries (Addo, 2021a; Addo & Avgerou, 2021b; Sahay et al., 2010). Although information technology might have affordances to enable transformation in specific domains of activity, these affordances might not be actualised due to institutional factors affecting the individual, organizational, and broader national levels of developing countries (Addo & Avgerou, 2021b). Various interventions exist in the public sector to shift practices toward long-term institutional change (Chang, 2001b; Polidano & Hulme, 1999; Schacter, 2000b), and digital transformation might be considered such an intervention. In the IS literature, institutional theory has been acknowledged as an appropriate perspective to

examine the dynamics of organizational stability and change (King et al., 1994; Orlikowski & Barley, 2001a; Robey & Boudreau, 1999).

However, institutional theory has been critiqued as being better at explaining stability than change (Orlikowski & Barley, 2001b). Institutions have been viewed as exogenous in relation to agents, organizations, or entire organizational fields (DiMaggio & Powell, 1983), with individuals or organizations being recipients of the taken-for-granted influences (Oliver, 1991). IT has been said to embody institutions in terms of their enduring rule structures and underpinning assumptions (Gosain, 2004; Hernández-González et al., 2004b). In developing countries, IT has been an important institutional actor through the assemblage of artefacts, processes, legislation, industries, and various ‘rational myths’ about its potential value (Avgerou, 2003). IT has also been linked to institutional forces of ‘development’ and ‘management’ professions, industries, and ideologies (Hanna & Schware, 1990; Korac-Kakabadse et al., 2000; Saint-Martin, 2000b).

Based on this foundation, a stream of research that attempts to explain how institutional change happens with IT use has attempted to bridge the chasm between macro-level influences (the structural and institutional dimension) and the micro (situated motivations and cognitions of individuals) by focusing on the structurational association between human agents, technology, and institutions (Giddens, 1984; Powell & DiMaggio, 1991; Thornton & Ocasio, 2008a). For example, through the institutional logics perspective (Thornton et al., 2012), human agency has been integrated into institutional explanations of IT-driven change (André et al., 2018; Berente & Yoo, 2012; Slavova & Karanasios, 2018). The notion of “embedded agency” in the institutional logics perspective (Thornton & Ocasio, 2008b) clarifies that humans are not passive recipients of institutional scripts but act based on embedded cognition and recursively interact with institutional context. The institutional logics perspective has been instrumental in improving understanding of how situated IT users draw upon institutions or accommodate multiple

competing institutions in the course of their work. However, it focuses on situated IT use and emphasises the cognitive frames individuals bring to their work based on their embeddedness in an institutional system. The institutional logics perspective in IS does not shed light on how agents who do not directly use IT might shape the institutional context to make them amenable to successful digital transformation.

To unpack the role of such agency in institutional change, we first turn to a related construct in institutional theory—*institutional work*—to explain how the actions of an individual might trigger and help embed institutional change in the context of digital transformation in the public sector of developing countries. We further explore the specific role of powerful political agents in institutional change through the construct of political entrepreneurship, which we view in this paper in terms of the institutional work conducted by a political entrepreneur.

4.1.2 Institutional work and political entrepreneurship

Institutional work has been defined as “*the purposive action of individuals and organizations to create, maintain, and disrupt institutions*” (Lawrence & Suddaby, 2006b). The concept brings together concerns about action and agency in institutional theory with elements of structuration from the practice turn in social theory (Lawrence & Suddaby, 2006b). It emphasises the role of individuals in creating, maintaining, or transforming institutions and institutional fields. Building upon previous studies on the significance of actors in creating new institutions via institutional entrepreneurship (DiMaggio, 1988), it further opens up exploration of what it is that institutional entrepreneurs do. Lawrence and Suddaby (Lawrence & Suddaby, 2006b) outlined common actions identified as institutional work in the literature (Table 5) *Table 5: SomTable 5Table 5e types of institutional workTable 5Table 5.*

Table 5: Some types of institutional work

Type of institutional work	Nature of institutional work	Actions involved
Creating institutions	Political	Advocacy
		Defining
		Vesting
	Reconfiguring belief systems	Constructing identities
		Changing norms
		Constructing networks
	Alter meaning systems	Mimicry
		Theorizing
		Educating
Maintaining institutions	Adherence to rule systems	Enabling
		Policing
		Deterring
	Norms and belief systems	Valorising/demonizing
		Mythologizing
		Embedding and routinizing
Disrupting/transforming institutions		Create new institutions
		Disconnecting sanctions and rewards
		Disassociating moral foundations
		Undermining core assumptions and beliefs

Source: Source: (Lawrence & Suddaby, 2006)

Institutional work goes beyond institutional entrepreneurship of an individual and might encompass the actions of individuals and collectives involved in institutional change (Lawrence & Suddaby, 2006b). The kind of actors involved might also vary, and the construct is agnostic of the type of ‘institutional worker’ involved. Given our interest in understanding the particular nature of institutional change actions carried out by a political actor, we complement the broad institutional work perspective with the more specific theoretical perspective of political entrepreneurship. We, therefore, view the potential actions involved in political entrepreneurship as constitutive of, rather than exclusive from institutional work.

4.1.3 Political entrepreneurship

The concept of political entrepreneurship has been linked to institutional change and innovation in the public sector. Although varying definitions exist, a political entrepreneur is an agent with some political clout, position, or political interest who draws upon their personal resources such as expertise, skill, persistence, reputation, or networks to act purposively and creatively to affect institutions or their outcomes in a particular direction (Kingdon, 1984a, p. 214; Sheingate, 2003a, p. 185). Political entrepreneurs might be located inside (Roberts & King, 1991a) or outside the political realm (François, 2003a), although the concept has also been applied to actors within the bureaucracy (Edwards et al., 2002). Drawing on longstanding debates around the duality of structure and agency, the concept highlights the endogenous aspect of change that might be instigated by a creative agent, in contrast to exogenous structural drivers of change that are not sufficient conditions for institutional change (Hederer, 2010). Although institutional entrepreneurs might occasionally be opportunistic and rent-seeking (Holcombe, 2002; Schellenbach, 2007), institutional entrepreneurship helps to overcome rigidities and bottlenecks and force progress in a context of multiple institutional pressures (Schneider & Teske, 1992; Sheingate, 2003b). Similar to other authors, we regard political entrepreneurship in this paper as a form of the broader notion of institutional entrepreneurship (Beckert, 1999; Campbell, 2004a; Fligstein, 2001a). Consequently, the impact of political entrepreneurship might depend on the nature and strength of the broader institutional framework. For example, weaker institutional environments might have more scope for the operations of political entrepreneurs as there might be fewer constraints (Hederer, 2010).

Among other things, political entrepreneurs might identify or help problematise issues as well as formulate their solutions (Kingdon, 1984b; Roberts & King, 1991b), spearhead the preferences of electorate or political decision-makers (François, 2003b), broker and disseminate ideas across networks and different communities (Campbell, 2004b), mobilise support and enable coalitions (Roberts & King, 1991b), mobilise the media and bring public attention to important

institutional issues, escalate issues on the agenda of key decision-makers, and leverage windows of opportunity for institutional change (Kingdon, 1984b). Although the literature has identified such generic activities of political entrepreneurs, there is no research on the kinds of activities performed by a political entrepreneur in the context of digital transformation in the public sector or on how and why such activities might enable successful digital transformation in the institutional context of a developing country. Our research specifically focuses on these questions and aims to make a contribution to the broader literature on the social actor perspective in Information Systems (Lamb et al., 2002) by showing how other important social actors, like political entrepreneurs are implicated in digital transformation.

4.2 Method

Given that methodologies for assessing influence in ‘hard to measure’ institutional work, such as advocacy and education are underdeveloped (Tsui & Lucas, 2013), we adopted a case study approach that allows us to use multiple data sources (Chaiklin, 1991). We also took an interpretive stance because aspects of the data required interpretation and sensitivity to theory (Walsham, 2006). We began the field work when the implementation of the paperless port process had been institutionalised (established and taken for granted). While inductively analysing this change, we heard stories from informants of how a political actor (Dr Bawumia) had succeeded in transforming institutions in the public sector where others had failed. That observation motivated further data collection to develop an explanation. We conducted our research on Ghana’s Customs and port industry from 2017-2019. This period is significant for our research objective because it is when a significant digital transformation underpinned by political entrepreneurship took place.

4.2.1 Empirical Context

4.2.1.1 Digital transformation in Ghana’s port sector

Digital initiatives at Ghana's ports and customs can be traced to at least the 1980s with the implementation of a customs data management system called Automated System for Customs Declaration (ASYCUDA). In 1998, as part of a trade and investment reform process, the Ghana Community Network (GCNet) system was introduced to curb corruption and increase international trade tax revenues through a single submission of clearance documentation without the need for multiple paper submissions (single window). It was modelled after Singapore's TradeNet deployed in the 1990s. TradeNet was an electronic data interchange (EDI) where shippers, declarants, banks, shipping lines, terminals and over 20 government agencies were networked to submit and access information.

GCNet automated many customs and import processes such as document verification, compliance checks, revenue reconciliation and data reporting (Addo & Avgerou, 2021b; De Wulf & Sokol, 2004). However, many state agencies did not take full advantage of the system's capabilities partly because their management systems were still based on manual procedures (De Wulf, 2005b). Manual submission of import and export documents to state agencies hampered the objective of a paperless process resulting in several adverse effects on port efficiency and effectiveness.

State support for GCNet's incorporation and operation also suffered due to the timing of the start of the project. GCNet was incorporated in November 2000, a month before a national election that saw the government losing power. The new government revised policy decisions made by the previous government, and a power vacuum created by the absence of a cabinet stalled the operational decision of the secretariat in charge of GCNet. The lack of political backing required for the project dampened the vision of integrating the various trading partners, including ministries, departments, and agencies, into one trading community. Following Ghana's ratification of the World Trade Organisation's Trade Facilitation Agreement in

January 2017, Dr Bawumia stepped up and led his government to automate port and customs operations under a ‘paperless port system’.

4.2.1.2 Dr Bawumia, a political entrepreneur

Dr Bawumia, an economist by training, was widely perceived in the country as a ‘technocrat’ and a visionary (see Appendix 1 for official bio). Since taking office in January 2017, he served as the head of the government’s Economic Management Team and consistently championed an agenda to formalise the Ghanaian economy through digitalization. His efforts at introducing technology in all sectors of the Ghanaian economy dominated the headlines of Ghanaian newspapers and online portals. A leading Ghanaian news portal succinctly put it, “*Bawumia has leveraged technology to help reform and improve Ghana’s institutional and regulatory processes towards creating a digital economy*” (Asante, 2022).

In May 2017, he issued a directive for port transactions to be made paperless within three months (Aryee et al., 2021b). By the deadline of 1st September 2017, paperless processing was effective at the ports and had incrementally improved efficiency. Dr Bawumia attributed the quick transformation to the pre-existing affordances of the system. The paperless port was institutionalised, and a subsequent change in IT vendor from GCNet to ICUMS did not destabilise the new digital regime but consolidated it. Dr Bawumia was not the only leader in Ghana’s history who recognised the need to reform the ports, customs, and other trade-related institutions, but his approach proved unique.

In 2009, an earlier government led by President John Atta-Mills also recognised the problems at the ports and attempted interventions. One such intervention was the abrogation of an IT contract agreed upon by a previous government that was found to duplicate the activities of incumbent IT Vendors (The Ghanaian Chronicles, 2015). Another significant action was his unannounced visit to the customs office at Ghana’s main Port of Tema, where he lamented the unacceptably high levels of corruption and malpractice. He threatened to sack or transfer

corrupt officers who undermined reforms at the ports (Ghana News Network, 2011). The visit was a direct response to a damning investigative report that had shocked the nation and put the spotlight on corruption and related malpractices at the ports (Tiger Eye PI, 2011). However, ultimately, Atta-Mills direct and confrontational approach did not result in enduring changes at the ports, and nearly all traditional practices persisted.

By contrast, Dr Bawumia had the privilege of affordances built over the years just as Attah-Mills and other governments did but elevated the digital transformation agenda to the national level without directly targeting individuals. He focused instead on making systems work by enabling the actualisation of digital affordances. His approach and manoeuvres offer insight into how political entrepreneurship fused with institutional work might bring about digital transformation.

4.3 Data collection

Data was collected between 2018 – 2021. The period started three months after the 1st September 2017 deadline for implementation and ended a year after a national general election. The end year was significant because it was widely known among port community members that new political mandates in Ghana often brought significant changes to port and customs leadership and operations. We obtained data through interviews, observation, documents, and media reports and supported this evidence with focus group discussions.

We conducted 46 in-depth interviews with major stakeholders and port users in 53 semi-structured interview sessions. Seven of these were follow up interviews. The first round of interviews was done between March and April 2019. The second and third rounds of interviews were follow-up interviews to validate the data and stay abreast with new developments. The second and third rounds of interviews occurred in November 2019 and between February and March 2020. We also observed and monitored episodes of the official public TV informational

programme of the Ghana Ports and Harbours Authority (GPHA), known as ‘Eye on Ports’. On ‘Eye on Ports’, high ranking state officials in charge of the paperless port talked about the implementation and answered questions from the host and viewers. These televised interviews provided an additional trove of rich data. ‘Eye on Ports’ was also a way to access information from government ministers who were otherwise inaccessible. **Error! Reference source not found.**Table 6 summarises the data collected.

Table 6: Data Collection

Instruments	Sources
Focus Groups	Westblue Consulting, Ghana Standards Authority, Ghana Shippers Council, Meridian Port Services, The Ghana Institute of Freight Forwarders (GIFF), Amaris terminal and the Chartered Institute of Logistics and Transport
In-depth Interviews	46 interviews and 7 follow up interviews with major stakeholders and port users (53 semi-structured interview sessions).
Media Observation	Observed and monitored 18 episodes of the official public TV informational programme of the Ghana Ports and Harbours Authority (GPHA) known as ‘Eye on Ports’.
Newspaper Analysis	Analysed 348 news articles published from January 2017 to December 2021 with the keywords ‘Bawumia’ and ‘paperless’.

In April 2021, when the paperless transformation had achieved a significant level of stability, we undertook another focus group discussion to retrospectively assess the paperless port system after the government introduced a new IT vendor and a new single-window system in 2020.

4.3.1 Data analysis

We employed content analysis of the news coverage on Dr Bawumia’s public activities in digital transformation. We used the Factiva database to find media accounts of the paperless port process. We searched for news articles published between January 2017 to December 2021

with the keywords ‘Bawumia’ and ‘paperless’. The search result produced a sample of 348 articles and news statements. Using the qualitative research software QDA Miner lite, we organised and coded our data deductively (according to the theoretical constructs identified through our literature review) and inductively (paying attention to new themes not captured by our theoretical frame).

4.3.1.1 Deductive coding

Based on the formulation of everyday actions identified as institutional work in the literature (Table 1), we coded data that supported or built on the constructs (Hsieh & Shannon, 2005). Since our focus was to find out how transformation occurred through the institutional work of a political entrepreneur, we analyzed those constructs of institutional work that disrupted or transformed institutions. Those actions included creating new institutions, undermining core assumptions and beliefs, disconnecting sanctions and rewards and disassociating moral foundations. In the subsequent coding round, we further coded the disrupting and transforming institutional work actions to the actions of political entrepreneurs found in the literature.

4.3.1.2 Inductive coding

To account for novel constructs and themes that might emerge from our data, we further explored codes for political entrepreneurial activity and the institutional work of bureaucrats, state institutions and private sector institutions that helped achieve digital transformation. Our reported findings were corroborated by empirical evidence from two or more sources.

4.4 Findings

We found that Dr Bawumia carried out the following forms of institutional work during the implementation of the paperless system.

4.4.1 Creating new institutions

Dr Bawumia initiated three new policy reforms in customs and the other border agencies to align with the new value proposition of customs and the other border agencies. The policies satisfied the provisions of the WTO Trade Facilitation Agreement (TFA), which Ghana ratified on January 4th, 2017. The TFA shifted the focus of customs and other border agencies from rent-seeking national regulators to agencies that enhance trade rather than create bottlenecks in international trade processes. Amongst the practical ways to achieve the aims of the TFA was the use of information technology to ease trade processes. The three policy measures included the removal of all internal customs barriers, including barriers and mandatory joint inspections at all ports. The most prominent of the three was the directive for all ports to go paperless by the 1st of September 2017 (Arthur-Mensah, 2017).

4.4.2 Institutional Work to Disrupt or Transform Institutions

Disconnecting sanctions and rewards

To disrupt institutions, state and non-state actors worked through the state apparatus to disconnect sanctions and rewards from some set of practices, technologies or rules. Most of the examples available in the literature show the use of legal arguments to dismantle formerly powerful institutions (T. Lawrence & Suddaby, 2006b). Dr Bawumia did not use the courts to dismantle deep-rooted institutions in the port clearance process. Instead, he rode on the back of the newly ratified TFA to effectively eliminate the discretionary and arbitrary powers of customs officials to unduly delay the process and extort rent from importers via the risk management tools of the single window system. To send a signal to organizations, officers and shippers that are not complying, he said

“We are moving from a system of applying sub-standards and unnecessary complex procedures at the port to a system which meet international standards and is in conformity with trade facilitation agreements” (Ghana News Agency, 2017a)

The risk management tool in the IT system also rewards compliant importers by getting their documents and goods through the process faster as they are pre-qualified. For sanctions, declarants who presented falsified documents are punished based on a two-strike rule of first a punitive fine and second a complete ban' (Ofori, 2017). *Table 7* summarises these findings.

Undermining core assumptions and beliefs

A critical institutional work in digital transformation was to help decrease the perceived risks of innovation by undermining prior core assumptions and beliefs. Moving away from an established practice comes with some costs and risks. To disrupt such institutions, change agents need to prove that such costs are removed or, at best, minimised. This type of institutional work is rare in the literature (Lawrence & Suddaby, 2006). Dr Bawumia proved to sceptics that the paperless process cost the government nothing (Adjei, 2017). Furthermore, to undermine the prevailing corruption and extortion practices at the ports, the government abolished the compliance stage of the customs process, where physical contact presented officers with the opportunity to extract rent from shippers. The functions were handed over to the Customs Technical Services Bureau which performed it through digitalized risk assessments. As explained by a freight forwarder 1, the result was that: *“the new system is much tighter now. It is difficult to evade tax. All the loopholes have been plugged”*.

Table 7: Summary of institutional work findings

Institutional work to disrupt or transform institutions	Illustrated quotes from Interviews
Create new institutions	<ul style="list-style-type: none"> • <i>We are happy with the paperless system. The distances we had to cover to access the various offices of government agencies, customs, shipping line, terminals and bank reduced the number of consignments we could clear in a day (Freight forwarder 1, March 2019).</i> • <i>Physical submission of document was an opportunity for the receiving officials to demand facilitation fees and bribes...failure to pay resulted in delays of days or even weeks (Freight forwarder 2, March 2019).</i> • <i>The delays led to extra cost incurred for importer as the consignment attracted demurrage and rent charges (Research Officer, Ghana Shippers Authority, March 2019).</i>
Disconnecting sanctions and rewards	<ul style="list-style-type: none"> • <i>We are moving from a system of applying sub-standards and unnecessary complex procedures at the port to a system which meet international standards and is in conformity with trade facilitation agreements -Dr Bawumia (Ghana News Agency, 2017)</i> • <i>Every activity by importers will be fed into the risk engine to build risk profiles for importers and exporters. That way compliant shippers are prequalified and can have expedited clearing of goods (Ghana Institute of Freight Forwarders Executive, 2018).</i>
Undermining core assumptions and beliefs	<ul style="list-style-type: none"> • <i>All relevant documents for clearing goods at the ports were online and that the compliance stage of the clearance process had been abolished because it had become redundant under the new system – Dr Bawumia (Business World Ghana, 2018)</i> • <i>(digital transformation does not have to be expensive)...the most remarkable part of the paperless ports project was that government did not have to spend a penny on it -Dr Bawumia (Acquah-Hayford, 2017a)</i>
Disassociating moral foundations	<ul style="list-style-type: none"> • <i>We've looked at the revenues that are generated from these barriers and they are really nothing to write home about. The whole issue with multiple agencies feeling like they have a right to inspect goods...we are going to deal with it – Dr Bawumia (Daily Guide, 2017a)</i> • <i>The paperless system has been widely accepted by stakeholders because it is what shippers have been agitating for years to avoid the payment of facilitation fees (Representative, Westblue Consulting 2018).</i>

Disassociating moral foundations

This refers to actions to remove the practice, rule or technology from its moral foundation within a specific cultural context. This study found instances of institutional work done to dismantle certain socio-cultural practices that impeded digital transformation at the port. For instance, customs officers believed that examining every consignment and placing barriers to check goods in transit amounted to higher revenue generation for the government. However, Dr Bawumia revealed that the Ghana Revenue Authority data proved that the revenue generated from such a time-consuming physical examination of goods was not worth the resources committed to the exercise. Instead, using the risk management system in conjunction with a scanner and post-clearance auditing was a better way to secure government revenue and facilitate the clearance of goods from the port.

4.4.3 Actions Associated with Political Entrepreneurship

The ‘institutional work by the digital solution owners and other stakeholders was complemented by eight sets of activities taken by Dr Bawumia, which enabled the digital transformation to be realised. The institutional work and set of eight activities associated with political entrepreneurship as expressed by interviewees and reported by newspapers are presented in *Table 8*.

Table 8: Summary of actions of Political entrepreneurs

Actions of political entrepreneurs	Illustrated quote from interviews
Spearheading the preferences of electorate or political decision-makers	<ul style="list-style-type: none"> • <i>Ghana's port operations have not lived up to international standards, hence the introduction of the paperless system- Dr Bawumia (Daily Guide, n.d.)</i> • <i>We are moving from a system of applying sub-standards and unnecessary complex procedures at the port to a system which meet international standards and is in conformity with trade facilitation agreements (Ghana News Agency, 2017b)</i>
Leverage windows of opportunity for institutional change	<ul style="list-style-type: none"> • <i>"The good news is that GPHA, GCNet, West Blue all have excellent systems in place as well as customs. We just have to see how we integrate, which is very possible...We have the registration for several key agencies [...] to ensure that we have that shared as well...The next thing that we need is the declaration and the post-clearance all coming in. And we must work together to make this happen" (CEO, Customs World of Dubai, Daily Guide (Ghana), 2017)</i> • <i>"The company had already deployed the infrastructure to give full effect to the pursuit of the transactions regime, noting that. It is on record that GCNet provided a clearance system several years earlier and won a World Customs Organisation Award as far back as January 2014" (Executive Chairman, GCNet. Business and Financial Times, 2017)</i>
Identifying or helping problematise issues as well as formulating solutions	<ul style="list-style-type: none"> • <i>We want to strengthen tracking at the port and checking at the ports... issues that have to do with multiple agencies we are going to deal with it...We need to be a bit more outward looking when we think about our port services because we are surrounded by a lot of opportunities" (Dr Bawumia, The Herald, 2017)</i> • <i>The proliferation of state agencies in the port is an issue for us because they adversely affect efficiency by the way they operate but we have no power over them. They will flash their legal mandate in your face anytime we complain. We had proposed a change in our (GPHA) mandate to be able to control them in our space (Port manager 2, 2018)</i>

Brokering and disseminating ideas across networks and different communities	<ul style="list-style-type: none"> • <i>We are getting to a point where very soon government will have to stop accepting cash payment anywhere. Once we do that, one of the biggest enemies of corruption is technology. If we can track all payment and collect them properly, it will make it more difficult for people to steal the money if it is all electronic,” (Dr Bawumia, Business and Financial Times, 2018)</i>
Escalate issues on the agenda of key decision-makers	<ul style="list-style-type: none"> • <i>The Economic Management Team, along with the Ministries of Trade and Industry, Transport and Finance, are all going to sit together in the next few weeks, synthesis all of this information and come up with a clear roadmap in terms of reforms that we are going to be announcing in the next four weeks” (Dr Bawumia, Daily Guide, 2017)</i> • <i>Parliament has taken a keen interest in the implementation of the paperless system, and we provide updates to the trade and finance committee as and when demanded (Port Manager 2, 2018)</i>
Mobilizing support and enable coalitions	<ul style="list-style-type: none"> • <i>We have a taskforce to monitor the implementation of the system at the ports on a daily basis and provide reports for action where bottlenecks arise. We have regular meetings to address the challenges that come up (Port Manager 1, 2018)</i> • <i>We (Ghana Institute of Freight Forwarders. GIFF) are part of the national trade facilitation committee where we discuss the implementation of the Trade facilitation agreement and the paperless port system which has become part of our deliberation because it is in line with the TFA requirements (GIFF Executive, 2021)</i>
Mobilizing the media and bringing public attention to important institutional issues	<ul style="list-style-type: none"> • <i>I understand that some officials at the port are demanding documents from importers for stamping. This is ridiculous and should not happen under the new regime. No official should demand from any importer documents (except the Waybill and Bill of Lading) for stamping or any other purpose during the clearance process. All the relevant documents are online. It is only a ruse for corruption” (Dr Bawumia, Business World Ghana, 2018).</i>

Spearheading the preferences of electorate or political decision-makers

Dr Bawumia rallied the support of the executive, legislature, and port stakeholders for the paperless port initiative. He declared:

“We’re moving from a system of applying sub-standards and unnecessary complex procedures at the port to a system which meet international standards and is in conformity with trade facilitation agreements”. (Ghana News Agency, 2017b).

The massive support reflected a general wish of a cross-section of Ghanaians and port stakeholders to have more efficient and less corrupt public services, particularly at the ports. A commentator puts the commitment shown by stakeholders this way:

“All of a sudden there is a display of a perfect collaboration and coordination among the stakeholders, all avoiding the ‘blame game’ that we used to witness... Port efficiency has become a priority for all” (Business Day Ghana, 2017).

Leverage windows of opportunity for institutional change

Often politicians in developing countries pursue projects that fit within the electoral cycle to gain popular support. Digital transformation is not one such project with short-term results. However, specific affordances made it possible for Dr Bawumia and the government to succeed in a relatively short time. Dr Bawumia’s directive for the ports to go paperless coincided with the Chief Executive Officer of Westblue Consulting (IT partners of Ghana Customs) indicated their readiness to a visiting parliamentary committee on Finance. Similarly, in July 2017, the Executive Chairman of GCNet indicated the readiness of GCNet for the take-off of the paperless system scheduled for 1st September 2017 (Business and Financial Times, 2017a). Further confirmation of the readiness of all stakeholders was the profound statement by the Commissioner-General of the Ghana Revenue Authority on August 22, 2017, indicating that

collaboration (and by extension integration) was the major hurdle and not technological (Business and Financial Times, 2017b).

Five years prior, in 2012, GCNet and GRA attempted to introduce paperless clearance in Ghana's ports (Figure 1). The initiative had minimum success because of the lack of cooperation and compliance by street-level officers who operated the system and other government officials with a vested interest in the traditional manual processes.

Figure 11: News clipping reporting attempted introduction of paperless clearance at Ghana's ports in 2012 (Sackey, 2018)



The President of the Ghana National Chamber of Commerce (GNCC) affirmed GCNet's claim saying *"In 2012, an attempt to go (paperless) stalled as some of the stakeholders in the value chain were found unprepared"* (Acquah-Hayford, 2017b).

The GPHA, which is the regulator of the port, and Meridian Port Services –the largest and only private terminal container in Ghana at the time—both significant players in the port embraced the paperless agenda in line with their strategy of reducing human interactions through automation at their terminal and in their administrative processes (Business and Financial

Times, 2017c). In many respects, the pre-conditions existed for a paperless process, and Dr Bawumia leveraged the window of opportunity to bring greater resolve that had been lacking in the past.

Identifying or helping problematise issues as well as formulating solutions

During several forums, Dr Bawumia sought to paint a picture of the inefficient process at the port that denied the government the required revenue and the proliferation of rent-seeking state agencies at the port, using the port as a cash cow. Such practices were made possible by the legal backing the organisations historically had. Dr Bawumia proposed a counter-problematization by pushing for a joint inspection by only three state agencies. Instead of the arbitrary number of agencies that could inspect goods and containers at different times, inspections were now tightly controlled under stricter monitoring. The single window system sent text messages to the officers and the shipper showing the time and place for the inspections.

Brokering and disseminating ideas across networks and different communities

One of the distinctive characteristics of Dr Bawumia's leadership was his vision to accelerate economic development through the digitalisation of the various sectors of the economy. We found that in all the speeches he made at various forums in Ghana, he announced digitalization projects that have been implemented, those pending implementation and those planned. Since implementing the paperless port project, he repeated the success story on most platforms he addressed.

Escalate issues on the agenda of key decision-makers

The support of key decision-makers was critical in implementing the paperless port project. Through the oversight committees of the various ministries, the executive and the legislature took an interest in the paperless port project because inefficiencies at the port reduced

government revenue and affected every facet of the lives of citizens who eventually bore the cost. Dr Bawumia roped in the executive branch of government represented by the affected ministry when he announced the project.

“The Economic Management Team, along with the Ministries of Trade and Industry, Transport and Finance, are all going to sit together in the next few weeks, synthesise all of this information and come up with a clear roadmap in terms of reforms” (Daily Guide, 2017b).

Another key success factor was the legislature’s oversight role through monitoring and updating events to ensure that all key agencies and IT vendors were ready to play their part. Parliament performed this task through the Trade, Industry & Tourism, and Finance committees. The burden to report to the public through their representatives in parliament created a sense of importance and urgency. No agency or institution dared to frustrate it at a high level except for ‘street-level operatives’. Hence, when the Trade, Industry and Tourism committee called for an update, all the concerned agencies were present to give updates on steps being taken to meet the deadline.

Mobilizing support and enabling coalitions

Right from the onset, when Dr Bawumia announced the paperless port policy, he charged the trade and port industry leaders to ensure the implementation was successful. He used the National Trade Facilitation Committee (NTFC) as a coordinating body to set out the operational plans. The NTFC was formed before Ghana ratified the WTO Trade Facilitation Agreement to provide a platform for discussion and implementation of reforms for an improved trading environment. The committee was chaired by the Ministry of Trade and Industry and constituted by relevant ministries, departments and agencies, and the private sector (Seidu, 2018). The NTFC platform allowed stakeholders to collaborate and work towards a common goal. To support this high-level arrangement, Dr Bawumia formed a task force to monitor

implementation (Business World Ghana, 2018). The taskforce's work complemented the work of the executive and legislature in policing the process to ensure a successful implementation of the policy.

Mobilizing the media and bringing public attention to important institutional issues

Quite early in his bid to fully digitalise the port, Dr Bawumia acknowledged the work done by the two IT vendors and the state agencies. However, he also pointed out issues that prevent the efficient operation of the port. During the implementation, he sought to point out to the media and public the recalcitrant act of some state officials who were finding ways to continue their traditional corrupt practices. A freight forwarder explained: *"Some customs officers would stop you at the terminal gate after the system had cleared the green light and demanded to physically inspect the goods"* (Car importer, 2020).

4.5 Discussion

Against the backdrop of persistent failures and obstacles to digital transformation initiatives in the public sectors of developing countries (Addo, 2016; Addo & Avgerou, 2021b; Heeks, 2003, 2005, 2020; Madon, 1993), we have explored how political entrepreneurship might play a role in enabling successful digital transformation. We noted the institutional character of digital transformation and took as our theoretical foundation the significance of agency in driving institutional change through actions that might be considered institutional work and political entrepreneurship. Our findings build upon this foundation by revealing how a political entrepreneur might perform a range of activities that help reconfigure the institutional underpinnings of digital system use to result in digital transformation.

From our case study and elsewhere in other developing countries, digital technology implementations and use seldom result in the intended transformational outcomes (Baker Tilly, 2014; Davis, 2004c; Malik, 2020). As a partial explanation, Information Systems (IS)

scholarship has highlighted the significance of developing countries' context in shaping socio-technical phenomena such as digital transformation (Addo, 2021a; Nurnberger, 1975a; Silva & Hirschheim, 2007). Contextual factors at the broader national, organizational, and work levels have been known to sustain the conditions of possibility for particular socio-technical transformations (Avgerou, 2019a). Hence, although digital artefacts might furnish affordances, such affordances might not be actualised for transformation if the context does not prove to enable them.

Ironically, although attention has focused on the ways political actors in developing countries undermine or contribute to the failure of digital interventions (Addo & Avgerou, 2021b; England, 2014; Gagliardone, 2014a), little attention has been paid to how they could also enable successful digital transformation. Political will to go against established institutions have been identified as critical for successful digitally enabled transformation and reforms in the public sector, although it remains theoretically unclear how that might translate into change (Ankamah & Khoda, 2018; Senyo et al., 2019). Our study contributes evidence of political entrepreneurship that results in digital transformation through institutional change processes. Our case of Ghana's paperless port transformation shows the successful institutional change realised in public sector organizations and private organizations. While the changes themselves are worthy of interest, the political entrepreneurial actions driving them are what we further theorise.

4.5.1 Political Entrepreneurship, Institutional Work and Digital Transformation

We noted that digital transformation (DT) processes differ from IT-enabled organizational transformation (ITOT). Following the logic that technology can either (re) define (DT) or support existing value propositions (ITOT), implying either the emergence of a new organizational identity or reinforcing an existing organizational identity (Wessel, Baiyere, Ologeanu-Taddei, Cha, & Jensen, 2021). Our findings confirmed that the paperless port system

amounted to DT and that success is linked to the activities of an influential political entrepreneur. We found that Dr Bawumia's success was attributed to a series of coordinated measures that helped transform the work, organizational and broader context of customs and port operations, such that the pre-existing but unrealised paperless affordances of Ghana's TradeNet and subsequent single window systems could be actualised.

Transforming the broader national context of digital transformation

Institutional work for digital transformation may require a political push in the broader national context. What is unique in our case is that the ambitious national agenda was not driven by a national development plan or legal framework but by the vision and ambition of the NPP government under the political leadership of Dr Bawumia. By effectively liaising with relevant government agencies and organs, these initiatives became more than mere pet projects of the vice president and eventually gained acceptance and became institutionalised. He used the 'bully pulpit' of the VP's office to consistently push the digitalization agenda in every economic sector he encountered. The imaginaries of the possibilities of a digitalised economy that he created in the minds of the citizens garnered public and organizational support for his vision. His conviction and that of the government he served was that digitalization would provide Ghana with the platform to leapfrog into a high-middle-income country as the way forward for a new Ghana.

The paperless port system might have been realised in the early 2000s if the Political backing had not been partial until 2017. Since 2017, it has not been pursued in isolation but as part of an overarching drive to digitally transform services across the public sector. The government drove such sector-wide transformation to fight corruption, increase government revenues through technology, improve the business climate, and provide efficiency and greater convenience for ordinary citizens.

Digital transformation of customs and trade was considered an essential priority in the central government's economic agenda (because international trade revenues and taxes are critical in the political economy of developing countries).

Transforming the organizational and field context of digital transformation

Despite the idea of a dichotomy between agency and structure in developing countries, institutions built on the legal mandates have persisted over the agency of 'strong men' who have sought to reform dysfunctional public organizations. In addition to normative and cultural-cognitive elements, institutions are also built on regulations; and, together with associated activities and resources, provide stability and meaning to social life (Deegan 2014, pp382). Public sector organizations are structured and operated through the law establishing them. Sometimes, the law that dictates the organization's functions is used to institutionalise corrupt practices. Therefore, a transformation attempt may involve a change in the value proposition, including through the legal mandate of public organizations.

In our case, Dr Bawumia's digital transformation agenda at the ports coincided with Ghana's ratification of the TFA in the same year. Ratifying the trade facilitation agreement injected a new value proposition into customs and other state agencies. The agreement refocuses the mandate and images of customs and the other border agencies from exacting regulators to trade facilitators with a single-window platform (information technology) as the tool for all international trade transactions through the ports. Operational and organisational level workers can ignore the instructions of 'revered' politicians in developing countries if not backed by policy. This is an essential contribution to the understanding of institutional work similar to the institutional work of disconnecting sanctions, where actors work through state apparatus like the judiciary to disconnect rewards and sanctions from some set of practices, technology, and rules (Lawrence & Suddaby, 2006b).

Furthermore, the forms of institutional work that disrupt or transform; and the actions of political entrepreneurs evidenced by literature are complementary. In our case study, we recognise that while Dr Bawumia enacted all the actions of a political entrepreneur, he was not the only actor in institutional work. Other actors and organizations played a role in the transformation process. He instructed the relevant organizations to take charge and put in the institutional work for change. On the other hand, some relevant organizations like the GPHA and IT Vendors were progressive and had previously created the preconditions for achieving the goal of a paperless port.

We also observed a subtle uptake of the paperless process by the private sector and a way of being consistent with the new institutional logic. It is uncommon in developing countries to see the private sector would follow the public sector's lead. Gawer and Philips (Gawer & Phillips, 2013) look at this in terms of legitimacy work - a form of institutional work through which the focal organization tries to influence the collective identities legitimately associated with a new logic, as well as influence external acceptance of its legitimate membership in one of the new collective identities.

Transforming the work context of digital transformation

Drawing insights from our case study, we theorised the relationship between political entrepreneurs, institutional work, and affordance actualization. Seeing the three concepts are all based on action toward transformation, we saw an opportunity to synthesise the insights from the paperless port case into a framework. Tying in political entrepreneurship and institutional work with affordance actualization opens an analytical space to explain what tools, strategies, resources, and capacities political entrepreneurs employ to institute and navigate change agendas in developing countries—a perspective inadequately addressed in the literature (Jarvis & He, 2020b).

The objective of a political entrepreneur may not materialise without affordances due to the limited time they have in the office to oversee a digital transformation process to its end. Only pre-existing conditions can respond to the actions of the political entrepreneur leading to actualization. The emphasis on ‘immediate concrete outcomes’ in the definition of affordance by Strong et al. (2014) is instructive about the timeframe of the outcome. Actualization only happens when a political entrepreneur triggered affordance.

The concept of affordance actualization gives room to show the level of analysis by recognizing that a configuration of behaviours makes up the action leading to transformation. Therefore, while Dr Bawumia was the trigger of the affordances, we acknowledged that organizational and work (operational) level actions made a difference in the transformation. The reorganization of import clearance procedures to introduce joint inspections, the elimination of the ‘Long room’ and the new emphasis placed on post-clearance risk assessment all worked to the wanton abuse of the administrative discretion afforded officials (Addo & Avgerou, 2021b). Political visionaries in developing countries have often failed in their transformation bid partly due to organizational and work level indifference or nonchalance.

4.5.2 Implications

Our findings are significant because by focusing on the importance of political entrepreneurship, we shed light on an often-overlooked element of how and why digital transformation might succeed in the public sector of developing countries despite the widespread and typical record of failures and challenges. The field of IS has overwhelmingly noted the significance of context for technology-enabled organizational phenomena (Avgerou, 2019b; Nurnberger, 1975b) but has yet to extensively explore the role of agency in transforming the institutional setting and contexts of DT and ITOT. Furthermore, although much is known about the digitally-enabled change in the public sector of developing countries,

studies have mainly focused on failures and why they might occur rather than success cases (Addo, 2016; Addo & Avgerou, 2021b; Heeks, 2003, 2005, 2020; Madon, 1993).

Against this backdrop, our theoretical contributions are as follows. First, we contribute to the institutional literature in IS that looks at how individuals interact with, shape and are shaped by the institutional logics of technology within institutionally plural organizational and broader contexts (A. Addo, 2021a; Hayes & Rajão, 2011; Seetharaman & Pant, 2018). Although we do not explicitly engage the institutional logic to construct, we similarly address the critical concern of how the agency might be implicated in the institutional changes concomitant with effective technology implementation and use. As in our case, the construct of political entrepreneurship can potentially extend the scope of analysis beyond the organizational setting to explain how the agency might enable institutional change at the multi-organizational or field level of digitally enabled change.

Our second contribution is to the social actor perspective in IS (Lamb & Kling, 2003). We show how digital transformation results from the interconnected actions of various social actors working in coordination across organizations through the enablement of political entrepreneurship. In this view, digital transformation is not automatically accomplished at the work or task levels where street-level officers exercise significant discretion in their uses (and non-uses) of technology. Instead, transformation requires changes across organizational and institutional layers. Importantly, transformation affordances of digital technologies are only actualised when street-level officers are induced to operate in a transformed organizational and broader context with different incentive structures and tighter top-down controls.

Thirdly, we merge institutional work literature and political entrepreneurship literature and view them as related to how they drive institutional change. Lastly, we introduce the construct

of political entrepreneurship into the Information systems literature and explore its salience in the context of digital transformation in developing countries.

4.5.3 Limitations

Our theoretical emphasis on political entrepreneurship as a potential enabler of digital transformation in the public sector might be relevant across various developing countries. Even though our case was specific to one sector of Ghana's public service, our findings may apply to other sectors in Ghana and elsewhere. Potential differences might depend on the nature of affordance actualization, and the question of what barriers exist to affordance actualization in any given context. For example, although Dr Bawumia pursued digital transformation in several of Ghana's public services, the outcomes differed, partly because each setting had different technologies with different affordances and peculiar reasons for why digital affordances were not actualized.

How political entrepreneurship and institutional work unfold might also be contingent. For example, a great deal of political entrepreneurial outcomes, and the general efficacy of a political entrepreneur, might be related to individual traits or the leadership style of the political entrepreneur. The sociologist, Fligstein (2001b) has also outlined the notion of 'social skill'—the ability to motivate others into cooperation and engage them in collective action—as relevant in constructing or reproducing local institutional orders. Such potential exploration of the typologies and determinants of political entrepreneurship in digital transformation could be explored in future work.

Furthermore, the setting of our case might differ from other developing countries, with important implications for the nature of political entrepreneurship that may or may not be expressed. For example, Ghana has been noted as having one of the more robust democracies in Africa, with uninterrupted multiparty elections since 1992 when the nation transitioned from

military rule. Consequently, Ghanaian government leaders and elected politicians in their bid to win elections and re-elections show significant accountability to citizens and generally ensure electoral campaign promises such as economic and bureaucratic reforms are pursued. However, the related question of when and why political leaders might be responsive to one case of digital transformation and not to others is beyond the scope of this paper. Future research might explore these questions and how political entrepreneurship differs in different contexts in its expression and implications for the digital transformation of the public sector.

Finally, our study only considers digital transformation over a few years, whereas institutional change in the public sector typically has a long time horizon (Schacter, 2000). Whether or not such changes might last in the long term is made even more uncertain given the precarious nature of technology-driven reforms in developing countries. Subsequent government administrations, especially from an opposition party, might reverse the progress made or fail to provide the necessary continued support (Addo & Avgerou, 2021b). Future research might consider the long-term viability of political entrepreneur-driven digital transformation in developing countries' various public sector contexts and the factors that enable or inhibit the sustainability of successful initiatives.

4.6 Conclusion

The study shows the effects of political entrepreneurship and institutional work on the actualization of technology affordances for digital transformation in the public sector of a developing country. Through our theorization of political entrepreneurship as a kind of institutional work, we identify a hopeful contributor to effective change in the public sector of developing countries. In a departure from the abundant findings of digital project failures in the public sector of developing countries (Addo, 2016; Addo & Avgerou, 2021b; Heeks, 2003, 2005,

2020; Madon, 1993), we show that all hope is not lost and that political entrepreneurs can enable positive deviance from the norm.

One way the study advances IS research is that it suggests the institutional context of digital transformation is malleable once powerful actors get effectively involved. In explanations of digital phenomena, IS research has sometimes assumed context as a given, a kind of backdrop to the ‘content’ of technology-enabled change. The notion of the developing country context in ICT for development (ICT4D) is often imbued with assumptions of fixedness and historically-formed institutional calcification (Addo, 2021a; Addo, 2016). Few studies have looked at how the institutional context of digital phenomena might be changed to increase the possibility of successful transformation. This is one promising area for future ICT4D research to understand better the nature and sources of institutional change in the public sector and broader context of developing countries.

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Chapter 5: Article 4

Aryee, J., Andersen, T., & Hansen, A. S. (Under review with the Transport Geography Journal). Gateways and Transshipment Hubs: National and Global Narratives of Port Development as Socio-technical Imaginaries

**Gateways and Transshipment Hubs:
National and Global Narratives of Port Development as Socio-technical
Imaginaries**

Abstract

In this article, we argue that the inherent meanings, focus and positionality of ports acting as gateways or transshipment hubs, impact long-standing socio-technical imaginaries of a state's development path and vice versa. Considering socio-technical imaginaries of port development by the state/state institutions, international shipping lines and terminal operators, and local grassroots, respectively, we draw evidence from a case study of the expansion of the Tema Port in Ghana. The study explains how national and global narratives of port development intersect and the implications of these intersections for the

future of port development. We do this through discourse analysis of state policy and media content on discourses surrounding the port expansion project. With the support of the grassroots, we discover how a state entity defends the state imaginary against the strong imaginary of transnational companies and sometimes against the state to balance the impact of neoliberal reforms on the port and its stakeholders.

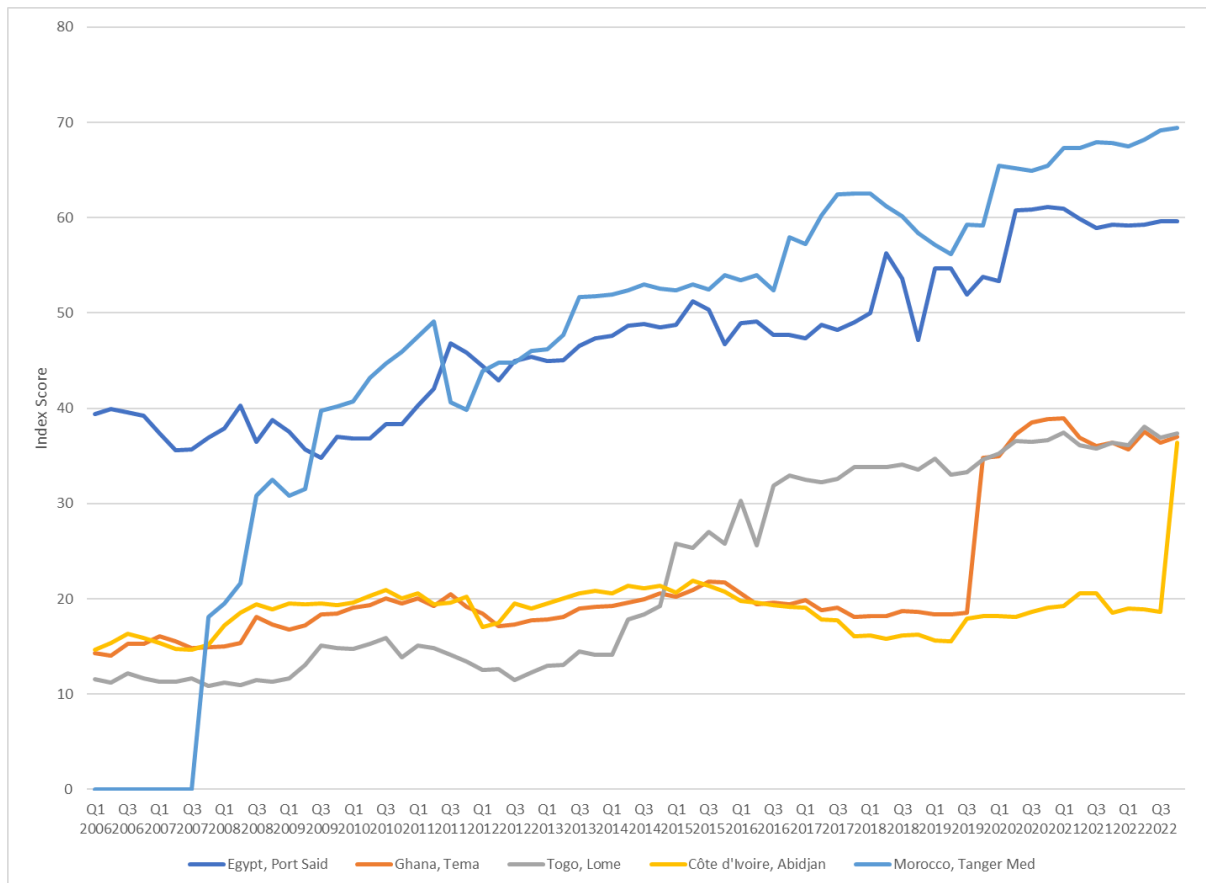
Keywords: Port Development, Socio-technical imaginaries, Globalization, Development, Neo-liberal reforms, Discourse analysis, West African Infrastructures, Power

Status: Under Review at *Maritime Policy and Management Journal*

5. Introduction

West Africa is bearing the fruit of port reforms initiated about two decades ago. New container terminals capable of handling above 2 million Twenty-foot Equivalent Units of containers are emerging along the Gulf of Guinea, with three ports, namely Lome, Tema and Abidjan, advancing into Africa's top five most connected ports in terms of the United Nations Conference on Trade and Development's (UNCTAD) Liner Shipping Connectivity Index (LSCI) (See Figure 12 below).

Figure 12: Tema's Ranking in Africa (UNCTAD's LSCI 2006- 2022)



Source:UNCTADSTAT

(<https://unctadstat.unctad.org/wds/TableViewer/tableView.aspx?ReportId=170026>)

The proximity of these ports to each other, coupled with a massive block of the three landlocked countries of Mali, Burkina Faso and Niger, present a competitive environment for the transit and transshipment cargo (see Figure 13). Searching for a transshipment hub port in West Africa has piqued researchers' interest (Kobina van Dyck 2015; Chen, Xu, and Haralambides 2020; Ussher-dennis and Ussher-dennis 1999; H. J. Kim, Lam, and Lee 2018; Pálsson, Harding, and Raballand 2007) in the last decade. Meanwhile, part of the port reform objectives championed by the Worldbank and UNCTAD in Africa had been framed as 'maritime gateway' projects. Dar es Salam (Hönke & Cuesta-Fernandez, 2017, p. 1077) and Ghana (World Bank IEG 2013) are well-known.

Figure 13: The geographic location of Tema



Source: <http://www.skuld.com>

This notion of gateway ports and transshipment hubs is derived from travelling ideas mostly propagated and supported by the World Bank (Hönke, 2018) as part of neo-liberal economic reforms introduced in the last three decades. These framing portray a specific future direction for the concerned country's development and how that development is inextricably connected to port development. Ducruet (2013) and Olukoju (2020) affirm the symbiotic relationship between ports/port cities and the development path of nation-states, with clear examples from Asia. However, this relationship is not so clear in many developing countries, especially in Africa and South America, where the vision of a value-added exports-led economy that propelled the economic boom of the Asian Tigers (Singapore, Hong Kong, South Korea, and Taiwan) and others like Dubai, Singapore and Malaysia still eludes them.

The two concepts have been used innocently and interchangeably without problems. However, a \$1.5 billion container terminal recently completed as part of the port expansion in Ghana's Tema port reveals tensions that we hypothesise are linked not only

to the liberal usage of the term ‘transshipment’ in discourses regarding the benefits, role and scope of what the new container terminal can be used for but a means for power redistribution in the port.

Therefore, in his article, we explore how taken-for-granted meanings of the gateway and transshipment constructs can shape power distribution in ports and port development trajectory using the case study of Tema Port in Ghana where \$1 billion container terminal was completed in 2019, propelled Tema in a leading port in Africa.

5.1 The Context

The Tema Port expansion project (a new container terminal), which began in 2016 and opened in June 2019, is worth 1 billion US Dollars and is located outside the capital of Accra. Tensions arose in the Tema Port over a concession awarded to Meridian Ports Services (MPS), which already operated the only dedicated container terminal to build and operate the new container terminal. MPS is a consortium made up of the Ghana Ports & Harbours Authority (GPHA), otherwise known as the Port Authority, and Meridian Port Holdings (MPH), which is made up of APM Terminals and Bollore Logistics, with MPH as the majority shareholder with 75% of shares.

The concession was considered awarded in contravention of the state's procurement laws. According to a ministerial report by Ghana's Ministry of Transport in 2017, the contract was seen as being against the state's interests and more beneficial to the MPH consortium. This was after an international tendering process initiated by the port authority was abrogated by the government in 2014, and the concession was awarded to MPS, who did not bid. More tension arose around issues such as the dilution of the port authority's shares from 35% to 15%, a tax relief of \$832 million (Weir 2021), and a potential loss of 1200 jobs and revenue for GPHA and other off-dock container terminal

operators, as all containers were to be handled by MPS according to the "revised" concession agreement. The port authority's response was to set up a port development fund to facilitate indigenous investment in the port rather than relying on transnational entities whose power keeps increasing.

In contrast to the first concession to MPS, in which the port authority maintained their powers to protect national and public interest drawing approval from Chalfin (2010a) as a "victory" against the neo-liberal-led "takeover" of ports by global transnational entities, the new presents a different case. Chalfin (2010a) found that contrary to the literature's assumption that the target of reforms in Africa are bureaucrats and government institutions, they function as the engine for changes in state sovereignty. It is worth noting that such discourses about sovereignty does not appear in developed countries where the global phenomenon of private operation of port terminals is rife. Debie (2012) explains that the impact of private investment on port development is challenging in West Africa because international operators seek to dissociate their economic interests from the well-being of the areas they serve. Furthermore, due to rapid deregulation and lack of expertise in public action concerning port policy, the externalities on society still need to be addressed in Africa.

The tensions can be explained in several ways. One way is to look at the power distribution within the port as Lamarque (2019) did by using the political settlement lens to study local tensions in Kenya's Mombasa Port. A related approach is to focus on the controversies as Hönke and Cuesta-Fernandez (2018)'s did in their studies of Tanzania's Dar es Salaam Port. We use the related concept of socio-technical imaginaries (STIs), which are intricately linked to political settlements and controversies because they reflect the broader social and political norms and values that shape power distribution and resources. STIs refer to the collective visions or shared images of desirable futures a

particular social group holds. They are rooted in cultural and social norms and beliefs; broader political and institutional structures shape them. We believe that understanding the role of STIs in shaping institutional port development discourse is critical because port development in a neo-liberal economic reform setting is based on both public and private investment, which sometimes conflicts. Large-scale infrastructure hubs such as port terminals are not only sites to learn about development pathways, new political geographies (Hönke & Cuesta-Fernandez, 2017), or respacing (Engel & Nugent, 2007), but also about how global logistics value chains and maritime/terminal networks and infrastructure project sponsors impose their power, authority, and visions.

Therefore, in this study, we hypothesise that the terms "gateways" and "transshipment hubs" assume different meanings in the everyday discourse around port development by different actors and trigger societal tensions when implemented on their own merits. The article proceeds with a review of constructs of socio-technical imaginaries and gateways and transshipment hubs in port development as a discourse, followed by our methodological choices and data characteristics. We present our findings, discussions, and conclusions after that.

5.2 Socio-technical Imaginaries as an Analytical Lens

Attention to socio-technical imaginaries has proven to be a fruitful way to connect the domains of facts and artefacts with storytelling, imaging and imagining (McNeil et al., 2017). During the last decade, socio-technical imaginaries have been employed to study technological systems, including large-scale physical infrastructures such as ports (Hönke & Cuesta-Fernandez, 2017). The Tema Port expansion project (hereafter called the project) meets the criteria for what constitutes a socio-technical imaginary as defined by Jasanoff and Kim (2015) in the seminal book *Dreamscapes of Modernity*: "collectively

held, institutionally stabilised, and publicly performed visions of desirable futures, animated by shared understandings of social life and social order attainable through, and supportive of, advances in science and technology". Framing port development as socio-technical imaginaries reveals the mix of ideas underlying the tensions in port and port cities and the results of state developmental objectives.

Socio-technical imaginaries can be seen in time, social order, and space/geography. Analyses of socio-technical imaginaries have a vital anticipatory element and usually draw on past narratives to frame and implement desired futures. They are not interested in history as much as in how history is used actively in the present. At the same time, we learn about the present by looking at what futures are imagined.

We use sociotechnical imaginaries as a critical lens to explore broader national ideas about social order, as in Store's (2015) rendition of the socio-technical imaginaries of South Africa through the life of Cecil Rhodes. Storey uses a specific entry point (Rhodes) in that chapter to explore broader national ideas about social order. In his case, it is a person; in our case, it is a port. Other than this relevant literature, socio-technical imaginaries and social order has focused on the energy and extractive sector.

The identity of a place is not created by the place but by its relations to other places (positionality). 'Positionality is conceptualised as both shaping and shaped by the trajectories of globalisation and as influencing the conditions of possibility of a place in a global world (Sheppard 2002). Socio-technical imaginaries are, in this case, built around interpretations of Tema's place in networks. For example, is Tema imagined as a West African Port, and if so, who does the imagining, and what does this mean? The concept emphasises three key elements. Positionality is a relational construct. It involves power

relations in that some positions are more influential than others and it is continually enacted in ways that both reproduce and challenge its preexisting configurations.

Lastly, According to Sismondo (2020), socio-technical imaginaries are contested, changeable, flexible, and loose around the edges (Sismondo 2020). In an editorial to an issue of *Social Studies of Science* journal, he identifies depoliticisation as a theme that runs through the seven articles (Lawless, 2020; Lawrence, 2020; Levidow & Raman, 2020; Polleri, 2020; Schiølin, 2020; Smallman, 2019; Sovacool et al., 2020) on sociotechnical imaginaries. The articles show that socio-technical systems (STS) are not stable, or at best, only stable for a period or some group of persons.

5.2.1 What and Who Propagates Socio-technical Imaginaries and How?

State agents and governments often espouse socio-technical imaginaries. Most studies (Wittrock et al. 2021; S.-H. Kim 2007) have focused on the state as the central site for framing socio-technical imaginaries through state policies, institutions, media, and regulations. However, a growing literature demonstrates that corporations and corporate strategies can also be the leading drivers in formulating and disseminating imaginations relating to infrastructures, as in the case of "smart cities" (McNeill, 2015; Sadowski & Bendor, 2019).

Giraud and Grugel (2022) argue that development paths are shaped by nationally embedded, elite-led ideas about the ideal national economy. Due to the multi-level governance structure in various sectors, they are also shaped by STIs at the regional level. (Trencher and van der Heijden, 2019) Differing socio-cultural and political-economic contexts at this level interact with and produce variations of national STIs, sometimes alternatives to national imaginaries (Levenda et al. 2019). Eaton et al. (2014) prove that

national imaginaries are interpreted differently by local and nonlocal actors involved in implementing proposed projects in communities.

Hönke (2018a) shows that nationally embedded ideas are often confronted with alternative or counter imaginaries from the vanguards of globalisation, i.e., transnational companies that provide new sources of investment in developing countries, whether for the extractive industry (Schubert, 2018), agricultural commodities (Glavee-Geo et al., 2022) or port infrastructure (Debie, 2012). The dependence of developing countries on external funding for large-scale infrastructure developments also pits the imaginaries of funders and recipients of the investment against each other. In Tanzania, Hönke (2018a) recounts how President Kikwete envisioned the Bagamoyo Port project as one that would turn Dar es Salaam into another Dubai. On the contrary, the Ambassador of China to Tanzania, whose country sponsors the project, envisaged it as a new Shenzhen. Extant literature (Mager & Katzenbach, 2021) provides evidence of multiple, alternative, or counter imaginaries attributed to a single project.

5.2.2 Socio-technical Imaginaries in Ports Context

Ports are surprisingly understudied as systems and transition sites, even though they are an intersection for connecting several sectors, such as transport, energy, markets, and supply chains (Bjerkkan & Ryghaug, 2021a). They connect global markets via the cheapest and most effective mode of transport -sea transport and are the location for industries that influence the lives of employees and indirect benefactors (Dwarakish & Salim, 2015). Sakalayan et al. (2017) found that symbiotic growths of ports and concerned regions accelerate regional development.

STIs related to African ports have historically been linked to city/state development and colonialism (Hilling 1966, 1969, 1977) as an essential connection to development pathways. However, this relationship is not so clear in many developing countries where the vision of a value-added exports-led economy that propelled the economic boom of the Asian Tigers (Singapore, Hong Kong, South Korea, and Taiwan) still eludes them. In recent times, Chalfin (2010), Hönke (2018a), and Hönke and Cuesta-Fernandez (2017) have highlighted the conundrum presented by the neo-liberal practices and competing imaginaries of transnational global terminal operators and shipping lines to African port authorities and states.

In the case of port development, public-private participation means that state and non-state agents espouse similar ideas or at least regard differences as reconcilable because the general direction is agreed upon. Nonetheless, there are also notable differences that arise and create tensions.

5.2.3 The Gateway Port and Transshipment Hub Nexus

Transport geographers consider gateways and hubs similar in that they are locations where flows converge and reconnect. However, they differ in terms of the nature of their connectivity. A gateway connotes a shift from one mode to another, such as maritime/land mostly connecting the hinterlands. Their focus is commanding access to large manufacturing or market regions. Rotterdam and Los Angeles are examples of gateway ports. Gateways tend to have temporal stability as they commonly emerge at the convergence of inland transport systems and through the long-term accumulation of infrastructure and investments. Gateway ports are inextricably connected to particular locations, which is essential for our discussion—considering seaports as locations rather than a function makes ports a subset of ‘real’ gateways -the city or region (Bird, 1980).

Rodrigue (2013, 2020a) defines a transshipment port or hub as a central location in a transport system with many inbound and outbound connections of the same mode (e.g., ship to ship). Its inherent characteristic is found in its other name- intermediate hub port- where it acts as an intermediary location where containers are transhipped between different segments of the global maritime transport system. Centrality and intermediacy are spatial qualities that enhance the traffic levels of transportation hubs (Fleming & Hayuth, 1994). The cargo is not meant for the country where the port is located but for another country. Singapore and Dubai are typical examples of transshipment ports. The importance of hubs depends on the commercial strategies of their users because transport companies (e.g., ocean carriers and air carriers) are footloose. They may switch from one hub to another depending on opportunities for commerce and operations.

Seaports functioning as gateway and hub are not mutually exclusive since a location can assume both functions if it fits the commercial strategies of carriers (Rodrigue, 2020b). Port terminals have proven to be an indispensable platform for achieving value addition and changing the economic models of countries either as transport nodes or as attractive platforms for industrial clusters to develop. Singapore and Malaysia are specific countries that have changed their economic models with efficient and effective ports backed by industrial enclaves known as exclusive economic zone (EEZ) or special economic zones (SEZ) and appropriate state policies. Many developing countries recognise this as a secure approach to job creation, skills development, and foreign exchange generation. The evidence of such conviction is found in powerful state actors' development plans, policies, and speeches. Further evidence can be adduced from the massive port infrastructure developments in various world regions.

Developing countries aspiring to use this development path face different challenges presently. Inadequate public funding for port infrastructure development,

rapidly changing technology and regulations in the maritime sector, and the rise of the landlord port management model means the countries must rely on well-funded transnational maritime conglomerates to build the needed port infrastructure to be competitive. The involvement of the private sector is not always a comfortable alliance, as the transnational companies have visions of creating global maritime empires that threaten the power and control of nations and their port authorities. With these dynamics coming into play, how are developing countries navigating these challenges to achieve their visions?

5.3 Materials and Methods

We use thematic media analysis to identify the socio-technical imaginaries formulated and performed in connection with the port expansion project in Tema Port. We triangulate the media content with state policies, a report from the Worldbank which sponsored port reforms in Ghana, interviews and focus groups. Thematic analysis is a method for identifying, analysing, and reporting patterns (themes) within data (Braun & Clarke, 2006) and interprets various aspects of the research topic (Boyatzis 1998). The thematic analysis involves an active process of reflexivity, where a researcher's subjective experience plays a central role in meaning-making from data. In the following section, we present the data and our analytical approach.

5.3.1 Data Collection, Organisation and Analysis

Our study aimed to understand the perspectives and actions of the various stakeholders involved in the port expansion project and identify the imagined future role of the port as a gateway and transshipment hub. To achieve this goal, we used the Factiva database to

find media coverage of the project from January 2016 to May 2021. We eliminated duplicate articles and analyzed the data using Nvivo 12.

Our first round of coding aimed to identify codes related to the future. We used in vivo and descriptive coding to capture the perspectives of prominent individuals, organizations, and groups that form the port stakeholder community. In vivo coding helped us to understand the direct stories, ideas, and meanings that research participants expressed. We focused on quotes from influential figures such as the president, ministers of state, representatives of international development partners, port authority, state border agencies, shipping lines, terminal operators, shipper associations, and other service providers that suggested the future role of the port.

After identifying the literal words used in describing the terminal, we did a second round of coding where we read through the highlighted quotes to identify patterns in meaning and derive themes. We were also interested in finding out who made the statements and what organization they represented, which was important to ascertain whose imaginary they were projecting.

We juxtaposed the data from the thematic analysis of media content with the policy documents, semi-structured interviews with a Director General of the Port Authority, and a focus group to identify how various groups differ or converge in their opinions and actions concerning the new terminal. We compared the objectives of Ghana's policy documents over the years, including the Seven-Year Development Plan, Ghana Vision 2020 plan, the Ghana Beyond Aid policy, and the Ghana Trade and Investment Gateway Project report from the sponsor -the Worldbank- which underlies Ghana's port, industrial, and trade reforms in the 90s.

To gain a deeper understanding of the dissenting voices regarding port development and its role in safeguarding national interests, we had an extensive semi-structured interview with a former Director General (DG) of the Ghana Ports and Harbours Authority, during whose tenure the construction of the new terminal began. Interviewing him was necessary because, during his tenure as DG, he had proposed a nationalistic idea of a Port Development Fund (PDF) meant to support indigenous investment in Ghana's ports.

Lastly, we sought the opinions of a variety of port stakeholders in a focus group with participants from MPS (the terminal operator), State Agencies at the port, including the shipper representative -Ghana Shippers Authority, off-dock terminals -Amaris, Maritime and Dock Workers Union, IT operators of the Ghana National Single Window, Shipping Lines, Ghana Institute of Freight Forwarders, and the Chartered Institute of Logistics and Transport.

In conclusion, our study provides a comprehensive understanding of the imagined future role of the port as a gateway and transshipment hub. We identified tensions and interpreted expectations related to the port's future role by comparing the quotes of prominent voices, policy documents, interviews, focus group discussions, and literature. Our sample included a broad range of stakeholders and themes but was small enough for qualitative analysis to reveal both manifest content and latent meaning (Reese & Shoemaker, 2016).

5.4 Results

5.4.1 Socio- technical Imaginaries of Tema Port

We first show how the state of Ghana had envisioned the port's role in its development and the emerging shared and contested imaginaries revealed through discourses of the port's future role and positioning in light of the new container terminal. In each data set, namely the policy documents, interview/focus group and media publications, we identified the STIs, the proponents of the STIs, the core elements or reason behind them and their positionality.

5.4.1.1 State Socio-technical Imaginaries and Tema Port Development

The imaginary for port development is intricately linked to the state's imaginary of industrialising Ghana. Ghana's industrialisation bid predates the African Union (AU) Commission's Agenda 2063 Ten-year Implementation Plan for Africa, which includes enjoined African states to develop an industrial policy by 2015 and implement it towards a prosperous Africa (African Union Commission 2015, 36, 54) Ghana, together with other African countries committed to having regional industrialisation hubs and export development linked to global supply chains (African Union Commission 2015). Table 9 summarises the state's vision expressed through its economic policies from independence in 1957 until 2023, with objectives clearly illustrated. We named them state STIs.

Table 9: Summary of Ghana's Policies Since Independence Related with roles for Ports

Policy	Year	Objectives
7-year Development plan	1957	The three-point aims of the policy were to <ul style="list-style-type: none"> - accelerate economic growth - embark on rapid development, and - eradicate the colonial structure of Ghana's economy.
Vision 2020	1996	To make Ghana a middle-income country by 2020. The Vision 2020 policy reiterated Nkrumah's export-led growth through FDI,

		industrialisation, and infrastructure development in a series of poverty reduction plans culminating in the
Ghana Trade and Investment Gateway Project.	1998	To attract a critical mass of export-oriented investors to Ghana to accelerate export-led growth and facilitate trade.
Ghana Beyond Aid	(2017).	A broad agenda to utilise the resources of the country efficiently

Source; Own Illustration

Dr Kwame Nkrumah's Ghana 7-Year Development Plan, which he presented to parliament in 1957, is the country's first policy on industrialisation post-independence. The three-point aims of the policy were to accelerate economic growth, embark on rapid development, and eradicate the colonial structure of Ghana's economy. Tema was the pivot location for many industries that emerged from the plan. Subsequently, Ghanaian state policies have all followed this vision of changing the colonial structure of the economy, which refers to the export of raw materials such as cocoa, timber, manganese, gold, and bauxite and industrialising. The International Monetary Fund (IMF) led neoliberal economic reforms of the 1980s ushered in a series of structural adjustment programmes that resulted in the privatisation of state-owned enterprises, many of which cease to exist today. In the 1990s, the Vision 2020 policy was launched to make Ghana a middle-income country by 2020. The Vision 2020 policy reiterated Nkrumah's export-led growth through FDI, industrialisation, and infrastructure development in a series of poverty reduction plans culminating in the Ghana Trade and Investment Gateway Project.

The working policy from 2016 was dubbed '*Ghana Beyond Aid*', a national transformation agenda based on manufacturing and high-value services (Government of Ghana 2019, 10). One of the flagship programmes under the charter is the '*One District, One Factory*' (1D1F) programme launched in August 2017 (Government of Ghana, 2017).

The programme is the government's vision to change the nature of Ghana's economy from dependency on the import of manufactured and processed goods and export of raw materials to one on which the focus is on manufacturing, value addition, and export of processed goods.

5.4.1.2 State STI envisioned in the Development of Tema Port

Tema Port and the city of Tema was the central focal point of many national policy pillars. Nkrumah had laid the foundations as Ghana's industrial hub and outlet into the world economy.

This (Port) expansion project (in Tema) takes the dream of our founding father, Dr Kwame Nkrumah, to the next level and will remain for future generations to benefit from
(Director General, Ghana Ports & Harbours Authority, 2016).

The quote above illustrates the pivotal role in the ongoing vision of industrialisation and the role of the port as a gateway. The city was to host the industries and the port as the gateway to the world. Despite the objective set in the Gateway project to transition Ghana's ports from a state-operated port to the private sector through a change of management model from service port to landlord port, the port authority varied it by opting for what they call a hybrid model for the reason illustrated in the paraphrased quote below.

Upon consideration as a public entity with a responsibility to provide a social safety net, the port authority stalled a proposed Landlord Port Bill to parliament and opted for partnerships with private operators to operate Tema's first dedicated container terminal (T2) to protect the interest of the state (Gyebi-Donkor, 2007).

We notice that despite the consistency in state policies, various governments and powerful individuals in influential positions, including politicians and port officials lean

towards the port's outlook to the international community and seek that outward recognition against performing the responsibilities of providing a social safety net. These tendencies are found in statements reported by the media to have come from presidents and ministers of state. For instance: "*The terminal will position Tema as the most important transshipment port anywhere on the west coast of Africa*" – (President Mahama, January 2017). We noted that this could mean one of three things. It could indicate a shift in focus, a marketing tool for the port or a promotion for international acclaim. We engage the literature in this discussion later.

Table 10: Summary of Socio-technical Imaginaries of Tema Espoused by State and Non-state Actors

Groups/Institutions that form STIs	Drivers of STI	Core STIs and their elements	Geography/Spatial imaginary
1: The state/national STI in Tema.	Espoused in policy documents and by state agencies, including the Ghana Ports and Harbours Authority	CORE: Tema in a nation-state trajectory – past, present, and future. Sub-themes: a) Tema as a gateway in the modern state b) Catalyst of industrialisation of the nation c) To succeed in competition with neighbouring states d) Anti-corruption as modern state performance	National – the whole nation– and the landlocked hinterland
2:Trans-National Shipping/Terminal Operators STI in Tema	Espoused by major shipping lines and terminal operators, World Bank, UNCTAD, politicians, port officials, and MPS	CORE: Tema in an international business/shipping trajectory – past, present, and future. Subthemes: a) Tema as a hub in international commodity flows b) Part of the expansion of global trade b) To succeed in competition with other businesses	Global connectivity West African hub
3: Grassroot STI in Tema	Espoused by groups whose everyday lives are connected to the developing port. Mainly labour unions.	CORE: Tema as a place of work and livelihood – past, present, and future. Subthemes a) Tema as a gateway strengthening Ghanaian enterprises and workplaces b) Tema as a place of work/identity C) Tema in transition from non-digital to digital type work	Tema as a local place rather than "national", "regional", or "global" in the STI

5.4.2 Trans-National Companies Sociotechnical Imaginaries

The imaginary of a transshipment port is seen as the way forward by prominent voices, including development partners like the World Bank, UNCTAD and MPS. As the expected drop in the cost of doing business at the port did not materialise, attention gradually shifted to the role of Tema as a game changer for transshipment (hub) services in the West African region. This narrative was pushed by the Worldbank, MPS and the shipping lines. Table 11 illustrates quotes from them.

Table 11: Illustrative quotes portraying the transshipment imaginary

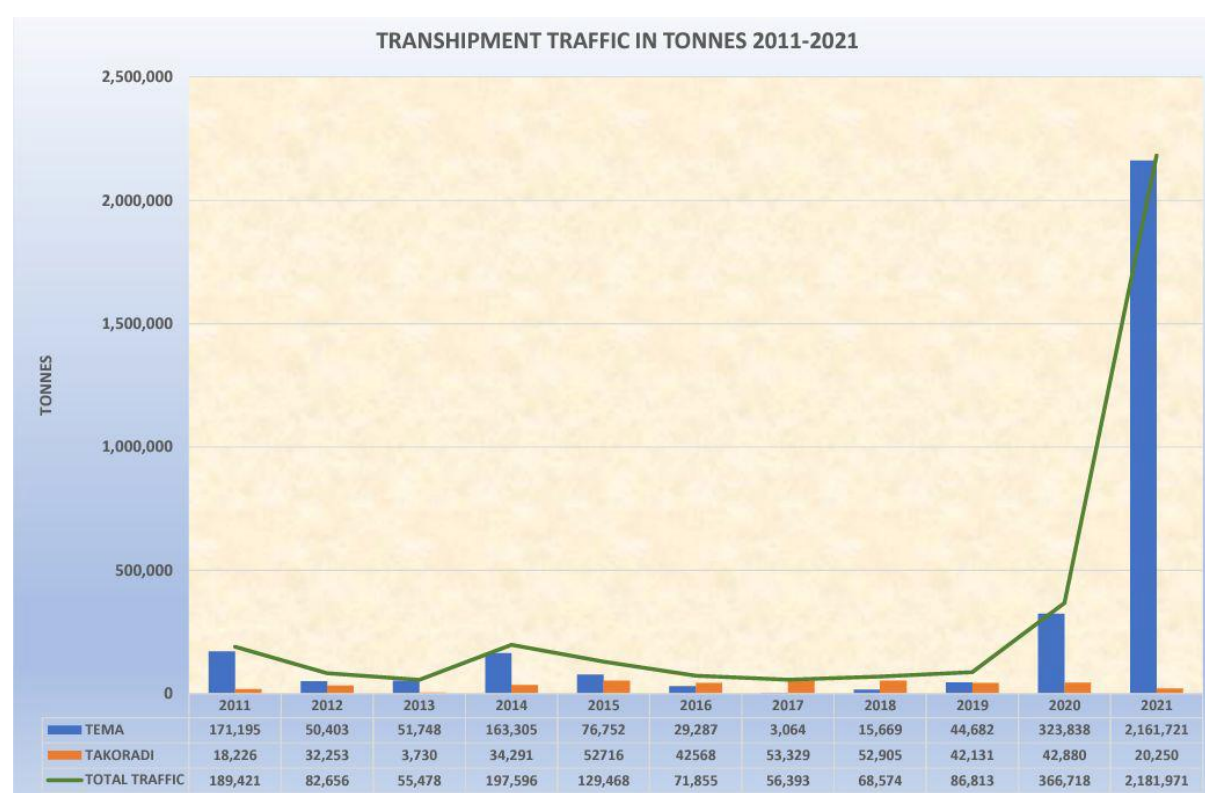
Source	Illustrative quotes
Worldbank	<i>"Ghana must look more seriously into shipment processes and procedures at the Tema Port if it is to become a hub for the West African sub-region... global best practices, as found in Singapore, showed the benefits of focusing on transshipment" (Periklis Saragiotis, World Bank, 2016)</i>
MPS	<i>Every port in this world markets itself as the hub and the centre of everything. Even if you put a piece of land in Timbuktu in the middle of the Sahara Desert you will market it as the hub and the centre of everything! But what is really interesting here on our West Coast, is that Ghana is in a position, or Tema port and our investment in particular is in a position to compete with others for their transit and transshipment traffic (Mohammed Samara, CEO, MPS, 2017).</i>
Hapag Lloyd	<i>"...the expansion in the port will definitely make shipment into Ghana and transshipment in this area much more efficient...The Tema Port could become the transshipment hub for West Africa but their operations and legal requirements need to be suitable to be able to manage transshipment" (Chief Operating Officer, Hapag Lloyd AG)</i>
MPS	<i>"We must commend the Ghana Revenue Authority for their instrumental role towards translating this long-awaited vision into reality. Since identifying the legal barriers to facilitate transshipment trade, they have advocated and worked together with us on amending the old transshipment laws to allow a much more robust and fluid transshipment process to reflect present happenings in major shipping hubs" (Head of Legal and Compliance, MPS).</i>

Source: Own illustration

The fierce competition for hub status in West Africa is a driving factor for the focus on competition. MPS projects this as a marketing tool. However, the promotion of Tema as a transshipment hub is more than a marketing ploy. MPS and the shipping lines

have impressed the government to change the Ghana Customs laws on transhipment to reflect the new focus. The Chief Operating Officer of Hapag Lloyd AG, the world's 5th largest shipping line, reiterated the call to revise the laws (see Table 2). The old laws confirm the orientation of the state towards the transhipment trade. Upon revision of the regulations, transhipment throughput at the Tema Port grew significantly (see Figure 14).

Figure 14: Transhipment Traffic in Tonnes 2011-2021



Source: Ghana Ports and Harbours Authority

Hapag Lloyd, and other shipping lines, utilise the expanded connectivity, capacity and capabilities of the MPS Terminal 3 at the Tema port to tranship the traffic between South Africa and Europe in Tema. This is a victory for MPS. In contrast, the port authority has been pursuing transit trade to the Sahel region of West Africa and promoting the port in the Sahel countries.

5.4.2.1 Grassroots STI- Port Development Fund

A hub is only desirable for the local grassroots if it is also a local and hinterland development gateway. We found that the public criticism of the T3 agreement related primarily to a concern that the expansion, based on the new agreement, places control of future trade infrastructure in foreign hands to the detriment of the national port authority and Ghana's national development. Organised labour and the port authority launched initiatives to counter these perceived adverse effects. One such initiative was setting up the *Port Development Fund (PDF)*. The purpose was to minimise the cycle of dependency and borrowing in the maritime sector and build local businesses' capacity to participate in infrastructure development in the maritime industry. The PDF would allow for more revenue internally to facilitate a process to develop multimodal connectivity between the port and the hinterlands and improve port accessibility. While this initiative was aborted, we found concrete initiatives and ideas to alleviate some perceived problems. Even though the organisation's plan for a development fund never materialised as the initiator of the idea's tenure as Director General of the Ghana Ports and Harbours Authority (GPHA) was cut short, the fundamental tension it reflected persisted. As late as 2019, 2020 and 2022, labour disputes concerning opening the new MPS terminal (T3) persisted.

5.4.2.2 Tensions points

This tension point is rooted not only in the spatial perspective of national versus regional and international outlook but also in how contracts are awarded and the agreements within the contract, which substantially benefits the foreign private entity. At the same time, the state bears the cost of the externalities that arise. Related to this is a perceived bias in favour of foreign companies during project tendering. The quote below by the former port authority DG illustrates this point.

For about 100 years, foreign advisors deceived Africans to believe that no local company had the capacity to do it. Unfortunately, we accepted this until today that the century long jinx has been broken. Now every dollar made in Takoradi remains in Ghana to improve the country's foreign exchange position. This is unlike the Tema Port MPS container terminal from where every dollar that is made, is repatriated to France and Sweden by their foreign owners to develop their countries (Ansah, 2022).

He made the statement when the first ever container terminal and dry bulk terminal built and owned by indigenous investors was inaugurated at the Takoradi port in western Ghana. The stands of the former DG and the port authority who facilitated the Takoradi terminal project emerged when the effect of the contested Terminal 3 contract was signed by his predecessor, and the previous government with MPS began to surface. The effect included diluting the port authority's shares from 30% to 15%, a potential loss of 1200 jobs and a monopoly over all container handling and storage in Tema as per the agreement signed.

5.5 Discussion

We analyzed the Tema Port expansion discourses and identified gateways and transshipment as two themes meant to facilitate social and economic development. However, they differ in terms of cost and benefits to society. Our hypothesis from the onset was that the terms "gateways" and "transshipment hubs" assume different meanings in everyday discourse around port development by different actors.

We deduced from the tensions that powerful voices impact the direction of port policy choices, and the choices made have different levels of impact on society. Abiding by the definition and characteristics of the gateway and transshipment port expounded by Rodrigue (2020b), gateway ports inherently cater to industrial enclaves and hinterlands

and rely heavily on inland transport infrastructures like roads, rail, and inland waterways. They also rely on thriving industrial enclaves backed by economic, trade and industrial policies. Hence, the gateway imaginary, as envisioned by Ghana's various state policies, meant creating more jobs and transferring technology, amongst other economic benefits, along with the value and supply chains to spur economic growth. These are the actual impacts of realising the gateway imaginary on society. The orientation towards national benefits and retention of power in state institutions makes the gateway idea appealing to state institutions.

The findings reveal a third group dominated by labour unions and trade associations besides state institutions that support the gateway notion. Their views are local and seek to protect their livelihood and environment. Despite labour unions' averseness to neoliberal policies, there appeared to be a political settlement over the gateway idea until the new container terminal contract was signed between the government and MPS.

The transshipment port idea appears enticing to the shipping companies, terminal operators, politicians and sometimes the port authority, who are the direct beneficiaries. The port authority's appearance in this list is not odd considering that they have had to skillfully balance social protection responsibilities with ensuring that the port remained competitive in the West Africa region simultaneously. Also, they have no power to provide hinterland access infrastructure and facilities such as roads, railways, and logistics platforms that the gateway port relies on. The appearance of transshipment as an emerging theme was not surprising as to who some of the supporters were.

The proliferation of 'transshipment' in the statements of politicians is a marked shift from the language used in the policy documents that form part of our data. Politicians appear to have adopted the term following active advocacy by the terminal operator (MPS)

for the Customs Division of the Ghana Revenue Authority to revise the regime on transshipment to make it an attractive proposition for shipping lines while providing statistics on how the transshipment trade is improving since the port expansion with good water depth and sophisticated facilities was done. Sometimes it is used innocently when they are actually talking about transit. The adoption of a transshipment narrative is opportunistic and follows a similar trend when the gateway term was the buzzword often used in a promotional sense than performed. The social construction of the imaginary is significant in the analysis as its literal and metaphorical meanings impact the imagination of the emblematic case, Ghana.

Gateways are openings to get in or out through a gate. In the colonisation of Africa, ports were used just for that purpose, with colonial masters as gatekeepers controlling access to revenue derived from movement and transactions going in and out of the state (Dorman 2018). A projection of gatekeeping into the future means that ports in Africa are not mere logistics platforms for trade but are the sites where power and authority exhibited by the colonial powers continue to be reenacted by state and non-state actors, raising the stakes for who gets to control the port. Metaphorically ports or port cities are the entrepôts to which goods are brought for import, export, storage and distribution. The term has been used contemporarily in policy documents and investment promotions to mean the preferred entry or exit point in or out of a country, region, or continent through large-scale transport infrastructure such as ports (including airports).

The growth of transshipment may mark the beginning of a significant shift in actions performed in support of both imaginaries. Transshipment trade can be successful in a ‘do nothing’ scenario if the government does not act on its policies. All that is required is the appropriate investment in port infrastructure and facilities, a revised customs regime, and taking advantage of Tema’s geographical position, which is relatively central compared

to its competitors in West Africa. It is an easy pick compared to the expensive, time-consuming, complex infrastructure to access the hinterland and the policies required to make a gateway imaginary succeed.

A shift towards the transshipment imaginary also has implications for social order as it deepens the negative impact of neo-liberal policies. It begins with a shift of focus of the port from national to regional and global competition and a desire to meet the needs of ‘external’ actors like the shipping lines rather than the shippers (industries, traders and individuals) in-country. While the shippers enjoy the efficiency of the new facilities and use bigger ships, our findings show that the cost of doing business at the port increased during the period. Another negative impact and point of tension were identified as the potential of job losses to about 1200 people as the new terminal monopolised the container terminal business in Tema through a disputed contract. In the absence of strong regulation and civil society in African countries (Debrie, 2012), coupled with the alleged practice of transnationals influencing political elites (Weir, 2021b), local port authorities and labour look inward to protect their interests that are intertwined with the long-standing stable state imaginary of a gateway port.

One of the tension points in the transshipment imaginary is how the social cost and benefits are distributed. Rodrigue and Notteboom (2022) note that “with the setting up of global supply and transportation chains, there has been a growing mismatch between the benefits of port activities and the scale and scope of the benefits”. The local community is pitted against regional/national/global interests because the benefits often transcend the local community and the region. Conflicts and tensions arise because local community expectations are not met, while it bears the environmental externalities. Our findings

reveal a plan launched in 2017 to set up a *Tema Development Fund* (PDF) to mitigate potential threats to the port's local economy, where the foreign interests monopolised the container handling and storage, collapsing all other inland container terminals and related businesses. The core idea of the PDF was that ports are strategic assets that fulfil a socio-economic function besides fulfilling market requirements and becoming competitive and profitable (van Niekerk, 2005).

The PDF idea operated within the neo-liberal framework of the gateway port where private sector involvement in port operations is encouraged with institutions, power and rents having been settled on for decades, but this plan advocated support for the indigenous private sector to retain more of the benefits in-country and change the power dynamics. The port authority, led by its Director General at the time, sought to balance or correct what the DG termed as a bias in favour of foreign companies in the tender process by transnational transaction advisors who manage it. As Debie (2012, 8-9) will allude to, support for the PDF idea is further grounded in the fact that it is more challenging to observe the impact of private investment on development in West Africa than elsewhere. Because the international operators seek to dissociate the functions internal to the maritime network from the functions related to the local spaces in which they operate. Evidence from Kothuis and Slinger's (2018) study of Tema Port confirms the disconnect between these port enclaves and the surrounding community. PDF was a radical nationalist alternative imaginary nested in a stabilised neoliberal framework. Therefore, despite the lack of infrastructure and abysmal policy implementation of the gateway imaginary, the port authority played its social protection role by balancing the interest of foreign transnational companies and politicians who sway now and then.

Finally, we address the overlaps or what may seem to be contradictions in the state STI where some powerful voices adopt the buzzword of transshipment against the policy

direction. One plausible explanation would be that offered by (Giraud & Grugel, 2022)-developing countries' governments are often 'locked into development choices that are environmentally unsustainable and that reproduce inequalities. We note examples from Ghana's cocoa sector where local policies to process more of the cocoa beans rather than exporting them raw are overruled by external pressure and Global fame and acclaim to the detriment of local ambitions. The early 2000s saw a policy for increased cocoa production to pursue the number one spot (Chalfin, 2010, p. 576). The effort to claim the number one spot from the Ivory Coast contradicted the imaginaries of Ghanaians and the government policies for industrialising cocoa processing before export to gain a larger share of the 100 billion-a-year industry (Africanews, n.d.). Exporting raw or semi-processed cocoa beans leaves Ghana and Ivory Coast with little market value share. The contradiction in imaginaries can also be described as forced or imposed imaginaries from external forces.

5.6 Conclusions

We have highlighted how the inherent meanings, focus and positionality of ports acting as gateways or transshipment hubs impact long-standing socio-technical imaginaries of a state's development path and power dynamics. The article explained how the state's imaginary of an export-led economy backed by a gateway port has gradually accommodated the idea of a transshipment port with critical implications for society, creating tensions. We have shown that STIs have real-world effects within the development, governance, operational and social spheres. Hence, the STIs should not be ignored but be studied carefully because convergence and divergence among the powerful public voices within the public-private partnerships formulate the desired futures of the port and state development.

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Appendices

Appendix 1: Focus Group Participants

Ghana Shippers Authority
Ghana Maritime Authority
Maritime & Dockworkers Union
Meridian Port Services
Amaris Terminal
Chartered Institute of Transport and Logistics
Westblue Consulting
Ghana Institute of Freight Forwarders

Appendix 2: List of Participants for Stakeholder Workshop (March 2019)

Ghana Shippers Authority
Ghana Standard Authority
Maritime & Dockworkers Union
Westblue Consulting
GCNet Ltd
Meridian Port Services
Amaris Terminal
Tacotel
Chartered Institute of Transport & Logistics (Ghana)
Ghana Institute of Freight Forwarders
Ghana Maritime Authority
Regional Maritime University
Maersk/APM Terminals
Mediterranean Shipping Company (Ghana)
Institute of Chartered Shipbrokers

Appendix 3: Number of Newspaper Publications on Tema Port from 1969 to May, 2019 from the LexisUni Database

Period/Year	Total no. of Reports	Outlets	No of Articles
1969 – 1979	0		
1980 – 1989	3	<i>Journal of Commerce</i> <i>New York Times</i>	2 1
1990-1999	5	<i>The Journal of Commerce</i> <i>New Straight Times of Malaysia</i>	4 1
2000- 2009	18	BBC <i>The Korea Herald</i> <i>Evening Chronicle (Newcastle, uk)</i> <i>National Post (Canada)</i> <i>Evening Standard (London)</i>	13 1 2 1 1
2010 – 2019	379	(Break down below- year by year from Jan to May)	
2010	13	Ghanaian Chronicles Daily Independent (Lagos) BBC Monitoring Africa Accra Mail Vanguard (Lagos) Daily Champion(Lagos)	2 4 1 3 2 1
2011	28	Ghanaian Chronicle BBC monitoring Africa The Nation (Nairobi) The Herald (Zimbabwe) Daily Independence (Lagos)	21 3 1 1 2
2012	35	Ghanaian Chronicles Leadership (Abuja) BBC Monitoring Africa Accra Mail Daily Trust (Abuja) China Daily European Edition 8 (Mostly on the Argentina Military Ship Libertad's arrest) The New York Times (Also on Argentine Ship's arrest) The New Times (Kigali) Argus Weekend (South Africa) (Argentine Ship) The Guardian (London) The Observer (London)	12 2 4 1 2 1 1 1 2 2
2013	27	Ghanaian Chronicle This Day (Lagos) The Sun (Nigeria) Leadership (Abuja)	19 4 1 1
2014	28	Ghanaian Chronicle Sub sahara Africa Today Daily Trust (Abuja)	13 1 1

		BBC Monitoring Africa	3
		IBNS	2
		This Day	1
		Daily Independence	2
		The Mercury (South Africa)	1
		Cape Times (South Africa)	1
		Jefferson Law Book Company Journal of	1
		Maritime Law & Commerce (Journal Article	2
		in Maritime Security)	
2015	33	Ghanaian Chronicle	20
		Progressive Media	1
		US Official News	1
		This Day	2
		Business & Financial Times 2	2
2016	65	Business & Financial Times	41
		Ghanaian Chronicle	11
		The Herald (Ghana)	5
		This Day (Lagos)	1
		Daily Trust (Abuja)	1
		The Sun (Nigeria)	1
		Tender for new bridge on eastern corridor road	
		Washington Official News	1
		Tender Eastern Railway line rebuilding	1
		Progressive media	1
2017	76	Business & Financial Times	51
		The Herald	18
		Ghanaian Chronicle	5
		Tender for Tema Port Expansion	1
		DefenceWeb (Piracy)	1
2018	42	Business & Financial Times	21
		The Herald	7
		European Union News	1
		Tender Port Expansion	1
		Tender LNG Terminal Tema Port	1
		The Will (Nigeria)	1
		DefenceWeb (China Navy visits Cape Coast)	1
		China Daily	2
		China Daily European Edition	1
		Tenders Burkina Rail Line	
		Standard.co.uk	1
		Daily Independence (Nigeria)	1
Up to May 2019	27	Business & Financial Times 12	12
		The Herald 5	5
		GlobalData 4	4
		This Day (Nigeria) 1	1
		PBC limited 1	1
		Stitch World 1	1
		Tenders eastern railway	2

Appendix 4: GCNet Integration3: GCNet Integration

