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LINKING PORT PERFORMANCE AND POST-DEVOLUTION PORT GOVERNANCE MODELS

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Abstract

The aim of this paper is to develop a conceptual framework that integrates various relevant port performance components in a way that can be used for a comprehensive port evaluation and adjustment of the existing port governance models. The paper provides the outcome of a synthesis of the literature on port governance models and port performance, arguing that within the process of change, the latter contributes substantially to the realignment and, possibly eventually, the reform of the former. In so doing, the paper addresses the potential for decomposing performance into two different, although related, port 'performances', namely efficiency and effectiveness. Bringing into the analysis concepts like the need to integrate users' satisfaction in port performance assessment, the paper explores the content of each of these performance components and their interface. This discussion, along with some empirical evidence, leads to the conclusion that governance decisions, both at firm and government levels, are largely based on a partial assessment of port performance. The effectiveness of port reform is largely neglected, with user perspectives not being an integral part of an effort to improve performance by the port or as feedback to assess the effectiveness of the governance model imposed by the government's port policy.

Keywords: Port, governance, port performance, efficiency, effectiveness, reform

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1. INTRODUCTION

The recent worldwide trend towards port devolution has generated research interest in studying port governance models and their implications for port performance. In this context, Baltazar and Brooks (2001) proposed a generic environment-strategy-structure configuration, and they concluded that the discussion of port performance needed to be considered as a product of these inputs. Inspired by this concept, a number of scholars formed the Port Performance Research Network (PPRN) to engage in worldwide research, the ultimate goal of which was to understand whether many of the sector's problems in the post-devolution period can be attributed to mismatched (or inappropriate) configurations. The qualitative and quantitative research that was conducted (Brooks and Cullinane, 2007a) provides evidence of a much greater range of existing/potential port governance typologies than had been contemplated by previous authors (Baird, 2000; World Bank, n.d.). Moreover, the research about performance outcomes that these inputs (port governance models) produced remains inconclusive. None of the 14 national port reform programs examined¹ stands as an unqualified success, while a comprehensive performance assessment of these reforms remains to be completed.

Building on this earlier research by the PPRN, the key objective of this paper is to identify potential methods for delineating the relationship between this expanded range of port governance typologies and port performance. The aim is to advance the development of a conceptual framework that integrates various relevant port performance components in a way that can be used for a comprehensive port evaluation and adjustment of the existing governance models. The paper will focus on (a) the relevant variables to be used as performance measures depending on the model in place and (b) the agencies (stakeholders, authorities, governmental and non-governmental third parties or even port users) that might be the collectors and/or source of this information.

To achieve these aims, the paper provides the outcome of a synthesis of the literature on (a) port governance models and (b) industrial and port performance, arguing that within the process of change, the latter contributes substantially to the realignment and, possibly eventually, the reform of the former. In so doing, the paper addresses the potential for decomposing port performance into two different, although related, components, namely efficiency and effectiveness. Bringing into the analysis concepts like the need to integrate users' satisfaction in port performance assessment, the paper explores the content of each of these performance components and their interface.

A major theme is the fact that the considerable number of studies dealing with port performance focus primarily on the efficiency part of port performance. This is also the case with the performance data collected by ports. This study provides some empirical indications of how the link between governance and performance is currently approached by port authorities (PAs). A data-set of questionnaire responses by 12 port authorities in five countries suggest that port authorities' stakeholders remain focused on some

¹ These are Argentina, Australia, Belgium, Canada, Greece, Italy, Korea, The Netherlands, Singapore, Turkey, United Kingdom, the United States, Uruguay, and Hong Kong and China.

elements of performance, without this focus matching (or referring to) the demands of the governance model in place.

Governance decisions, both at firm and government levels, are largely based on a partial assessment of port performance. The effectiveness of port reform is largely neglected. In port studies, there are a flourishing number of quality studies that endorse a user (buyer of services) approach and study port selection (Lirn *et al*, 2003; 2004; Park and De, 2004; de Langen, 2007) or port attractiveness (Ng, 2006). The argument that is put forward is that there is still a flaw: user perspectives are approached ‘passively’ (in other words, as a variable determining the choices) rather than as an integral part of an effort to improve performance by the port or as feedback to assess the effectiveness of the governance model imposed by the government’s port policy. The latter two are still, for the most part, missing in the port literature.

2. THE INPUT: GOVERNANCE

In recent decades, extensive port reforms have challenged the conventional models of port organisation (Bichou and Gray, 2005). A number of governments in both developed and developing countries (cf. Juhel 2001; Cullinane and Song, 2002; 2007; Brooks and Cullinane, 2007a) adopted alternative service delivery models and devolved port operational responsibility and sometimes port assets to local public (decentralized) entities or to private and/or commercially driven port entities. Some of these port entities are now listed on international stock markets. In several cases, the public sector retains only a supervisory and monitoring role; in others like the UK, there is no national port monitoring agency.

Aiming to address these institutional changes, scholars redirected discussions on port models from ownership towards governance approaches (Baltazar and Brooks, 2001; Notteboom and Winkelmanns, 2001, 2002; Wang and Slack, 2002; Wang *et al*, 2004). Brooks and Cullinane (2007b) provide evidence of a full spectrum of models that range from fully public to fully privately managed port activities. The survey of 42 ports produced 34 different combinations of governance along the private-public continuum with four ports being the only ones operating under a fully public model, and only one port being fully private. Contrary to what would have been anticipated, even the UK ports present an array of “mixed” governance models in the structuring of port activities.

Notteboom and Winkelmanns (2002) include in the notion of governance the management of stakeholders’ relations (internal, external, public policy, and community). Concentrating on the logistics integration in ports, as well as on the importance of inland freight distribution, Notteboom and Rodrigue (2005) argue that the hinterland ‘regionalization’ of the sector demands new approaches to port governance. De Langen (2002) suggests that an analysis of the mix of stakeholder management approaches in a port cluster would add to the understanding of port competition and performance. This is because the levels and the scope of coordination beyond price, in short the quality of governance, differs between clusters. Opportunistic behaviours might limit trust and the presence of an infrastructure for solving problems of collective action (Olson 1971). Wang and Slack (2002) suggest that a broader concept drawing from the social sciences that would allow for greater weight of social and cultural variables. Their notion of port governance includes three axes, namely spatial-jurisdictional scales, stakeholder

community, and logistical capabilities. All these are suggestions for a cluster governance approach that is about port communities' governance.

In a different vein, Baltazar and Brooks (2001; 2007) endorse a corporate governance approach to analyse port governance. This concept draws on three streams of research—namely strategic management, organisation theory, and configuration theory, and is based on the OECD (1999) definition of corporate governance. The approach focuses on the (inter)actions of the two 'core' governing institutions in developing a port governance model. These are the responsible government department (ministry or other relevant policy-actors), and the port authorities that are in essence the 'firms' governing a port. The authors put forward the notion that the port governance model is defined by the configuration of three inputs: (a) the *structure*, which is implemented as a result of government regulation and policies and the strategy chosen by the PA; (b) the *strategy* (in other words, the objectives, the decisions about its product-market scope, and the plan for effecting these) of the port, as developed by the PA; and (c) the *environment* in which a port operates represent. These inputs produce an output (*performance*), the quality of which results from the consistency or fit of the inputs when taken together. One of the configurations with 'fit' is marked by an environment of low uncertainty, low complexity and dynamism, an efficiency-oriented strategy that focuses on delivery of the basic services, and a mechanistic structure of centralised decision-making characterised by procedural standardisation; to determine if this port is successful in optimizing its performance, the performance must be measured against its efficiency-seeking objective. A second configuration with 'fit' is marked by a highly uncertain environment, an effectiveness-oriented strategy offering peripheral products and services, and an organic structure of decentralised decision-making; this configuration's success is determined by measuring effectiveness. Port performance is, therefore, the 'output' of any, fitting or not, governance configuration. That is, for those ports with dual objectives imposed by government, they will find it difficult to optimise performance and will be forced to choose measures from both fields.

Case studies of port devolution programmes (Hoffmann 2001; Brooks and Cullinane, 2007a) advocate that there are several inconsistencies between the characteristics and requirements of the environment on the one side, and the strategy and structures on the other. The overwhelming conclusion that is reached is a simple one: the combination of the inputs does not always result in fit. The second conclusion is based on the evaluation of specific performance indicators. While governments may have had the best of intentions in establishing a more commercialised footing for port operations, the program of reform has not always delivered the full benefits sought.

There are two questions to be answered. How can this situation be corrected? There is a need to detail the links between the models (input) and its performance (output). Having a good theoretical knowledge of the former, there is scope to detail the latter. It is also important to know whether ports are aware of the produced deficiencies (i.e., do they measure the total of the performance components or part only) and whether (and how) they really use the collected performance components in a comprehensive way, for example to realign the components of the governance model in practice.

3. THE OBJECTIVE: LINKING ‘INPUTS’ AND ‘OUTPUTS’ OF PORT GOVERNANCE

The output of this governance configuration is the performance of the port, with performance deficiencies being the by-products of inconsistent governance frameworks, that is, mismatches between the characteristics and requirements of the environment, the strategy, and the structures in place. This might be the case because of flows of the designed governance framework, or because frameworks appropriate to a particular government’s objectives have not been imposed as anticipated. It is important, therefore, that governments know how the models have failed to deliver a well-performing port reform program (if indeed that is the conclusion drawn in a particular country or port system). A prerequisite is to detail the exact components of this performance, the agents to measure these components, and, depending on the strategic intent of the port, the choice of the performance components to be prioritised.

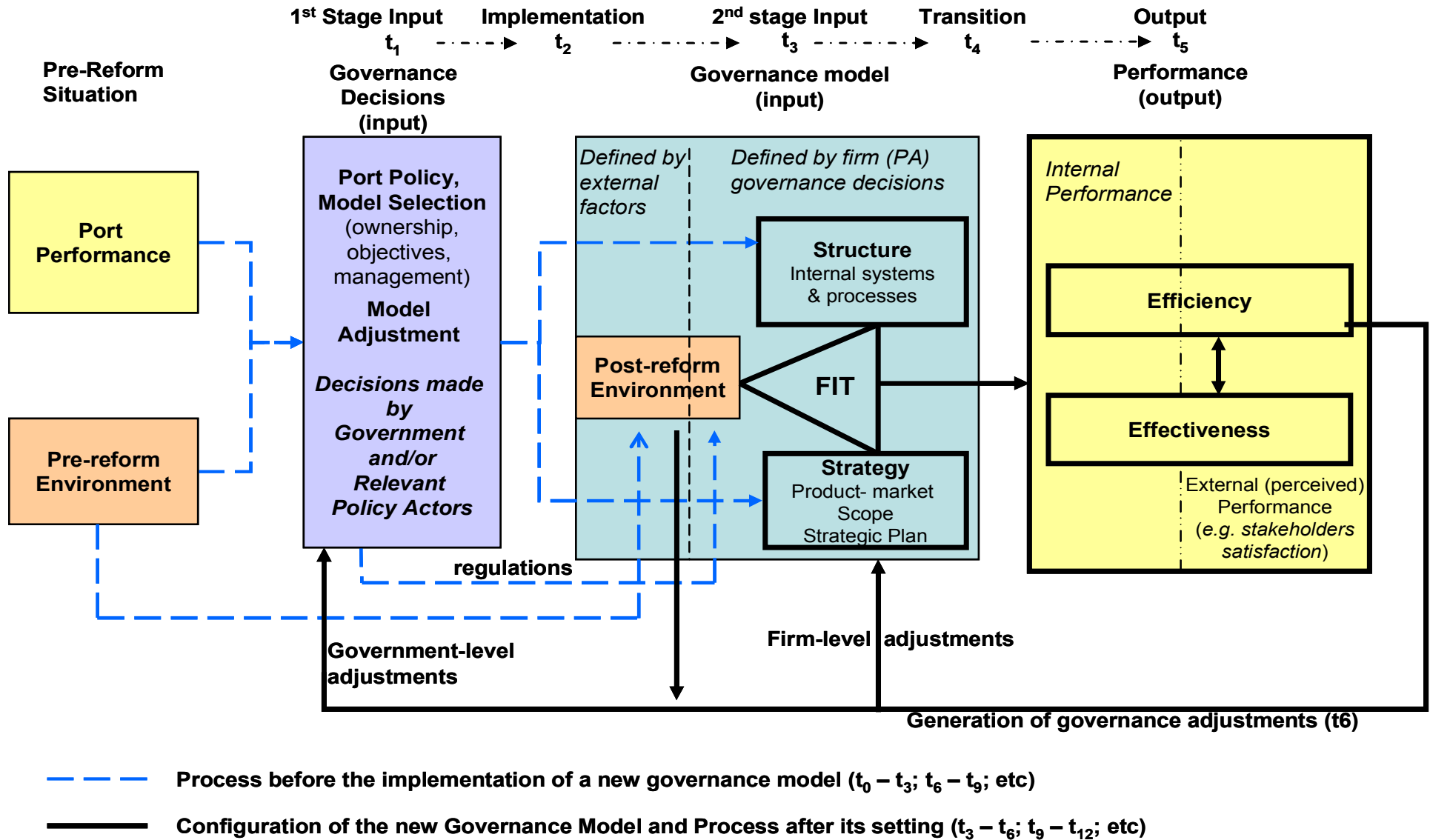
1.1 3.1 The Process

Figure 1 provides a feedback loop through evaluation of performance to the contemplation of opportunities for additional port reform. Within a process that unfolds over time each output (performance), along with the contextual environment, provides the background for the initiation of governance adjustments aiming to tune, or comprehensively reform, the specifics of the governance model in place.

Motivated by the conditions of a port, as well as the environment in which this port operates, government agencies and/or other relevant policy actors decide to initiate change at (t_1). These decisions are made in the light of a specific environment at that time, with decision-makers, whether port authorities or government, having a vision of what they would like to see as port performance output.

These governance decisions, which might or might not be associated with PA choices, generate a process wherein PAs act at a certain period (t_2) in order to impose the structures (systems and processes) and develop the objectives of a specific governance model. Implementation means a number of choices regarding these structures and the strategy of the ports that require time for introduction and implementation. Delmas and Tokat (2005) note that policy-makers in deregulation decisions often underestimate the time required, and that the transition period may last more than 10 years (citing Dyer and Larsen, 2001: 1153). Even when the governance model is established (t_3), fully operational estimations of its output are not instantly possible. Change demands both a cultural and operational adjustment by all those involved in the development and management of port services/activities, and perhaps respective adjustments by other stakeholders. Given that most port reform programs also include deregulation efforts, Brooks and Cullinane (2007c: 634) conclude that “the period of transition for the world’s port industry is likely not yet over, as many have entered their new governance environment within the past decade.” It is clear, however, that all these changes are accompanied by lengthy, transition times (t_4).

Figure 1. Linking Governance and Performance



Only after this transition period, it is possible to accurately understand how the selected (or the resulting) model performs. Performance assessments should take this into account and allow for the essential time lag between the initiation of a governance change and the measurement of the outcome of this change. Measuring the performance (output) at (t_5) and informed by changes in the economic environment (defined partially by previous governance decisions that reform objectives and regulatory frameworks, and partially by exogenous variables), PAs and applicable government agencies and/or other relevant actors can reach decisions for adjusting previous governance choices (at t_2) and processes (t_6): Governance modifications will then continue to result in performance changes and vice-versa. Linking to performance and port devolution will complete the picture the performance–governance debate and map a future research agenda to assist government and port authorities in determining future alignments to achieve the desired outcome.

Of course, in order to complete the process, PAs and other relevant actors need to establish the essential monitoring practices. To give an example, port reforms are a recent phenomenon, generated by exogenous factors (changing economic environment) and endogenous changes (new transportation methods; new technologies; and outdated models of governance) that informed policy change. According to the conceptualization by van Patot (1973/4, as rendered by van Gent & Kuyvenhoven, 1980) of the making of transport policies, the existing economic situation in the sector forms the basis for the actions of authorities, and thus the framework within which policy makers must take their decisions. That is, they judge the present situation and indicate the situation to be expected in the future. Following their principles, they then target a desired outcome and apply those means within their powers and competencies to change the situation. Implementing this rational approach implies that it would have been useful for port authorities or any other governing body to have measured the situation prior to t_1 (i.e., pre-reform time) but, as illustrated by the cases in Brooks and Cullinane (2007a), this did not happen. In fact, it appears that the absence of a complete performance measurement link continues through to the post-reform era, making it not only difficult to judge the post-reform of any particular port but also the performance of the entire devolution program a government might have taken across its ports of national strategic importance.

4. THE OUTPUT: PERFORMANCE

1.1.1 4.1 Efficiency

Thirty years ago, the seminal UNCTAD monograph on port performance indicators included berth occupancy, revenue per ton of cargo, capital equipment expenditure per ton of cargo, turn-around time and number of gangs employed (UNCTAD, 1976). Following this path, a number of past studies attempted to capture the performance of port activities focusing mainly on operational efficiency and proposed the implementation of an operating index (i.e. Hoffmann, 1985; Thomas, 1985; Tongzon, 1995). In recent years, scholars have increasingly used Data Envelopment Analysis (DEA) to analyse port production (for a most recent comprehensive review of these studies: Cullinane and Wang, 2007). Such efficiency indicators are important, since terminals stand as the most essential port function in transport chains.

Efficiency performance measures relate to the physical quantities of items, levels of effort expended, scale or scope of activities, and the efficiency in converting resources into some kind of product (or service). The most common outcome measures relate, in private

corporations, mostly to the financial viability of the firm (e.g., profit extracted from the revenue from operations). To extract the greatest financial return, efficiency-oriented companies focus on measures of asset utilization. The purpose of improved operations is to expand the gross margin extracted. Measurements of performance for efficiency-focused ports tend to benchmark financial, system-wide, and production and marketing activities against prior year performance and against competitor performance in order to deliver efficiency objectives. However, scale development for efficiency measures is well advanced and there is little contribution to new knowledge for those interested in performance measurement from the scale development perspective.

It is important to note, however, that improving efficiency does not necessarily lead to improved competitiveness (Ng, 2006) or to fully understanding user behaviour. Port performance, therefore, must be viewed from more than an efficiency perspective.

1.2 4.2 Effectiveness

Efficiency and effectiveness are related concepts. If a terminal operator wishes to improve its cargo-handling efficiency so as to improve berth utilization through faster vessel turnaround, it may also improve its effectiveness as vessel time at berth drops and the customer may be more satisfied. However, if terminal operator improves its asset utilization by leaving more vessels at anchor so as to minimize downtime, its utilization is improved but the customer's service expectations may not have been met. In this case efficiency has come at the expense of effectiveness. Various stakeholders may have different performance objectives in this illustration. Effectiveness is related to the objectives of those seeking it.

Effectiveness-oriented PAs tend to be more customer-focused. Effectiveness measures relate to how well the firm or agency uses its strategies, structures, and task environment to meet its mission and stated goals. If one of the goals is profit-maximizing in an effectiveness-oriented PA, there will be a companion goal of developing and retaining those customers who generate the greatest margins, while "firing" those who are not profitable. There is no interest within the effectiveness-oriented PA of serving unprofitable customers unless it is part of the PA's government-imposed mandate (in which case the PA will seek a subsidy to offset its losses). There is, however, the stakeholder view that if you take care of the customer, your employees, and stakeholders, the shareholders will be taken care of over the long-term because profitability will accrue to solutions-driven customer-focused organisations. For ports, effectiveness-oriented performance is related to the quality of services provided to transportation users. Quality-of-service measures are extremely important because they represent the "bottom line" for the customers. The efficiency perspective is important because it can be used to improve operations, but it is only secondary. User satisfaction is one of the critical performance indicators that must be measured in an effectiveness-focused organization (Brooks, 2007).

Searching for a long-term strategy, the European Commission since 1997 has put the improvement of port efficiency as the major goal of the EU port policy (see: Chlomoudis and Pallis, 2002), but they have failed to address issues that may improve both efficiency and effectiveness, such as documentation simplification, harmonised customs procedures, and the like that would enhance users' satisfaction. In the absence of customer-focused improvements, and despite the fact that some of the North European ports are among the

most productive ports worldwide (i.e. in terms of TEU per quay length, and TEU per terminal area)², the use of short-sea shipping at the expense of other transport modes has been a policy target that has yet to be fully accomplished. In the absence of a performance monitoring system at “firm” (PA) level, and with such problems yet to be addressed, the European Commission recently suggested more central planning of port developments, in order to address issues like spatial and ‘green’ port development as well as providing a mechanism for introducing port users’ perception of European ports performance to decision making. It seems that the problem is the one-sided initiatives at the supranational (EU) level in conjunction with ‘passive landlord’ PA governance models and financial efficiency-oriented operations by terminal operators. In addition, an efficiency focus in government policy is not the path to delivery of social public benefits. Once objectives are set, such as those seeking reduced air pollution or reduced congestion or greater local employment, the effectiveness of meeting those objectives can be measured through assessment of user (or stakeholder) satisfaction.

Many studies present measures of effectiveness—they are often found in the lists of criteria—but then fail to examine them fully. The problem is that, while efficiency may be absolute and therefore measurable using a method like DEA (already discussed) or SFA (stochastic frontier analysis), effectiveness is measured relative to the objectives being sought. For example, Ng (2006), in his study assessing attractiveness in the North European container transshipment market, identifies 21 different factors ranging from (perceived) service quality to legislation and pure monetary costs. He emphasises the highly divided theme of ‘what factors’ or ‘package of factors’ to be included in performance assessment in order to capture the relationship between improved service quality and altered port competitiveness. The study confirms significant divergences in users’ opinions on different factors. This is because it does not capture the objectives of the users or those of the port.

1.3 4.3 Merits of Thinking of Performance Components

The addition of performance indicators, other than simply operational ones, is a key suggestion in recent port research (Heaver, 2006; Brooks, 2007; Talley, 2007). Bichou (2007) notes that performance is a broad concept that covers almost any objective of operational management and competitive excellence of a firm and its activities. Depicting the taxonomy of the performance measurement dimensions, he suggests that efficiency and utilisation dimensions interact with quality and effectiveness. He also points out that little has emerged on linking and integrating operations design and strategy within the multi-institutional and cross-functional port sector. For the scholar, it is not irrelevant that any such attempts face methodological difficulties such as (a) multi-firm dimensions (b) cross-functional dimensions and (c) inter-disciplinary dimensions involved in understanding port activities.

Based on the complexity of the contemporary port product, de Langen *et al* (2006) suggest that port authorities should apply a multifaceted examination of different port performances grounded on the distinction between cargo transfer, port logistics and port

² Major (North) European berth productivity is significantly higher than in major US ports. In 2003 the differential was placed at 23 per cent. The difference with major Japanese port was even more significant at around 88 per cent. Major European ports were lagging only in comparing to major Asian ports in respect of average berth utilization (OSC, 2005).

manufacturing product³ and the development of several respective performance indicators; this is not least because the users of these products and the respective selection criteria differ substantially. Several authors propose the Balanced Scorecard approach (Kaplan and Norton, 1996) as a means of comprehensively evaluating various port performances; this approach proposes four dimensions of performance: finance, customer, internal business process, learning and growth perspectives, and considers the interests of management, customers, employees, and equity owners at the same time. It is clear that there is interest in moving beyond efficiency to the broader perspective of performance in supply chains.

The next stage is to tailor performance measurement and communication of performance measures to specific objectives (efficiency-oriented, effectiveness-oriented, or those that attempt to balance the two). Port shareholders desire that return on their investment be optimized, but may be willing to see that investment over a longer period of time. A port also may desire to respond to stakeholders that are associated with a specific port complex. As a result, not all of the components might be of importance for all stakeholders. The latter have diverse objectives and targets, ranging from securing public interests to profit making (de Langen, 2004). Grounding on these objectives, they develop different expectations and conceptions of what should be considered as port *performance*. Researchers then need to focus on the linkage between expectations and performance, that is satisfaction.

In conclusion, Figure 1 leads to the need to begin the process of evaluating port performance by understanding the objectives of both the government's port reform process and the objectives of the Port Authority's configuration. Linking outcomes to objectives enables the feedback mechanism to work for the next cycle of review. If the government believes its objectives have been met, the port is pleased with its performance and stakeholders are satisfied with the outcome, there will be little tension over the port's performance and little impetus to make any changes. If, on the other hand, any of the parties are dissatisfied with port performance outcomes, e.g. their objectives have not been met, there will be a groundswell of interest in making changes to government policy, the imposed port governance model, the way that the PA configures itself in response to the imposed model (and accompanying regulation), or the management team. There will be a temptation to engage in political interference if government is not pleased with performance, to engage in lobbying government if stakeholders are not pleased, or for customers or employees to 'exit' if the situation becomes unacceptable. The total of the efficiency performance and the effectiveness performance must be linked and tied to the objective of informing future port governance decisions.

1.4 4.4. A Process for Evaluating Effectiveness

1.4.1 Step 1: Define customer (buyer/user/stakeholder).

In most studies, scholars consider the carrier as the port's primary customer (the buyer). However, in cases where a port is specified in the transport contract or the goods' contract of sale, the manufacturer or the freight forwarder (including 3PLs or 4PLs) or the consignee are also buyers depending on who has responsibility for making that purchase

³ The port manufacturing product consists of the provision of space and conditions for investments in manufacturing facilities. The most important users of this product are (multinational) companies that invest in manufacturing plants in the port area (i.e., petro-chemical activities). Examples of ports with such activities include Houston, Antwerp and Marseilles (de Langen *et al*, 2006).

choice. As a second group, there are those that are actively involved in the supply chain by providing port-related activities in wider geographical locations (i.e. operators of intermodal distribution centres, providers of port-related value-added services or value added logistics). Given the incursion of ocean carriers into land-based logistics activities, the role of the carrier in port selection may be even stronger than previously considered. Thus, their perceptions are also of considerable significance, given the emerging geographical and functional integration of ports in wider supply chains and logistics pathways (Notteboom and Rodrigue, 2005) and the transformation of ports to elements embedded in value-driven multifaceted chains (Paixao and Marlow, 2003; Robinson, 2003), which compete for attracting users located in overlapping hinterlands. In a recent study, de Langen (2007) proposes the idea of measuring the preferences of the ‘hinterland’ decider of port selection. This second group is considered by some port authorities as included in the category of customers (although they may not be buyers and pay for the services provided) but more frequently are considered stakeholders, parties with an interest in the activities of ports. This implies an understanding of the different subcategories of users and actors involved in deciding which port or even mode to use for completing a transportation process. Problematically, many scholars include academic ‘experts’ as arbiters of what is to be chosen when they have no role other than that of interested observer.

1.4.2 Step 2: Identify the attributes (decision criteria) of importance to the user/buyer.

Lirn *et al* (2004: Table 1) identify 47 criteria they group into four, using Delphi techniques to reduce the 47 to a manageable number of 12.⁴ A variation is that the attributes may be ‘weighted’ by the user; Lirn *et al* do this. A weighted set of attributes can yield a composite scale reflecting the specific attributes desired by a particular user sub-group. Ng (2006: 237) correctly notes that “[D]ifferent scholars try to interpret the issue based on self-beliefs on what exactly port attractiveness is about and thus causing confusion.” It is the contention of Brooks (1983) and supported by Lirn *et al* (2004) that importance is an insufficient condition to explain choice. It is merely a beginning. Unfortunately, many scholars conclude their research at this point.

Furthermore, the attributes of importance cannot be useful when statically evaluated at a certain point of time. Port performance is related with the changing perceptions and levels of satisfaction that these attributes are associated with, before and following the use of a port by a buyer/user. A dynamic evaluation of these attributes (i.e. pre- and post-use evaluation) might allow the port to develop a better understanding of the changing perceptions of the users as a result of this use.

1.4.3 Step 3: Supplier (port) evaluation of own performance on the attributes (decision-criteria).

This evaluation may be in terms of quantifiable product benefit attributes or service delivery attributes. What is service quality and how do is it measured? Do ports measure service quality? Brooks and Cullinane (2007b) indicate that very little measurement of service quality is undertaken, and few ports in the 42 sampled added service quality indicators to the listed performance measures. The additional empirical evidence provided in Section 5 of this paper supports this conclusion.

Notably, these two exercises have a reference to ports above a 2 million tonnes per year traffic threshold and 40% international traffic, while both the port literature (cf. Pallis *et*

⁴ With hindsight, it might have been more appropriate to use a group of users rather than “experts,” as the resulting grouping may have been too small. Part of the problem is that, in the face of complexity, researchers are too quick to try to aggregate the detail.

al 2007) and port reports have a ‘container focus’. The latter is indicative of the dearth of performance measurement in other port markets, apart from counting numbers of tonnes, passengers, or vessels transiting/calling a port. For instance, we know very little about who measures performance of passenger terminals and how, or other information regarding suppliers/users interaction; one exception is the recent Pantouvakis (2006) study of passengers perception of quality. The focus of scholars on container terminals suggests there is a gap to be filled both in theoretical and practical terms.

There are two uses for this data: 1) Performance is measured against the importance to buyer so that performance gaps can be identified for repair that will improve operational performance. 2) Performance is measured against the performance of other ports so that performance gaps can be identified in developing a port’s strategic response. Lirn *et al* (2006) collect this for six container ports on a five–point Likert scale. It is most credible if this evaluation is undertaken by a third party, either contracted or scholarly.⁵

1.4.4 Step 4: Buyer/user evaluation of the particular port’s performance

Ng (2006) attempts to conduct a similar approach to assessing performance in light of relevant attributes. While the terminology is different, he evaluates first those factors of significance to the port choice decision. Eschewing the established marketing literature terminology of “importance” scores, he establishes a set of criteria scores for their significance to the decision as seen by the buyers. He then asks users to rate each of the six ports in the LeHavre–Hamburg range in North Europe on these dimensions. In essence, he combines importance and performance for six ports, as did Lirn *et al* (2004), but with a completely different set of scales. He does not adopt the recognised Aaker and Day model, supported by Lirn *et al* (2004), Brooks (1983) or Mangan (2000), that noted that, at minimum, the decision is a function of importance and performance, and, at best, more. The six variables scoring more than 4.0 are: accessibility of the port (4.47), time efficiency (4.42), cases of delay in loading/unloading containers (4.42), cost (terminal handling charge and port dues) (4.26), speed in responding to a liner’s new demands (4.05), and geographical location (4.00).⁶ It would have been useful to examine the performance of these ports on the top ranking significance scores.

Lirn *et al* (2004) also collect performance ratings from a user perspective, and thus are able to do pairwise comparison of importance–performance, concluding that this would reveal preference determinants. As Brooks (1985) notes, this only reveals the potential set of determinants, as a determinant attribute must be both important and perceived to be different, as well as correlated to the decision. This last point has somehow been lost.

The final part of this step is to collect an overall user satisfaction score as user satisfaction is one measure of effectiveness in delivering the expected service. While the previous importance–performance assessment provides an indication of where performance gaps may occur, the satisfaction rating will uncover the user’s predisposition for port facility

⁵ It is the authors’ assumption that a buyer will receive a third-party performance assessment tool (asking for relative qualitative performance assessment of its performance against competing ports) more positively than one from a port authority. If the quantitative assessment can be done at the same time, there is then need of only one standardized instrument. Buyers will rely more on a third party assessment than on one perceived as biased.

⁶ It is not clear if Ng tested for multicollinearity before assessing these factors using ANOVA. A number of variables are dropped and F scores given only for a few, which may be because they are the only significant ones or because of some other unstated reason.

support. Users who feel captive will use the opportunity to indicate their disgruntlement out of line with the findings of the gap analysis. Overall user satisfaction is not an indication of future choice behaviour as satisfied customers may still switch to a competitor. If a customer is satisfied, they choose to stay (not switch) or they may cease to, for the time being, evaluate competing options. It is also a measure that acts as a proxy for user concerns about PA discrimination, political interference, non-delivery of promised services or poor responsiveness, theft or loss and damage experience, investments not made on a timely basis, and so on. There is very little evidence of user satisfaction being collected (to be discussed later) by ports.

1.5 4.5 Discussion

To recap, Brooks (1983) indicates that decision determinants have, as a pre-requisite, a high importance score and a perceived difference in performance. In other words, in Lirn *et al's* (2004) Table 6, the criteria could not a choice determinant unless it was high in importance. In their assessment of transshipment ports, four factors are in the determinant quadrant. Of these, Handling Cost of Containers is of the highest importance (and is also perceived as different between options) and Basic Infrastructure Condition exhibits the greatest perceived difference in performance. Both of these are possible determinants of choice. The remaining two, Proximity to Main Navigation Routes and Proximity to Feeder Ports, are both important and differentiated, but are not discussed because they are beyond the port's control to change. This does not diminish their impact however.

While it is important to measure performance, the critical question is: are the attributes in existing studies sufficient for examining outcomes in both efficiency-oriented and effectiveness-oriented configurations? In other words, for example, are the 47 attributes that Lirn *et al* (2004) initially examines all-inclusive of those in the decision-making process? Their criteria are generally focused on efficiency criteria as reported in the literature review. Perhaps most interesting is that the list does not include service dimensions such as sales representative service, commitment to resolving the user's problems, invoice accuracy, terminal theft, the ability of the port to be flexible in its service offering, and other service quality dimensions. The list is definitively incomplete without a satisfaction scale as customer dissatisfaction is a major cause of customer defection (Buttle & Burton, 2002).

Perhaps most important for the purposes of this paper, Ng (2006: 247) rightly notes that "many researchers tend to mix up 'attractiveness' with 'competitiveness' ... [that is they] assume that a port's service level is directly proportional to port competitiveness." He concludes that "attractiveness is only a pre-requisite to allow a port to achieve competitiveness" (Ng, 2006: 248). This second point is true, and underpins the work of Lirn *et al* (2004) and predecessors. While important or significant attributes may guide a user to consider a port and perceived difference between ports may lead to the choice of one over another, expectations of performance if not met, may result in negative disconfirmation or, if met, in positive disconfirmation.⁷ The resulting performance may or

⁷ Disconfirmation is the difference between pre-purchase expectation and post-purchase performance perception; positive disconfirmation is when performance is better than expected and negative is when the performance does not meet expectations. Delight (high satisfaction) is the extreme of positive disconfirmation. If disconfirmation is neutral, satisfaction is a product of the level of expectations and performance.

may not lead to satisfaction, and future choice. The link between satisfaction and future choice is not proven; in the marketing literature, choices are often a product of other reasons. However, all else equal, choices tend to favour the party with whom one has a satisfactory relationship.

5. EMPIRICAL INDICATIONS OF WHAT IS MEASURED

The next issue that needs to be explored and put in perspective is what is actually measured by the (recently devolved, in most cases) port authorities and how the latter use this measurement. A first set of indications has been collected by Port Performance Research Network (PPRN) and was recently analyzed in Brooks and Cullinane (2007a). This section discusses a further set of data that has been provided by port authorities that participated in the PPRN exercise via the completion of an additional questionnaire. This research is in progress with 12 PAs located in five countries (Italy, Canada, Korea, USA, and the UK) having already provided some data.

At this stage of research, port managers were asked to provide information regarding the measurement practices that they follow, with the research attempting to link the collected performance with certain types of port goals and port governance models. The replies suggest that port authorities remain focused on some types of performance only. In fact, the number of indicators reported (or the Port Authorities were willing to disclose) is lower than expected. As the replying PAs are responsible for ports whose annual cargo traffic exceeds the threshold of 2 million tonnes per year and 40% international traffic, it can be assumed that these would have the appropriate mechanisms to collect data considered essential.

The incomplete nature of the questionnaires received means that this exercise provides some empirical evidence but not sufficient to draw conclusions. Further difficulties arise from the fact that different PAs were willing to answer different sections of the questionnaire. We conclude that this is a clear sign that there are not comprehensive performance measurement exercises that are practiced in order to realign governance models, or even to measure the performance of the port in a complete way.

Brooks (2007a) notes that ports in total implement fewer performance measurements programs than do airports. Further investigation into the data from 41 port replies received by PPRN researchers⁸ (Table 1) that led to this conclusion reveals that performance measurement programs are limited and this is a general situation that takes place irrespective of the strategic intent of the port. Yet, when ports have a clear economic objective, which means that they have as their only stated goal either to maximise profits for stakeholders or maximize return on investment by government, performance measurements programs are further limited.

Environmental management (e.g., ISO 14000) and quality management systems (e.g., ISO 9000; BS5750 or similar) seem to be the 'performance measurement' programs that

⁸ Members of the network who assisted with data collection were Khalid Bichou (Imperial College London), Mary R. Brooks (Dalhousie University), Dionisia Cazzaniga Francesetti (Universita Di Pisa), Guldem Cerit (Dokuz Eylul University), Peter W. de Langen (Erasmus University), Sophia Everett (Melbourne University), James A. Fawcett (University of Southern California), Ricardo Sánchez (Austral University/ECLAC), Marisa Valleri (University of Bari), and Thierry Vanellander (Universiteit Antwerpen).

are employed more frequently than others. However, this happens more frequently in the case of ports that have non-economic goals (either exclusively, or in combination with economic goals) rather than in the case of ports that have solely economic goals. Non-economic goals might include traffic throughput maximization, and optimization of local or national economic development prospects. In fact, quality management systems are extensively implemented in ports with a mixed strategic intent. Other performance management practices, including Activity Based Costing, Balanced Scorecard, and Best Practice Benchmarking, are observed in fewer ports. Finally, Business Process Reengineering and Total Quality Management are rarely applied. The main reason these programs are included in this research is that ports could use these programs as a form of performance measurement; they are really a product of efforts to achieve process improvements or comply with regulatory requirements (or customary practices) but their purposes can be stretched to performance management as well.

Table 2 suggests that both in cases of mixed and public governance models, PAs report either to a Board of Directors (BoD), which ensures the good stewardship of the port's assets, or to a Board of Advisors (BoA) that provides advice and support as needed. There are no signs that particular reporting approaches are associated with specific types of governance. With those ports seeking to balance economic and non-economic goals, there is not a clear association between port objectives and the management reporting model. The incidence of management reporting to a department or branch of government, who is responsible for ensuring the good stewardship of the port's assets, or reporting to community groups on a regular basis are rare. These practices are being followed in only one out of 12 ports in the sample. That said, several studies (Everett, 2003; Pallis, 2007) have identified informal, rather than institutionalized, political interference as a common occurrence in devolved ports, and this is a variable worthy of consideration in performance measurement and management reporting assessments.

Corporate governance practices are commonly determined by legislation or letters patent filed with regulatory authorities or agencies (seven out of 12 cases). Explicit regulations, or legislation, were observed in two cases. In the case of one port authority alone, these laws are accompanied by specific 'corporate best practices and corporate governance guidelines'.

Responsibility for the financial performance of the port lies extensively with the senior management of the port authority and, only in some cases, with a governmental department. The role of the PA senior management is greater in the case of non-financial performance. Even in the case of public ports, this responsibility has been devolved to port entities, as has, to a lesser extent, financial-performance responsibility. Only in one of the three cases has the port had to report to a government on its financial performance.

Table 2 leads us to find little government interest in non-financial performance. As a result, there is weak external pressure on port authorities to examine non-financial performance other than as a way of dealing with customers or stakeholders. Overall, it is the senior management of the port authority that has to measure and assess both the financial and non-financial performance of the port and then (following corporate governance practices that are, in most cases, legally determined) develop governance realignment actions to improve this performance. This however does not exclude the potential of the PA management being, at the same time, accountable to another policy actor, whether this is a government department or otherwise.

Tables 3 to 5 illustrate the clear trend that emerges from the seven port authorities that provided information of what is actually measured by the ports: With the exception of financial indicators, there is very little evidence that ports collect, let alone use, either internally or externally, critical operational performance measures, whether the measures relate to vessel or cargo (containerized, in the case of this exercise) operations. The measurement of other variables is rare indeed. A second major finding is the presence of a remarkable inconsistency with respect to what the PAs have assessed as necessary to measure.

The latter is true even with respect to financial indicators (Table 3). Excluding ancillary revenues as a percentage of gross revenues, and terminal charges as a percentage of gross revenue, there is no consistency regarding the other indicators.

Surprisingly only one of the seven port authorities is involved in a comprehensive measurement of container operations (Table 4). There is a partial explanation for this phenomenon—concessioning is already common practice with PAs. Still, the sporadic involvement in measuring performance indicators that are associated with vessel operations suggest that the situation is somehow different. Simply, Port Authorities are not involved in comprehensive performance measurement exercises.

Labour productivity measurement is also an issue that it not extensively measured (Table 5). There is little, if any, interest in measuring employee turnover rate, employment per tonne or TEU handled, contradicting the interest that exists insofar port labour reforms are concerned. This further supports the conclusion that the state of performance measurement by the management of port entities is, in general, rather poor.

Table 5 also illustrates that the seven port authorities that have replied to the questionnaire are rarely engaged in any other measurement exercise. Indicators like the number of customers served, number of destinations served, or even shipping lines that call the port, are not part of the PA performance measurement agenda, or at least they are not among the indicators that are commonly measured. Foremost, the respondents do not emphasise measuring those service elements that might enhance the satisfaction of the users. For instance, neither customer complaints nor invoice accuracy, are collected. The only port authority that stated it collects invoice accuracy reported a 100% accuracy, allowing us to question whether this more a qualitative assessment rather than a quantitative measurement. One PA replied that they measure customer satisfaction; however, it failed to report an outcome of this collecting process, merely indicating that its customers are satisfied, thereby raising similar concerns. Furthermore, there is no evidence of stakeholders' satisfaction measurement.

The absence of measurement of stakeholders' satisfaction contradicts the findings of Table 6. On the one hand, port authorities realize that a number of different stakeholders are of substantial importance, with the importance of seven different groups of stakeholders (including local industries and local residents) being remarkably balanced. This means that an interactive approach that would inform the various parties of the other stakeholders' priorities, interests, satisfaction and perceptions would be appropriate, either in order to build loyalty, or improve port governance and thus operation. It appears that ports are not really involved in a systematic feedback process, although three PAs replied positively to the notion that 'they are involved in stakeholder management'.

6. CONCLUSIONS

The key objective of this paper was to advance the development of a conceptual framework that integrates various relevant port performance components in a way that can be used for a comprehensive port evaluation and adjustment of the existing governance models. The paper argues that change is a process, wherein performance contributes substantially to the realignment and, possibly eventually, the reform of the governance models in place. Following the port devolution trend that has taken place throughout the past fifteen years, a new public management approach has been applied. The recent emphasis on port governance has identified a number of different port governance configurations. Governments and relevant (in several cases, newly devolved) port authorities, have implemented these reforms, and a considerable transition period has already taken place; now governments need to ensure that ports perform well and achieve the objectives that have been set for them

In order to reach this stage, the paper discusses the merits of decomposing performance into two different, although related components, namely *efficiency* and *effectiveness*. While not denying the importance of the first one, it argues in favour of bringing effectiveness into the measurement of performance in a greater way than has been the case to date. It also suggests that associating different types of performance measurement with different models of port governance can be particularly useful. In particular, there is the case of effectiveness-oriented PAs, which tend to be more customer-focused, and the need for them to engage in more focused measurement activities. Thus, user perspectives should be an integral part of their effort to improve port performance and, as feedback, to assess the effectiveness of the governance model imposed by the government's port policy.

Given the extensive literature on efficiency, this paper concentrated on further developing the 'missing variable' of port performance discussion—the evaluation of effectiveness. In particular, the paper suggested a four-stage process, that includes (a) definition of the user; (b) identification of the attributes of importance to the user/buyer; (c) evaluation of a supplier (port) own performance on the attributes; and (d) a buyer/user evaluation of the particular port's performance. The discussion of the third stage is something that has not been explored, and port studies commonly focus on port users' important decision criteria. The scope for further research is considerable, in order to identify how ports with different configurations could proceed to such evaluation (indicators, process), and then to decide what it should do, in terms of governance realignment, following such performance evaluation.

The paper also examined empirical data in order to put into perspective what is actually measured by the Port Authorities and how they use this data. The findings were that ports currently collect even fewer performance measurements than expected. Moreover, there are not any consistent patterns relating a port's strategic intent, with its governance model and performance measurement and assessment activities. Beyond financial indicators, those actors that have assumed responsibility for devolved ports' financial and non-financial performance are not engaged in extensive performance measurement practices. Users' perspectives and levels of satisfaction are among the most neglected issues.

It has to be noted that these conclusions are drawn based on a data-set provided by 12 ports in five countries, with all of them having an annual traffic of two million tones and above, and 40% international traffic. This means that further data collection is essential to confirm or refute such conclusions, in order to have a complete picture of what performance measurement practices are in application.

Table 1. Performance measurement programs and techniques in use

| Strategic Intent | Economic (n=11) | Non-Economic (n=19) | Mixed (n=11) |
|--|----------------------------|--------------------------------|-------------------------|
| Activity based costing | 18% | 26% | 27% |
| Balanced scorecard | 18% | 21% | 9% |
| Best practice benchmarking | 18% | 26% | 27% |
| Business process re-engineering | 9% | 11% | 9% |
| Environmental management systems (e.g., ISO 14000) | 36% | 42% | 55% |
| Quality management systems (e.g., ISO 9000; BS5750 or similar) | 36% | 42% | 73% |
| Total quality management (TQM) | 9% | 11% | 18% |
| Other | 0% | 11% | 0% |

Economic Strategic intent: Ports having as only goal either to maximize profits for shareholders; or maximise return on investment for government;

Non-Economic Strategic Intent: ports only goal is to maximize traffic throughput; or maximise throughput subject to a maximum allowable operating deficit; or optimize local or national economic development prospects;

Mixed: A combination of the above goals or any other non-economic goal.

Table 2. Performance measurement programs and techniques in use

| Goal | Governance | Management Reporting Model | Corporate Governance Practices Determined | Responsibility for Financial Performance | Responsibility for Non-financial Performance |
|------------|------------|----------------------------|---|--|--|
| Balanced | Public | BoA | Regulation | Sr. Mgmt. | Sr. Mgmt. |
| Balanced | Public | BoA | Laws/ Regulation | Sr. Mgmt. | Sr. Mgmt. |
| Balanced | Public | BoD | Laws | Government | Sr. Mgmt. |
| Balanced | Mixed | BoA | Regulation | Sr. Mgmt. | Sr. Mgmt. |
| Balanced | Mixed | Group | Legislation | Government | - |
| Balanced | Mixed | BoD | Laws | Sr. Mgmt. | Sr. Mgmt. |
| Balanced | Mixed | BoD | Laws | Sr. Mgmt. | Sr. Mgmt. |
| Not stated | Mixed | BoA | Laws | Government | Government/ Private |
| Not stated | Mixed | BoD | Laws | Sr. Mgmt. | Sr. Mgmt. |
| Not stated | Mixed | BoD | Laws & CBPCG | Sr. Mgmt. | Sr. Mgmt. |
| Economic | Private | BoA | Legislation | Sr. Mgmt. | Sr. Mgmt. |
| Not stated | Not stated | BoD / Gov. Department | Laws | Government | Sr. Mgmt. |

BoD: Management reports to a Board of Directors who ensure the good stewardship or the port's assets;

BoA: Management reports to a Board of Advisors who provide advice and support as needed;

Gov Dep: Management reports to a department or branch of government (or a Government Minister) who is responsible for ensuring the good stewardship of the port's assets;

Group: Management reports to community groups on a regular basis.

Sr. Mgmt.: Senior Management;

Laws: By-Laws, Letters Patent, filed with regulatory authority or agency;

Legislation: By national, regional or local legislation;

Regulation: By Regulation;

CBPCG: Corporate best practices and corporate governance guidelines.

Table 3. What Do Ports Actually Measure? (Financial Indicators)

| PORT | A | B | C | D | E | F | G |
|--|-----------------|-----------------|-----------------|-----------------|--------------|--------------|----------------------------|
| GOAL | Balanced | Balanced | Balanced | Balanced | - | - | Profits/ return |
| GOVERNANCE | Mixed | Mixed | Mixed | Public | Mixed | Mixed | Private |
| Ancillary revenue as % of gross revenue | R | N | | Y | R | R | |
| Ancillary profit as % of net profit | N | N | | Y | R | N | |
| Average days accounts receivable | N | R | | Y | | R | |
| Capital expenditure as % of gross revenue | N | N | | Y | | N | |
| Debt: equity ratio | R | N | | Y | | N | |
| Growth in profit (before taxes) | N | R | | Y | | N | |
| Interest coverage ratio | N | N | Y | N | | R | |
| Percent of port revenue from outsourced activities | N | N | | N | | N | R |
| Port-related profit as % of port-related revenue | N | N | | Y | | R | |
| Return on capital employed | N | N | | N | | R | |
| Terminal charges as a % of gross revenue | R | R | R | N | | N | |
| Total revenue collected | N | R | | Y | | R | |
| Vessel charges as % of gross revenue | R | R | | N | | N | |
| Yield % on share, if publicly traded | N | N | | N | | N | |

R= Collected and Reported to authors;

Y= Collected but not shared;

N = Not collected.

Table 4. What Do Ports Actually Measure? (Container and Vessels Operations)

| PORT | A | B | C | D | E | F | G |
|---|-----------------|-----------------|-----------------|-----------------|--------------|--------------|----------------------------|
| GOAL | Balanced | Balanced | Balanced | Balanced | - | - | Profits/ return |
| GOVERNANCE | Mixed | Mixed | Mixed | Public | Mixed | Mixed | Private |
| CONTAINER OPERATIONS | | | | | | | |
| 20' TEU as a % of Total TEU for year | R | N | N | N | R | R | |
| Average revenue per TEU | N | N | N | N | N | | |
| Average vessel turnaround time per 100 lifts (in hours) | R | N | N | N | N | | |
| Average yard dwell time in hours | R | N | N | N | N | | |
| Container port throughput (TEU/meter of quay/year) | R | N | N | N | N | | |
| Departure cut-off time (hours) | R | N | N | N | N | | |
| Growth in TEU throughput | R | N | N | N | R | R | |
| Import containers as a % of total containers | R | N | N | N | R | R | |
| Lifts per crane hour | R | N | N | N | N | | |
| Percent of containers grounded (ship to rail operations only) | | N | N | N | N | | |
| Reliability | | N | N | N | N | | |
| Transshipment (as % of total throughput) | R | N | N | N | N | R | |
| Yard hectares to quay meters | R | N | N | N | N | | |
| VESSEL OPERATIONS | | | | | | | |
| Average turnaround time per vessel | | N | N | N | N | | Approx |
| Average vessel calls per week | | R | N | N | R | | Approx |
| Average vessel waiting time at anchor | | N | N | N | N | | N |
| Berth utilization % | | N | N | N | N | | N |
| Hours of equipment downtime per month | | R | N | N | N | | N |
| Length of quay in meters (as a capacity measure) | | N | N | N | N | | N |
| Revenue per tonne handled | | R | N | N | N | | N |

R= Collected and Reported to authors

Y= Collected but not shared

N= Not collected

Approx: Approximately

Table 5. What Do Ports Actually Measure? (Other Measures)

| PORT | A | B | C | D | E | F | G |
|--|-----------------|-----------------|-----------------|-----------------|--------------|--------------|----------------------------|
| GOAL | Balanced | Balanced | Balanced | Balanced | - | - | Profits/ return |
| GOVERNANCE | Mixed | Mixed | Mixed | Public | Mixed | Mixed | Private |
| Employee turnover rate | | N | R | N | R | | |
| Employment (full-time equivalents) per tonne handled | | N | N | N | N | | |
| Employment (full-time equivalents) per TEU handled | | N | N | N | N | | |
| Destinations served this year | | N | R | N | N | | |
| Number of customers served | | N | R | N | N | | |
| Number of shipping lines that call | | N | N | N | N | R | R |
| Customer complaints per month | | N | N | N | N | | |
| Invoice accuracy percent | | N | N | N | N | | R |
| Overall customer satisfaction | | N | N | N | Y | | Satisfied |
| Stakeholder satisfaction | | N | N | N | | | Satisfied |

R= Collected and Reported to authors

Y= Collected but not shared

No= Not collected

NA= Not apply

“Satisfied” and “Approximately”: Qualitative assessments provided by the responding PA.

Table 6. Which Stakeholders are Relevant?

| Importance (%) to Various Stakeholders over time (n=6) | Transport Firms | Local Industries | End Users | Local Environ. Groups | Local/Reg. Govt | National Government(s) | Local residents |
|---|------------------------|-------------------------|------------------|------------------------------|------------------------|-------------------------------|------------------------|
| 2000 | 12.9 | 25.0 | 14.6 | 7.0 | 16.7 | 14.6 | 9.3 |
| 2005 | 11.1 | 24.7 | 8.8 | 10.6 | 21.1 | 14.4 | 9.4 |
| 2010 | 10.4 | 23.3 | 14.8 | 11.3 | 17.4 | 14.1 | 8.8 |
| Ports measuring user satisfaction (n=5) | 1 | 1 | 1 | 1 | | | |
| Stakeholder Management (n=5) | 3 | 3 | 3 | 3 | 3 | 3 | 3 |

Note: Another port replied that the only important stakeholder is the National Government.

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