Maritime Economics & Logistics (2020) 22:329–352
https://doi.org/10.1057/s41278-020-00162-7

EDITORIAL

Port management and governance in a post-COVID-19 era: quo vadis?

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Published online: 27 August 2020

1 Introduction

The seaport concept has a long history, going back to the early days of civilisation. In very conventional terms, a port is defined as a transit area, a gateway through which goods and people move from and to the sea (Sargent 1938). As such, a port is a place of contact between land and maritime space, a *knot* where ocean and inland transport lines meet and intertwine, an intermodal place of convergence (Weigend 1958). Ports come in various sizes and functions and cannot be narrowed down simply to the geographical notion of a delimited spatial area. To put things in perspective, a port could be anything, such as a sheltered stretch of sea, protecting a handful of fishing boats somewhere in the South Pacific; a block of cement in a small Greek island, on which a passenger ferry would lower its ramp to disembark passengers; a buoy onto which a tanker would moor to offload its oil through a pipeline; a finger pier alongside which a bulk carrier would unload its coal on a conveyor belt; a cool port (i.e. a refrigerated facility) in Latin America exporting fruit to Europe; a mega-yacht marina in Monaco or Nice; or just a water taxi that would disembark passengers from a cruise ship anchored in the middle of the sea, outside Amalfi, the picturesque village of South Italy. At the other end, there is the mind-boggling Yangshan

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Deep Water Port (of Shanghai), or the equally impressive industrial complexes of the ports of Rotterdam and Antwerp in the Rhine–Scheldt Delta region, comprising in their domain clusters of thousands of companies, from the large refineries of the oil majors to the small paint shop, inconspicuously hidden under an abandoned bridge (Haralambides 2021).

Today, the port picture is changing in leaps and bounds: the seaport of today is increasingly becoming a logistics and industrial node in the centre of complex intertwining global supply chains. As such, a functional and spatial clustering of activities takes place in the wider domain of a seaport, all aiming, directly or indirectly, at seamless and sustainable transportation, transformation and information processes within these global supply chains (Notteboom 2016).

Although some ports might benefit from shelter policies, designed by regional or national government agencies, seaports generally operate in an efficiency-oriented, competitive and highly dynamic market environment. Neoclassical thinking, founded on the premise that individual freedoms are guaranteed by freedom of the market and of trade, dominated much of the global economic and trade development in the post-World War II era. Such thinking is increasingly questioned today, and global clashes in economic thinking (and economic systems) are surfacing, as exemplified by the tensions between China's 'state capitalism' and the free markets of Western economies. Economic shocks, such as the financial-economic crisis of 2008–2009 and the COVID-19 pandemic, combined with rising international trade disputes (e.g. China–USA trade relations) and tensions in existing trading blocks (e.g. Brexit in Europe) add to the observed volatility in international trade and cargo volumes in ports. In spite of China's efforts to champion the creation of a *new* global economy based on interconnectedness and mutual trust and understanding (Costa et al. 2020; Haralambides and Merk 2020), the Western world came out of the 2008–2009 economic meltdown more wary of the alleged benefits of consumerism, free trade, free movement of persons and globalisation. The impact of such perceptions on international trade has been only too obvious: the gross domestic product (GDP) Multiplier, a metric often used to link a country's *income* to its containerised imports, almost halved from 2.2 in the early 2000s to 1.3 today [calculations based on figures by the International Monetary Fund (IMF) and Boston Consulting Group]. Often, the theoretical grounds to tendencies such as the above have manifested themselves as introversion, nationalism, populism and, at times, questioning of the ability of Western democracies to solve the *new* societal problems just by a simple recourse to the well-acclaimed 'rule of law'.

Furthermore, corporate strategies in shipping and global logistics are also having their impacts on the port industry. Examples of such developments include consolidation of and concentration in container shipping as well as in terminals and logistics companies, vertical integration along the supply chain and an increasing role of global shipping alliances (horizontal integration; Fig. 1). In other words, to improve their operating margins and offer a better service to their customers, market players in shipping, ports and logistics simultaneously pursue two complementary strategies: cost control through horizontal integration (e.g. shipping alliances) and service differentiation through vertical integration along the supply chain (Notteboom and Winkelmans 2001a; Haralambides 2019). Ports increasingly compete

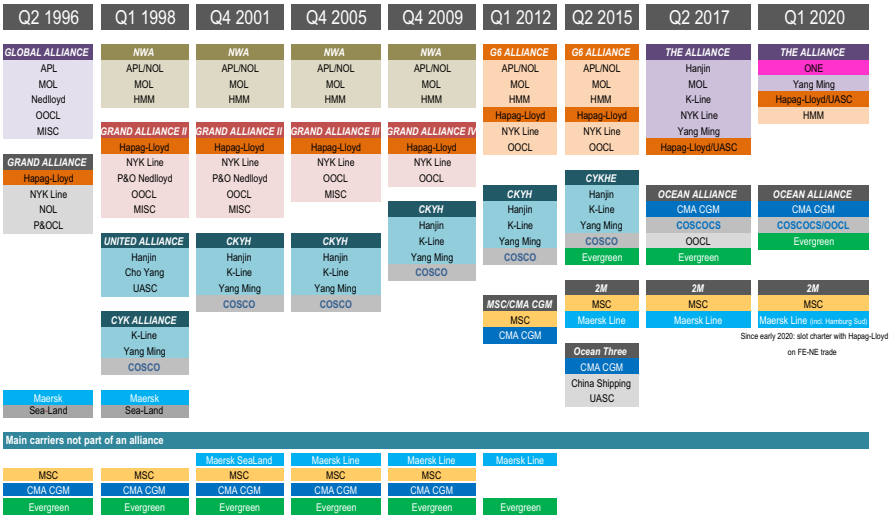

Fig. 1 Evolution of global alliances in container shipping aimed at joint vessel capacity management. *Source* Adapted from Notteboom et al. (2017)

not as individual activities that handle ships but as crucial nodes, linking competing global supply chains. Port and route selection criteria of shippers and carriers are thus based on the entire network in which the port is just one node.

The increasing importance of integrating ports and terminals in value-driven supply chains has shifted the focus towards horizontal and vertical integration and collaboration among relevant actors, digital transformation, and value capture along the chains. Changes in supply chains are forcing ports and terminals to seek effective integration in these supply chains when delivering value to shippers and third-party logistics service providers (Robinson 2002; Mangan et al. 2008). Song and Panayides (2008) provided a conceptual contribution to the measurement and quantification of such integration efforts whose success, however, has also been questioned, in the case of certain major European ports, by Magnan and van der Horst (2020).

Thus, modern seaports have evolved from pure cargo handling centres to pivotal entities in a comprehensive and complex mesh of intertwining global supply chains. The competitive battle of ports to accommodate global supply chains has led to functional changes in seaports as well as in the other nodes of the worldwide transport and logistics network. Nodes increasingly seek co-operation and co-ordination, for example by bundling their transport flows to/from the hinterland (e.g. the role of the inland port of Duisburg as a bundling hub connected to Belgian, Dutch and German gateway ports) or by using available space efficiently through an attractive supply of possible locations in seaport areas and in dry ports or logistics platforms in the hinterland. Nodal competition is supplemented by nodal co-operation.

It is not just hard economic factors, however, that guide port development and operations. The growing role of environmental and social considerations shape the behaviour and strategies of port-related actors, with a greater role attributed to

setting and achieving sustainability goals and to rolling out initiatives in the field of corporate social responsibility (CSR), stakeholder relations management and green supply chain management. Companies initiate the implementation of such initiatives due to motivational drivers, such as sales to customers and corporate reputation, regulatory pressures and the growing emancipation of individual citizens and stakeholders.

At the time of writing, the COVID-19 pandemic is having a major impact on the economic activity in seaports, with many ports around the world being confronted with moderate to strong decreases in cargo volumes and vessel calls and an overall lower activity level in the logistics and industrial clusters in and around ports. Sea-Intelligence (2020) reports that, for some ports, *blank sailings* implied 20% up to even 50% fewer container vessel calls in the second quarter of 2020; although for most ports, the impact is mainly visible on the main trade routes, e.g. Far East–Europe. Container volumes have been impacted as well, although large differences can be observed only among the larger container ports, as illustrated by the year-on-year growth in the first half of 2020 (based on TEU): −6.8% in Shanghai, −1.1% in Singapore, −17.1% in LA, −6.9% in Long Beach, −7% in Rotterdam, +0.4% in Antwerp, −9.1% in Valencia, −20.5% in Barcelona and −29% in Le Havre.[1]

The (hopefully temporary) lower economic activity level, combined with broader ongoing structural trends in the world economy [e.g. nearshoring and reshoring, dematerialisation of consumption, three-dimensional (3D) printing, energy transition and trade-related conflicts] make port actors, planning authorities and supply chain managers revisit and update port-related development and investment plans. Furthermore, the COVID-19 crisis, coupled at the same time, with China's inroads to port infrastructure investments around the world through its Belt and Road Initiative (BRI), brings again to the surface discussions on the socio-economic impact and resilience of ports as 'essential facilities' to national and regional communities.

Port management governance is continuously challenged to adapt to a changing port ecosystem. Not surprisingly, a vast amount of literature has focused on port governance reform, port devolution (but also re-centralisation of decision-making powers), port management efficiency and effectiveness of port operations. The role of the 'port authority' in all this has been particularly scrutinised. A port authority can be defined as the entity which, whether or not in conjunction with other activities, has as its objective under national law or regulation the administration and management of the port infrastructures and the co-ordination and control of the activities of the different operators present at the port (Commission of the European Communities 2001; Verhoeven 2010). In the past decade, the changing role of port authorities and the port environment in which they operate have given rise to the use of other more generic terms such as 'managing body of the port', a term formally introduced in the port regulation of the European Commission, or more specific terms such as port development company (e.g. De Langen et al. 2020) or port ecosystem/cluster manager. The role of public entities and of international and domestic

[1] Information obtained from the respective port authority websites.

corporations in ports and the desired development path in port governance are again being revisited. Still, it is early days to evaluate whether the current epidemiological crisis will create ruptures in port governance trends which have characterised global and regional port governance development in the past decade.

What follows is a critical assessment of some of the key issues and themes in port governance research, attempting at the same time, to propose new avenues for further port research in a post-COVID-19 era. We summarise the main developments by identifying trends and exploring research challenges, gaps and points of (re)orientation. Instead of providing answers, we provide inputs to ongoing discussions by sketching emerging and eminent issues in the hope that this will provide some guidance for further port studies in the field.

2 Towards continuous and more fluid approaches to port management governance models

In both academic and business circles, various typologies of port management governance models have been analysed and applied. The World Bank's Port Reform Toolkit presents an early and commonly used typology, distinguishing between four port administration models: i.e. the private service port, the landlord port, the tool port and the service port. The differences between these models are outlined on the basis of factors such as the type of service provider (public, private or mixed), their orientation (local, regional or global), the ownership of infrastructure, superstructure and assets, and the status of dock labour and management (World Bank 2007). The Port Reform Toolkit typology also makes reference to the presumed port authority (PA) objectives, with service and tool ports primarily serving public interests, private ports acting in the interest of private shareholders, and landlord port authorities trying to balance public and private goals.

We might not be totally amiss at this point were we to say that the landlord model is the most common model of port administration, found in more than 80% of ports around the world. The term 'landlord' derives from the simple fact that the PA, among its many other responsibilities, is the 'curator' and the 'authorised manager' of port land and adjacent aquatic surfaces, to be rented out (leased) for economic profit to the private sector. Often, revenues from this activity amount to 50% of total port revenue. As a 'landlord', the PA must optimise the use of its domain[2] by (i) earmarking port areas for specific uses, (ii) awarding concessions and authorisations to a carefully selected 'mix' of companies and (iii) adopting an appropriate pricing system.

In spite of its alleged intention to introduce more private sector operations in port administration, the landlord model is often the most bureaucratic (layered) one, given that the PA is summoned to manage infrastructure that does not really belong to it but to the State, to the Sovereign or other. In actual fact, in many countries around the world, the PA is a landlord 'on paper' only, and no more than a

[2] Defined here as the total area, land and aquatic, under the statutory responsibility of the port authority.

concessionaire, similar to those it leases its managed areas to. As such, in many instances, the PA has fairly limited autonomy in setting concession prices, port operator authorisation fees, wharfage charges and other dues, while at the same time, it *does* have the responsibility of turning out a surplus at the end of the year. Often, this creates a hopeless situation of 'responsibility without authority'.

Advances in academic research and business practices have revealed the limitations of the port management governance model typology. Brooks (2004) claims that it is difficult to use the framework of the Port Reform Toolkit or others (such as in Baird 2000) to understand the management of port activities. Furthermore, empirical studies have clearly (and correctly) demonstrated that, notwithstanding the long and interesting academic discourses, in practice, there is no such thing as 'adoption of a specific governance model'. Rather, port management is subjected to a series of smaller or bigger alterations over time. A large body of port economics literature has analysed how the governance model of individual or groups of (national) ports can dramatically change as a result of far-reaching port reform and devolution programmes (see the rich body of case studies in the edited volumes of Cullinane and Brooks 2006 and Brooks et al. 2017, and the literature review on port governance studies in Pallis et al. 2011 and Zhang et al. 2018) or stakeholder interests (and related lobbying).

The role of the public sector in ports has attracted particular attention. In many parts of the world, a wide range of privatisation, corporatisation and commercialisation schemes (Haralambides 2017; Notteboom and Winkelmans 2001b) have resulted in the entry of global terminal operating and logistics groups, large investment groups and equity fund managers. In a number of cases, this infusion of (private) money has led to greater competition, higher productivity and, eventually, lower costs, which often are passed on to importers and exporters wherever adequate intra- and inter-port competition among stevedores and terminal operators has also been ensured.

In this new environment, the public sector has been forced to reassess its role in the port industry, in some instances generating a discussion on whether public sector port authorities are indeed needed; a discussion often starting from the full privatisation examples of the UK, Australia and New Zealand. In our view, this discussion is pointless and dangerously misleading. Irrespective of how infrastructure is financed, developed and managed, the final owner of the port's infrastructure, both land and aquatic, is the State. In most cases, the State entrusts (i.e. port devolution) ownership and exploitation rights to the port authority. Moreover, passing on PA regulatory responsibilities, such as those pertaining to *public service obligations* or the monitoring and control of nautical-technical services, could never be accepted in many developed and developing countries alike. Thus, despite the greater private sector involvement in the port industry, many port assets or services have not been transferred from the public to private sector. Instead, most countries have relied on some form of commercialisation or corporatisation of public port authorities to deflect demands for much greater private sector involvement and safeguard the prerogatives and collective interests of the public sector.

The privatisation of UK ports in the 1980s is a textbook example of a shockwave port devolution. In many cases, however, the evolutionary trajectory of port

governance occurred in different and distinct phases covering several decades; for example the decentralisation of port management in China, from the central to the local level, unfolded gradually in three phases between 1979 and 2004, each supported by new regulatory frameworks (Cullinane and Wang 2006). In recent years, the Chinese port system has been undergoing a certain degree of recentralisation supported by large-scale port co-ordination and integration schemes at provincial level (Notteboom and Yang 2017; Huo et al. 2018). The new Chinese orientation on port governance is two-pronged: on the one hand, no efforts are spared in creating national champions (e.g. Shanghai) able to compete at regional and global levels, while on the other hand, greater intra-provincial co-operation and co-ordination among ports is pursued to ensure that duplication and resource-wasteful competition are avoided (Wan et al. 2020). Those were also the objectives of the 2016 Italian port reform (Prete and Tei 2020; Parola et al. 2017), but similar objectives could be found today in most countries, including the USA and Japan, where in the case of the latter, port development is centrally included in national development plans. Interestingly, *port devolution* seems to be reversing, with decision-making powers returning to the 'centre'; a trend apparent not solely in ports. It seems to many that concentration and recentralisation of all sorts of economic activity might be the answer to the failures of globalisation.

Changes to governance models are not always guided by large-scale port reform programmes. Small and subtle changes also occur when port actors opt for an approach of 'institutional plasticity' (see Strambach 2010 for a conceptual discussion), whereby port governance evolves without breaking out of the existing governance mould. Good examples can be found in many countries where large port supervisory bodies exist. Such bodies are sometimes difficult to manage and reconcile, often acting not solely in pursuit of the objectives of the port or of the general interest but of their own private interests, frequently purposely and conveniently confusing the concepts of 'management' and 'supervision'. In such situations, the management of the PA needs to indeed be fluid so as not to be paralysed.[3] Instead of forcing formal (regulatory) change, the relevant stakeholders in port governance might stretch existing institutions and institutional arrangements through deliberate action and flexible interpretation via processes of conversion, layering and stretching (Notteboom et al. 2013). Extensive and long processes of layering, involving multiple incremental changes and adaptations, can ultimately result in a gradual mutation of the role of the actors, thus obtaining a better fit between the port governance system and the local/regional socio-economic environment. Even subtle and stepwise changes in port governance, 'benevolent' or less so, such as the award of a multi-year concession to an influential local stakeholder, can have significant longer-term impacts on the functioning and performance of the port.

[3] One of the objectives of the 2016 Port Reform of Italy was to scrap port supervisory committees (comitato portuale); and quite rightly so: In the past 20 years, a number of those committees had done nothing but to hold back the growth and development of the port by promoting personal or special interests, often in tacit agreement with the port management they were expected to control and supervise.

In connection to the above, every port is confronted with specific challenges and opportunities in terms of economic and social development priorities, port–city relations, spatial dynamics, environmental pressures and more. This regional embeddedness implies that ports may go different ways in terms of the tasks, roles and activities they develop, and sometimes, this may require a different management approach. Classifying port management models in neatly labelled packages—assuming one might still have an interest in doing so—is becoming increasingly pointless. Quite a few countries or regions with a strongly centralised port management system have realised that a 'one size fits all' approach to port governance is impracticable as it poses great restrictions in effectively dealing with the regionalism in a seaport system. Ultimately, such rigidity can undermine the necessary dynamism at local port level.

In actual fact, a large diversity exists even within the same port management governance model; For example neighbouring ports of a similar scale applying the same landlord governance model (such as Rotterdam and Antwerp) might, in practice, show plenty differences in port management. Such diversity in scale, tasks, organisation and skills can render a port much more attractive to customers vis-à-vis its competitors. Processes of layering at regional and local levels allow actors to add some regional touches to port governance practices, without necessarily disconnecting from the national policy nor breaking out of the existing path. In other words, regional assignment of roles may lead to different management orientations, not necessarily different models.

Ports can learn from specific best practices of other ports, such as formalising city–port relationships, master-planning, concession agreements or marketing approaches to clients. But the management philosophy of the port, one presumably based on performance and results, should not be much different from that of any other economic activity when it comes to such things as human resources management, informatics, accounting, finance, concession contracts, authorisations etc. This means that port policy is getting (or should get) more orientated towards the formulation and enforcement of general rules of the (competitive) game, e.g. pricing for cost recovery or harmonisation of port statistics instead of trying to force individual ports into standardised governance models and solutions.

In conclusion, while authors do not fail to acknowledge that many variations and local/regional differences and orientations in port governance arrangements exist, they nevertheless persist in presenting and applying discrete port governance typologies (e.g. Brooks 2004). We believe that further work and analysis of port management practices, styles and models (sic) calls for a more continuous and fluid approach to the subject, whereby even subtle temporal and spatial differences and changes are measured and analysed along a broad spectrum instead of a set of discrete categories.

3 Call for an even stronger area-specific approach to port governance challenges

Typologies of port management governance models typically do not elaborate on the specific roles and regulatory and operational functions the port authority adopts voluntarily or obliged to pursue by law. Still, port economics literature is presenting us with possible discrete levels of engagement of a port authority (see e.g. the 'passive', 'facilitator' or 'entrepreneur' categorisation in Verhoeven 2010) and a port's specific roles (e.g. landlord, regulator and operator, see Baird 1995; Baltazar and Brooks 2001). As hinted above, however, and apart from the very few instances where such categorisations have been used as a roadmap to rationalise financial resources of donor agencies to be spent among competing ports in the developing world (World Bank 2019[4]), today hierarchies and typologies such as these attract rather limited interest, mostly among academics.

In his seminal work, Goss (1990) presented arguments for having public sector port authorities, i.e. to deal with property rights issues, to engage in port planning/port cluster management, to provide public goods, to deal with externalities of port areas and to enhance port efficiency. In the 2000s, port economists moved beyond these arguments in support of port authorities, envisioning a sort of 'renaissance' of the port authority. It has thus been argued that the port authority should play a more proactive role in facilitating and co-ordinating stakeholders in logistics networks and in developing the necessary competencies to succeed in a highly competitive market (Notteboom and Winkelmans 2001a; Comtois and Slack 2003; Van Der Lugt and De Langen 2007), perhaps even by adopting a more entrepreneurial role (Verhoeven 2010). Port authorities have also been encouraged to add a functional role as cluster managers (De Langen 2004) and community managers (Chlomoudis et al. 2003) to solve collective action problems in and around the port domain.

In the past two decades, a number of scholars have provided more insights to the call for a more active facilitator and even entrepreneurial role of port authorities. Studies have been carried out to examine the role of port authorities in specific activity areas, such as intermodal transport and hinterland development (Notteboom and Winkelmans 2001a; De Langen and Chouly 2004; Notteboom and Rodrigue 2005; Van Der Horst and De Langen 2008; Van den Berg and De Langen 2011; Magnan and Van Der Horst 2020; Wan et al. 2020); land management including terminal concessions/leases (Notteboom 2006; Notteboom et al. 2012; Ferrari et al. 2015); digital transformation as a key enabler of cargo flow facilitation and supply chain co-ordination; sustainability (Lam and Notteboom 2014; Acciaro et al. 2014; Ashrafi et al. 2020), green supply chain management in ports (Notteboom et al. 2020), the green port concept (Pavlic et al. 2014), energy efficiency (Iris and Lam 2019), energy transition (Hentschel et al. 2018; Wang and Notteboom 2015), the

[4] The publication was prepared by Martin Humphreys, Aiga Stokenberga, Matias Herrera Dappe, Atsushi Iimi and Olivier Hartmann of the World Bank based on a 2018 World Bank project entitled 'Ports Assessment Eastern and Southern Africa', carried out by Maritime Transport Business Solutions (MTBS) under the academic supervision and consistency control of Hercules Haralambides.

circular economy (De Langen and Sornn-Friese 2019; Mańkowska, et al. 2020); and port marketing (Parola et al. 2018).

The empirical findings presented so far suggest that port authorities can follow very different paths in dealing with current issues in the above areas of port activity. It has also become evident that tangible achievements and progress made by port authorities in a number of these areas, or action fields, remain rather underwhelming; For example many port authorities are struggling to define their role (or to create one for themselves), to enhance collective actions and to achieve visible positive results in the field of for example intermodal hinterland transport (Van Der Horst and De Langen 2008), including connectivity and the port's relations to inland ports (Magnan and Van der Horst 2020). Other current challenges include the role of port authorities in the large-scale implementation of cold ironing solutions for deep-sea vessels (Arduino et al. 2011; Tseng and Pilcher 2015; Innes and Monios 2018; Lorange 2020) or the largely untapped possibilities for the greening of terminal concession procedures and agreements (Notteboom and Lam 2018).

As such, a PA-centric approach advocating an ever-stronger role for port authorities might not be the right approach. In each 'area of port activity' and for every individual initiative ports might be willing to undertake, port authorities and their stakeholders should evaluate (a) whether the port authority may have a statutory role to play and, if so, (b) whether such involvement is likely to lead to a superior outcome compared with no involvement. In the context of such considerations, the PA needs also to decide whether its involvement should be restricted to its statutory domain or extend beyond the confines of its legal responsibility; what tools or instruments to use (e.g. regulation, penalty or incentive pricing, knowledge development, data sharing, investments etc.); whether and how to co-ordinate or form partnerships with other actors; and finally, whether the PA should act as facilitator or entrepreneur. Thus, the role and function of a port authority needs to be contextual: the PA can be an investor/entrepreneur in one area of activity but remain the usual 'onlooker' in another.

It is indeed true and clearly observable that, in many cases, port authorities move beyond the pure facilitating role by entering into key investments, in particular in those cases where private investors show reluctance to do so or when there are possibilities to partner with private or public entities; but this has not been always so. Until recently, at least among the ports of the European Union, the development of port infrastructure was not always demand-driven but rather an 'entitlement' of the port, in particular if the port's 'neighbours' were lucky recipients of public funding themselves. Such 'understandings' had created considerable excess capacity, which went hand in glove with high levels of management inefficiency (Haralambides 2017).

Ports today, however, cannot blindly roll out investments without a cost–benefit analysis included in a positive business plan. In most cases, this is seen as a prerequisite before such investments can get the green light from supervising authorities and port stakeholders who want to avoid negative impacts on the port's financial position. Investments are often embedded in a master plan, which is a useful planning instrument and, among other goals, aims to maximise port efficiency. In such a role, the master plan has to be flexible and able to accommodate the changing

demand for port services. Sometimes, the opposite is true and the master plan can become a statutory straight jacket, constraining agile port management and development. Often, this is the result of inflexible berth designations, i.e. allocation of port areas to specific port traffics promoted by various interest groups (mostly ship agents) who want 'their own' berths at the cost of better port utilisation.[5] More often than not, port land has a high *opportunity cost*. Whenever the confines of port and urban planning are not clear, conflict may arise between port and city management, with the latter often seeing port areas as areas of alternative use (coastal zones, residential, fisheries, recreational etc.). Ports and cities do not always look eye to eye, in particular when the relationship between the two administrations is not institutionalised by law.[6]

Stakeholder 'resistance' can also arise when a public port authority attempts to develop a strong entrepreneurial role. Such resistance can manifest itself in the form of rising conflicts with customers and supply chain actors about commercial investments of the PA which could potentially undermine its presumed market neutrality or conflicts with local community groups on the correct local input payback or relevance of investments made beyond the port perimeter or even overseas. A good example of this is China's recent decision to scrutinise better its investments in foreign ports, avoiding what the State Administration of Foreign Exchange (SAFE) calls 'irrational' sectors. That is, sectors, such as real estate, not directly related to the port sector or to China's grandiose Belt and Road Initiative (Haralambides and Merk 2020).

An area-specific approach to port authorities' roles and functions provides plenty of room for a further analysis of the strengths and limitations of specific port governance arrangements. The PA's capabilities and regulatory room to manoeuvre and act in one area of activity might be limited. A good example is a PA's inability to make changes to an approved master plan, aiming to adjust it to changing demand

[5] Two examples from the Italian port of Brindisi, which one of the authors run in the period 2011–2015, would suffice to illustrate this point. The port is served by a single towage company owning five tugs berthed at the touristic waterfront of the inner port, right at the heart of the historical old city of Brindisi. As the waterfront was undergoing urban rehabilitation, the tugs needed to move to another spot at the middle or outer port, but in spite of the ample and underutilised infrastructure there, no other place was available because this was not foreseen in a 40-year-old master plan. The second example is even more illustrative: The middle, and most commercial, part of the port of Brindisi, for years now, is dedicated to Ro–Ro and passenger traffic. To serve this traffic, the port authority decided to construct a new passenger terminal, one of the most modern in the Adriatic. The terminal should have been ready by the summer of 2012, but works were suspended as a result of an administrative appeal, claiming that, according to the 1974 (!) master plan, passengers and Ro–Ro ships could not be handled at this part of the port. Certain urban architects, joined by activist groups, were also against: at that part of the port, 50 years ago, there used to be a beach where their forefathers were spending the warm summer months!

[6] Examples of city–port tensions abound around the world, and some of them approach levels of highly entertaining comedy. Cases are known for instance where small functional adjustments to the master plan may require the consent ('no objection') of the city administration, i.e. to the effect that the adjustment does not interfere with city planning. Even when this is more than obvious, i.e. when the 'adjustment' is right in the centre of the port rather than in its confines with the city, the latter may still refuse to give the required consent on grounds of incompetency: 'this adjustment is in the port area and thus we (the City Administration) have no competence in advancing an opinion'. The next act on this theatrical stage is to agree on whether a statement like this constitutes 'consent' or not.

scenarios. In other areas of activity, e.g. investments in enhancing port security, or in the maintenance of infrastructure with the latest generation of ships in mind, the role and capabilities of the PA might be much more substantial and decisive. In other words, port governance should be tailored as much as possible to the specific needs and ambitions in each of the activity areas. This would naturally render a generalised and static/rigid approach to port governance less relevant. More research is needed to analyse the effectiveness and efficiency of specific port governance arrangements and routines in each of the activity areas.

Finally, a successful port authority—in terms of efficiency criteria—must adopt a market-oriented management style, based on clear goals, managerial skills and accountability. However, this does not imply that every decision concerning the involvement and actions of the PA in a specific activity area is taken in the context of a well-prepared long-term strategy or strategic plan. Some actions and initiatives might be the result of ad hoc decisions and investments fuelled by windows of opportunity that arise suddenly at a specific point in time (Jacobs and Notteboom 2011). Such decisions present critical junctures, shaping the role and function of the PA in the respective area, without excluding any future path disruptions. The increasingly volatile market environment might imply that the governance structure of PAs will have to be tailored towards more flexible ad hoc type of decisions, at least in those business activities that do not entail major regional or national interests. Such an approach has the potential to increase port resilience by continuously adapting the port to opportunities arising from a changing economic geography, economic shocks, sustainability needs or major shifts in the corporate world.

4 From spatial separation in port governance solutions to regional and global entanglement

Port management models did not 'confront' each other so much in the past, as neighbouring/competing ports typically followed similar port management models and their decisions were fairly game-theoretically interdependent. Demand for port services (among competing ports), as an example, has been known to be *kinked* (Haralambides 2002), i.e. tariffs respond to those of the competitor in two distinct ways: (a) remain unchanged on the way up but (b) follow suit on the way down (Fig. 2).

However, this picture is changing. In spite of the many efforts for more inter-regional co-operation and co-ordination among neighbouring ports, especially in areas of activity where public resources might be thoughtlessly and wastefully expended, inter-regional competition is intensifying in other more business-like areas of activity, such as marketing or pricing. This brings ports or port groups with different port governance philosophies into head-on competition (e.g. competitive forces between North European and Mediterranean ports).

Moreover, some (mostly public) port groups, to anchor more firmly their competitive position, are also walking down the path of *internationalisation*. Usually, such policies take the 'innocent' form of a memorandum of understanding (MoU) on things such as exchange of best practices or training. Behind them, however,

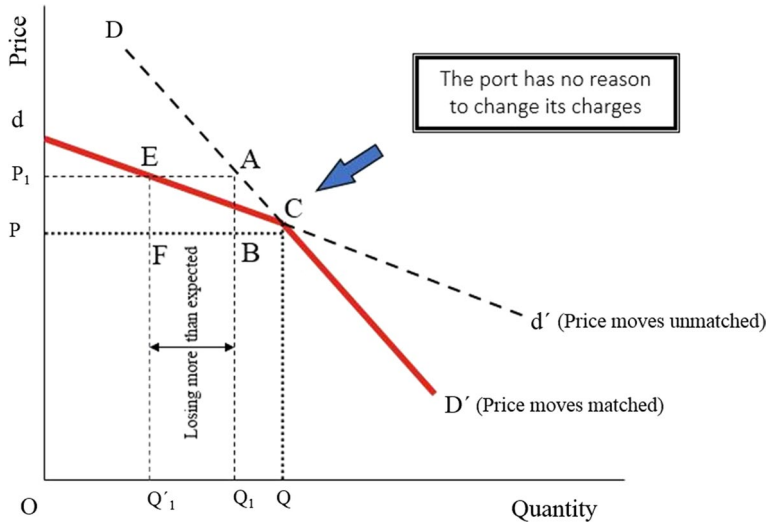

Fig. 2 Kinked demand for port services

may be hidden more 'sinister' objectives such as tacit collusion, aiming to make the two-port link the carriers' preferred choice vis-à-vis competitor ports.[7] This said, PA internationalisation can also be rather modest, combining small targeted investments with port management support and advice (see e.g. Dooms et al. 2013 on the internationalisation strategy of the port of Rotterdam). In other cases, PA internationalisation goes hand in hand with a large-scale mobilisation of resources and funds, exemplified by the Chinese port investment spree, which in some cases, has led to the adoption of new or adapted governance models at local level.[8] The resulting mix of local and imported port governance approaches might lead to clashes in port management styles,[9] but it also has the potential to produce efficient new

[7] We are aware of the allegation and of the anecdotal statement, but we are equally aware of the possible legal consequences were one to be more 'specific'. The point that is made here however is that regulatory authorities around the world should pay more attention to such 'MoUs', also in their investigations of mergers and acquisitions in shipping.

[8] Compared with other global terminal operators, the international expansion strategy of Chinese public port groups, such as Cosco Shipping Ports or the Qingdao Port Group, seems to be strongly embedded in the geo-economic and geo-political policies of the Chinese government. As mentioned above, the Chinese government is actively supporting the creation of champions able to play a role on the international scene. The role of companies in the Belt and Road Initiative was made very explicit in the 13th Five-Year Plan: The ambition is to enhance co-operations between China and Belt and Road countries, with private and corporatised enterprises taking a leading role. Chinese port actors have seized the windows of opportunity created by the BRI to go international [Notteboom and Yang 2017; Wang et al. 2021 (forthcoming)].

[9] A notable example is the friction that emerged (and resignations that followed) between the old Greek PA staff and the Chinese management that arrived, as soon as COSCO took over the Port of Piraeus. This said, however, the transfer of ownership and management transformed the port into the number one in the Mediterranean Basin and number four in Europe (Pelagidis and Haralambides 2019).

hybrid or mixed forms of port governance. The above developments give an impetus to the *level playing field* discussion, and it could well water down (national) attempts towards the standardisation of port management approaches (see above).

At the same time, many countries around the world are confronted with a shift from the management of individual ports to the management of multi-port regions. Port authorities are thus regionally integrated or even merged. This includes 'bottom–up' integrations such as the cross-border merger of Copenhagen and Malmö ports (De Langen and Nijdam 2009), the founding of the new North Sea Port (Belgium/the Netherlands, Notteboom et al. 2018) or the corridor-based gradual integration process of the ports of Le Havre, Rouen and Paris into Haropa (Deiss 2012); a development which is expected to result in a formal merger between the port authorities in January 2021. Other port authority integration processes have been more top–down, such as in the case of the creation of the Italian *port system authorities* (Ferretti et al. 2018) and the integration of Chinese port groups at provincial level (Notteboom and Yang 2017; Huo et al. 2018).

Irrespective of the drivers behind such integrations, the observed port integration processes in China are resulting in a wider spatial reach of corporatised and commercially driven provincial port groups. As a result, COSCO Shipping Ports, along with the integrated provincial port groups, are investing in foreign ports. In addition to full port authority integration schemes, a range of port alliances and coordination initiatives are in evidence too. An example is the Northwest Seaport Alliance between Seattle and Tacoma in the USA (Knatz 2017). Less far-reaching and targeted co-operation schemes are widespread and typically involve the creation of ad hoc bodies in charge of specific and limited functions or project-based co-operation initiatives involving a few (up to a dozen) ports.

The growing regional and global entanglement in port governance and management philosophies, orientations and ambitions form a breeding ground for innovative ideas and customised approaches to port governance in an increasingly globalised and connected world. The port research community can contribute to such insights by examining the melting and merging of port governance arrangements, the tensions and opportunities these processes bring and how internationalising PAs can adapt and embed themselves in a regional or global theatre.

5 Performance measurement in the field of port governance

The performance of ports and port authorities has grown into an important theme in maritime economics literature (see the content analysis in Pallis et al. 2011 and Woo et al. 2012). Port performance is often approached from a port competitiveness and competition angle, as ports want to position themselves as competitive nodes, with the ability to adapt effectively to intensified port competition. Cargo throughput and vessel traffic (i.e. absolute figures, growth and market share) remain important output measures for port competitiveness, and indirectly, so do the effectiveness of existing port governance structures and port reform programmes. Despite some concerns on the appropriateness of comparisons across ports, port throughput figures remain a commonly used and simple basis for market share analysis and port

rankings. These indicators are increasingly complemented with key performance indicators (KPIs) in the area of supply chain performance, maritime and inland connectivity, financial performance, customer satisfaction, sustainability, socio-economic significance, port governance, port resilience etc. [see for example, in a European context, the results of the European Commission 7th Framework Programme (EC FP7) project PORTOPIA]. Many of the newer KPIs are still rather experimental, with concerns expressed on their feasibility, acceptability and relevance, in particular when one wants to engage in comparing ports.

Port performance studies, in their great majority, focus on the performance and efficiency of container terminals, most of them being run by private companies these days. The measurement of the performance of a port authority, however, is by far under-researched. Indeed, it could be rather challenging were one to attempt to measure a PA's efficiency in accounting and finance, concessions and authorisations awarded, engineering designs, planned maintenance work, veterinary, health and security controls etc. The identification and relevance of governance-related performance indicators for a PA might, to some extent, be influenced by the PA objectives and the beliefs of PA executives. Empirical research has shown that public port authorities resemble regular for-profit companies, but they also habitually enshrine certain beliefs, such as a perceived 'role' in matters of national security, that distinguish them (Van der Lugt et al. 2017).

Moreover, meaningful port performance exercises should explicitly consider the requirements, needs, expectations and perceptions of different stakeholders. Valuable attempts have recently been made in maritime economics literature to present both qualitative and quantitative approaches to port performance measurement in a multi-stakeholder environment; For example Ha et al. (2017) modelled the interdependencies among port performance measures and a combination of weights of interdependent variables. The authors used both qualitative and quantitative evaluations of measures deriving from multiple stakeholders in their quantitative performance measurements.

The interdependencies (or lack thereof) between various port performance measures remain a rather under-explored research area in port studies; For example the relationships between port throughput and the evolution of the socio-economic indicators of seaports, such as value added and employment, have not been systematically examined, except for some rather factual exercises (e.g. Merk 2013) or local case studies. The examination of the link between port activity levels, in terms of cargo flows, and land management—e.g. concession awards—is another potentially interesting research theme (e.g. spatial productivity of port areas and related concessions pricing). Many more possible linkages between well-established and more experimental port performance measures can be explored using statistical techniques, decision science, system dynamics modelling or other quantitative and qualitative methods.

Finally, in closing the 'interdependencies' discussion, one should not fail to mention the problem of *multicollinearity* among input variables, such as those used in data envelopment analysis (DEA) and stochastic frontier models. In fact, variables such as 'number of quay cranes' and 'quay length' or 'terminal surface' are not just collinear, but their dependence is almost deterministic. The problem is usually

'solved' by arbitrarily dropping a collinear variable, and sometimes, the one dropped is the most important one; the technical solution prevails over the economic ramifications of a modelling choice, and this is a common pitfall in this type of studies (Psaraftis 2017).

Port performance is not only about hard economic values; it is also about the cultivation of the soft values of seaports, sometimes necessary to safeguard their 'licence to operate' (Van Hooydonk 2007). Among others, such values include CSR initiatives, reaching out to stakeholders through a well-balanced and effective stakeholder relations management or achieving broad sustainability goals (see for example the *World Ports Sustainability Program* which explicitly targets the UN Sustainable Development Goals in a port context). As part of the soft values discussion, PAs across the world are attaching greater importance to the role of *transparency and disclosure* as tools in stakeholder relations management and image building in port management performance (see for instance Notteboom et al. 2015 on disclosure practices of the port of Rotterdam; the extensive analysis on the levels and standards of transparency in the governance of ports by Brooks et al. 2020; or the growth of sustainability reporting by PAs in Geerts and Dooms 2017).

Despite the renewed academic interest in transparency and disclosure, a most welcome initiative indeed, in daily port practice, the issues may be quite different than the way they are presented in academic literature. Ports and their decisions, as detailed above, are often under the scrutiny and approval of supervisory bodies. These usually comprise a representative group of port stakeholders such as city, provincial or regional administrations; labour unions; concessionaires; railways; chambers of commerce and industry; carriers and their agents etc. These people, in addition to safeguarding and promoting the interests of the port, may have their own personal or corporate 'agenda'. Therefore, indiscriminately disclosing information to stakeholders, in particular on 'sensitive' matters such as cost breakdowns—things that no commercial entity would ever disclose even to its own shareholders—might be counterproductive to the long-term well-being of the port. This said, in an increasing number of ports around the world, the greatest part of the documentation produced by the PA is by law uploaded to the organisation's website. Such documentation, among other information, includes executive decisions as well as tenders, qualified suppliers, concessions and authorisations, maintenance plans, technical department designs, budgets and much more.

The COVID-19 pandemic has reinvigorated the importance of risk management and resilience in a seaport context characterised by uncertainty and volatility. Port authorities are challenged to further strengthen their organisational resilience, leanness (Marlow and Casaca 2003) and agility (Paixao and Marlow 2003). In the post-COVID-19 *new normal*, port authorities will be expected to develop capabilities in port resilience planning (Shaw et al. 2017; Vonck and Notteboom 2016; Verschuur et al. 2020), adaptive port planning (Taneja et al. 2011) and enhancement of ports' adaptive capacity (Notteboom 2016), so as to cope with economic shocks and trends and with the challenges imposed by climate change (Ng et al. 2015). At the same time, port authorities might have a role to play in increasing the overall resilience of the port ecosystem and of the individual companies within it through for example financial instruments (e.g. deferring land lease payments) or the deployment of

data-driven market analysis tools. While quite a few studies have been published in the past decade on risk management and resilience, there is still plenty of room for the development of novel performance indicators on risk management and resilience in a seaport governance context.

A last point concerning performance measurement relates to the challenge of comparing and benchmarking port and PA performance in a meaningful way. Benchmarking is a continuous process of evaluation of products, services and practices vis-à-vis those of the strongest competitors or of the ports recognised as leaders. Such exercises often constitute learning tools for the organisation with respect to the relative positioning of the port and for assessing ways to further improve performance. However, key difficulties encountered in earlier research include the identification of a peer group of ports for meaningful and valid comparisons,[10] and the potentially poor comparability of indicator values across ports, given the disparity of methodological variations in data collection and processing. PAs often face a dilemma between the desire to do more international benchmarking (or at least compare to relevant peers) and the desire to focus on highly customised and individualised port performance measures which may not be always susceptible to inter-port comparisons.

6 Exploring new revenue/business models for port authorities

A business model is a conceptual structure that supports the viability of an organisation and explains how the organisation operates and how it intends to achieve its goals. A business model consists of four interlocking elements (Johnson et al. 2008): customer value proposition (CVP), profit formula, key processes and key resources. The CVP and the profit formula define value, while the key resources and key processes describe how that value will be delivered. All the business processes and policies that an organisation adopts and follows ought to be part of its business model.

Obviously, the business model adopted by a PA will be influenced by its mission, vision and objectives as well as the governance structure and external environment in which it operates. Despite the large variation in port governance arrangements and orientations, there are some common tendencies among port authorities, including a change towards more autonomy, more commercially oriented strategies, resilience, accountability, a push for rational investments and scepticism about government funds for port investments.

Over the past 20 years, academics have repeatedly addressed the issue of *port pricing*, in both academic publications (Haralambides 2002) and research projects.[11]

[10] For example when applying DEA, the 'peers' are those on the frontier. This can lead to a situation where the analyst de facto perceives the least bad ports as the best ports. The ambition of a port should not be to become the best performer among its underperforming peers but to achieve the best one could possibly do.

[11] In Europe, this includes several projects for the European Commission (e.g. ATENCO—cost structures of European ports) as well as the European Commission's 'Green Paper on Ports and Maritime Infrastructure'.

A notable diversity of pricing structures can be observed among PAs around the world (Van den Berg et al. 2017). One aspect of port pricing in particular merits special reference, i.e. the treatment of *depreciation* of port investments in the design of port pricing systems. As port infrastructure used to be seen as a *public good*, at least up to recently, depreciation of assets was never a concern or a requirement of PAs. Rather, the requirement was to maximise the use of the port so as to also maximise the economic benefits to the wider port community and its stakeholders, including those of the host city. However, as ports are becoming more and more commercialised, or at least operating with increasingly commercial criteria and in competition to each other, an important question arises: In achieving a *level playing field* among competing ports in economically interdependent geographic areas,[12] should amortisation allowances be included in port prices which allegedly aim, as they should, at the recovery of port investment costs? The answer of major ports to this rather vexing question is usually 'yes but from now on; and bygones are bygones. In the future, investments should be demand-driven'; a demand, however, which is very *fluid* and volatile given the footloose nature of the container and its extensive hinterland infrastructure. Obviously, such an answer is not acceptable to ports, now in their own trajectory of economic and social development, in particular whenever the 'answer' is forthcoming from major competitors who have reached strong market positions through injections of public investments, never recovered nor depreciated but instead written off.

While many port authorities around the world have seen major changes in the past decades on how (public) port investments are funded, most ports held on to their traditional revenue base and pricing system. For PAs with a landlord function, the financial backbone remains heavily dependent on port dues (i.e. marine charges and cargo dues) and land fees, often designed using very simple and rather rigid pricing methods (e.g. a fixed rate per square meter per year for land/concession fees or a fixed amount per gross ton for marine charges). In a few cases, more 'intelligent' pricing methods have been invented, aimed at attracting to the port *those* ships for which the port maintains a comparative advantage. A good example of this is the pricing (dues) system of the Port of Rotterdam, favouring the calling of ships of the latest generation (in terms of size).

The total revenue generated by port dues is highly dependent on the port's vessel and cargo traffic and the associated pricing strategy of the PA. The current market environment of highly volatile trade and cargo flows and fierce inter-port competition causes fluctuations in port dues. In the medium to long term, the energy transition away from fossil fuels will negatively affect the revenue streams brought by oil tanker and bulk carrier calls, and fossil fuel related terminal and industrial activities

[12] The concept of an economically interdependent geographic area or region (Haralambides 2002) has both a spatial and an economic dimension. It refers to a spatially delineated geographic area in which 'binding' arrangements (laws) of direct economic impact—such as competition, labour and fiscal laws—are 'jointly and institutionally' put in place with the aim of maximising collective welfare. Apart from an individual country (with its regions, provinces etc.) that would obviously qualify under such a definition, a good example of such an area is the European Union as well as other regional blocs depending on the strength of their institutional ties over and above trade policy.

in the port. Furthermore, the land fee system used by a PA might not be well adapted to reflect the actual net land availability in the port (land for port extension is getting scarce in many port regions) and the dynamics in the availability of and pricing at alternative locations in other ports or the hinterland.

Thus, there is room for revisiting port pricing strategies and revenue models of PAs for example by exploring the possibility of designing more dynamic, flexible and differentiated pricing methods that take into account actual market conditions, trends in containership sizes, price elasticity of port users, nature of port activities, environmental targets and port's current and anticipated future financial position and needs. As an example, and in view of the diseconomies of scale confronting terminal operations these days as a result of the continuous increases in containership sizes, a novel *revenue-neutral* terminal charging system, based on ship-dimensions rather than $/box, has been proposed by Haralambides (2017). This differential or variable pricing design offers carriers incentives to improve stowage planning, thus enjoying faster turnaround times in the end, and at the same time, it would allow the terminal to utilize better its berths; resulting in a truly win–win situation.

In some cases, a revenue stream or a strategic objective for the port authority may imply a cost for the port user or vice versa. PAs have to effectively manage these trade-offs. PAs might also consider complementing cargo volume-dependent revenues (port dues and partly also land fees) with other revenue streams, in particular if they are operating in a market environment characterised by highly volatile or declining cargo volumes. Targeted investments in digital transformation, energy transition and the circular economy can open the door to new sources of revenue streams which might be less dependent on the vessel and cargo activity level in the port area. However, this brings us back to the discussion on the desirability of having an entrepreneurial PA.

Port pricing by PAs might have to adapt to the sustainability challenges that lie ahead, but also here some caution is justified. Given the position of seaports as key nodes in global supply chains and logistics networks, it is tempting to push port authorities to take up a role as tax collectors for environmental damage caused throughout these chains and networks. Port authorities should not be forced by policymakers at supranational or national level to act as the convenient tax collectors for the greening of supply chains. Any internalisation of environmental costs should target the polluter at the source and cannot lead to an obligation for port authorities to punish for externalities or to reward environmental performance. Obviously, the above point does not imply that port authorities should refrain from launching such schemes on a voluntary basis (individually or together with other ports).

7 In lieu of conclusions

The global landscape as we know it is changing fast, and change is always accompanied by uncertainty. Ports, the fundamental nodes of the global production–transport–distribution theatre, could not have stayed unaffected, and gone are the days when, with few data on consumption, incomes and trade, our students could forecast the port needs of the future. The port ecosystem is affected by a broad array

of economic, social, institutional and environmental trends and shocks, and above all, by a dynamic and highly unpredictable demand for port services. While it is still early days to evaluate whether the current epidemiological crisis, and more importantly the onslaught of the *new normal*, will create ruptures in port governance trends, in this editorial we try to stress that the academia has again a role to play in assisting the business community in continuously assessing trends and challenges and in identifying gaps and points of (re-)orientation.

We try to present a critical assessment of some of the key issues and themes in port governance research, attempting at the same time, to propose new avenues for further port research in a post-COVID-19 era. In particular, we extend an invitation to the research community to consider our call for (a) the development of continuous and more fluid approaches to port management governance models, (b) a stronger area-specific targeted approach to individual port governance challenges, (c) research on the conditions and ramifications of an increasing regional and global entanglement of ports and consequent governance solutions, (d) advancing performance measurement in the field of port governance and (e) exploring new revenue/business models for port authorities.

We do hope *MEL* readers will appreciate our 'appetizer' to all the above research challenges which we intend to address in future editorials.

Hercules Haralambides (in Paris and Dalian), Theo Notteboom (in Antwerp and Shanghai) August 2020.

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