Chapter 6

An effective policy mix for port-cities

The appropriate policy mix for a specific port-city depends on its local assets and characteristics. Despite the need for tailor-made policy design, a few generic lessons can be identified. An assessment of port-city policies shows the effectiveness of transport-related port-city policies, provided that policy coherence is respected.

Choosing an effective strategic policy must be informed by a clear assessment of existing local assets. Economic history is to a large extent determined by path dependency, and heroic, if not always successful, attempts to change existing trajectories. Not every port-city or every maritime nation can or should stake its economic development on the growth of its maritime cluster, if only because there can only be a few leading global maritime clusters in the world. Various port-cities have invested in heavy industrial development, which provides them with certain assets but also involves sunk investments that can limit alternative economic development. Similarly, not all port-cities can develop a successful waterfront, because success is defined by how well it can divert visitors, high-earning residents and investors away from other urban waterfronts. Only rarely, as in Bilbao and Bremen, have radical conversions of the economic destiny of a port-city had unqualified success. Looking for an effective policy mix is a delicate balancing act between building upon existing strengths and developing new assets and capabilities.

The typical port-city does not exist; rather, there is only a collection of port-cities with various characteristics and heterogeneous opportunities. Concrete impacts and implications differ depending on local circumstances, on the character of the port-city interface and the functional composition of the port and its city. Large-scale industrial development on or close to port sites requires a huge amount of bulk goods, generally associated with fairly limited job intensity, a variety of environmental impacts and strong local economic linkages. Container traffic has similar low job intensity, fewer local economic linkages and environmental impacts related to shipping and hinterland traffic, but overall less polluting impacts, because the connected economic activity is less industrial. Maritime business services generally generate high value added and limited environmental impacts, but are connected to large ports or large metropolitan areas. Cruise shipping is less space intensive than most other port functions, but the economic value it generates is fairly limited unless it is linked to a port-related waterfront. However, it can have relatively severe environmental impacts (emissions, noise) especially if terminals are close to city centres, which is frequently the case.

What makes a port competitive?

Recent studies have emphasised how important ports are in global supply chains. Their effectiveness depends ultimately on how they link up with these chains both by sea and by land, and also how port operations are aligned with shipping and hinterland transport. Four complementary areas competitive ports can pursue have been presented here: maritime connectivity, effective port operations, strong hinterlands and cultivating local goodwill. Ports with good practices in one domain tend to perform well in others, as in the case of Rotterdam. The continuing increase in ship size calls for better hinterland connectivity, whilst the trend towards port concentration makes local goodwill an important part of sustaining ports' functions close to cities. However, much depends on local circumstances. Some factors are exogenous, such as geographical location and to some extent nautical access, but even these are subject to change for example in the case of the future navigability of the Arctic seas. Port authorities have an important role to play in improving ports' competitive position, with the help of other actors, including national governments and cities. The area is relatively well researched: the determinants for competitive ports are known and identified, even though it is not always clear what this should mean in terms of concrete policies. Our study indicates that, in general, port policies have a positive impact on value added and economic performance.

Synergies between ports and cities

The interaction between ports and their cities is complicated by a series of policy dilemmas. Port authorities and city governments do not necessarily have the same interests, goals and perception of challenges and policies needed (Table 6.1). Typically, port authorities are concerned with cargo handling and ways to grow in this respect. Their priorities for transport investments are freight transport networks, efficiency of port labour, and land use dedicated to cargo handling and port-related industries. From the environmental perspective, their interest is to limit negative impacts. An urban government is not principally interested in port volumes, but in the value added it generates for the city; not in efficiency of port labour, but in the number of jobs that it can generate, preferably high value added jobs. Cities will generally have a wider set of challenges to address, including housing and urban transport, both issues of relevance to their constituencies, so they tend to prioritise urban passenger transport and have an interest in redeveloping urban waterfronts into housing areas. Environmental policies they favour extend past merely limiting impacts, toward marketing quality of life as one of their city's competitive advantages, as in Copenhagen, which promotes the swimming facilities in its harbour. The challenge for port-cities is to find synergies between the two perspectives, for example by introducing smart, selective goals for port growth, attracting high value added port employment, using the port as a site for green businesses and developing mixed urban waterfronts with room for port functions. This report has referred to numerous examples of such policies and related instruments.

Table 6.1. Policy aims for typical ports and cities

	Port	City	Port-city
Economic	Port volumes	Value added, diversification	Smart port growth strategies Maritime clusters
Transportation	Freight	Passengers	Dedicated freight corridors or smart co-existence of freight and passenger traffic
Labour	Efficiency	Employment	High value added port-related employment
Environment	Limit impacts	Quality of life	Green growth
Land use	Cargo handling, industry	Urban waterfront as opportunities for housing	Mixed development, with a role for port functions
Structural logic	Closed industrial cluster	Open networks with pure agglomeration effects	Mix

Increasing local economic benefits from ports

The three main economic policy models for port-cities that we have identified (maritime clusters, industrial development and urban waterfronts) have different orientations, but are often simultaneously pursued in the world's largest port-cities. Some of these functions are easier to combine than others. Maritime clusters and urban waterfronts can reinforce each other, as both models are being pursued by increasing urban attractiveness; urban amenities for maritime professionals, tourists and local population could be complementary and synergetic. However, a successful marriage between industrial development and maritime clusters is not as easy to achieve, thanks to the fundamentally different logic that informs them: industrial clusters are networks that are generally only open to suppliers and industry-related actors, whereas the agglomeration effects necessary for a thriving maritime cluster will benefit from a larger extent of openness (Box 6.1). However, port-cities such as Singapore and Hamburg have managed to combine the three strains, through a judicious choice of policies.

Box 6.1. The different clustering effects in ports and cities

Spatial clusters, where companies in a given economic sector decide to locate in proximity to one another, can be classified into three different groups, with different characteristics of relations between firms and knowledge spill-overs (McCann and Sheppard, 2003; Iammarino and McCann, 2006):

- **Pure agglomeration:** Metropolitan areas can be considered engines of growth thanks to economies of agglomeration. The assumption is that people and firms tend to cluster in metropolises because of the positive knowledge spill-overs that result from interaction between individuals. Firms in such a constellation typically have no market power, and will continuously modulate their interactions with other firms and customers in response to market arbitrage opportunities, leading to intense local competition. Loyalty between firms, and long-term relationships, are difficult to establish in these circumstances. The cost of the membership in this cluster is the local real estate market rent. There are no free riders, access to the cluster is open and the price that local real estate can command is a benchmark for the cluster's performance.

- **Industrial clusters**: These typically involve stable and predictable relations between the firms in the complex, involving frequent transactions. To become part of a cluster, firms each undertake significant long-term investments, particularly in physical capital and local real estate. Access is restricted by high entry and exit costs: the rationale for clustering is that proximity will minimise transport transaction costs between firms. In this context, a few large firms dominate the market. These often feel that outflows of knowledge to their industrial rivals can be costly in terms of lost competitive advantage. Such firms prefer to locate in industrial complexes with stable, planned and long-term relationships.

- **Social networks**: This third type of spatial cluster relies on mutual trust. Such relationships are manifested in a variety of ways, including joint lobbying, joint ventures, informal alliances and reciprocal arrangements. Relations of trust are assumed to reduce inter-firm transaction costs, because they minimise the problem of opportunism.

These models are theoretical ideal types, not intended to represent any particular location, but such classifications can clarify the challenges facing ports and port-cities. Large ports, especially those connected to heavy industries and specialised in containers and oil products, mostly fit the industrial complex model, with an oligopolistic firm structure, high entry and exit costs and a relatively closed character, which prevents leakage of strategic knowledge. Major port-cities like New York, Singapore and Hong Kong can combine these two imperatives, but the situation is more complicated in smaller port-cities such as Le Havre, and also to a certain extent in Rotterdam. Rotterdam has introduced economic diversification but struggles with relatively negative perceptions of its urban attractiveness. The challenge for cities like Le Havre is to compensate for its relative "closedness" due to the port cluster by building regional networks, with Paris among other places, to develop a larger mass of "pure agglomeration" effects.

The room for manoeuvre for public policies should not be overestimated in the market-driven environment of global shipping. Many of the linkages between producers, customers, suppliers, labour markets, training institutions and intermediary services that compose a maritime cluster or other port-related development form through necessity and a response to market signals that governments can hardly foresee or influence (Uyarra and Ramlogan, 2012). It is not certain that policy intervention is always an effective or necessary component of maritime cluster growth (Doloreux and Shearmur, 2009; OECD, 2009).

Moreover, not every declining sub-sector can be saved. While renewal of declining maritime clusters has been possible in countries such as Norway, where niche specialisation and cost-reduction through targeted outsourcing helped to breathe new life into an ailing shipbuilding sector, policy focus on declining sectors is not always desirable. This is of particular relevance to industrial development policies. Many port-cities in developed countries have been confronted with outsourcing of heavy industries and refineries. A proper understanding of needs and possible transitions is thus a prerequisite for any policy formulation.

Policy initiatives can be effective if their underlying rationale is grounded in a response to a real and problematic deficiency in the status quo. Underinvestment into emerging markets, where potential for growth has been identified but is not being exploited due to private sector reluctance, might indeed be remediated by the provision of public funds for R&D. An obvious lack of qualified labour in industries could be at least partially resolved by publicly promoted partnerships between training institutions and maritime firms. Firms with similar needs that do not interact or represent their interests collectively as part of shared marketing or lobbying strategies, might collaborate more effectively through complementary spatial planning frameworks or publicly created networking platforms. When a key component, such as the registration of shipowners, of the maritime cluster is in decline and this is bringing down with it the firms dependent on the demand generated by that component, targeted regulatory or fiscal intervention at the national level may slow down or reverse such a decline. Successes include Quebec's "Innovation Maritime", which has carried out 200 R&D projects for the maritime sector with government grants; and publicly sponsored educational partnerships through the industry-led Deltalinqs platform that have helped to turn Rotterdam into a leading centre for maritime expertise; the UK's tonnage tax has been credited with contributing to the growth in UK-registered and -owned fleets, not to mention the employment opportunities linked to the in-built training requirement of this policy.

Policy initiatives must be adapted to the maturity of the sector. Developmental support, such as incubator infrastructure or the provision of venture capital, can be vital for emergent clusters, as in the case of Los Angeles' PortTech industrial park, which has helped set up a clean port energy cluster. However, this cannot help clusters that have already matured or are in decline. Similarly, it might make sense for countries with large maritime clusters to engage in expensive measures to protect their fleets from competition by other flag states, such as the provision of Vessel Protection Detachments to protect at-risk vessels, but this expense cannot be justified by maritime nations that do not stand to gain from increased vessel registries (or to lose from deflagging). Similarly, it can make sense to assist with internationalisation of markets where clusters have matured, or to institutionalise inter-sectoral interactions where such linkages have begun to emerge, but global competition can imperil markets that are not mature enough to handle expansion, and interactions between sectors with little need of collaboration cannot be forced.

The composition of economic functions is highly relevant to all three strategic policy options. The most successful maritime clusters, such as London, Singapore and Hong Kong, are those that have developed into well-rounded and diverse clusters. Their diversity attracts new businesses because they can be guaranteed to find high-quality services in any maritime-related branch. Some maritime clusters, such as Rotterdam, have developed policies to benefit strong sub-sectors within that cluster, but need to expand into underdeveloped sectors in the cluster (Merk and Notteboom, 2013). Development of new industrial functions in port areas is hugely dependent on the existing industrial infrastructure that determines the potential for exchanging residual products. Mapping current and potential links can help identify gaps in commodities or infrastructure that can help create new economic opportunities. The mix of economic functions is also key in determining if urban waterfronts can attract visitors and create economic wealth.

Mitigating negative impacts

A variety of types of policy instruments can mitigate negative port impacts, from regulation to market-based incentives, information and technology upgrades. Many of the policy choices made will depend on the local situation, but the most convincing examples

of policy performance involve a coherent package of inter-related instruments, such as those used in Southern California for the San Pedro Bay Ports Clean Air Action Plan (Box 6.2). Mitigating negative port impacts requires the interplay of different levels of intervention, ranging from the local on up. Given the nature of the shipping industry, some environmental impacts of shipping are best tackled at the global level. Self-regulation of ports can work, but in most cases, external pressure is needed. Some port-city policies entail join benefits. For example, reducing port-related traffic congestion has positive environmental effects; and modal shifts of hinterland traffic not only improve environmental performance but can also reduce traffic within the city. Policy trade-offs, for example between security and commercial concerns must also be taken into account.

Box 6.2. San Pedro Bay Ports Clean Air Action Plan

The San Pedro Bay Ports Clean Air Action Plan (CAAP) is a comprehensive strategy to reduce air pollution emissions from port-related cargo movement. The two San Pedro Bay ports, the largest seaport complex in North America, are also the single largest source of pollution in Southern California, according to the South Coast Air Quality Management District (SCAQMD). In 2005, the twin mega-ports of Los Angeles and Long Beach generated approximately 25% of the diesel pollution in the region (O'Brien, 2004). The CAAP aims to address the problem of the ports' growing operations and their increasing environmental impact. Its goal was to dramatically reduce emissions and associated health risks for the region without upsetting the continuous port development. The plan was first approved in 2006 and updated in 2010. Near-term plans through 2014 and long-term goals include reducing port-related emissions by 59% for NO_x, 93% for SO_x and 77% for DPM by 2023 and meeting standards to lower the residential cancer risk in the port area from diesel particulates. Under the plan, the twin ports have developed annual emission Inventories, which are made public, to track progress in achieving CAAP standards. The CAAP uses a combination of regulations, fees, grants and incentives to the cargo industry to promote cleaner technology and operational systems, such as the Clean Truck Program, the Vessel Speed Reduction Program and the Alternative Maritime Power Program. To support the development and demonstration of clean-air technology, the ports have also jointly created a Technology Advancement Program that has provided more than USD 9 million in funding to the industry since 2007.

The latest analysis in 2011 indicates that the two ports have substantially reduced the key air pollutants from port-related sources since 2005, including a 71% and a 75% reduction in airborne diesel particulates, respectively. Several pillar programmes have significantly contributed to reducing air pollution at the two ports, including the Clean Truck Program (CTP) and the Vessel Speed Reduction Program (VSR).

The CAAP marks a milestone for the port industry in mitigating the environmental impact of maritime operations. The plan was a co-operative venture, and the two ports initiated the concept and brought along industry stakeholders and agency leaders (Giuliano and Linder, 2011). The key factor in its success is the co-operation of port users, including terminal operators, truckers and shippers, as well as the support of federal, state and local regulatory bodies and local communities (Mongelluzzo, 2012). The ports were also under considerable social pressure. Community concern over the health risks of port-related diesel emissions had grown after a series of air quality studies was published on the correlation between cancer and respiratory disease rates and proximity to freight-movement corridors. Cargo volumes rose through 2004, in an expansion of capacity at the two ports, and public opposition, including a series of lawsuits, made plans for expansion difficult if not impossible. Political pressure for increased regulatory oversight also prompted the ports to respond to public dissatisfaction over air quality. This ultimately led to the adoption of a comprehensive plan. The CAAP was portrayed as a solution to build the credibility of the ports to obtain agreements on future projects as they engaged all the key stakeholders. One study describes the CAAP as "a response to the loss of social legitimacy and to social and regulatory pressures that were restricting the ability of the ports to expand" (Giuliano and Linder, 2011). The two ports' market influence also played a role in the mitigation efforts, since their gateway location gave them more room to impose fees on the industry and generate the revenue to implement environmental policies.

Assessment of policy effectiveness

What is striking in most of the current literature on port-cities is the absence of description and assessment of port-city policies. There are only a few assessments of specific policy instruments. There is some literature on port pricing policies, but most of this literature is theoretical rather than practical. There are articles on port labour markets, but these focus more on institutional mechanisms rather than public policy tools. However, there are exceptions, all documented in the chapters above; *e.g.* the effectiveness of port gate strategies and truck retirement programmes in US ports have been well analysed and documented; the effectiveness of some maritime cluster policies has been assessed, as well as environmental port dues, onshore power and waste reception facilities. However, most reports on port and port-city policies are not coming from the academic domain, but have been written by international organisations, such as World Bank (The Port Reform Toolkit), ILO, IMO, European Union and OECD. It is within this context that we have tried to provide an overview of existing policies in preceding chapters. In addition, we have attempted to quantify the effectiveness of these policies (Merk and Dang, 2013).

We have attempted to measure the effectiveness of port-city governance by *i)* identifying the links between port and city on the basis of quantifiable outcomes; *ii)* assessing policy effectiveness in achieving such outcomes; and *iii)* highlighting emerging patterns of various policy instruments taken as a whole. Governance is here broadly defined, so it includes policies and institutions. We have conducted this analysis in Merk and Dang (2013) by using the principal component analysis (PCA), an appropriate methodology to explore these issues. It allows to measure key correlations for a set of indicators, shows the direction of the correlations, and summarises the various indicators into a limited number of interpretable factors. As such, this technique helps to derive good summary indicators to address the multidimensional aspect of port and city outcomes, identify ports which are performing along these factors, highlight policy effectiveness by comparing port performance to port policy scoring, explore the links between policy scores across different policy areas.

For the purpose of that study we build a database of main port-city instruments and port-city outcome indicators. Policy instruments were identified (Table 6.2) on the basis of a series of place-specific case studies that were conducted within the framework of the OECD Port-Cities Programme, as well as additional port-city profiles collected for this purpose. For each port-city, scores were assigned to each policy, ranging from A (best practice) to D (policies that in comparison to those of peer port-cities lag with respect to effectiveness, seriousness, comprehensiveness and variedness). In addition, policy outcome indicators were identified, covering port development, port-city development, transport, research and development, spatial development, environment and communication as described in Table 6.3.[1] The collection of the policy outcomes and policy scores was conducted for a selection of 27 large world port-cities from OECD countries, plus Singapore and China, in order to represent the major ports and port-cities of the world.

Table 6.2. Main port-city policy instruments

Policy areas	Policy instruments
Port development	Long term strategic port planning Modernisation of port terminals Port information systems Industrial development policies on port site Development of new port functions Port labour relations Upgrading port workers' skills
Port-city development	Creation of maritime clusters Attraction of port-related headquarter functions Economic diversification policies Creating synergies between port and other clusters Co-ordination between ports Co-operation with neighbouring port-cities
Transport	Intermodal access of hinterlands Modal shifts of hinterland traffic Dedicated freight lanes/corridors
Research and innovation	Innovation policy to improve port performance Fostering local research related to the port sector Attraction of port-related research institutes Attraction of innovative port-related firms Logistics related innovation systems
Spatial development	Port land use planning Common master plan for port and city Waterfront development Urban regeneration of old port and industrial sites Integral coastal/river management
Environment	Emission reduction policies Climate change adaptation policies Renewable energy production in the port Energy efficiency policies Waste reduction policies
Communication	Port communication and information Maritime museums Waterside leisure and recreation Cultural projects related with port Port as part of global city-brand

Source: Merk, O. and T. Dang (2013), "The Effectiveness of Port-City Policies: A Comparative Approach", *OECD Regional Development Working Papers*, 2013/25, OECD Publishing, Paris, http://dx.doi.org/10.1787/5k3ttg8zn1zt-en.

Table 6.3. Main port-city outcome indicators

Policy areas	Outcome Indicators
Port development	Port throughput 2009 (million tonnes); Port throughput containers 2009 (million TEUs) Growth port throughput (1971-2009); Growth port throughput TEUs (2001-2009) Value added port area (million USD) Efficiency index Maritime connectivity (degree of centrality); Maritime connectivity (clustering coefficient) Diversity maritime connections (diversity in vessel movements)
Port-city development	Metropolitan GDP per capita 2008 (USD, constant real prices, year 2000) Growth metropolitan GDP per capita 2000-08 (USD, average annual growth) Metropolitan population 2008 Metropolitan population growth Port related employment (including direct and indirect port-related employment) Port-related labour productivity (ratio of port related employment and value added port area) Unemployment rate (2008)
Transport	Motorway network density (km/1 000 km²); Railroad network density (km/1 000 km²)
Research and innovation	Total patent applications in region (TL3, 2005-07) Patent applications in shipping sector (2005-07) Number of articles in port research journals (1995-2011)
Spatial development	Land surface of port (km²) Urbanised area (km²)
Environment	CO_2 emissions per capita (tonnes per inhabitant, 2005) Population exposure to $PM_{2.5}$ (annual average 2005)
Communication	Number of Twitter followers (31/1/2013)

Source: Merk, O. and T. Dang (2013), "The Effectiveness of Port-City Policies: A Comparative Approach", *OECD Regional Development Working Papers*, 2013/25, OECD Publishing, Paris, http://dx.doi.org/10.1787/5k3ttg8zn1zt-en.

On the basis of these data, using the principal component analysis, the effectiveness of port-city policies was assessed by confronting policy outcomes with policy instruments in five different policy areas: port development, port-city development, transportation, environment, and a last category that includes R&D, spatial development and communication.

The results of our study confirm that port-city policies are key determinants of success. Sound policies can make a difference to port-cities, but in some areas more than others. The most effective port-city policies are transportation and R&D-policies. Port policies are effective in stimulating high port traffic performance. Performance in this context is characterised by high standards in traffic volumes, port efficiency, and port connectivity as a central and diversified node. Policies focused on transport and research and development (R&D), are found to be effective in stimulating port growth and port-city development. Port-city prosperity mostly relies on high value-added and employment level generated by the port. Such features are likely to be prone to high transport density network and innovation, but also to negative externalities as CO_2 pollution. Policies aimed at creating port-city synergies are found to be relatively ineffective in achieving both high port performance and city prosperity. City prosperity seems to be directly fuelled by port activity via port-related value-added activities and employment, but not so much by port-city policies. Spatial and communication policies also have mixed results in this respect (Merk and Dang, 2013).

Our analysis on the policy mix is confirmed by findings from the instruments for which policy evaluations exist. Our inventory and assessment of port-city policy instruments (Merk, 2013) reveals that various policy instruments related to transport have proven to be effective, which is often not the case for policy instruments in other fields where the perception of policy effectiveness is often based on anecdotal evidence and selective observation. Examples of transport policies with sound scientific evidence on effectiveness include programmes to replace old port trucks and extended port gate hours, to redistribute the arrival times of truck to port terminals throughout the day.

Our studies thus suggest that policy effectiveness in port-cities could possibly be increased by focusing even more attention to transportation policies, one of the most effective policy areas. Port-cities with average to least performing policy packages would benefit from moving their policy efforts towards the benchmark within the policy areas where they are the least performing, or focusing on the policy areas where public intervention is most effective, such as port development, transportation and R&D. Although there are limits to the generalisations for policy that one can make, one generic recommendation covers the desirability of policy coherence.

Towards policy coherence

The policy mix should be coherent: policy instruments should neither overlap nor work at cross-purposes. Networking mechanisms can generate overlap: too many different networking platforms can result in intra-sectoral competition and the fragmentation of available financing. If the effects of one policy on another have not been carefully gauged, instruments can cancel one another out. States that have chosen to implement a tonnage tax to attract shipping should also make sure that fiscal policies are aligned with their aims. In India, benefits to the shipping sector from the introduction of the tonnage tax in 2004 were largely nullified by increases in indirect taxation through the services tax in 2007, which reduced prior gains in foreign direct investment in India's shipping sector. Co-ordination between instruments is closely related to co-ordination

between actors. Stakeholders in the maritime sector must be clear about their priorities and intentions, and policy makers must seek to incorporate these priorities through a consultative process.
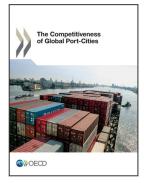
Alignment between local and national policies is particularly important in this regard. Much depends on the situation in a specific port-city: some ports are owned and controlled by their cities, whereas others are owned by a national government, and yet other ports completely privatised. These ownership patterns evidently change the dynamics between the city and its port. Whatever these institutional differences, port-cities are generally faced with a need for policy alignment on at least two levels; between the port administration and the city administration; and between the city and higher levels of government (central and regional/state).

Notes

1.   For an overview of sources of these policy outcome indicators, see Merk and Dang 2013.

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