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Identifying Maritime Ports' Investment Drivers: The Case of French Local and Regional Ports

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ABSTRACT

Ports play an essential role in the production and distribution processes of companies, as well as in the organizations set up by logistics and transportation service providers. But ports are also likely to have to contribute to the development of the territories they are part of. This paper aims at knowing more about how this double challenge impacts the investments made by local and regional ports. To this end, seventeen individual websites and three collective websites of French ports have been surveyed. Results show that the sampled ports and groups of ports have for the most part properly adjusted both to the constraints posed by the public authorities and to the needs and expectations of their current and potential customers.

Keywords: local ports, port investment, port strategy, regional ports.

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I. Introduction

The geographical expansion of supply and consumption markets has led to a tremendous increase in the volumes of freight moving by sea, to the point that it is now used by 90% of world trade flows. Ports therefore play an essential role in the production and distribution processes of companies, as well as in the organizations set up by logistics and transportation service providers.

But if they are at the service of their customers for the optimization of the management of their flows, the ports are also at the service of the development and planning of the territories which they are part of. At the request of their overseeing public authorities, ports may thus be led to act in support of such or such economic sector the survival or development of which is considered as a priority by these bodies.

The impact of such a context on port management is diverse and deep: improvement of operational performance to meet customers' requirements in the face of exacerbated competition, compliance with ever more numerous and restrictive regulations in terms of safety/security and environmental protection, or investment in maritime and land infrastructure to accommodate new import/export flows or new industrial and logistics activities, are some among other challenges to be met by ports.

Local and regional ports face these challenges under specific conditions:

1) Very involved in the economic activity of their local hinterland (e.g., import of raw materials for the local factory, export of products from the regional industry), it may be difficult for them to adapt to the redesign of the supply and distribution networks and processes of their historical customers.
2) This adaptation may also suffer from the fact that these ports have less space for redevelopment as they are geographically more intertwined with their surrounding urban area.
3) With a portfolio of activities very often combining trade, fishing, ro-ro/passenger traffic, shipbuilding/boat repair, yachting and cruise, they must take into account the objectives and constraints of multiple stakeholders.
4) Such a complexity can be reinforced by their involvement in territorial policies for the development or revival of an industry (e.g. renewable marine energies, agri-food), which restricts their freedom to build their portfolio of strategic activities the way they want.

Therefore, local, and regional ports appear to be a subject of study in themselves, even if the academic literature dealing with their specificities appears to be rather scant.

Interestingly enough, however, the range of topics dealt with by authors regarding these ports is rather wide, going from strategy and operational processes, which are the predominant concern up until around 2010, to digital and sustainability policies, on which the focus is mainly put from then on out to the early 2020's.

In reference to this content, the aim of this study is to identify the issues addressed by local and regional ports when they conduct their investment decision-making processes to handle the above-mentioned challenges.

To this end, seventeen individual websites and three collective websites of French local and regional ports have been surveyed, looking for what could characterize the impact on a port's investment choices 1) Of public authorities' strategies, 2) Of the needs and expectations of transportation network actors, and 3) of the needs and expectations of logistics network players.

After a short feed-back on the academic literature dedicated to local and regional ports as well as to small and medium-sized ports, the results of the survey will be presented, followed by concluding remarks.

II. Literature Review

Although they are not the only ones dealt with by the academic literature regarding local and regional ports (LRPs) and more generally speaking small and medium-sized ports (SMPs), four topics stand out as of a main concern for the authors: multi-option strategy-making, efficiency-dedicated operational processes, and often connected sustainability policy and digital policy.

A. Regarding Strategy-Making

While some provide a general approach of the process (Olesen *et al.*, 2012), most authors focus on specific orientations, ranging from direct competition with large ports (Feng & Yang, 2012; Feng, 2013; Bernacki & Lis, 2022) to full LRPs / SMPs merging (Ferretti *et al.*, 2018) via multi-port complementarity/collaboration (Notteboom, 2009; Hoshino, 2010; McMillan, 2011) sometimes imposed by public authorities (De Langen & Nijdam, 2016).

Other options suggested by authors are that LRPs / SMPs strengthen their economic links with their hinterland (Notteboom & Rodrigue, 2004; Tuck, 2007; Olesen *et al.*, 2012), or focus on diversifying their activity portfolio (Ducruet *et al.*, 2010; Ducruet, 2022) by welcoming new activities such as short-sea shipping lines (Denisis, 2009), circular supply chains (Mankowska *et al.*, 2020), or biomass imports (Mańkowska *et al.*, 2021).

B. Regarding Operational Processes

Beside enhancing quality and flexibility to compensate for limited efficiency (Seidenfus, 1987), the issue most widely addressed in the literature is rather the improvement of this efficiency (Chlomoudis & Pallis, 2002; Giannopoulos & Papageorgiou, 2002; Ding *et al.*, 2015).

To this end, a number of authors prescribe implementing dedicated IT tools (Giannopoulos, 2004; Yang *et al.*, 2008), possibly borrowed from other industries (Olesen *et al.*, 2014).

Incidentally, beyond their operational efficiency, authors are also studying the more general impacts of LRPs / SMPs' activities, be they economic (Musso *et al.*, 2011) or social (Simon *et al.*, 2019).

C. Regarding Sustainability Policy

"Assessment" is the primary focus for many authors, some working on the environmental impact of LRPs / SMPs' activities (Zhao *et al.*, 2020; Široka *et al.*, 2021), some on the impact of public authorities' environmental regulations (Stojanovic, 2006), some on the cost-profit evaluation of their environmental policies by LRPs/SMPs (Ashrafi *et al.*, 2019; Geerts *et al.*, 2021).

While their actions seem to have positive results both in-house (Bermúdez *et al.*, 2020) and extended to their hinterland (Mortensen *et al.*, 2020), LRPs/SMPs often find it difficult to implement an environmental policy (Palantzas *et al.*, 2021) and their governing bodies need to continuously adjust their competitive strategies to public authorities-enforced environmental regulations (Gan *et al.*, 2021).

Safety/security issues, which may be included in the field of sustainability, are also addressed by the literature (Habert, 2015; Ringsberg & Cole, 2020; Eski & Fiddelers, 2022).

D. Regarding Digital Policy

Authors generally acknowledge (Philipp *et al.*, 2020) and assess (Paulauskas *et al.*, 2021) the ongoing digitalization of LRPs / SMPs' processes, partly motivated by the public authorities' support of "smart port" projects (Battino & Leonisio, 2022).

Some authors are more prescriptive, suggesting that such technologies as RFID (Knapskog, 2018) or blockchain (Philipp, 2020) be implemented, as well as a drive for the general automation of operational activities (Haraldson *et al.*, 2019).

E. To Be Noted

Several authors mention the tight links which exist between the sustainability policy and the digital policy, more specifically insisting on the positive contribution of the latter to the former (Adu-Gyamfi Appiah, 2019; Gerlitz & Meyer, 2021; Othman *et al.*, 2022).

On the whole, the literature review has shown that, regarding LRPs/SMPs, a large part of authors' attention is caught by multi-option strategy-making, efficiency-dedicated operational processes, and often connected sustainability policy and digital policy.

The next chapter feeds back on what are the main preoccupations of these ports when they make their investment choices in response to the public authorities' strategies and the needs and expectations of their customers from the transportation and logistics industries.

III. The Impact of Public Authorities' Strategies

It manifests itself in two areas: on the one hand, the strengthening of environmental protection and safety/security, and on the other hand, the support provided to certain sectors of economic activity.

A. On Environmental Protection and Safety/Security

As far as protecting the environment is concerned, all ports and groups of ports are impacted; almost three-quarters of ports (14) cite their efforts in waste management, to which three of them add specific actions to reduce air, water and/or noise pollution; two additional ports also mention this type of action.

To help reduce CO^2 emissions, eight ports have created or are in the process of creating multimodal platforms or connections; of these eight ports, three indicate that they provide special support for the development of rail-road transportation.

It should be noted that despite the multiplicity of such initiatives for the protection of the environment, pushed by public authorities, only one port explicitly states having a "green port" ambition.

To enhance the safety and security of goods and people, six ports or groups of ports highlight the investments they have made to adjust to ISPS standards.

B. On Supporting the Development of Economic Activity

Even if most local and regional ports have a multi-sector vocation, public authorities can specifically support certain activities; in the case of the twenty French ports and groups of ports, four sector are explicitly aided: fishing (6 times mentioned), ropax and renewable marine energies (4 mentions each) and shipbuilding/boat repair (3 mentions).

The contribution of public authorities to the development of these sectors takes various forms, such as the improvement of nautical access (e.g., ropax, fishing), the construction of dedicated terminals (e.g., ropax, renewable marine energies), or the financing of equipment (e.g., fishing, shipbuilding/boat repair).

It should also be noted that two ports report a "smart port" orientation.

IV. The Impact of the Needs and Expectations of Transportation Network Actors

When working on the design of networks for the routing of physical flows, maritime, land and/or hybrid transportation actors are often led to integrate one or more port nodes.

In order to choose from several possible options, they consider three characteristics featured by the pre-identified ports: the quality of their operational services, their environmental protection policy, their safety/security policy.

These concerns have a direct impact on the actions taken by local and regional ports.

A. Regarding the Quality of Operational Services

Half of the ports (10) are investing/have invested in improving their nautical infrastructure: upgrading of quays (8) and basins (2), construction and equipment of terminals (3), deepening of channels (2); eight ports also cite the easiness of their nautical (6) or land (2) access.

From one port to another, various specific services are furthermore mentioned: new lines, new calls, new ro-ro services, high frequency of ropax departures, feeder lines stopovers, over-panamax container handling capacities, privileged geographical position for certain destinations.

Also, to meet the operational quality needs of the transportation operators and organizers, several ports have obtained ISO 9001 (5) or 9002 (1) certifications, plus an AEO certification for one of them.

B. Regarding the Protection of the Environment

The efforts in this direction mentioned by the sampled ports and groups of ports take various, non-exclusive, forms: ISO 14000 certification (4), creation of multimodal platforms (6) or connections (2), implementation of an ESG policy (3) or of a "green port" project (1).

C. Regarding Safety/Security Reinforcement

Even if one port indicates that it provides real-time monitoring of its site activities, and two other states that they have implemented a safety/security policy, almost all of the initiatives reported by the ports relate to obtaining certifications.

ISPS for securing port sites (6), ISO 45001 for occupational safety (3), ISO 22001 for food safety (1), AEO for securing transactions (1); to be noted, one port has five ISO certifications (including ISO 50001 for energy management), one port has three, three ports have two.

In addition, nine ports prevail themselves of being certified entry points for agricultural products (5), for food products (3) and/or for livestock (1).

The impact of the needs of the transportation network actors can probably also be found in the reporting by three ports of their investments in the field of information systems (e.g., CCS implementation) and by two ports of a "smart port" project.

V. The Impact of the Needs and Expectations of Logistics Network Players

Local and regional ports are most often involved in the activity of the primary and secondary economic sectors of their close hinterland; nine ports report tight links with their hinterland, especially with the agricultural sector (6 out of 9); they are therefore naturally regarded by shippers and logistics service providers as potential locations for settlement, thus pushing ports to optimize the conditions for establishing sites on their territory.

These conditions must take into account an interest in the protection of the environment and in the safety/security of goods and people that the actors of the logistics networks share with the transportation operators and organizers, and which induces actions and investments previously mentioned.

But it is at least as much of their real estate and logistics services offering that ports must take care, in response to the expectations of these players.

Nearly half of the ports (9) highlight their investments in real estate, for the provision of land (5) and/or of buildings for industrial, commercial or logistics use (7); these non-dedicated investments add to those which the ports say they have made to support specific activities: fishing (6), ropax (4), renewable marine energies (4), shipbuilding/boat repair (3).

Also, half of the ports (10) cite the existence of storage capacities offered by existing service providers, three of which are temperature-controlled and two bonded.

The mention of obtaining an AEO certification, of making investments in information systems (e.g., RFID), of improving the traceability of seafood products, or of the possibility of processing containerized goods, can be considered as additional manifestations of the concern that ports have to meet the expectations of logistics network players.

These findings of the survey, partly combined with the outcome of the literature review, lead to a number of concluding remarks.

VI. Concluding Remarks

Pretty much like what academic authors do with regards to LRPs/SMPs, the sampled French ports and groups of ports pay attention to specific strategic options, operational efficiency, and sustainability, in response to both the public authorities' strategies and their customers' needs and

expectations.

A. Regarding Specific Strategic Options

Rather than direct competition, ports opt for cooperation with large ports, e.g., by providing handling capabilities to container feedering lines; as the three collective websites illustrate, inter-LRPs/SMPs collaboration is also an option, which has gone to full merger for two ports.

Besides, several ports have already diversified their activity portfolio, or are in the process of doing so, e.g., in the field of renewable marine energies; incidentally, part of this diversification is constrained upon ports by their governing bodies, in their drive for an optimal split of regional port-based activities.

Ports also put forward their tight links with their hinterland, primarily with customers from the agriculture industry for which they handle various import and export flows.

B. Regarding Operational Efficiency

Although a few of them indicate having implemented IT tools as a way to enhance operational efficiency, ports insist significantly more on the investments they have made or are making in nautical infrastructure and in real estate, as well as on their provision of new services to their transportation and logistics customers.

Beside operational efficiency, which is a preoccupation for all ports, operational quality is also on the mind of many of them; to improve their performance in this respect, they have launched labeling processes, leading to the obtention of ISO 9001/9002 and AEO certifications.

C. Regarding Sustainability

All 20 (groups of) ports are impacted by the concern of public authorities and their customers for environmental protection, and for the safety/security of goods and people.

Consequently, at least for the larger ones, they invest heavily in the building of multimodal, especially railroad, platforms or connections; while not at the same level of sophistication, all ports are conducting specific actions to reduce air, water and/or noise pollution; adding to these initiatives for enhanced environmental protection, ports also follow the path of dedicated ISO 14001 and/or 50001 certifications.

In the same way, to address safety/security issues, ports combine specific actions, e.g., real-time activity monitoring or on-site seafood traceability, with dedicated certifications, e.g., ISPS and ISO 22001/45001.

On the whole, even if ports deal globally with the same topics as those found in the academic literature, their focus within each topic is fairly different, e.g. more on support to local/regional industries regarding strategy-making, more on infrastructure investments regarding operational efficiency, more on certification regarding sustainability; furthermore, there is no explicit indication of a digital policy implementation and, contrary to the strong focus of the academic literature on this matter, no mention of IT-based solutions for enhanced sustainability purposes.

That said, the results of the survey show that the sampled local and regional ports and groups of ports have for the most part well-adjusted both to the constraints posed by public authorities and to the needs and expectations of their current and potential customers.

While remaining active in traditional sectors such as fishing and keeping close links with their local hinterland, they all make the required efforts in terms of environmental protection and/or security of their processes, and many of them welcome new activities, especially in the field of renewable marine energies.

More generally, industrial relocation strategies generated by changing economic, social, and geopolitical contexts can provide these ports with new development opportunities, subject to sufficient organizational and informational integration with these redesigned global supply chains.

CONFLICT OF INTEREST

The author declares that he does not have any conflict of interest.

REFERENCES

Adu-Gyamfi Appiah, B. (2019). *Onshore and offshore coordination of logistics services at seaports* [Master's thesis, UiT Norges arktiske universitet].

Ashrafi, M., Acciaro, M., Walker, T.R., Magnan, G.M., & Adams, M. (2019). Corporate sustainability in Canadian and US maritime ports. *Journal of Cleaner Production*, 220, 386–397.

Battino, S., & Leonisio, M.D.M.M. (2022). Port Authorities and smartness: the training policies of Spain's smart ports. *J-READING Journal of Reasearch and Didatics in Geography*, 2(11), 195–208.

Bermúdez, F.M., Laxe, F.G., & Aguayo-Lorenzo, E. (2020). Port sustainability in Spain: the case of noise. *Environment, Development and Sustainability*, 22(8), 8061–8078.

Bernacki, D., & Lis, C. (2022). Investigating the future dynamics of multiport systems: the case of Poland and the Rhine–Scheldt Delta Region. *Energies*, 15(18), 1–27.

Chlomoudis, C., & Pallis, A. (2002). The way forward: institutional proposals and stakeholders' reactions. In *European Union Port Policy* (pp. 146–185). Edward Elgar Publishing.

De Langen, P.W., & Nijdam, M.H. (2016). A best practice in cross-border port cooperation: Copenhagen Malmö. In *Ports in Proximity* (pp. 189–200). Routledge.

Denisis, A. (2009). *An economic feasibility study of short sea shipping including the estimation of externalities with fuzzy logic* [Doctoral dissertation, University of Michigan].

Ding, Z. Y., Jo, G.S., Wang, Y., & Yeo, G.T. (2015). The relative efficiency of container terminals in small and medium-sized ports in China. *The Asian Journal of Shipping and Logistics*, 31(2), 231–251.

Ducruet, C. (2022). Port specialization and connectivity in the global maritime network. *Maritime Policy & Management*, 49(1), 1–17.

Ducruet, C., Koster, H.R., & Van der Beek, D.J. (2010). Commodity variety and seaport performance. *Regional Studies*, 44(9), 1221–1240.

Eski, Y., & Fiddelers, V. (2022). Ignorance-led port policing? the limits of information sharing–based policing in the North Sea Canal Area and Port of Amsterdam and in the Port of Moerdijk. *Policing: A Journal of Policy and Practice*, paac071, https://doi.org/10.1093/police/paac071.

Feng, L. (2013). Regression analysis on the hinterland connection of peripheral ports in the China Bohai Sea regions. *International Journal of Advances in Management Science*, 2(4), 159–162.

Feng, L., & Yang, R. (2012). How small and medium-sized ports (SMPs) compete in multi-ports gateway regions: the case study of Zhuhai Port in Pearl River Delta Region (PRD) of China. *International Forum on Shipping, Ports and Airports (IFSPA) 2012: Transport Logistics for Sustainable Growth at a New Level*, Hong Kong.

Ferretti, M., Parola, F., Risitano, M., & Vitiello, I. (2018). Planning and concession management under port cooperation schemes: a multiple case study of Italian port mergers. *Research in Transportation Business & Management*, 26, 5–13.

Gan, M., Li, D., Wang, J., Zhang, J., & Huang, Q. (2021). A comparative analysis of the competition strategy of seaports under carbon emission constraints. *Journal of Cleaner Production*, 310, 127488.

Geerts, M., Dooms, M., & Stas, L. (2021). Determinants of sustainability reporting in the present institutional context: the case of port managing bodies. *Sustainability*, 13(6), 3148.

Gerlitz, L., & Meyer, C. (2021). Small and medium-sized ports in the ten-t network and nexus of Europe's twin transition: the way towards sustainable and digital port service ecosystems. *Sustainability*, 13(8), 1–24.

Giannopoulos, G. A. (2004). The application of information and communication technologies in transport. *European journal of operational research*, 152(2), 302–320.

Giannopoulos, G. A., & Papageorgiou, K. (2002). Application of reengineering techniques in redesign of port processes. *Transportation research record*, 1782(1), 56–63.

Habert, O. (2015). *Perceptions of small to medium ports in Northern Europe on the impact of security initiatives* [Master's thesis, Lunds universitet].

Haraldson, S., Lind, M., Karlsson, M., Bach, A., Woxenius, J., & Gonzalez-Aregall, M. (2019). Digitalization and automation in small and medium sized Swedish ports (SMPs). In *Lighthouse reports* (pp. 1–31). Lighthouse Swedish Maritime Competence Centre.

Hoshino, H. (2010). Competition and collaboration among container ports. *The Asian Journal of Shipping and Logistics*, 26(1), 31–47.

Knapskog, K. A. (2018). *Logistic service at ports in northern Norway. Case study of the port of Narvik* [Master's thesis, UiT Norges arktiske universitet].

McMillan, C. (2011). Innovation in Canada's trade gateways and corridors. *Policy*, September, 47.

Mańkowska, M., Kotowska, I., & Pluciński, M. (2020). Seaports as nodal points of circular supply chains: opportunities and challenges for secondary ports. *Sustainability*, 12(9), 1–21.

Mańkowska, M., Pluciński, M., & Kotowska, I. (2021). Biomass sea-based supply chains and secondary ports in the era of decarbonization. *Energies*, 14(7), 1–24.

Mortensen, L., Kørnøv, L., Lyhne, I., & Raakjær, J. (2020). Smaller ports' evolution towards catalyzing sustainable hinterland development. *Maritime Policy & Management*, 47(3), 402–418.

Musso, E., Benacchio, M., Ferrari, C., & Haralambides, H.E. (2001). On the economic impact of ports: local vs. national costs and benefits. *Proceedings of the 9th World Conference on Transport Research*. Seoul.

Notteboom, T. E. (2009). Complementarity and substitutability among adjacent gateway ports. *Environment and Planning A*, 41(3), 743–762.

Notteboom, T., & Rodrigue, J.P. (2004). Inland freight distribution and the sub arborization of port terminals. *Proceedings of the First International Conference on Logistics Strategy for Ports*, ed. Licheng Sun, Dalian, 365–382.

Olesen, P. B., Damgaard, C. M., Hvolby, H. H., & Dukovska-Popovska, I. (2014). Applicability of planning and control in a port environment. *Advances in Production Management Systems*, Springer, Ajaccio, 555–562.

Olesen, P.B., Dukovska-Popovska, I., Hvolby, H.H., & Jensen, K.S. (2012). Strategic port development: identifying a development approach for small and medium-sized ports. *Selected Proceedings from the Annual Transport Conference at Aalborg University*, 7(1), 1–16.

Othman, A., El Gazzar, S., & Knez, M. (2022). Investigating the influences of smart port practices and technology employment on port sustainable performance: the Egypt case. *Sustainability*, 14(21), 1–26.

Palantzas, G., Darbra Roman, R.M., Naniopoulos, A., Tselentis, V., & Wooldridge, C. (2021). The environmental management of small ports–challenges and options. *Proceedings Greenport 2021 Online*.

Paulauskas, V., Filina-Dawidowicz, L., & Paulauskas, D. (2021). Ports digitalization level evaluation. *Sensors*, 21(18), 1–22.

Philipp, R. (2020). *Smart seaports as innovation drivers for Blue Growth* [Doctoral dissertation, Tallinn University of Technology, School of Business and Governance].

Philipp, R., Gerlitz, L., & Moldabekova, A. (2020). Small and medium-sized seaports on the digital track: tracing digitalization across the South Baltic Region by innovative auditing procedures. *International Conference on Reliability and Statistics in Transportation and Communication*, Springer, Riga, pp. 351–362.

Ringsberg, A. H., & Cole, S. (2020). Maritime security guidelines: a study of Swedish ports' perceived barriers to compliance. *Maritime Policy & Management*, 47(3), 388–401.

Seidenfus, H. (1987). European ports in the context of the world economy and the European economy: changes in sea transport. *International Journal of Transport Economics/Rivista Internazionale de Economia dei Trasporti*, 14(2), 133–138.

Simon, E., Garnier, C., Lacalle, I., Costa, J.P., & Palau, C.E. (2019). Small and medium ports' activities modelling introduction to the pixel approach. *WIT Transactions on The Built Environment*, 187, 149–163.

Široka, M., Piličić, S., Milošević, T., Lacalle, I., & Traven, L. (2021). A novel approach for assessing the ports' environmental impacts in real time-the IoT based port environmental index. *Ecological Indicators*, VOL(ISSUE), 120.

Stojanovic, T. A., Ormerod Smith, H.D., & Wooldridge, C.F. (2006). The impact of the habitat's directive on European port operations and management. *GeoJournal*, 65(3), 165–176.

Tuck, S. J. (2007). *Socio-economic aspects of commercial ports and wharves in Southwest England: a grounded theory approach to regional competitiveness* [Doctoral dissertation, University of Plymouth].

Yang, G., Sun, G., Li, Q., & Liu, G. (2008). Visualizing layout of a container terminal. *2008 4th International Conference on Wireless Communications, Networking and Mobile Computing*, IEEE, Dalian, pp. 1–4.

Zhao, Y., Zhu, Q., Kou, Y., & Lun, Y.V. (2020). Quantitative evaluation of dual operational-environmental port performance in the Pearl River Delta. *International Journal of Shipping and Transport Logistics*, 12(3), 212–229.