



Development dynamics of the Portuguese range as a multi-port gateway system



Tiago A. Santos, C. Guedes Soares *

Centre for Marine Technology and Ocean Engineering (CENTEC), Instituto Superior Técnico, Universidade de Lisboa, Portugal

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ABSTRACT

The aim of this paper is to discuss the current status of port regionalization in the Portuguese range and to identify its possible developments, giving special consideration to cross-border issues. The 'Portuguese range' comprises a set of ports located in the west coast of the Iberian Peninsula, grouped in a multi-port gateway region, directly connected to one of the main European Union rail freight corridors. These ports possess a natural competitive advantage as a gateway to foreland regions along the Atlantic Ocean, such as Latin America, North America and West Africa. In order to fully realize this potential, the entire range is engaged in a regionalization process into certain regions of Spain, which is analysed in this paper. The paper builds upon previous work on regionalization, inland terminal networks, dry port development and dyad formations and applies these concepts to the Portuguese range, in its pursue for the capture of hinterlands in Spain. The validity of the regionalization theoretical framework is thus benchmarked against a trans-national case and novel elements are sought to enrich the framework. The paper first describes the current situation of container terminals in the Portuguese range regarding throughput, rail connections, network of inland terminals (and dry ports) and its utilization. Comparison is made with its Spanish counterparts. The policies of major stakeholders are also reviewed concerning dry port and logistic platform development. A number of potential and existing seaport-dry port dyads are identified. Conclusions and policy suggestions are presented.

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1. Introduction

The 'Portuguese range' consists in a number of ports located along the west coast of the Iberian Peninsula sharing sea and land services, a criterion for defining ranges, as mentioned in [Ducruet \(2009\)](#). In fact, liner services typically call in more than one of these ports and a common road and rail network promptly interconnects these ports and provides access to a common Portuguese hinterland. On the other hand, these ports are geographically sufficiently close to be considered a multi-port gateway system, defined as a set of ports serving the same hinterland and therefore with common hinterland connectivity issues ([Notteboom, 2010, 2013](#)). They currently serve primarily the Portuguese hinterland but also the cross-border regions of Spain and the region of Madrid. Being part of a multi-port gateway system, their relationship involves cooperation in promoting the development of land based infrastructures of common interest, but also competition in the utilization of those resources.

Portuguese ports provide land-locked regions with a competitive gateway to foreland regions across the Atlantic Ocean, such as Latin

America, North America and West Africa, since they are the closest solution for their logistic needs. This solution is also favoured by good natural conditions in the regions concerned and by the existence in Portuguese ports of suitable and available infrastructures and equipment. Regarding cargos coming from the Far East and Oceania, the 'Portuguese range' faces significant competition from ports located in the Spanish Mediterranean coast which are better positioned to receive traffic coming from these routes.

In addition to these opportunities, the European Union has introduced from the beginning of 2014 a new transport infrastructure policy (TEN-T), which aims at closing gaps at borders between national networks, removing bottlenecks and overcoming different technical barriers. Overall, this policy aims primarily at promoting the European common market. In order to push forward the TEN-T, a number of rail freight corridors aiming at shifting traffic from the congested road network towards the railway have been defined. Among these, rail freight corridor N°4 runs from the Portuguese ports, across the border towards Madrid, and then to Northern Europe. In the market studies for this corridor ([Atlantic Corridor, 2014](#)), it is even mentioned that there is an opportunity for cargos bounded for northern Europe and coming from the Atlantic basin to use the Portuguese ports and freight corridor N°4. Therefore, the coming into existence of TEN-T may actually be an opportunity for the regionalization of Portuguese ports, since the rail

* Corresponding author.

E-mail address: c.guedes.soares@centec.tecnico.ulisboa.pt (C. Guedes Soares).

infrastructure projects developed under this umbrella may also be used to convey freight into the region of Madrid. These railway lines will need to be complemented with suitable inland terminals, which also need to receive from the EU appropriate funding.

This EU policy comes in the wake of a long effort by Portuguese port administrations and the Portuguese governments to develop and equip ports and improve maritime and land accessibilities. Substantial efforts have also been invested in promoting ports to ocean carriers and shippers, including those located in Spain. The Portuguese Government (ME, 2014), announced a Transport Infrastructure Plan focused on port investments, including a significant upgrade in container handling capacity and investments in railway access to ports and to Spain. In order to attract cargos for these infrastructures, enhanced port regionalization is of the utmost importance, since Spanish cargos are needed in order to build sufficient critical mass and ensure adequate utilization levels.

This paper presents an empirical study of the Portuguese range and tests the ability of the port regionalization theoretical framework to describe the undergoing developments in the Portuguese range, in particular those related to the expansion of hinterlands towards certain Spanish regions, and the evaluation if in this particular trans-national scenario new elements or improvements can be identified and added to the framework. Section 2 presents a literature review describing the development of the concept of regionalization and outlines the methodology applied in this study. Section 3 describes the current status of ports in the Portuguese range in what concerns containerized cargo. Section 4 presents the status of infrastructure and utilization in what concerns transport corridors and inland terminals, while Section 5 reviews the policies of public and private organizations concerning regionalization. Section 6 examines the development of seaport-dry port dyads in the Portuguese range. Section 7 presents the main conclusions of this paper.

2. Literature review and methodology

2.1. Review of port and hinterland development theory

Port development in time and space has been studied using different perspectives and theoretical models. The works of Bird (1963), Taaffe et al. (1963), Hayuth (1981), Barke (1986) and Slack (1990) are especially noteworthy in this respect. More recently, Notteboom and Rodrigue (2005) introduced the concept of 'port regionalization', which consists in developing a regional network of load centres interconnected with the port by transport corridors, making it possible to expand the port hinterland. This development addresses issues such as congestion of transport infrastructure, environmental constraints, local opposition, lack of free space and limited handling capacity, all causing delays. In parallel, costs along the supply chain can only be cut through streamlined processes and economies of scale, allowing the major players in the supply chain to achieve cost reductions in inland distribution, which represents nowadays a significant fraction of total logistic costs, see Notteboom and Rodrigue (2005).

Regionalization promotes the formation of discontinuous hinterlands, characterized by 'islands' in distant regions connected with the port by high capacity transport corridors, implying a significant departure from past experience. These islands are formed around particular inland terminals, with which the port is well connected, its size depending on the inland terminal efficiency in the door-to-door transport (road haulage). One major advantage of these inland terminals and associated islands is that they allow ports to intrude in the natural hinterland of competing ports. Roso et al. (2008), building upon the concepts of inland terminal and transport corridor, discuss the different definitions for inland terminal and the nature and role of dry ports in port regionalization and categorize them according with the distance from the seaport: distant, midrange and close dry ports.

A further development within the theoretical framework of port regionalization is the formation of seaport-dry port dyads, described by Wilmsmeier et al. (2011) and Bask et al. (2014). These authors propose a three stage development in such dyads: preliminary, start-up and growth. Furthermore, they indicate that the development of dyads may occur according with three modes: inside-out, outside-in or bi-directionally. This last mode occurs typically in the growth phase, as observed in the two case studies studied by Bask et al. (2014). These authors admit that this bidirectional element may be present in some cases already in the start-up phase, a development deserving further research in this paper.

The theoretical framework developed in the mentioned studies has allowed research on regionalization processes to proceed in a number of different directions. The first direction has been through regional case studies. Notteboom (2006) applied his own concept to the port of Antwerp, including significant discussions on the development of key elements of regionalization: load centres, rail and barge network, logistic poles. Roso et al. (2006) reviewed the situation of dry port terminals and rail services in Sweden. Ng and Gujar (2009) studied the situation in Southern India and Monios (2011) described the role of inland terminals in Spain. Korovyakovsky and Panova (2011) review the development of dry ports in Russia, Mwemezi and Huang (2012) apply the same approach to the study of an African case in Tanzania and Ng et al. (2013) to Brasil.

Several regional case studies are more focused on port development models. Monios and Wilmsmeier (2012) provide an analysis of different cases studies in Europe and United States. Wilmsmeier et al. (2015) have subsequently studied the Mexican case where a process of outside-in port hinterland integration is taking place. Concerning European cases, Monios (2011) concludes that, in general, development of inland terminals in Spain is being carried out using the outside-in model, with seaport terminal operators assuming controlling shares in inland terminals. This author indicates that developments using the inside-out model by local and regional bodies are prone to problems due to poor efficiency of adopted transport solutions.

A second approach to the study of regionalization processes builds upon the fact that the development of transport corridors between seaports and inland terminals is a significant contributing factor for port regionalization. Therefore, some authors have focused on the development and characteristics of transport corridors (rail or inland waterways) across wide geographical regions. Examples are Notteboom (2007), who focused on inland waterways, and Notteboom and Rodrigue (2012) who provide a study of rail developments in Europe and North America. Later, Rodrigue and Notteboom (2013) compared the characteristics of the rail network, distribution networks and dry ports in Europe and North America.

Another approach in the literature consists on focusing on organizational aspects, which have also been found to be relevant in the facilitation of the regionalization process. Van der Horst and De Langen (2008) reported that most ports need substantial investments and time to fully develop and coordinate regional load centre networks. Also in this respect, the study by De Langen and Chouly (2004) concluded that governments and port administrations are important in providing the organizational capabilities necessary for coordinating the stakeholders involved in regionalization. Another important aspect for inland terminals is the possibility of obtaining customs clearance at these inland terminals or of providing additional services to the containers, aspects which are also discussed by Monios (2011). Acciaro (2013) provides a comprehensive review of hinterland infrastructure and services provided to containers, emphasizing also the importance of the evaluation of external costs. Finally, Van den Berg and De Langen (2014) indicate that shipping lines may be moving towards a port-to-inland terminal value proposition (engaging in freight distribution), which is also a significant organizational development.

A final approach in port regionalization studies consists on the quantification of port hinterlands and its evolution over time, which provides

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