Introduction:
A Global Perspective on Dry Ports

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Background

The importance of logistics increases as the economy becomes more and more specialised and globalised. Changes in business environments such as globalisation, production patterns, urbanisation and environmental awareness further support this trend. Since production and logistics arrive at a consensus where every individual product or module is produced in regions where the comparative advantage is the greatest, there is an increased focus on hinterlands and logistics. Traditionally, ports have been in the focus as logistic centres of maritime logistics chains, but changes in production patterns are supported by the development of the rapid transport of goods over long distances. As a result, the relevance of port hinterland transport, high utilisation of transport resources and infrastructure through the consolidation of goods flows and extending the influence of ports in their hinterlands to increase their competitiveness has become even more important. This development emphasises the connection between the intra-regional transport systems and the larger inter-regional transport systems, since this is where much of the consolidation of freight flow occurs.

From an environmental perspective, it is untenable to await direct solutions based on significant technological breakthroughs in the field of alternative energy sources or in increased engine performance. Therefore, other more indirect measures are useful for improving transportation systems. The increased utilisation of transportation resources, the coordination and consolidation of goods flows and increased use of less environmentally damaging means of transport and intermodal solutions are examples of such indirect measures which rest upon the logic of collaboration in a regional setting.

Global container trade and, in particular, container ports are facing challenges related to capacity expansion, environmental considerations, and community restrictions. At the same time, freight transport and logistics functions are more and more integrated into global supply chains. The challenges for the container trade and liner shipping have moved inland from the sea, first to the ports and then to the hinterland (cf. Notteboom 2002). The increased scale of ships puts more pressure on ports as they must handle large volumes of load units during short periods of time (Cullinane and Khanna 1999). Being able to effectively and efficiently distribute the load units to and from the hinterland is crucial for overall efficiency at the ports and, ultimately, for the whole supply chain (Cullinane and Khanna
As a consequence, costs and lead time are increasingly being generated in the smaller routes, rather than in the arteries (Bergqvist and Woxenius 2011). The use of high capacity transport modes, such as trains and barges, is one measure to increase the capacity of hinterland transport. Both rail and inland waterway present some advantages in terms of decreased environmental impact, economies of scale, faster throughput in ports and less delay related to road congestion. Maximising hinterland effectiveness and efficiency is a matter of finding the optimal mix of transport modes and setups, rather than identifying a single service or solution.

Improving the hinterland connectivity of ports has become more and more important for addressing today’s logistics challenges. The hinterlands of ports have been able to expand due to containerisation in combination with intermodal transport possibilities (Song 2003). As hinterlands expand, the hinterlands of different ports naturally overlap and inter-port competition intensifies (cf. Notteboom and Winkelmans 2001, Cullinane and Wilmsmeier 2011). This intensified competition, in combination with the complexity of hinterland transport and associated infrastructure and strategic transhipment nodes, have made hinterland connectivity an essential part of a port’s distinct value proposition (Bergqvist 2011). The potential for more effective and efficient hinterland systems, associated with better collaboration and coordination in the supply chain, gives hinterland logistics and associated concepts, such as dry ports, an obvious role in designing and managing global supply chains.

The development worldwide concerning “dry ports” (in their various forms, functions and strategies) addresses many of the challenges facing contemporary logistics and ports. The concept of a dry port is more often used in practice while being given more scientific attention. In 1982, the UN first used the term to underline the integration of services with different traffic modes under one contract (Beresford and Dubey 1990). A “dry port” was defined as an inland terminal to and from which shipping lines could issue their bills of lading (UNCTAD 1982). The concept has evolved from merely focusing on the container segment to other market segments as well, so that it is now more focussed on the services originally offered at the port but moved inland (Woxenius and Bergqvist 2011, Cullinane and Wilmsmeier 2011). Parallel to the development of the concept in practice and theory, numerous definitions have been developed (e.g., Rodrigue et al. 2010, Van den Bossche and Gujar 2010, Cardebring and Warnecke 1995, Ng and Gujar 2009, UNESCAP 2006, Roso et al. 2009, Jaržemskis and Vasiliauskas 2007, Harrison et al. 2002, Leitner and Harrison 2001, Walter and Poist 2003). Although alternative definitions do exist, there seems to be a consensus on the importance of dry ports; potential dry ports must improve cost-efficiency, environmental performance (e.g. congestion, pollution, safety, health, and noise) and the logistics quality of hinterland logistics (cf. Bergqvist and Woxenius 2011, Roso et al. 2009, Padilha and Ng 2011).

This book comprises a number of case studies and state-of-the-art examples from measures taken in different parts of the world with varying economic, social,
institutional and environmental realities that show the complexity and diverse approaches to this phenomenon.

**Dry Ports: A Global Phenomena with Local Characteristics**

The contributions in this book illustrate dry port applications in Europe, Africa, Asia, and North America.

In Chapter 2, Rickard Bergqvist describes the development of hinterland transport in Sweden and in particular the system of rail shuttles connected to the Port of Gothenburg. This development has been possible due to a number of reasons, deregulation being the most evident enabler. The development of new intermodal terminals has been a prerequisite for the system of rail shuttles to expand geographically and in this chapter a number of key factors related to the development of dry ports are identified and described. The research concludes that the existence of commitment and trust is crucial since the development process is facing stress from many different sources.

The contribution by Bergqvist (2013) describes the remarkable journey within some sub-segments of hinterland logistics and transport in Europe related to the development of dry ports and freight villages.

There is an increasing interest in the concept of dry ports from policy makers and logistics service providers; the case study by Gille and Bozuwa (2013), presented in Chapter 3, provides an example of how potential dry port establishments can be evaluated, analysed and assessed. The case study recognises the role of dry ports as economic drivers within the regions in which they are located, by focussing on the potential of a dry port development in the Southeast Drenthe region of the Netherlands by defining three questions:

1. Are sufficient volumes of freight being transported between main seaports and the region, or passing along the region, to allow for multimodal freight services concentrated in a dry port?
2. Are the required infrastructure and services in place?
3. How do stakeholders envisage the potential of a dry port in this region?

These questions illustrate the necessary components involved in dry port development, i.e. material flows, infrastructure and stakeholders. Issues of coordination, freight volumes and bundling are important aspects highlighted by stakeholders. Furthermore, the regulatory and operational framework and the behaviour and perspectives of stakeholders are identified as key development factors (cf. Bergqvist 2013).

Connectivity regarding the relationship between the hinterland and the seaport is a multifaceted issue. The concept relates to both the physical transportation with associated extended services of the port, as well as the virtual connection related to communication and information exchange. The virtual connection is
often not given priority; however, much research concludes that this is an area with great inefficiency and potential for improvement (cf. Furió 2013). In Chapter 4, Salvador Furió builds on the integration of maritime and rail operations. Special attention is given to information integration and the role of Port Community Systems. Furió develops a standard for computerising information exchange between stakeholders and a pilot test involving the Madrid Dry port and the Port of Valencia was carried out. The analysis identifies great potential and the pilots confirmed significant benefits associated with a common standard for information exchange. Benefits include service quality improvement and cost reductions (operational and administrative costs) in maritime-rail operations in dry ports and seaport terminals.

In Chapter 5, Gavin Roser, Kenneth Russel, Gordon Wilmsmeier and Jason Monios emphasise the importance of a user perspective when planning infrastructure development. The chapter provides insights from one of Scotland’s most innovative logistics service providers on the planning, location and utilisation of hinterland intermodal terminals. The lack of low wagons in the UK is identified as a large barrier for future rail-based intermodal transport growth. Current regulations and government funding do not provide a solution to this problem and the lead-time can be detrimental to the service development process. Better utilisation of resources and better information for potential shippers can help in improving the competitiveness and attractiveness of train services. In sum, major adverse impacts have been observed from the current arrangements. The hinterland transport requirements of Scottish trade flows have not been given the necessary attention, either in policy or by the private sector, where a visionary mid- and long-term perspective is not common.

Benefits associated with dry ports and related intermodal transport services are often referred to within the context of large efficient hubs with modern and high-capacity infrastructure. However, the benefits are often the greatest in areas and markets with high trade/transaction costs. This is especially true for regions such as Africa which also have a large number of landlocked countries (cf. Kunaka 2013). In Chapter 6, Charles Kunaka addresses the issue of high logistics and trade costs and the role that dry ports may have in decreasing these trade barriers. The author observes that previously, road, rail and port projects were often designed and developed in isolation, rather than being designed as an integrated part of a transport system. Today, more strategic and coherent approaches to logistics are being adopted in many regions where port development is becoming more linked to hinterland transport systems. For many regions in Africa, this should mean more efficient access to global markets and should also facilitate intraregional trade (cf. Kunaka 2013).

In Chapter 7, Ragdu Dayal describes the development of intermodal transport in India by Indian Railways and its subsidiary Container Corporation of India (CONCOR). An extensive countryside network of ICDs (inland container depots) and CFSs (container freight stations), along with a comprehensive institutional framework, have all been developed. Although a somewhat late-starter in
developing the multimodal infrastructure, India has taken great strides in its steady and sustainable growth, with a comprehensive framework of systems, procedures and institutions already in place. The development and operation of dry ports in the country provides new challenges to face. These challenges involve the further penetration of hinterlands, along with the need to consolidate and coalesce facilities which have mushroomed in some areas, simultaneously with the need to expeditiously redress some practices which appear to distort the sector and have the potential to debilitate the system.

In Chapter 8, Vaibhav Shah investigates the dynamics of price, cost and quality of Indian dry ports. Due to improper planning, fiscal constraints, differences in status, non-standardisation, and imbalanced port–dry port integration, the author identifies the need for government intervention to bring standardisation, better quality of services and overall development of the sector. Once the standards are achieved, operations will become more harmonised and best practices more easily identified. The author asserts that better facilitation and a stringent regulatory environment would support future growth, with the goal being to maintain a steady and relatively competitive situation, with less focus on low pricing and more focus on quality and efficiency at Indian dry ports.

In Chapter 9, Jing Lu and Zheng Chang introduce the status of dry port development in China. Economic strategies which focus on a vast inland with tremendous resources and great potential have triggered an enthusiasm for dry port construction on the part of coastal ports in China. Port authorities have noticed that conventional port competition has evolved into a competition between the supply chains in which ports are involved. For seaports, a dry port can bring a port’s function forward in these supply chains, to an inland city for example, and can provide efficient hinterland transport and access. It may also ease a port’s demand for land for expansion, by moving logistics activities to the city. At the same time, for inland regions, the diverse functions that a dry port possesses may attract more investment and promote the local economy. These are seen as great opportunities to coordinate and balance Chinese economic development.

The empirical analysis uses Dalian as an example to introduce the characteristics, modes of construction, and the cooperation strategies taken by coastal ports and dry ports in the actual operational process in China. From the empirical analysis, the authors suggest that port operators should have closer cooperation with local government and should try to strengthen the relationship amongst other stakeholders such as shipping companies, customs, and railway operators.

In Chapter 10, Bruce Lambert, Chad Miller, Libby Ogard and Ben Ritchey provide a discussion of the role of dry ports in the United States, largely framing the role of dry ports as one element in a broader transportation network. Roles associated with the linkages between ports and hinterlands in the United States, with a specific emphasis on railway linkages, are also presented. The chapter ends with a discussion of the institutional challenges facing dry ports and opportunities related to dry port development.
In Chapter 11, Jason Monios and Bruce Lambert compare port hinterland access strategies in the form of intermodal freight corridors connecting ports and inland intermodal terminals. Detailed case studies of the Alameda Corridor, the Alameda Corridor East, Norfolk Southern’s Heartland Corridor and CSX’s National Gateway are presented in this chapter. The various projects represent corridors of different sizes, objectives and challenges relating to stakeholder management. The results indicate the importance of aligning stakeholder objectives with funding sources and planning schedules. Of particular importance to the development of hinterland access is recent US policy towards the provision of public funding through discretionary funding programmes. These developments are discussed in the context of US transport policy and the difficulties of government involvement in a traditionally privately owned and operated rail industry.

In Chapter 12, Leo Tadeus Robles describes the development process of dedicated areas for foreign trade in Brazil and, in particular, the Santos Metropolitan region. From a Brazilian regulatory and policy perspective, foreign trade is facilitated and enhanced in two dimensions. The first dimension concerns logistics, focusing on location sites, infrastructure and overall connectivity. The second dimension is based on legal regulations that are not necessarily related to a specific site or location. The author concludes that it is important that the various roles of dedicated areas are shared by Governmental Agencies in a vision for enhancing foreign trade as part of a more general objective towards poverty reduction, creating jobs and wealth generation opportunities open to all people.

In Chapter 13, Erick Leal Matamala, Gabriel Pérez Salas and Ricardo J. Sánchez examine the potential for developing logistics zones in Chile. By analysing the decisions of logistics operators regarding location selection, the authors are able to identify the potential for developing logistics zones. The methodology is based on an econometric model that contains variables influencing the location decision process. Combined with a cluster analysis, 49 Chilean provinces are classified. The results show that Santiago, Valparaíso and Concepción are the provinces with the highest potential, with market characteristics and port infrastructure as the main influences over this potential.

In fast growing economic regions, as described in Chapters 7–9 and 12–13, dry ports have evidently become a necessity for relieving the ever-increasing stress experienced by seaports in dealing with rapid economic expansion (e.g., India – Dayal 2013, Shah 2013; China – Lu and Chang 2013; Brazil – Robles 2013; Chile – Leal Matamala et al. 2013). Limited space at container yards, stress on the road infrastructure and congestion at the gates of the seaport are examples of effects that increase the need for better hinterland connectivity and the development of dry ports.

Conclusions

The benefits associated with dry ports and intermodal transport usually fall within the categories of cost-efficiency, environmental performance and logistics quality
As the benefits are enjoyed by many stakeholders, the interest in the concept of dry ports is multifaceted. Public actors and decision-makers often associate the dry port concept with improved competitiveness of local and regional businesses, increased attractiveness of the region and sustainable logistics development (Bergqvist 2008). As a result, the development of dry ports is often a process involving public actors, often in partnership with private actors, i.e. public–private partnerships (Bergqvist 2008). The involvement of public actors raises some interesting issues related to the institutional framework. Tendering, concession agreements, independency of terminal operations, transparency, ownership, responsibilities and roles are examples of difficult aspects that need to be considered in every dry port development process (Bergqvist 2013). Case studies suggest that these issues look quite similar regionally (e.g. in Europe) as well as globally, but are addressed in many different ways (cf. Shah 2011, Bergqvist 2013, Roser et al. 2013).

Public–private partnerships have the potential to balance the development process of dry ports by accounting for objectives and benefits from both a private and public perspective. The partnership may with great advantage utilise the characteristics and benefits of the different actors, e.g. the private actors’ closeness to the market and the public actors’ access to infrastructure investment funds and long-term perspectives, to name a few. The issue of aligning the different time-perspectives of different actors and aligning them with the funding sources and planning schedules is an important part of a successful development process (Monios and Lambert 2013, Bergqvist 2008).

In order to cope with these challenges and aspects, a number of key factors have been identified, e.g. local enthusiasm, formal arrangements and operational framework (Bergqvist 2013), PPP, information exchange (Furió 2013), port connectivity (Kunaka 2013), aligning stakeholder objectives with funding sources and planning schedules (Monios and Lambert 2013).

The concept of dry ports is continuously developing and new generations of dry ports continue to emerge, with an increasing number of sophisticated services being offered (Kunaka 2013, Gille and Bozuwa 2013, Bergqvist 2013). The increasing number of dry ports and the interest in collaboration and exploring the market opportunities for intermodal transport have led to an increasing interest in, and pressure on, the interconnection between nodes (i.e. particularly with respect to railways) and overall transport efficiency and capacity (Kunaka 2013, Bergqvist 2013).

The dry port concept has already generated great benefits globally and has been proven to provide logistics efficiency, low environmental impact and high logistics quality. Regional and local transport policies and infrastructure plans need to consider and address the contemporary challenges associated with the development of intermodal transport in general and dry ports in particular. On this basis, the best incentives for developing effective, efficient and sustainable transport systems can be identified. However, within this context, it is important to recognise that dry ports are a global phenomenon with local characteristics.
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References


