



Intermodal terminal concessions: Lessons from the port sector



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ABSTRACT

Tendering procedures for concession of port terminals to private operators have been the subject of considerable interest during the last decade. As a consequence, keys to effective port governance, particularly the landlord model, are fairly well understood, even standardised to some degree. By contrast, intermodal terminal contracts have been found to be quite varied, with little standardisation of procedures, requirements, risks, incentives or contracts even within a single country.

This paper applies lessons from the study of port terminal concession contracts to the intermodal sector. The World Bank port reform toolkit is used to create a framework with 72 provisions, which is then matched against five intermodal terminal concession contracts. The analysis reveals several uncertainties in intermodal concession contracts, relating particularly to a lack of specified provisions on performance monitoring and measurement, open access to users, infrastructure maintenance, service marketing and hand back procedures. The paper identifies how the port concession framework used in this paper can be adapted for use with intermodal terminals, as the first step towards developing a global standard such as that used in the port sector.

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1. Introduction

Port governance has been treated comprehensively in the literature. As major engines for driving economies, control of ports is a significant lever for governments to manage trade and its resultant economic benefits. Over recent decades, a general trend has been observed for port management to move from the public to the private sector (Baird, 2002). Tendering procedures for concession of port terminals to private operators have been the subject of considerable interest during the last decade (see Section 3). As a consequence, keys to effective port governance, particularly the landlord model, are fairly well understood, if not even standardised to some degree.

Intermodal terminals are, though generally smaller than ports, similarly important to trade flows, of strategic importance to countries, regions and municipalities (Ng & Gujar, 2009). Moreover, the use of intermodal transport to reduce emissions by taking a larger modal share of overland transport from road haulage is a key aspect of government emissions reduction targets (European Commission, 2001). Efficient operation of intermodal terminals and corridors is essential to reach these goals, but is constrained by various factors (see Section 2). Topics such as terminal design and rail/barge operations have been addressed in the literature, but “soft” factors such as ineffective management have received far less attention (Monios, 2014). In contrast to port concessions,

intermodal terminal management models are quite varied, with little standardisation of procedures, requirements, risks or incentives even within a single country (Bergqvist & Monios, forthcoming).

This paper focuses on the concession arrangement between public sector owner and private sector operator. The methodology is to apply lessons from the study of port terminal tendering procedures to the intermodal sector. The World Bank port reform toolkit is used to create a conceptual framework, which is then matched against a selection of intermodal terminal concession contracts. The analysis reveals where potential weaknesses and uncertainties in intermodal tendering processes can benefit from clear lessons from similar processes in the maritime sector. The goal is to provide the first step towards standardisation of intermodal terminal concessioning procedures.

The empirical research is based on a selection of case studies of intermodal terminal concessions in Sweden, according to the rationale that it was one of the earliest countries in Europe to liberalise its rail freight network and vertically separate infrastructure and services. Thus Swedish intermodal terminals are, like ports, often developed and owned by the public sector and leased on contracts to private operators. The tendering procedure by which these relationships are formalised provides a source of data analogous to the situation in ports and thus suitable for the research framework developed in this paper. While the geographical scope of the empirical data is limited to one country, the goal of the paper is to use these data to adapt the current port concession framework for use in the intermodal sector. Once the framework has been developed in this paper, future research can apply the findings in other contexts in order to refine the framework further.

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Section 2 reviews the literature on intermodal terminal development and operation to reveal the lack of research on the relationship between the intermodal terminal owner and operator and the potentially adverse impact on effective operations. Section 3 reviews the literature on port concessions to draw lessons for the intermodal sector, while Section 4 utilises the concession framework in the World Bank Port Reform Toolkit to derive a suitable framework applicable to intermodal terminals. Sections 5 and 6 outline the case study methodology and the background to the Swedish case, before the results of applying the framework are presented in Section 7. Section 8 presents conclusions and policy recommendations, in addition to suggestions for future research.

2. Intermodal terminal management and operations

The literature on intermodal terminals has addressed a number of key issues in recent years. The development phase, in particular, has received significant attention (e.g. Beresford, Pettit, Xu, & Williams, 2012; Bergqvist, Falkemark, & Woxenius, 2010; Flämig & Hesse, 2011; Hanaoka & Regmi, 2011; Monios & Wilmsmeier, 2012; Ng & Gujar, 2009; Rodrigue, Debie, Fremont, & Gouvernal, 2010; Roso, 2008; Wilmsmeier, Monios, & Lambert, 2011). The economic feasibility of intermodal operations, both in the terminal and along the corridor, has been an important topic for quantitative analysis (e.g. Arnold, Peeters, & Thomas, 2004; Ballis & Golias, 2002; Iannone, 2012; Janic, 2007; Kim & Wee, 2011; Kreutzberger, 2008), while qualitative approaches have sought to understand the importance of aligning cargo types with intermodal service characteristics (e.g. Eng-Larsson & Kohn, 2012; Monios, 2013; Slack & Vogt, 2007; Van der Horst & De Langen, 2008; Woodburn, 2003; Woodburn, 2011) as well as the role of transport industry actors in choosing intermodal transport rather than road haulage (e.g. Bärthel & Woxenius, 2004; Panayides, 2002; Runhaar & van der Heijden, 2005; Van Schijndel & Dinwoodie, 2000).

These papers reveal the importance of understanding the roles played by key actors in the public and private sectors, especially considering the fact that many intermodal terminals are owned by the public sector but managed on a concession basis by private sector operators. Little research has investigated these relationships and whether they have an adverse impact on effective operations; this is an interesting lacuna, given that questions have been raised regarding the efficacy of public investment in terminals that experience difficulty achieving economic viability (Gouvernal, Debie, & Slack, 2005; Hölting, 1996; Liedtke & Carillo Murillo, 2012; Proost et al., 2011).

A topic that has received only limited attention is the management model in intermodal transport (Lehtinan & Bask, 2012). Beresford et al. (2012) applied the World Bank port classification (public, private, tool, landlord) to dry ports, and Monios (2013, 2014) developed this classification further, using governance theory to explore how the different types of organisations that may own and/or operate a terminal can affect these relationships, for example whether the terminal is operated by a dedicated terminal operator, a rail service operator, or other sectors such as a 3PL or even a subsidiary of a port terminal operator. An area identified for future research was the relationships between owner, operator and user and how these influence the management of resources in the pursuit of efficient and effective operation of intermodal terminals. As a consequence, Bergqvist & Monios (forthcoming) explored the relationship between infrastructure owners, terminal owners, terminal operators and rail operators, finding that the contractual procedures are quite varied, with little standardisation of procedures, requirements, risks or incentives even within a single country. They concluded that greater standardisation is required to alleviate these uncertainties, but as yet no framework has been developed to address this need. It is the contention of this paper that such a framework may be found in the literature on port concessions.

3. Port concessions

A large body of literature exists on different models of port governance, a close examination of which is beyond the scope of this paper (e.g. Baird, 2000, 2002; Baltazar & Brooks, 2001; Brooks, 2004; Brooks & Cullinane, 2007; Brooks & Pallis, 2008; Cullinane & Song, 2002; Everett & Robinson, 1998; Ferrari & Musso, 2011; Hoffmann, 2001; Notteboom, De Langen, & Wouter, 2013; Pallis & Syriopoulos, 2007; Verhoeven & Vanoutrive, 2012). The World Bank (2001, 2007) identified four models: the public service port, the private port, the tool port (a mixed model where private sector operators perform some of the operations but under the direction of public sector managers) and the landlord port (the public sector retains ownership while the terminal management and operations are leased to private sector operators).

In many cases a handover of a public port terminal to a private operator is not a one-off action but an ongoing process of governance reform, leading to numerous parallels with the governance of intermodal terminals. For example, the influence of shipping networks on port terminal management (Wilmsmeier & Notteboom, 2011) is reflected in the need for intermodal terminals to attract and maintain traffic (Bergqvist et al., 2010), as the terminal owner and operator strive to embed the terminal in the larger flows of traffic governed by decision makers such as shippers, rail operators and 3PLs. The role of the port authority in the cluster of associated businesses and services agglomerated around a port (Bichou & Gray, 2005; De Langen, 2004; Hall, 2003; Hall & Jacobs, 2010) is mirrored in the increasing focus of planners to integrate intermodal terminals with logistics platforms and freight villages (Monios, *in press*). The devolution of port governance from one level of government to another rather than from the public to the private sector (Debie, Gouvernal, & Slack, 2007) can also be relevant because, in cases where the terminal is owned by a government, which level of government retains planning or funding powers can have a determinative impact on the responsiveness of the terminal contract (e.g. fees, access conditions) to changes in the industry, the market or the wider economy.

Advantages of greater private sector involvement in ports include increased efficiency and reduced cost to the public sector, while negative impacts include the loss or increased ambiguity of state control as well as the difficulties and risks involved in managing the tender process and subsequent monitoring (Baird, 2002). However, despite something of a standardisation of approach, applying this generic process to ports in different regions has produced a diversification of outcomes, varying according to local conditions (e.g. Baird, 2002; Ng & Pallis, 2010; Wang & Slack, 2004; Wang, Ng, & Olivier, 2004). Therefore, while a standard template is no guarantee of a standardised result in every case, such a template facilitates analysis of the process and the outcomes and comparison between cases.

4. Deriving a conceptual framework

The Port Reform Toolkit was first published by the World Bank in 2001 and updated in 2007. One of its stated aims is to provide support to public sector officials in “choosing among options for private sector participation and analyzing their implications for redefining interdependent operational, regulatory, and legal relationships between public and private parties” (p. xviii). It consists of eight modules. Module 4 (legal tools for port reform) contains advice on various legal instruments, including the preparation of concession agreements.

The World Bank toolkit provides a list of 72 provisions normally found in a concession or BOT (Build, Operate, Transfer) agreement. These cover the basic conditions and project scope, the hand over and hand back procedures, project finance and legal issues, extension works, operations, fee setting and performance monitoring. The World Bank model covers concession of existing terminals as well as the building of new ones (or extending current terminals).

The empirical analysis in this paper will examine all the 72 provisions in the World Bank model as the first step in systematising what

is currently utilised in intermodal terminal concession agreements, and from there to work towards a customised model. It is expected that some categories will not be applicable, due to the different operational requirements between ports and intermodal terminals, as well as the reduced complexity and traffic of the latter.

5. Methodology

The methodology is based on a selection of case studies from Sweden. The choice of a case study research approach was based on the ambition to analyse the dynamics of the phenomenon from a 'why' and 'how' perspective (Hilmola, Hejazi, & Ojala, 2005; Silverman, 2001; Yin, 1994). Case studies are particularly useful for exploratory research. The geographical focus on Sweden is based on the rationale that it is one of the earliest countries in Europe to liberalise its rail freight networks and vertically separate infrastructure and services. Thus Swedish intermodal terminals are, like ports, often developed and owned by the public sector and leased on contracts to private operators. The procedure by which these relationships are formalised thus provides a source of data analogous to the situation in ports and therefore suitable for the research framework developed in this paper.

A total of five cases were analysed. The volumes handled vary from 20,000 TEU to 80,000 TEU annually. Regarding ownership, all case sites are publicly owned, two by municipalities and three by the state-owned company Jernhusen. Four of the five cases are registered as limited companies and one operates directly under the Traffic and Property Management Department of the municipality. Table 1 illustrates the main characteristics of the five cases.

Two of the five cases were new-built terminals, hence they had no previous terminal operator; however, the three terminals owned by Jernhusen had the Swedish and Norwegian joint state-owned railroad company CargoNet as previous operator. All three Jernhusen-owned terminals ended up with new operators. As a result of acquisitions and renewed tendering processes, many of the terminals have actually changed operator since the original tendering processes. Currently, all five terminals are operated by different terminal operators. The terminal operators, with regard to the five cases, have been private since the tendering processes were completed and the concession contracts signed.

All cases performed terminal tendering processes sometime during the period 2009–2013. The normal tendering process was 3–6 months from publishing the request for tender to signing the concession contract. The main empirical data consisted of the terminal concession contracts, with more detail provided and data gaps filled by interviews with the relevant stakeholders. For cases that are limited companies, secondary sources such as annual reports have also been useful sources of information and, for the case that is directly owned by the municipality, additional information was obtained through the right-of-access principle in Sweden. The locations of the five cases have been kept anonymous for reasons of commercial confidentiality.

An essential criterion of good case study research is to beware of statistical inference. The sample in this paper does not allow the drawing of conclusions relating to the entire population. The goal of this paper is exploratory, based on a representative sample, in order to draw out

the issues. High or low coverage of a provision in the framework is not proof that such an item is important or not important. Rather, it indicates potential areas for future analysis with additional samples. Nevertheless, as this is the first attempt to standardise intermodal terminal concessions, such analysis is expected to provide a unique insight into the process.

6. Background to the Swedish case

The Swedish intermodal terminal network started developing when the state-owned rail operator SJ built some 40 terminals to facilitate the start of intermodal traffic (Bergqvist et al., 2010). The terminal network was rationalised during the 1980s and 1990s and decreased to about 15 terminals. One explanation for the reduction in the number of terminals was the increased focus on direct block trains, while the smaller terminals did not have a sufficient customer base to justify full block trains. New operators also settled into the market and the potential for cross-subsidisation between lines decreased.

During the 1990s new terminals started to be developed as a response to the deregulation of the railway market and the entrance of new rail operators. One of the reasons for the development was that the new rail operators had difficulty getting access to existing terminals since they were controlled by the main state-owned rail operator and not open access. The focus of the new operators was primarily on direct container shuttle trains to and from the port of Gothenburg. Examples of these are Eskilstuna, Nässjö, Insjön, Falköping, Hallsberg, Åmal and Ahus (cf. Bergqvist & Flodén, 2010). In some cases Swedish ports also developed intermodal terminals within or adjacent to their sea-related terminals.

The Swedish government has had a somewhat passive role in the development of intermodal terminals in the past. They have been more focused on ownership issues related to the state-owned rail operator, infrastructure development and the deregulation process. A few government-initiated investigations have been made focusing on the terminal network with the purpose of identifying critical terminals with special national interest from a transport system perspective. The purpose is to ensure that the Swedish Transport Administration considers these carefully in their overall planning and investment strategies for connecting infrastructure. As a result of further deregulation, the state-owned intermodal terminals came under the ownership of the state-owned company Jernhusen. During recent years, Jernhusen has been focusing on opening up the market for intermodal terminal operations. A handful of terminals have undergone public tendering procedures and attracted significant interest from potential terminal operators.

7. Applying the framework

For ease of analysis, the 72 provisions have been divided into sections. The provisions have been analysed according to three perspectives: whether the provision is necessary for intermodal terminals, to what level of detail each provision is currently specified, and to what level of detail each provision should be specified. The five intermodal terminals, coded A to E, have been analysed in terms of the 72

Table 1
The selection of cases and main characteristics.

Case	Level of public ownership	Ownership	Legal body	Traffic volumes per annum	Type of traffic	Type of terminal operator	Existing or new-built
A	Local	Municipality	Traffic and Property Management Department of the Municipality	~20,000 TEU	Containers	Private	New-built
B	Local	Municipality	Limited Company	~30,000 TEU	Containers, semi-trailers and wagon load	Private	New-built
C	National	Jernhusen/ Government	Limited Company	~30,000 TEU	Containers	Private	Existing
D	National	Jernhusen/ Government	Limited Company	~40,000 TEU	Containers and semi-trailers	Private	Existing
E	National	Jernhusen/ Government	Limited Company	~60,000 TEU	Containers and semi-trailers	Private	Existing

provisions of the World Bank Port Reform Toolkit in Table 3. For each provision, each terminal has been coded either:

- 0 - provision is not included in the intermodal contract
- 1 - provision is included, but very simply
- 2 - provision is included in detail.

The overall level of representation of each provision across all five terminals is then summarised as shown in Table 2.

Table 3 presents the results of the empirical analysis of mapping the five intermodal terminal concession contracts against the port concession framework.

The first striking aspect of the data is the high degree of commonality across the five cases, although, as noted earlier, care must be taken in drawing conclusions from this small sample. What can be seen is that, overall, provision specification for intermodal terminals is far less substantial compared to what is suggested in the port concession framework, as shown in Table 4.

The table reveals that the only section with comprehensive coverage (majority of 2s) is the section on fees. The next sections with good coverage (majority of 1s) are the introduction, hand over, project control and finance and the legal sections. The weakest sections are extension works (this may be partly because it is less relevant here), operations, performance and hand back procedures. These represent major problems, because, as shown by Bergqvist & Monios (forthcoming), lack of specification of these provisions leads to many day-to-day operational uncertainties. In order to resolve them, regular ongoing communication is required between the public sector owner and the private sector operator, leading to delays and increased costs.

Looking in detail at the sample contracts, it can be seen that many concession contracts lack important information and specifications regarding priority to customers, open access definitions, division of roles between infrastructure owner and terminal operator related to functions such as marketing efforts. Other important gaps are which performance standards and measures to use. Very few of the studied agreements incorporated performance monitoring processes with defined key performance indicators. Furthermore, there are weak definitions and specifications on the maintenance requirements for the terminal operator related to moveable assets, facilities and infrastructure. Another common undefined aspect is the operational subcontracting.

There are severe and critical gaps related to hand back procedures in all of the studied contracts. There is uncertainty on which grounds the contract can be terminated by the respective partner, termination compensations, termination procedures (e.g. formal inspection of moveable assets, facilities and infrastructure) and hand-back requirements. Furthermore, options for continuation are rare and the definition of ownership of assets is generally weak as well as asset transfers on expiry or termination and transfer of employees. The contracts also lack a clear framework for conflict resolutions which is particularly troublesome given the many gaps identified in the contract.

A final point is to look for any clauses that are not found in the port concession framework, in order to explore if port concession contracts are sufficient for intermodal terminal operations or whether new provisions should be added. None of the five cases studied for this paper included any additional clauses. This will be a topic for further research. Furthermore, as new concessions are made there is an opportunity for

further research by studying how these provisions are implemented and their consequences.

Close analysis of the identified gaps reveals that they pose a severe risk to terminal performance as they may hinder the efficient operation of the terminal and fail to resolve future situations that may arise over the course of time, particularly conflicts of interest and uncertainties over future liabilities. Several of the gaps can be explained by the lack of experience on behalf of the public sector officials managing the process and the fact that many of the tenders are first time terminal tendering processes. Such uncertainty makes the terminal less attractive to private sector operators who will therefore not be incentivised to bid for the contract as they may fear unexpected future costs and uncertain profit forecasts. In order to resolve these issues, a framework such as that used in this paper could be utilised in future, with care taken to address all relevant specifications in the required level of detail as listed in

8. Conclusions and research implications

The empirical analysis in this paper has used a selection of contracts to reveal which provisions from the port reform toolkit are currently specified in intermodal terminal concessions and to what degree. A clear lack of sophistication has been identified in intermodal terminal contracts compared to port concessions. While this may be due in part to the reduced complexity and shorter timescales, such uncertainties and discrepancies lead to inefficiency from a transport system perspective. Several implications for managerial practice as well as scholarly knowledge can be identified.

8.1. Implications for managerial practice

Much effort goes into planning of freight infrastructure to achieve government policy aims of modal shift, and governments (and government-backed infrastructure managers and rail ministries) strive to make track access and other regulatory aspects of rail operations manageable and affordable in order to induce private sector operators to enter the market of rail service provision. However, while intermodal terminal concession contracts do not exhibit any universality of conditions, terminal operators may not be able to offer handling services at consistently low prices to the rail operators, who in turn will be constrained in their ability to provide regular reliable services to shippers and forwarders at prices competitive with road haulage. When terminal users do not have confidence of stable and standard conditions across the network, potential service coverage may be constrained as certain terminals are favoured. Very few of the studied agreements incorporated performance monitoring processes with defined key performance indicators, which is an essential aspect of port terminal concessions and one that frequently leads to legal disputes when such terms are contended partway through a concession timeframe. The result of this is that usage of intermodal transport may be reduced, threatening the achievement of government modal shift policy targets.

Successful intermodal transport was made possible not simply by the invention or adoption of the container as a loading unit but by their increasing standardization into a handful of dominant types and sizes. As with equipment, so with operations; intermodal transport is not a seamless journey from origin to destination but the joining together of a number of discrete operations, several stakeholders,

Table 2
Classification system for each provision.

N/A	This provision is not needed in an intermodal terminal concession contract.
Probably not relevant but could be	This provision won't be relevant in most cases and the contracts in the sample have mostly 0 s or 1 s, but it should probably stay in the framework as it may be needed in some cases.
Needed in future	This provision is needed but most contracts currently don't have it (i.e. mostly 0 s).
Acceptable	This provision is needed and most contracts currently have it specified at a simple level (i.e. mostly 1 s) but that is reasonable.
Should have more detail	As above but this is an important provision and should be specified in detail (i.e. should be mostly 2 s).
Good	This provision is needed and most contracts currently have it specified at a detailed level (i.e. mostly 2 s).

Table 3
Port concession framework provisions coded by case.

No.	Section	No.	Provision	A	B	C	D	E	Comments		
1	Intro and basic conditions	1	Introduction	1	1	1	1	1	Acceptable		
		2	Definitions	1	1	1	1	1	Acceptable		
		3	Conditions precedent	1	1	1	1	1	Acceptable		
		4	Grant of concession	1	1	1	1	1	Acceptable		
		5	Term of the agreement	1	1	1	1	1	Acceptable		
2	Hand over	6	Employment	0	0	1	1	1	Acceptable		
		7	Transfer of assets	0	0	1	1	1	Acceptable		
		8	Hand-over of the terminal	1	1	1	1	1	Acceptable		
		9	Exclusivity	2	2	2	2	2	Good		
3	Project control and finance	10	Project	1	2	1	1	1	Acceptable		
		11	Project document compliance	1	1	1	1	1	Acceptable		
		12	Project finance	0	1	1	1	1	Acceptable		
		13	Lenders' security	1	2	2	2	2	Good		
4	Extension works	14	Functional requirements	1	2	1	1	1	Acceptable		
		15	Design solutions	1	2	1	1	1	Acceptable		
		16	Design developments	1	1	0	0	0	Acceptable		
		17	Design flaws	0	0	0	0	0	Needed in future		
		18	Applicable permits	1	1	1	1	1	Acceptable		
		19	Concession area conditions	2	2	2	2	2	Good		
		20	Archaeological or geological items	0	0	0	0	0	Needed in future		
		21	Building contract	0	0	0	0	0	Needed in future		
		22	Construction program	0	0	0	0	0	Needed in future		
		23	Progress reviews	0	1	1	1	1	Should have more detail		
		24	Extension events	0	0	0	0	0	Needed in future		
		25	Sanctions for late completion	0	0	0	0	0	Needed in future		
		26	Commissioning of the project phases	0	0	0	0	0	Needed in future		
		5	Operations	27	Operator's operational functions and activities	1	1	1	1	1	Acceptable
28	Port authority's port services			0	1	1	1	1	Acceptable		
29	Berthing priorities			0	0	0	0	0	Needed in future		
30	Security			0	1	0	0	0	Needed in future		
31	Use of the terminals			1	1	1	1	1	Should have more detail		
32	Operator's operational performance standards			0	0	0	0	0	Needed in future		
33	Maintenance of moveable assets, facilities and infrastructure			0	1	1	1	1	Should have more detail		
34	Operational subcontracting			0	0	0	0	0	Needed in future		
6	Fees			35	Tariff regulation (by port authority)	2	2	2	2	2	Good
				36	Tariff setting (by terminal operator)	2	2	2	2	2	Good
		37	Site lease (e.g. flat fee or per m ² , inflation, etc.)	1	2	2	2	2	Good		
		38	TEU fee (optional, may also specify min. throughput)	2	2	2	2	2	Good		
		39	Bank guarantee	0	1	2	2	2	Good		
		40	Refinancing needing approval of port authority	0	0	0	0	0	N/A		
		41	Release from rents, taxes, levies and other obligations and dues	0	0	0	0	0	N/A		
		42	Payments to the government	0	0	0	0	0	N/A		
7	Legal and insurance	43	Information supply to port authority (e.g. throughput, etc.)	1	1	1	1	1	Should have more detail		
		44	Legal compliance	1	1	1	1	1	Acceptable		
		45	Change in future law (e.g. tax increases)	0	0	0	0	0	Needed in future		
		46	Force majeure (what events beyond the operator's control will affect their performance)	1	1	1	1	1	Should have more detail		
		47	Insurance	1	1	1	1	1	Acceptable		
8	Hand back	48	Ownership of assets	1	2	2	2	2	Good		
		49	Option to continue	2	1	1	1	1	Acceptable		
		50	(Interim) termination by the government	0	1	1	1	1	Should have more detail		
		51	Termination by the operator	0	0	0	0	0	Needed in future		
		52	Termination procedure	0	0	0	0	0	Needed in future		
		53	Rights cease	0	0	0	0	0	Needed in future		
		54	Termination compensation	0	0	0	0	0	Needed in future		
		55	Hand-back	0	1	1	1	1	Should have more detail		
		56	Asset transfers on expiry or termination	0	1	1	1	1	Should have more detail		
		57	Information technology license	0	0	0	0	0	Probably not relevant but could be		
		58	No share or liability acquisition (cases where the port authority owns a share of the operator)	0	0	0	0	0	Needed in future		
9	Legal and insurance	59	Transfer of employees	0	0	0	0	0	Probably not relevant but could be		
		60	Conflict resolution	0	1	1	1	1	Should have more detail		
10	Performance	61	Waiver of immunity	0	0	0	0	0	N/A		
		62	Recognition of lenders' rights	1	1	1	1	1	Probably not relevant but could be		
11	Legal and insurance	63	Performance monitoring	0	1	1	1	1	Should have more detail		
		64	Transfer committee	0	0	0	0	0	Needed in future		
		65	Responsibilities (including actions of sub-contractors)	0	1	1	1	1	Acceptable		
		66	Liabilities (limited to losses relating to breaches of contract)	0	0	0	0	0	Needed in future		
11	Legal and insurance	67	Confidentiality	0	1	1	1	1	Acceptable		
		68	Disclosed data	0	0	0	0	0	Probably not relevant but could be		
		69	Change in institutional structures	0	0	0	0	0	Needed in future		
		70	Variations	1	1	1	1	1	Acceptable		
		71	Applicable law	1	1	1	1	1	Acceptable		
		72	Notices	0	0	1	1	1	Acceptable		

Note: 0 (provision is not included), 1 (provision is included but very simply), 2 (provision is included in detail).

Table 4
Summary of provision specification by category.

No.	Section	No. of provisions	Coverage
1	Intro and basic conditions	5	All provisions are covered, but only in basic terms.
2	Hand over	4	All provisions are covered, but only in basic terms, except for exclusivity, which received detailed coverage in all five cases. This is acceptable as it is the hand back that needs more detailed specification.
3	Project control and finance	4	All provisions are covered, but only in basic terms. This is acceptable as this is a fairly straightforward topic.
4	Extension works	13	Good coverage of 5 out of 13. It is difficult to comment further on this section as it is very case specific. It would require more detailed qualitative analysis of individual cases.
5	Operations	8	Good coverage of 4 provisions but no coverage of 4. This is an area of concern.
6	Fees	8	High coverage of 5 provisions, no coverage of 3 which are not needed. This is a good result.
7	Legal and insurance	5	Good coverage of 4 out of 5 but more detail is needed on these important provisions.
8	Hand back	13	6 well covered and 7 not covered. This is a concern as this is a very contentious topic.
9	Legal and insurance	2	Coverage of 1 but not the other. This is not so important.
10	Performance	4	Coverage of 2 out of 4. This is a concern as these provisions need detailed specification.
11	Legal and insurance	6	Coverage of 4 out of 6. This is acceptable but could be improved.

numerous legal jurisdictions and a large amount of paperwork. Increasing standardisation has been essential to the development of intermodal transport, not only in the physical standards of containers and handling apparatus, but in domestic and international regulation, in business practice and information sharing, and in supply chain integration through mergers and acquisitions. One important element of the above is the management and operation of intermodal terminals. Likewise, the rise in port efficiency in recent decades has resulted not solely from standardisation of equipment (e.g. container types, handling equipment, cellular holds in container vessels) but changes in management structure and the harnessing of private sector investment. It is not yet clear if such advantages have been fully exploited in the intermodal sector; application of a standardised framework can, therefore, enable identification of sources of inefficiency that need to be addressed through better tendering procedures.

The particular cases analysed in this paper show severe shortages in crucial areas of terminal concession agreements relating to operations, performance monitoring and hand back procedures. The limited sample size in this study means that care must be taken extrapolating results to the wider population of terminals in Sweden, Europe and further afield. Future research is required to determine if the findings in the Swedish case are reflected in other geographical contexts. The aim of this paper, however, was to use Sweden as a test case for this methodology and to establish the groundwork for a framework that can be applied to all terminals. As seen in the port sector, a standardised framework could be of great use to public sector administrators managing the concession process, who do not always possess the required industry knowledge to specify such provisions with confidence. It would also enable private sector operators to enter the market with greater certainty and less risk, which is also the aim of public sector terminal developers. The research has shown that the port concession framework can be applied successfully to intermodal terminals, and the framework facilitates identification and comparison of deficiencies. Such analysis can be useful both to public sector managers seeking the best concession for their terminal, as well as private sector terminal operators seeking the most appropriate and profitable location to enter the market in a particular country or region.

8.2. Contribution to scholarly knowledge

Such a framework is also of use to researchers. The intermodal literature tends to focus either on the development process or the operational phase, with less attention given to the link between the two, i.e. how the developer finds an operator and secures both efficient operations and acceptable prices for users. The findings from this paper suggest that this process is quite uncertain and may be exerting considerable limitations on the quality of the intermodal network. A solution to this problem should therefore be a significant priority for public sector network managers, and requires analysis of further cases to identify

best practice that can be included in the framework. Another topic for further research is whether any additional provisions should be added to those examined in the current port concession framework, as well as changes over time when a terminal goes through successive concession processes.

This research is exploratory, thus this paper provides the first step in addressing this topic and introducing a degree of standardisation. Now that a framework has been developed in this paper, future research is needed to apply the findings in other contexts in order to refine the framework further. Such research can identify if there are differences between countries, and to what degree processes of standardisation have been implemented and how successful they have been, with a view eventually to develop a global standard such as that used in the port sector.

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References

- Arnold, P., Peeters, D., & Thomas, I. (2004). Modelling a rail/road intermodal transportation system. *Transportation Research Part E*, 40(3), 255–270.
- Baird, A. J. (2000). Port privatisation: Objectives, extent, process and the UK experience. *International Journal of Maritime Economics*, 2, 177–194.
- Baird, A. (2002). Privatization trends at the world's top-100 container ports. *Maritime Policy & Management*, 29, 271–284.
- Ballis, A., & Golias, J. (2002). Comparative evaluation of existing and innovative rail-road freight transport terminals. *Transportation Research Part A*, 36(7), 593–611.
- Baltazar, R., & Brooks, M. R. (2001). The governance of port devolution: A tale of two countries. *Proceedings of the 9th World Conference on Transport Research, Seoul, 2001*.
- Bärthel, F., & Woxenius, Y. (2004). Developing intermodal transport for small flows over short distances. *Transportation Planning & Technology*, 27(5), 403–424.
- Beresford, A., Pettit, S., Xu, Q., & Williams, S. (2012). A study of dry port development in China. *Maritime Economics & Logistics*, 14(1), 73–98.
- Bergqvist, R., Falkemark, G., & Woxenius, J. (2010). Establishing intermodal terminals. *International Journal of World Review of Intermodal Transportation Research (WRITR)*, 3(3), 285–302.
- Bergqvist, R., & Flodén, J. (2010). Intermodal road-rail transport in Sweden—on the path to sustainability. *World Conference on Transport Research, 11–15 July 2010, Lisbon*.
- Bergqvist, R., & Monios, J. (2014g). The role of contracts in achieving effective governance of intermodal terminals". *World Review of Intermodal Transportation Research (WRITR)* (forthcoming).
- Bichou, K., & Gray, R. (2005). A critical review of conventional terminology for classifying seaports. *Transportation Research Part A: Policy and Practice*, 39, 75–92.
- Brooks, M. R. (2004). The governance structure of ports. *Review of Network Economics*, 3, 168–183.
- Brooks, M. R., & Cullinane, K. (2007). *Devolution, port governance and port performance*. London: Elsevier.
- Brooks, M., & Pallis, A. A. (2008). Assessing port governance models: process and performance components. *Maritime Policy & Management*, 35, 411–432.
- Cullinane, K., & Song, D. W. (2002). Port privatisation policy and practice. *Maritime Policy & Management*, 22, 55–75.

- De Langen, P. (2004). Governance in seaport clusters. *Maritime Economics & Logistics*, 6, 141–156.
- Debrie, J., Gouvernal, E., & Slack, B. (2007). Port devolution revisited: the case of regional ports and the role of lower tier governments. *Journal of Transport Geography*, 15, 455–464.
- Eng-Larsson, F., & Kohn, C. (2012). Modal shift for greener logistics – the shipper's perspective. *International Journal of Physical Distribution and Logistics Management*, 42(1), 36–59.
- European Commission (2001). *European transport policy for 2010: Time to decide*. Luxembourg: European Commission.
- Everett, S., & Robinson, R. (1998). Port reform in Australia: Issues in the ownership debate. *Maritime Policy & Management*, 25, 41–62.
- Ferrari, C., & Musso, E. (2011). Italian ports: Towards a new governance? *Maritime Policy & Management*, 38, 335–346.
- Flämig, H., & Hesse, M. (2011). Placing dryports. Port regionalization as a planning challenge – the case of Hamburg, Germany, and the Süderelbe. *Research in Transportation Economics*, 33(1), 42–50.
- Gouvernal, E., Debrie, J., & Slack, B. (2005). Dynamics of change in the port system of the western Mediterranean. *Maritime Policy & Management*, 32(2), 107–121.
- Hall, P. V. (2003). Regional institutional convergence? Reflections from the Baltimore waterfront. *Economic Geography*, 79, 347–363.
- Hall, P. V., & Jacobs, W. (2010). Shifting proximities: The maritime ports sector in an era of global supply chains. *Regional Studies*, 44, 1103–1115.
- Hanaoka, S., & Regmi, M. B. (2011). Promoting intermodal freight transport through the development of dry ports in Asia: an environmental perspective. *IATSS Research*, 35(1), 16–23.
- Hilmola, O. -P., Hejazi, A., & Ojala, L. (2005). Supply chain management research using case studies. *International Journal of Integrated Supply Management*, 1(3), 294–311.
- Hoffmann, J. (2001). Latin American ports: Results and determinants of private sector participation. *International Journal of Maritime Economics*, 3(2), 221–241.
- Höltgen, D. (1996). *Intermodal terminals in the trans-European network*.
- Iannone, F. (2012). A model optimizing the port-hinterland logistics of containers: The case of the Campania region in Southern Italy. *Maritime Economics & Logistics*, 14(1), 33–72.
- Janic, M. (2007). Modelling the full costs of an intermodal and road freight transport network. *Transportation Research Part D: Transport and Environment*, 12(1), 33–44.
- Kim, N. S., & Wee, B. V. (2011). The relative importance of factors that influence the break-even distance of intermodal freight transport systems. *Journal of Transport Geography*, 19(4), 859–875.
- Kreutzberger, E. D. (2008). Distance and time in intermodal goods transport networks in Europe: A generic approach. *Transportation Research Part A: Policy & Practice*, 42(7), 973–993.
- Lehtinan, J., & Bask, A. H. (2012). Analysis of business models for potential 3Mode transport corridor. *Journal of Transport Geography*, 22(1), 96–108.
- Liedtke, G., & Carillo Murillo, D. G. (2012). Assessment of policy strategies to develop intermodal services: The case of inland terminals in Germany. *Transport Policy*, 24, 168–178.
- Monios, J. (2013). Identifying governance relationships between intermodal terminals and logistics platforms. *TRI working paper*.
- Monios, J. (2014). *Institutional challenges to intermodal transport and logistics*. London: Ashgate.
- Monios, J. (2014s). Intermodal transport as a regional development strategy: The case of Italian freight villages. *Growth and Change* (in press).
- Monios, J., & Wilmsmeier, G. (2012). Giving a direction to port regionalisation. *Transportation Research Part A: Policy & Practice*, 46(10), 1551–1561.
- Ng, K. Y. A., & Gujar, G. C. (2009). Government policies, efficiency and competitiveness: The case of dry ports in India. *Transport Policy*, 16(5), 232–239.
- Ng, A. K. Y., & Pallis, A. A. (2010). Port governance reforms in diversified institutional frameworks: Generic solutions, implementation asymmetries. *Environment & Planning A*, 42, 2147–2167.
- Notteboom, T., De Langen, P., & Wouter, J. (2013). Institutional plasticity and path dependence in seaports: Interactions between institutions, port governance reforms and port authority routines. *Journal of Transport Geography*, 27, 26–35.
- Pallis, A. A., & Syriopoulos, T. (2007). Port governance models: Financial evaluation of Greek port restructuring. *Transport Policy*, 14, 232–246.
- Panayides, P. M. (2002). Economic organisation of intermodal transport. *Transport Reviews*, 22(4), 401–414.
- Proost, S., Dunkerley, F., De Borger, B., Günheeman, A., Koskenoja, P., Mackie, P., et al. (2011). When are subsidies to trans-European network projects justified? *Transportation Research Part A*, 45(3), 161–170.
- Rodrigue, J. -P., Debrie, J., Fremont, A., & Gouvernal, E. (2010). Functions and actors of inland ports: European and North American dynamics. *Journal of Transport Geography*, 18(4), 519–529.
- Roso, V. (2008). Factors influencing implementation of a dry port. *International Journal of Physical Distribution & Logistics Management*, 38(10), 782–798.
- Runhaar, H., & van der Heijden, R. (2005). Public policy intervention in freight transport costs: Effects on printed media logistics in the Netherlands. *Transport Policy*, 12(1), 35–46.
- Silverman, D. (2001). *Interpreting qualitative data: Methods for analysing task, text and interaction*. London: Sage.
- Slack, B., & Vogt, A. (2007). Challenges confronting new traction providers of rail freight in Germany. *Transport Policy*, 14(5), 399–409.
- Van der Horst, M. R., & De Langen, P. W. (2008). Coordination in hinterland transport-chains: A major challenge for the seaport community. *Maritime Economics & Logistics*, 10(1–2), 108–129.
- Van Schijndel, W. J., & Dinwoodie, J. (2000). Congestion and multimodal transport: A survey of cargo transport operators in the Netherlands. *Transport Policy*, 7(4), 231–241.
- Verhoeven, P., & Vanoutrive, T. (2012). A quantitative analysis of European port governance. *Maritime Economics & Logistics*, 14, 178–203.
- Wang, J. J., Ng, A. K. Y., & Olivier, D. (2004). Port governance in China: A review of policies in an era of internationalizing port management practices. *Transport Policy*, 11, 237–250.
- Wang, J. J., & Slack, B. (2004). Regional governance of port development in China: A case study of Shanghai International Shipping Centre. *Maritime Policy & Management*, 31, 357–373.
- Wilmsmeier, G., Monios, J., & Lambert, B. (2011). The directional development of intermodal freight corridors in relation to inland terminals. *Journal of Transport Geography*, 19(6), 1379–1386.
- Wilmsmeier, G., & Notteboom, T. (2011). Determinants of liner shipping network configuration: a two-region comparison. *GeoJournal*, 76, 213–228.
- Woodburn, A. (2003). A logistical perspective on the potential for modal shift of freight from road to rail in Great Britain. *International Journal of Transport Management*, 1(4), 237–245.
- Woodburn, A. (2011). An investigation of container train service provision and load factors in Great Britain. *European Journal of Transport and Infrastructure Research*, 11(2), 147–165.
- World Bank (2001). *Port reform toolkit*. Washington DC: World Bank.
- World Bank (2007). *Port reform toolkit* (2nd ed.). Washington DC: World Bank.
- Yin, R. K. (1994). *Case study research. Designs and methods*. London: Sage.