Hybrid Governance Models for Integrated Ocean Carriers

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Abstract

The development of the market for third party logistics service provision has opened the possibility for ocean carriers to integrate along the supply chain and expand the scope of their activities beyond port-to-port ocean transportation. The level of integration observable in the industry is though variable and a clear understanding of the rationale that may lead an ocean carrier to integrate vertically along the supply chain is the subject of an intense academic debate. The present paper aims at providing an alternative approach to the problem using the paradigms developed within the field of transaction cost economics to explain organisation governance structures. The paper highlights the role of bilateral dependency in the determination of the adequate alignment between the type of transactions and the organisation governance forms and provides the background for further empirical testing.

Keywords

Vertical integration; transaction cost economics; liner shipping; container logistics.

Introduction

The importance of third-party logistics service provision also referred to as *logistics outsourcing*, has increased steadily in the last two decades and so has the attention that practitioners and academics alike have dedicated to the subject (Marasco, 2008). Firms have several options available to them as far as logistics services are concerned. They can provide logistic services in-house, they can have these activities provided by a logistics subsidiary previously purchased or set up, or they can simply purchase the service from an external company (Razzaque and Sheng, 1998).

Transportation in particular is one of those activities that are most likely to be outsourced (Selviaridis *et al*, 2008). Some of the reasons for this are cost savings, problems associated with the internal administration of transportation functions, the fact that transportation is not a core competence for many firms, issues related to supply chain flexibility, or simply the complexity of managing certain transport services or the high investment costs necessary to set them up (Boyson, *et al.*1998). This is certainly the case for ocean transportation, for which the high costs associated with the provision of a regular, frequent and reliable intercontinental service would be prohibitive for most firms, and surely highly inefficient for society (Brooks, 2000). Outsourcing relationships between shippers and ocean carriers are central for international supply chains and globalisation by ad large (Cullinane, 2004).

Since the 80's, ocean carriers have expanded the scope of their operation to include other logistics services, such as terminal handling, hinterland transportation and to the extreme supply chain management and value added logistics, in the phenomenon referred to as *vertical integration* along the supply chain (Heaver, 2002*a*). Since the extent to which a carrier embraces vertical integration is deeply rooted to its overall business strategy (Robinson, 2005), various degrees of integration can be observed in the industry (Fremont, 2009). The empirical review of the industry developments in the recent years (Slack and Fremont, 2009), reveals ocean carriers have developed their capabilities of providing logistics services along different paths.

On the one extreme there are those carriers that have marginally invested in logistics beyond hinterland transportation, such as MSC, while on the other there are those that have centred their activities on integrated *door-to-door* logistics solutions, such as NYK (Fremont, 2009). In between, we have carriers that have set up logistics service providers (LSP) under the umbrella of the same parent company (APL and APL Logistics), and that have built a considerable portfolio of parallel logistics activities (Maersk Line). In the recent months some ocean liners have divested participation in container terminals (e.g. CMA-CGM) and other chain investment raising doubts on the viability of maritime supply chain integration strategies especially in market downturns (Hailey, 2009).

The grounds on which an ocean carrier may be brought to opt for a certain setup as far as the extent of its logistics activities are still unclear, in particular in period of rapid business change. One of the core theoretical arguments used to justify vertical integration along the chain refers to the reduction in transaction costs that eventually it delivers (Haralambides, *et al* 2009). Nonetheless, the role of transaction costs in shaping the organisational form of the logistics activities of a container carrier has not yet been satisfactorily explicated. What determines the degree of integration between a LSP and an ocean carrier? What are the attributes of the transaction governance models that make a carrier choose for a specific integration setup?

These questions call naturally for the paradigms developed in the context of transaction cost economics (TCE). But to date no attempts have been made to apply the frameworks of TCE to the liner shipping industry[1], and only few references can be found in the supply chain management and logistics literature by and large (Williamson, 2009). TCE however offered successful analytical perspective in a wide range of applied problems (Geykens, Steenkamp and Kumar, 2006), including outsourcing contracts (see Coltman *et al.* 2009; Barthélemy and Quélin, 2006). The purpose of this paper is to provide an alternative and original analytical approach to issues connected to vertical integration in liner shipping by making use of the lenses of TCE. The aim of the article is to use TCE in order to provide a renewed research agenda on vertical integration.

The article is structured as follows. In the next section we provide an overview of the issues discussed in the literature on vertical integration in liner shipping along the supply chain. This is followed by the presentation of the

[1] Although no applications exist to liner shipping industry, in the article of Masten, *et al.* (1991), *'The costs of organisation'*, the authors use the shipbuilding industry as an empirical estimation of organisation costs.

fundamental TCE concepts useful in discussing economic organisation issues. The discussion on the economic organisation in liner shipping is presented in the following section. This corresponds to the prioritisation phase of the analysis. Particular attention is given to the role of transaction costs that constitute the subject of section five. This is followed by the description of the resulting governance model and the discussion on the efficient alignment between ocean transportation and logistics, which embody the conceptualisation and operationalisation phases of the analysis respectively. Some final remarks and issues for further research conclude the paper.

Containerisation and vertical integration along the supply chain

Logistics Outsourcing and Ocean Transportation

Logistics outsourcing can be defined as:

> *'[…] activities carried out by a logistics service provider on behalf of a shipper and consisting of at least management and execution of transportation and warehousing. In addition, other activities can be included, for example inventory management, information related activities, such as tracking and tracing, value added activities, such as secondary assembly and installation of products, or even supply chain management. Also, the contract is required to contain some management, analytical or design activities, and the length of the co-operation between shipper and provider to be at least one year, to distinguish third-party logistics from traditional "arm's length" sourcing of transportation and/or warehousing*' (Berglund *et al.* 1999, p. 59).

This definition highlights two important distinctions between third party logistics service provision and *arm's length* contracts. It implies some sort of long-term agreement between the parties (typically a year) and the provision of management and design activities.

Logistics outsourcing can be constructed on different forms of supply chain relationships. The spectrum of ways of building cooperation instead of adverse relations exclusively based on price negotiations, has been studied extensively and concepts such as cooperation, coordination and collaboration in the chain have emerged as effective ways of structuring supply chain relations next to market negotiations (Speckman, *et al.* 1998). Nonetheless supply chain relationships are not yet fully understood (Hines and Samuel, 2007) and the organisational structure that is better apt at providing an array of logistics services is still open to debate (Selviaridis and Spring, 2007; Selviaridis and Spring, 2007).

The benefits of outsourcing are multiple and can be summarised in strategic, financial and operational benefits (Selviaridis *et al.* 2008), and refer mostly to the possibility of reducing costs and increasing competitive advantage (Razzaque and Sheng, 1998). Empirical analyses seem to point towards transportation and warehousing as the most outsourced services with respect to supply chain advanced solutions such as information management and process control (Lieb and Bentz, 2005; Wilding and Juriado, 2004).

Containerization (Hayuth, 1987; 1992), the advances of ICT, (Evangelista, 2005) and the centrality of ocean transportation in global supply chains (Rao and Young, 1994), have offered shipping lines the possibility to engage in the provision of additional logistics services in addition to ocean transportation. The opportunities offered by this new form of business have been rapidly embraced by all major carriers (Midoro and Parola, 2006), and today most of them have some form of participation in hinterland transportation, terminal handling and other logistics services (Fremont, 2009). Carriers recognise the importance of providing integrated services, and *door-to-door* rates, as opposed to *port-to-port* rates, have become the norm in the industry (Acciaro and Haralambides, 2007).

Vertical integration in liner shipping

Even if first seminal contributions may be traced back to the 70's, the first structured approach to frame ocean transportation in a more complex (vertical) transportation chain appeared in Casson (1986). The author concluded that vertical integration is clearly a trend in the shipping industry since carriers could enjoy substantial costs advantages when investing in terminals and hinterland transportation. Casson also argues that some of these advantages can be obtainable by means of contractual arrangements (i.e. outsourcing) and do not necessary call for vertical integration. As clearly discussed by Heaver (2002*b*), even if shipping lines are increasingly becoming vertically integrated, the management of logistics services remains distinct from the management of shipping. This has also been observed in a survey conducted by Frémont (2009): even if a large number of shipping lines provide logistics services, they are in most cases neither priced nor offered in conjunction with ocean transportation.

It seems that the forecast of Frankel (1999*a*) forecasted that integration in the supply chain would become in the long term the only viable strategy for ocean carriers, has not yet been realised. More recent contributions (Heaver 2002*a*; 2002*b*; 2005; Evangelista, 2005; Frémont, 2009), although recognising the crucial impact of integration strategies on ocean carriers and shippers, are more cautious and stress the fact that integration along the supply chain raises a set of controversial issues. First and foremost the perception of liner shipping customers that may prefer to deal with independent logistic service providers (Heaver 2002*a*). Secondly are issues related to the different managerial focus of ocean transportation and logistics service provision: costs control for the former and customer service for the latter (Frémont, 2009). To those we could add that empirically the claims for the cost advantages deriving from vertical integration have not yet been tested.

An important example of vertical integration is represented by the joint provision of ocean transportation and terminal operations in the phenomenon described as dedicated terminals (Haralambides *et al*. 2002). The provision of transport together with terminal operations is the first and easiest form of vertical integration in the shipping industry (Parola and Musso, 2007). Soppé *et al.* (2008) present a detailed analysis of the costs and benefits of dedicated terminals for ocean carriers and the implications for port authorities. Haralambides *et al*. (2002) identify as a major driver behind the development of dedicated container terminals the greater flexibility, reliability, short turnaround times and enhanced efficiency in the management of the global chain. These

advantages though did not seem to be enough to prevent the recent cases of container terminal participation sales that took place in the past year. Whether these are the results of conscious strategic decisions or of the need for immediate cash relief is difficult to assess at this stage (Hailey 2009).

Downturn or not, some fundamental reasons to vertically integrate are bound to remain important. In the end, one of the fundamental theoretical arguments presented in support of vertical integration refers to the technical economies, of which vertical economies and economies of diversification are typical examples (Shepherd, 1997: p. 152). Most of the literature on integration along the supply chain in general refers to some forms of cost advantages attainable through vertical integration, since cost reduction is one of the preeminent goals for companies (Treacy and Wieresma, 1993). At the basis of the discussion for vertical integration, is the possibility of attaining some sort of economic advantages by changing the nature of the transaction. Typical examples are better control of the supply base (Choi and Krause, 2006) and procurement (Bharadwaj and Matsuno, 2005). The competitive advantage of a logistics service provider lies in its ability to harness the costs deriving from combining logistics services together (Deepen *et al*, 2008). In doing so he is in a better position to control and reduce costs, and identify value creation opportunities for its customers.

We can rephrase the previous line of reasoning stating that vertical integration in liner shipping is motivated by the advantages that accrue to ocean carriers and their customers from a different way of transacting. Vertical integration in liner shipping implies a change in chain control from the shipper (or logistics service provider) to the ocean carrier. This is consistent with the approach taken by Robinson (2005). In his insightful paper, the author precedes a step further, stating that a shipping line is *de facto* a LSP.

> '*Shipping lines will only derive competitive advantage by delivering the value that the customer will accept – not by operating on extensive networks, or by operating with larger and faster ships or by operating clever e-business systems through these may be fundamental to the value proposition offered by the line and accepted by the customer*' (Robinson, 2005: p. 252).

Competitive advantage and the chain system perspective that Robinson uses are one of the alternatives to interpret vertical integration. We hope in the next paragraphs to be able to show that TCE can offer another valuable perspective. Before looking at the application of TCE to the liner shipping industry, it is expedient to provide a background note on the theory of economic organisation in the perspective of TCE.

Economic Organisation and Transaction Costs

The purpose of economic organisation

Using the lenses of transaction cost economics, the main purpose of economic organisation is adaptation (Williamson, 2008). Economic actors adapt spontaneously to changes in the market (Hayek 1945, pp. 526-527), or pursue a '*conscious, deliberate and purposeful*' adaptation though administration in

hierarchies (Barnard, 1938, p.9). Markets and hierarchies are the polar modes of economic organisation, each with distinctive strengths and weaknesses. In order to explain the connection between transactions and organisational adaptation that lead to certain forms of economic organisation, it is important to focus on specific attributes of transactions. Most of the literature on TCE focused on asset specificity, uncertainty and frequency (Williamson, 2008).

Asset specificity has been widely studied (Williamson 1975; 1979; Grossman and Hart, 1986; Klein, Crawford and Alchian, 1978). Williamson (1991) reports six asset-specificity distinctions:

- Site specificity aiming at economising inventories and transportation costs;
- Physical asset specificity that entail the development of technical relations n the transaction;
- Human asset specificity deriving from learning-by-doing and economies of experience;
- Brand name capital;
- Dedicated asset that entail the development of infrastructure or investment dedicated to a specific customer;
- And temporal specificity characterised by timely responsiveness.

Asset specificity is also the driving force behind bilateral dependency. Bilateral dependency though is not necessarily problematic if contracts were not incomplete and parties would not have to adapt to disturbances. Disturbances are the result of uncertainty and jointly with asset specificity they constitute the major objective of contractual action. Frequency of contracting actions becomes relevant when reputation effects are tangible and the costs of setting up a contract with a new party are substantial (Williamson 2008).

Transaction governance attributes

Next to the transaction aspects, the TCE identifies a set of attributes of transaction governance structures. These attributes give rise to different adaptive strengths and weaknesses and can be categorised as incentive intensity, administrative command and control, and contract law regime. The relation among transaction attributes and governance structures can be summarised using the words of Williamson (2008: p.9):

> '*Transactions, which differ in their attributes, are aligned with governance structures, which differ in their adaptive strength and weaknesses, so that to accomplish a transaction cost economising result.*'

Incentives of decision-makers and other economic agents are the fundamental factors that distinguish among market and non-market organisations (Williamson, 1996). In particular the market structures are characterised by high-powered incentives, little degree of administration control and legalistic contract law regime. Hierarchy in contrast features low-power incentives, high degree of administration and weak contract law regime, since the firm is its own dispute settlement forum (Williamson 2008). Between the two extreme governance structures of hierarchy and market, Williamson (1991)

proposes and analyses hybrid forms. Hybrid forms feature semi-strong incentives, an intermediate administrative control and a semi-legalistic contractual law regime (Williamson 1991, p. 281).

The important issue is how the alignment between transactions and governance structures is achieved. Asset specificity plays a crucial role on the definition of the desirable governance structure. Asset specificity with limited or no exogenous disturbances places internal organisation at a disadvantage with respect to market contracting, since hierarchies entail increase bureaucratic costs. When disturbances though become more frequent, the costs associated with asset specificity increase and the strong market incentives may impede adaptability, since parties try to appropriate adaptive gains as much as possible. In this setting hierarchy may provide better governance (Williamson 1991).

The hybrid contracting is located in between hierarchy and market with respect to incentives, adaptability and bureaucratic costs. With respect to markets hybrid governance is characterised by lower incentives but allows for better coordination among parties. With respect to hierarchy hybrid governance reduces the ability to coordinate among parties but in turn increases the incentives intensity (Williamson 1991). A clear example provided by Williamson (1991) of the differences between the various forms of governance is the sale of branded products by single brand shops (hierarchy), market and franchise (hybrid). Further examples come to mind in supply chain context, where backward integration of manufacturing into procurement is an example of hierarchy. A form of hybrid is provided by the selective policy towards suppliers applied by McDonalds restaurants.

It should be noted that vertical and lateral integration are considered forms of hierarchy. To the eyes of the transaction cost economist, these forms of integration come as a response to the necessity of parties to adapt. Williamson (1991) presents two forms of adaptation. Adaptation A, where *A* stands for ***A****utonomy*, corresponds to the neoclassical paradigm according to which consumers and producers respond to prices in order to maximise utility and profits. Adaptation C, where *C* denotes ***C****ooperation*, enters the picture when, because of disturbances, bounded rationality and opportunism, bargaining becomes costly and authority has adaptive advantages with respect to markets. Integration should then be employed when other instruments fails, since markets deliver better results in adaptation A respect.

The Economic Organisation of Liner Shipping

Transactions in liner shipping

How do the concepts presented in the previous paragraph could be applied to the liner shipping industry in the quest of explaining the specific type of set-ups we observe in practice? Before proceeding with the discussion on the organisation of liner shipping, it is instrumental for a clearer definition of the problem to elaborate on the nature of the transactions we are focusing on.

We can identify the following transactions that are relevant for our discussions: the transaction of the carrier with a shipper (named B in fig. 1) and a transaction of a carrier with a logistics service provider (A in fig.1). In addition

we will refer to the transaction of the LSP with the cargo owner (C in fig.1). It should be considered that the nature of transaction A is different is looked at from the side of the carrier or from the side of the LSP. For the former it is a customer transaction, while for the LSP it is one of the many outsourcing relations. In the rest we will refer to vertical integration as the situation in which the transaction A, instead of being aligned with a market is organised hierarchically or though a hybrid form of governance.

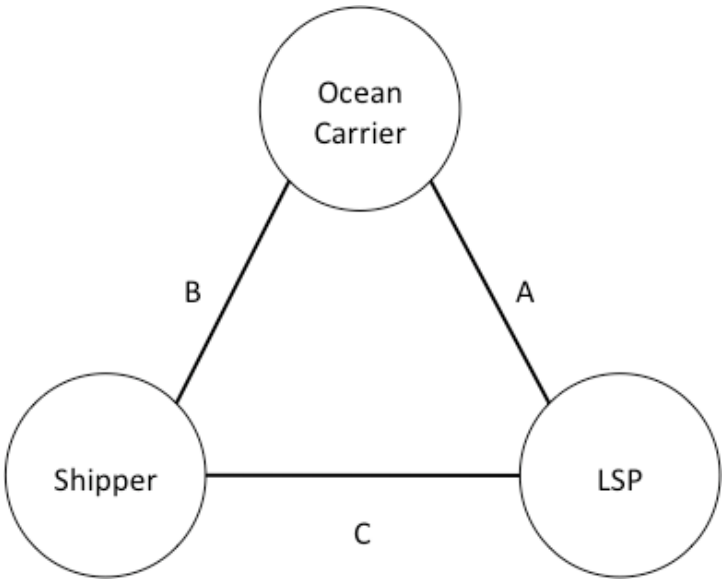


Figure 1: Transaction among shippers, LSPs and ocean carriers

Adaptation in liner shipping

In the rest of the discussion, in order to disentangle the issue of vertical integration along the supply chain, we will refer to the pragmatic methodology proposed by Williamson (2009). The pragmatic methodology is in line with the theoretical frameworks developed by the TCE and is built around three precepts: kept is simple, get it right and make it plausible. The theory develops on three steps, prioritisation, conceptualisation and operationalisation. With the first we focus on what are the central forces in the theory, with the second we proceed with describing those defining aspects of the central forces and the third is achieved by naming and explicating the attributes of the transactions and the governance structures that emerged in the analysis.

Starting with prioritisation, the main purpose of all economic organisation is adaptation (Williamson, 1991) as mentioned in the previous paragraph. In order to identify how liner shipping adapts to the market disturbances, it is useful to analyse the reasons for which vertical integration is likely to emerge. This provides an indication of the type of disturbances that affect the contracting between ocean carriers and LSP.

Heaver (2002*b*; 2005) mentions demand complementarity, costs reduction and other benefits (mainly strategic market control increase and business diversification). Similarly Frémont (2009) expands on the argument of Heaver (2002*b*) explaining that shipping lines vertically integrate in the attempt to capture cargo. This would reduce the dependency on freight forwarders for volumes. In addition Frémont (2009) refers to an argument presented by

Notteboom (2002; 2004) and points at the necessity for carriers to reduce costs on the hinterland leg of *door-to-door* transportation since the use of larger vessels tends to increase the relevance of the hinterland costs with respect to costs associated with the sea-leg.

This explanation refers to a large extent to changes in demand requirements. The growth of the third party logistics service provision (Rabinovich, *et al*. 1999, among others), the increased centrality of supply chain management thinking (Horne, 1989) and the competitive pressure that characterised liner shipping in the last thirty years (Fusillo, 2006; Slack and Frémont, 2008), constitute the some of the disturbances that influence the industry governance structure. Although in general disturbances in demand can be accommodated directly through the market (adaptation A), structural differences such as those we have witnessed may require adaptation of type C (Coltman *et al*, 2009).

Shippers have been faced with changing market conditions and this has triggered the search for better ways of outsourcing their logistics (Berglund *et al,* 1999; Notteboom, and Merckx, 2006). But why should shipper entrust more than ocean transportation to an ocean carrier when they have a large number of third party logistics service providers that specialise in finding best logistics service solutions? Although a detailed answer to this question is not yet available, we can think of the following reasons: the shipper has already extensive relations with the ocean carriers and the shipper's chain is extensively based on ocean transportation. As the shipper is dependent on ocean transportation for the transaction, instead of using another party, may find advantageous to make use of the same carrier. In high market condition, the shipper may be under the impression that acquiring an integrated service from a carrier may even offer discount opportunities on the chain with respect to purchasing services from a third partly logistics service provider.

Midoro and Parola (2006) try to explain from a business development point of view the reasons behind vertical integration. The major driver for some companies seemed to be business diversification and build on investment opportunities in related markets. For other companies, generally part of larger industrial conglomerates, the decision to invest in logistics was motivated by the desire at a group level to better control distribution and marketing in expanding markets. This is most notably the case for vertical integration in the 80's for the major Japanese carriers and has been confirmed by a set of interviews done on the topic by Acciaro and Haralambides (2007). In this case, the disturbances influencing the industry structure are connected to the change in the global production system, i.e. globalisation, and the business diversification opportunities this opened.

Vertical integration, nonetheless, could also be motivated by operational considerations. In addition to the relevance of container logistics (in combination with vessel logistics and freight logistics) as a source of operational efficiency, as clearly discussed by Frémont (2009), integration in the terminal industry would grant a carrier advantageous conditions in terms of slot availability and increased flexibility (Haralambides, *et al.* 2002, Heaver, 2005). The emergence of a global stevedoring industry represent also a disturbance

factor, by changing the nature of competition in for terminal handling and providing further business opportunities (Midoro *et al.* 2005; Olivier *et al.* 2007). The complete discussion on the issue of integration between terminals and ocean carriers though would require a more extensive analysis that cannot be done here.

The reasons discussed refer to specific types of disturbances that intervene to affect the organisational asset. We can summarise these disturbances around demand, technical economies, competitive environment, and internal company strategy.

The Issue of Transaction Costs

Types of transaction costs

The issue of transaction costs is often listed as an important concept to explain and justify vertical integration. Excluding conglomerate integration, that may be relevant for shipping groups (e.g. *A.P. Møller Mærsk*), vertical integration in the traditional meaning occurs when transactions are taken out of the market and become organised by one firm. Using Coase's words, where by *combination* the author intends lateral integration (see text note in the original article):

> '*There is a combination when transactions which were previously organised by two or more entrepreneurs, become organised by one. This becomes integration when it involves the organisation of transactions which were previously carried out between the entrepreneurs on a market.'* (Coase, 1937, pp. 397-398).

In this sense, forms of vertical integration in the liner industry would include upstream, shipbuilding, container building and agency services, freight forwarding downstream. Transaction costs reduction opportunities seems obvious, mostly connected to contract negotiation and search costs, similarly to the case of railroads described by Coltman, *et al.* (2009). Nonetheless no empirical measurement has been performed so far in the liner industry. The integration between logistics service providers and ocean carriers on the other side, is somewhat different, since we have hardly witnessed full integration and most carriers will keep on selling capacity to competing LSP (Slack and Frémont, 2008; Frémont, 2009). In this sense, transaction cost reductions, although possible, might not be enough to justify vertical integration.

In addition to transaction costs, reasons for vertical integration are the technical economies and group synergies obtainable between an ocean carrier and a logistics provider, in terms of marketing, increase chain visibility and shared cost reduction. The issue is whether these economies are strong enough to grant the new integrated entity a competitive advantage with respect to other ocean carriers and LSPs. Although no conclusive answer is available in the literature or empirically, it is likely that the existence of these economies depends on shipper type, product vertical and geographical circumstances. As pointed out by Frémont (2009) synergies between container logistics (essentially terminal and hinterland transportation) are rather obvious, while synergies at the freight level of the chain are more difficult to justify.

Nonetheless, recent interviews conducted by Acciaro (2009), seem to point that although rare, these synergies are possible. This is also in line with the survey performed by Selviaridis *et al.* 2008 on the type of services outsourced to LSP.

Asset specificity and bilateral dependency

In the case of the transaction between an ocean carrier and LSP the relevant level of transaction costs depends on the asset specificity and the level of bilateral dependency in the transaction. This level is bound to depend on the type of supply chain we are dealing with. If we analyse the list of categories of asset specificity provided by Williamson (1991), the following interpretation with reference to the liner and LSP industry and can be worked out.

- Site specificity aiming at economising inventories and transportation costs; in this category the definition of network paths and the locations for terminals, warehouses, and distribution centres.
- Physical asset specificity that entail the development of technical relations in the transaction; This may related to the development of specific coding and RFID technologies, or, for the example the technical relation between post-panamax vessels and post-panamax cranes.
- Human asset specificity deriving from learning-by-doing and economies of experience; this relays on the ability of accommodating customers requests.
- Brand name capital; this refers t the association of a carrier and its logistics service provider.
- Dedicated asset that entail the development of infrastructure or investment dedicated to a specific customer; the development of terminals or hinterland gateways.
- And temporal specificity characterised by timely responsiveness; fundamental in logistics to favour just-in-time responses for example.

Alternative Modes of Governance

Governance models

If we define transaction cost as the costs emerging from a specific alignment between a transaction and a governance model, we can develop a conceptual testable comparison of three situations:

- The transaction between an ocean carrier and a LSP takes place on a market (no-integration);
- The transaction between an ocean carrier and a LSP takes places within the boundaries of an integrated firm (hierarchy). This corresponds to the case of a carrier that has the full capabilities of a LSP or of a LSP that has acquired vessels (full-integration).
- The transaction between the ocean carrier and the logistics service provider is of a more hybrid nature. This can materialise in practice through long-term contracts, partnerships, integration of the logistic service provision and transportation under the same group management.

If we work out the possible models nested in the last case, we can propose the categorisation presented in the following table.

Table 1: Vertical integration models in liner shipping.

Model		Description
C	Carrier	Pure carrier: the carrier focuses exclusively on ocean transportation
CL	Carrier + LSP	The carrier is associated with a LSP that operates as a completely independent company but is under the control of the same holding or group. Ocean transportation has a dominant role on the strategies of the group.
I	Carrier/LSP	The carrier offers a full range of logistics services. Further distinctions in this category could refer the extent of the range of logistics services provided, e.g. hinterland transportation or freight logistics.
	LSP/Carrier	The LSP offers a wide range of logistics services and acquired the capability of offering ocean transportation by directly operating vessels.
LC	LSP + Carrier	The LSP and the ocean carrier operate under the same holding or group. In this case the LSP is the primary focus of the group
L	LSP	The LSP does not offer ocean transportation by directly operating vessels.

Pure ocean carriers and pure LSP (C; L)

The advantages in terms of transaction costs of this form of organisation relies on the high incentives it provides. This organisation form allows for rapid change in strategy and a strong focus on the bottom line. Business opportunities may be foregone and synergies between activities cannot be exploited. This organisational form may not be able to respond effectively to changes in customer demands. Transactions between carriers and LSP take place on the market.

Intuitively the structure of the liner industry was characterised by C until the 80's, when the disturbances connected with supply chain thinking allowed for other forms of transaction governance. Although carriers have more and more moved in some forms of integration, examples still exist of carriers focusing exclusively on ocean transportation.

Integrated carriers (I)

The main focus of integration is to take advantage of the cost reduction deriving from control *vis-à-vis* market transactions. Integration should be favoured when critical chain managing the interfaces on the market becomes more expensive than the cost of higher degree of control and decrease of incentives. In assessing the effectiveness of this form of governance require adopting the perspective of a LSP. Does the availability of an asset like ships grants the LSP a stronger competitive advantage with respect to a non-asset-based LSP? Does the provision of logistics services grant the carrier that chain competitive advantage as proposed by Robinson (2005)?

Full integration naturally sacrifices incentives in favour of better administrative command and control. The reduction in incentives deriving from integration may be compensated by the gains obtainable through coordination.

Coordination though also comes at a cost. In general terms high coordination is recommended for high level of bilateral dependency, so in those cases where the LSP and the carrier work hand in glove. In our categorisation, we proposed integration centred on logistics and centred on ocean transportation. These can be considered as transitory arrangements, until full integration is achieved. An example of companies that has come close to full integration could be NYK Logistics and Megacarriers.

Hybrid (CL; LC)

The last set of possible outcomes refers to hybrid forms of integration that has been defined in the table above as CL and LC. In these circumstances the ocean carrier and the LSP are independent companies, although under the same control of a holding company or group. This type of construction seems to be the most frequent in the industry, although the costs of hybrid models can also be substantial (Williamson, 1991).

Efficient alignments between ocean transportation and logistics

After the description of the possible governance models, it is useful to proceed deriving refutable implications the lead to the efficient alignment between the economic organisation of ocean transportation and logistics service provision and the type of transactions involved between carriers and LSP. This phase of the analysis is referred to as *operationalisation*. Using the words of Williamson (2008, p. 8):

> *'Operationalisation is accomplished by naming and explicating the key attributes of both transactions and governance structures, by working out the efficient alignments between transactions and governance and by empirical testing. What is required is identifying bilateral dependency'.*

The theory calls for identifying those transaction costs that rise as a result of organisational maladaptaion. This is the result of a dimensionalisation phase, where the variation of costs is connected with the attributes of the transaction.

Dimensionalisation

Reviewing the various models developed in the previous paragraph, what is the level of asset specificity, uncertainty and frequency connected with each of the transaction governance model? A reasoned summary of the level of asset specificity is tentatively provided in the following table.

Table 2: Asset specificity, uncertainty and frequency attributes to governance forms in liner shipping.

	Asset specificity	Uncertainty	Frequency of the transaction
Market (C and L)	Low asset specificity High powered incentives	High uncertainty	High importance of reputation
Hierarchy (I)	High asset specificity Low powered incentives	High uncertainty	High importance of setup costs
Hybrid (LC and CL)	Different levels of asset specificity	Lower uncertainty	Reputation and setup costs are relatively negligible

The success of hybrid governance models is connected the level of efficacy of credible commitments (Williamson, 1983). When transactions become highly uncertain, setup costs are high and the role of reputation is crucial for the transaction, then credible commitment is not effective in ensuring a successful transaction and hybrid models may lead to increase in costs.

Predicted alignments

Given the dynamic nature of the outsourcing relations, it is unlikely to be able to provide a *one-size-fit-all* type of solution. On the contrary, the observation of the changes taking place in the liner shipping industry point towards a very different approach. It is important then to identify key parameters that may contribute to read the adaptation efforts made by carriers and LSPs.

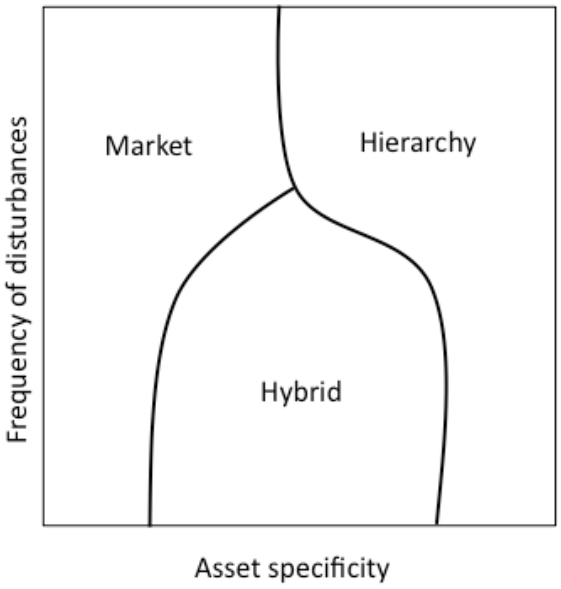
A first type of distinction points at measures of asset specificity. In some forms of vertical integration, asset specificity may play a crucial role. Let us consider the case of terminal integration. The transaction we are referring to is between a carrier and a terminal. The issue of asset specificity would lead to answer the question, how crucial is the terminal in the provision of the service given the characteristics of the carrier network? Let us assume that this level of asset specificity is k. If k is 0 – i.e. there is no bilateral dependency – we may assume that the terminal does not respond to any specific needs of a carrier. In other words, the terminal can be easily replaced. In this context then it is advisable not to increase administrative control on the terminal (i.e. integration), and transact terminal services under unassisted market (e.g. multiuser terminals).

Naturally integration is not the only option to reduce the exposure of a carrier-terminal bilateral dependency to disturbances. Terminals and carriers have developed a large variety of safeguard measures, ranging from long-term contracts to joint-ventures. Using the categorisation of Williamson (2008) we can refer as the level of these safeguard measures as s, where s=0 corresponds to unrelieved hazard. In those cases in which both k and s are positive, all forms of hybrid governance are possible, up to the extreme of integration. The level of inter-firm contractual safeguards is bound to increase as the complexity of the transactions increase. Integration should be opted for only when contractual breakdowns become frequent and costly and unified ownership is the only alternative to cooperative adaptation (Grossman and Hart, 1986).

High frequency of the disturbances in the transactions, with the increase in contract breakdowns, might lead to preference for market organisation or hierarchy with respect to hybrid organisations depending on the level of asset specificity (figure 2). This observation would justify the 'decoupling' of logistics and ocean transportation trend that is taking place under the current more 'uncertain' market conditions and provides an interesting explanation of increase integration of ocean transportation and logistics that took place in more stable markets.

The implications of this approach to organisation are far-reaching. Consider for example the impact on the viability of bundle pricing for door-to-

door transportation, or even integrated logistics services. Since transaction costs savings are offset by higher variability, bundling propositions may be less attractive in highly variable markets. As an example, assuming a customer is interested in an integrated proposition. This integrated proposition requires from the side of both parties some degree of bilateral dependency. In the moment in which markets become unstable, the costs associated to the adaptation of the contract to the requirements of the parties increase so that to offset the costs advantages granted by the flexibility offered by the hybrid governance. Therefore either the parties move to a market governed transactions, characterised by the ability to renegotiate contracts, or full integration takes place, reducing incentives and at higher bureaucratic costs. The distinction between the two depends on asset specificity, therefore terminals and hinterland transportation – that are components in the chain characterised by high asset specificity will be fully integrated, consumer logistics or value added logistic on the other side, will be governed by market transactions, to the extreme even in the case of the same group, e.g. Maersk Line and Maersk Logistics, APL and APLL. Those companies nonetheless retain the cost saving associated with certain asset specificities, such as brand name.



Source: Williamson (1991)

Figure 2: Organisation form responses to changes in frequency.

Conclusions

The paper presented an alternative explanation to vertical integration between ocean transportation and other logistics services based on TCE. We explained that TCE offers valuable insights in analysing the issues connected with vertical integration in the industry. We proposed alternative models of governance and discussed their characteristics in terms of asset specificity and contractual safeguard measures. The paper aimed at opening a dialogue between the branch of maritime economics that studies integration in liner shipping and the theory developed by transaction cost economists.

The obvious extension of this paper would imply the empirical estimation of the transaction costs and organisation costs. There are several examples of

studies that attempted successfully this type of exercises (see Geyskens, *et al*. 2006). Further issues investigate empirically refer to the quantification of the technical economies deriving from group synergies between ocean carriers and LSP. This analysis would require undertaking an analysis of these economies on the basis of geography, product vertical and customer characteristics.

Further issue for investigation refer to the impact of vertical integration on competition and on customer relations. Vertical integration is bound to have effects that go beyond the specific transaction that is internalised within the firm. Instruments to assess this type of problems though are still under development in the apparatus of TCE. A further interesting point of further research relates on how could global carriers and LSP leverage on the eventual synergies delivered by integration. The efficacy of the alignment between transactions and governance lies in the degree of bilateral dependency between the ocean carrier and the LSP. The characterisation of bilateral dependency in this industry is an urgent area open for investigation.

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