

**ACCOMPANIED Vs. UNACCOMPANIED TRANSPORT IN SHORT SEA
SHIPPING BETWEEN SPAIN AND ITALY: AN ANALYSIS FROM
TRANSPORT ROAD FIRMS PERSPECTIVE¹**

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Abstract:

Short Sea Shipping (SSS) is called to play a key role in ensuring sustainable mobility in the European context. In the last years several studies have tried to define the SSS requirements and also to identify lines of this nature that were economically viable.

However, no studies approach the profile of their users – the road transport firms- and the organizational patterns adopted by them, in order to gain a better understanding of this transport modality. This research, on the basis of a sample of 81 international road transport firms that use SSS between Spain and Italy, analyze the profile of these companies and certain elements inherent to their relationship with the shipping firms, according to the two modalities of organizing their SSS transport operations: accompanied vs. unaccompanied.

Introduction

In September 2001, the European Commission published the White Paper of Transport “*European Transport Policy for 2010: Time to Decide*”. Its content was, and still is, revealing of the future of the freight transport sector in the coming years, and above all it shows what the priorities of European governments will be on the subject of transport policies and infrastructure. Specifically, the Commission identified a series of difficulties in the European transport sector: (1) The unequal growth of modes of transport, so that the road one represents nowadays the dominant alternative as far as freight transport is concerned; (2) The congestion of the roads and of the most important rail corridors. Moreover, in the case of roads, international freight transport contributes to increase this problem. Despite it, the Commission recognises that, for short journeys, no alternative transport is as well adapted to the needs of the economy as road transport; (3) The harmful effects for the environment and for citizens' health, not forgetting the high cost in human lives lost every year on the roads.

Most of the investments in infrastructures in recent years have been made in roads, but in the new context marked by sustainable development, it is advisable to reorient investments towards rail, maritime and river transport. This decision is reinforced by the forecast of the European Commission's Directorate General for Energy and Transport, which estimates an increase of 70% in freight transport until the year 2020 for the Europe of the 15, a percentage which would increase to 95% if the new member states are taken into consideration. Such percentages would imply the saturation of many communication infrastructures if these increases were absorbed mostly by road transport. In this sense, Short Sea Shipping (SSS) is called upon to play a priority role in absorbing the growing flows of intra-community transport. Indeed, the Commission catalogues it as the only mode of transport capable of sustaining the rapid growth of the

European Union. It is also considered to be the only mode that offers real possibilities of achieving transfer of loadings from the road, improving competitiveness, reducing environmental costs and favouring cohesion in an expanded European Union.

Despite the efforts of the European Commission and of the different national and local administrations, the development of SSS is involving numerous difficulties –it does not seem to achieve an appropriate level of recognition or market share in the overall transport network- (Paixão and Marlow, 2005; 2009; Perakis and Denisis, 2008). Apart from administrative problems or those associated with inefficiencies of the ports, international road transport firms are notoriously reluctant to use ships in the movement of their semi-trailers, since this implies a substantial change in their operational model (López-Navarro, Moliner, Sánchez, Callarisa and Rodríguez, 2005; Gouvernal, Slack and Franc, 2009). However, the success of SSS requires the adhesion of road transport companies.

In recent years several studies have tried to justify the strengths and weaknesses of SSS (Paixão and Marlow, 2002; Perakis and Denisis, 2008), identify SSS links on the basis of comparative analyses in terms of costs and transit times in relation to road transport (Castells and Martínez, 2006; Koi, 2009; Paulauskas and Bentzen, 2008), or identify the elements that determinate the choice between transport modes (Brooks and Trifts, 2008; García-Menéndez and Feo-Valero, 2009). However, no studies approach the profile of the road transport firms that use this mode of transport, or analyse the elements of the relationship between such firms and the shipping companies that operate the lines.

Customers of SSS services are road transport companies and understanding their characteristics and behaviours is important to ensure the success of this mode of transport. It appeared necessary to interact directly with transport companies and to study the patterns and organisation adopted by these users in order to gain an

understanding of relevant criteria governing SSS services. For the road transport companies it is important to have information around these questions because it will enable them to take appropriate decisions in their SSS operations. And this is precisely the aim of the present study. In this research, on the basis of a sample of 81 international road transport firms that use SSS between Spain and Italy, we analyse some dimensions of road transport firms and certain elements inherent to their relationship with the shipping companies, in terms of two models of organizing the combined transport: accompanied vs. unaccompanied modes.

Literature review

Despite the growing awareness of SSS in recent years, conditioned to a large extent by the support of public institutions, there is still a limited research in this field. First, it is important to point out the existence of a certain lack of consensus around the definition of SSS (Lombardo, 2004; Brooks and Frost, 2004; Grosso, Lynce, Silla and Vaggelas, 2009). This, as pointed out explicitly by Lombardo (2004), does not only cause confusion on the semantic level, but also generates difficulties for analyzing SSS from a general perspective and developing public support initiatives to enable its success in the market. The European Commission defined SSS as “*The movement of cargo and passengers by sea, between ports situated in geographical Europe or between those ports situated in non-European Countries, having a coastline on the enclosed seas bordering Europe*” (Commission of the European Communities, 1999). Gouvernal et al. (2009) indicate that for a proper understanding of the nature of SSS it is necessary to distinguish between the different types of traffic, which give rise to several types of markets. Specifically, they distinguish between bulk and conventional cargoes, and within the latter they differentiate between: (1) Conventional maritime transport which

does not involve bulk products or containers but where the products are packed in bags, pallets, packets or boxes; (2) Container traffic; (3) Roll-on/Roll-off (Ro-Ro) system. Perakis and Denisis (2008), point out that SSS can be categorized according to the type of cargo transported, the types of vessels or the waterways that are being used. As these authors indicate, there are two major types of cargo units for the transport of general cargo -freight containers and truck-trailers or semi-trailers-, and SSS can provide transportation options for both types of cargos. Table 1 provides a comparison of the two types of SSS. Containers are the least expensive mode of carrying goods, but they are also the slowest due to the inherent characteristics of their operations (Paixão and Marlow, 2002). Ro-Ro allows shorter delivery times compared to container. This reduction in delivery time is particularly important for trade of valuable goods in a world in which just-in-time principles are increasingly widespread (Torbianelli, 2000). In this respect our study is circumscribed to the segment of SSS where truck-trailers or semi-trailers are transported in Ro-Ro ships, and considering it a direct alternative to all-road transport. We therefore exclude the “captive” maritime market where Ro-Ro traffic does not compete with road transport.

Insert Table 1 about here

From a conceptual view it is also necessary to indicate that, in recent years, special emphasis has been placed on the so-called Motorways of the Sea. The European Commission indicates that Motorways of the Sea constitute a special mode within SSS

and can be defined as *existing or new sea-based transport services that are integrated in door-to-door logistical chains and concentrate flows of freight on viable, regular, frequent, high-quality and reliable Short Sea Shipping links. The deployment of the Motorways of the Sea network should absorb a significant part of the expected increase in road freight traffic, improve the accessibility of peripheral and island regions and states and reduce road congestion* (Commission of the European Communities, 2007).

Motorways of the Sea are thus conceived as high quality transport services based on SSS that constitute a real competitive alternative to land transport. In consequence, we can consider Motorways of the Sea as a more restrictive concept than SSS, able to generate additional value (Parantainen and Meriläinen, 2007). Its development will be conditioned to the capacity to offer efficient door-to-door transport that, in general terms, will show levels of competitiveness that can be matched with those of the unimodal land transport chains (Baird, 2007; Paixão, 2008). Specifically, the White Paper on European Transport Policy for 2010 stated that Motorways of the Sea should:

(1) Be an integral part of door-to-door logistic chains; (2) Offer efficient, regular, reliable, and frequent services that can compete in terms of transit time and price; (3) Have ports connected to the motorways and with effective hinterland connections, rapid administrative procedures and a high level of service. However, as Valente de Oliveira Oliveira –European Coordinator for Motorways of the Sea- (2008) suggests, the concept of Motorways of the Sea suffers from a lack of clarity among the players in the sector.

This author, from the views provided by these players, points out the main success characteristics associated with the Motorways of the Sea. Reliability is the most important success factor followed by the frequency of the line. With respect to the frequency, one sailing a week is the minimum, but it would go too far to decree at EU level that frequency should be at least 3 or 5 times a week. Other important factors are

the ease of access and use for the clients, close contacts with potential clients and continuous exploration of the market, and marketing of the concept among transport companies and getting these to change their way of doing business and their traditional investment patterns. Basically, as Beskovnik (2006: 30) points out, the motorways of the sea must be seen as a new transport concept in the wider context of the marketing of a multimodal logistics offer.

The literature has broadly identified the advantages and disadvantages deriving from the use of SSS rather than the roads. Basically, taking as reference the study by Paixão and Marlow (2002), the advantages of SSS over road transport can be summarised as: (1) Lower saturation of maritime infrastructures and lower freight rates due to inherent economies of scale; (2) Lower consumption of energy, and consequently, lower emission of pollutants into the atmosphere; (3) Human resource advantages, such as shorter operating periods for drivers; (4) Greater safety –fewer social costs related to traffic accidents-, and; (5) Improvement of communications between some member states. Despite its advantages, SSS also presents a large number of difficulties with regard to achieving its adequate integration into multimodal logistical chains (Paixão and Marlow, 2002; Beskovnik, 2006; Commission of the European Communities, 2006; Kapros and Panou, 2007; Perakis and Denisis, 2008). In these studies, the main weaknesses pointed out are the absence of an efficient image in door-to-door service – transport of goods by trucks seems to offer a significant degree of flexibility which compensates for the higher cost of door-to-door road transport–, greater complexity from the administrative point of view, and problems deriving from the efficiency of the ports, their connections with their *hinterland* and the lack of flexibility of port services.

In order to shift freight from road to sea, several studies have analysed the conditions for SSS development. Some studies have tried to identify SSS links that would be

feasible, basically judging by the flows of freight exchanged between the geographical areas joined by those links and on the basis of comparative analyses in terms of costs and transit times in relation to road transport -for example, Shortsea Promotion Centre–Spain (2003a,b); Vassallo, Lloyd and Arnaud (2004); Martínez and Olivella (2005); Castells and Martínez (2006); Ministerio de Fomento, (2006); Paulauskas and Bentzen (2008); Koi (2009)-. A dominant conclusion in these studies is that SSS will be more competitive when the use of the ship occupies a higher proportion of the multimodal transport route considered, given the greater possibilities of utilizing the economies of scale associated with maritime transport. Other studies have evaluated, from a economic perspective, aspects such as the cost structure in a SSS line (Saurí, 2006), the parameters that impact the most on the economic return of SSS in accordance with a cost-benefit analysis methodology (Mange, 2006), or the factors influencing SSS costs and operators' pricing policies (Grosso et al., 2009). There are also several studies covering issues relating to the determinants of the modal choice (García-Menéndez, Martínez-Zarzoso and Piñero de Miguel, 2004; Lloyd and Vassallo, 2005; Kapros and Panou, 2002; Brooks and Trifts, 2008; García-Menéndez and Feo-Valero, 2009). The findings of these studies indicated that other non-cost factors appeared to be key modal choice drivers. In particular, reliability, travel time, frequency of services, how accessible port infrastructure is, the overland distance covered by the shipment or the relative value added of the freight. In order to achieve a substantial market share, SSS must be able to compete with road transportation not only in prices, but also in services. As Baird (2007) argues, the challenge for maritime transport is to offer the same overall service package as road transport. This alternative must provide free flow without any bottlenecks, physical or operational, and be a credible choice (Haralambous, 2005).

Considering the SSS weaknesses and its opportunities for development, a key factor is its integration in the framework of multimodal transport chains. The concept of intermodality relates to the development of competing organizational forms of transport chains using at least two different transport modes along a transport chain and based on unitized cargo, in order to create alternative solutions to unimodal door-to-door road transport chains (Commission of the European Communities, 1997). As it was mentioned above, SSS falls mainly within the context of a door-to-door intermodal link, where transshipment at the road/sea interface is the key element. Multimodal transport chains are more complex than pure road transport. They involve a greater number of transport agents and require the use of a larger number of infrastructures, and correct linkage with terrestrial modes of transport being necessary for the maritime transport to be able to provide door-to-door services (Camarero and González, 2004; Macharis and Bontekoning, 2004). Consequently, coordination among the various actors in the supply chain is an important prerequisite in order to achieve a competitive advantage (Womack, Jones and Roos, 1990; Perakis and Denisis, 2008; Valente de Oliveira, 2008). As Paixão and Marlow, (2005: 376) state, there is no doubting the existence of success stories in SSS as an alternative mode to other means of transport, where its integration in multimodal logistic supply chains has been achieved.

Paixão and Marlow (2005) analyzed the service attributes that SSS must deliver to be integrated into multimodal logistics chains in a more competitive way. In descending order of importance, these factors are the following: (1) Carrier's logistic network design and speed; (2) Cost of service (freight rates) and reliability/quality; (3) Carrier's representatives' sales and after-sales behaviour; (4) Involvement in the forwarding industry; (5) Service guarantee; (6) Corporate image; (7) Commercial/operational; (8) Carrier-shipper's relationship policies and investment policy. As Paixão and Marlow

(2005) suggested, results highlight the need to focus on the efficiency of the transport network and the adoption of a relationship management approach where partnerships or strategic alliances are the basis of such relations. Specifically, the authors refer to inter-organizational relationships promoting a collaborative attitude rather than a competitive one. Given the need to integrate SSS into intermodal transport and logistics chains as an essential element in enabling their success, the road transport sector must be considered a partner for SSS operations (Perakis and Denisis, 2008). This is not a matter of confrontation between road transport and sea transport, but of encouraging cooperation between the two modes, so that the competition takes place between multimodal transport chains. Cooperation and long-term partnership in the channel could lead to improved performance that would allow a bigger market share (Taylor and Jackson, 2000: 13). Saldanha and Gray (2002) in their study of “coastal shipping” indicate the importance, on the part of the shipping industry, of establishing long term collaboration agreements with their customers – road hauliers - in order to provide better overall services and generate competitive advantages. In fact, many of the reasons explaining the poor development of SSS in non-captive markets make reference to the conflict of interests of the intermediaries (Gouvernal et al., 2009). As López-Navarro et al. (2005) and Gouvernal et al. (2009) point out, international transport firms are structured around road transport, and the use of SSS, transferring cargo away from the road, would imply important modifications in the organization of their traffic operations. The road transport firm will not be willing to make such changes and investments required unless there are shipping companies that offer sufficient guarantees to become partners and collaborate under satisfactory conditions. Operating as a traditional international road transport firm the organization possesses full autonomy to move the customer's cargo from its origin to the final destination. However, when it becomes a multimodal

operator it comes to depend on the shipping company in its operations. The fear of possible opportunistic behaviours on the part of the latter (poaching of customers, unilateral increases in prices, modifications in the standards of service, etc.) is one of the main reasons that lead international road transport firms to continue with their traditional business, rather than modify their structure and operating methods to adapt them to the conditions of SSS. In this context of intermodality, the establishment of a long-term relationship between international road transport firms and shipping companies is crucial. However, the analysis of the details of this relationship is a question hitherto unexplored by the specialist literature in this field.

Research questions

From the perspective of the road transport firms, there are two models of operating in the context of SSS: accompanied transport mode (semi-trailers are loaded together with their tractor cabs and drivers travel as passengers) and unaccompanied transport mode (only semi-trailers are boarded onto the vessels, which are loaded/unloaded at the port with special vehicles; semi-trailers are then coupled with the tractor units located at either end, and moved onto their final destinations as complete units). We consider that the great advantage of SSS lies in the loading of semi-trailers without tractor cab –the unaccompanied transport of cargo units is, in the long run, the most economic option. Support of unaccompanied transport, among other measures, was identified as an incentive to developing SSS in a two-day discussion headed by European Commission in the framework of the 2009 annual meeting of stakeholders and experts of Short Sea Shipping and Motorways of the Sea. Loading the complete truck onto the vessel, rather than only the semi-trailer, constitutes a greater consumption of hold space aboard the vessel, and as well as the direct financial costs also entails a cost in terms of

immobilized vehicles and drivers for the company (Torbianelli, 2000). Consequently, from a road transport firm's perspective, transfer of semi-trailers provides the added advantage of cutting down on operational costs, as well reducing the capital investment in trucks. With a certain number of trucks the road transport firms can multiply the number of movements.

However, the accompanied mode is also used by many firms, enabling a gradual involvement in SSS without having to make major adaptations from the start in their way of operating –whilst unaccompanied transport appears to be a more economically relevant solution than accompanied transport, it does nevertheless impose major organizational constraints and meeting of market requirements-. The two modes imply substantial differences in the organization of operations, so we consider it relevant to analyze them. This study asked:

- What is the profile of road transport firms, distinguishing between accompanied and unaccompanied transport modes? In this analysis we will emphasise questions such as size, transport flows and volume of cargo, percentage of cargo sent by SSS (as against by road) and nationality.

- What are the characteristics of the relationship between road transport firms and shipping companies? Concerning this analysis, we will stress a series of dimensions such as long-term orientation, trust (benevolence and honesty), relationship-specific adaptation, costs associated with breaking off the relationship, shared planning and conflict.

Having stated the research questions, in the next section we describe the research methodology. Then, the paper discusses the data analysis results and presents conclusions, including managerial implications and suggestions for future research.

Methodology

Data collection procedure

The study population consisted of the international road transport firms that use SSS between Spain and Italy via the lines “Barcelona-Genoa” and “Barcelona-Rome”. Both lines, of daily frequency and clearly established schedules, constitute at the present time and in the Spanish context, the cases that best identify with the concept of SSS -and more specifically Motorways of the Sea- as a direct alternative to long-distance road transport.

Having identified this collective as the study subject, we describe below very briefly, some of the most significant characteristics of the two lines. The Barcelona-Genoa line, operated by the shipping company Grandi Navi Veloci, started in 1998 with one vessel and a frequency of three sailings a week from each port. This service was expanded the following year with two ships and a frequency of six sailings a week (being at this moment the time of journey around 18 hours). The Barcelona-Rome line, operated by the shipping company Grimaldi Napoli, started to work in 2004, also with one vessel and three sailings a week from each port, and like the other line, the following year incorporated a second vessel and expanded the frequency of sailings to six a week (the time of journey is also around 20 hours).

The definition of the study population as above implied a substantial restriction, due to the lack of any directory or database from which to extract information on the international road transport firms that made use of the lines above mentioned. For us, the most reasonable solution to this difficulty was to visit the terminals of the Port of Barcelona where these companies operated. And all of this, in order to build up a database of the international road transport firms that make use of such lines on the basis of direct observation of the trailers loaded/unloaded and their assignment to

specific transport firms. This enabled us to configure a database of Spanish, Portuguese and Italian firms that used the above-mentioned lines. Specifically, we identified 120 firms (53 Spanish, 4 Portuguese and 63 Italian). All of them were contacted by telephone to explain to them in detail the aims of the study and to request their collaboration. A total of 81 firms (41 Spanish, 3 Portuguese and 37 Italian) showed their willingness to collaborate in the study and agreed to respond to the questionnaire designed for the purposes of the investigation. They represented the 67.5% of the total number of firms contacted. It should be pointed out, however, that the questionnaire contemplated the possibility that these transport firms might work with more than one shipping company. Specifically, the firms were requested to specify which SSS lines between Spain and Italy they used. Indeed, as well as the Barcelona-Genoa and Barcelona-Rome lines, there exist another three consolidated lines, namely Tarragona-Livorno (operated by the shipping company *Suardiaz*), Valencia-Livorno and Valerncia-Salerno (both operated by the shipping company *Grimaldi Napoli*). There is also a fourth line between Barcelona and Livorno, operated by *Grimaldi Napoli*, inaugurated in mid 2007. The firms surveyed could therefore work with three possible shipping companies: *Grandi Navi Veloci*, *Grimaldi Napoli* and *Suardiaz*. At least they worked with one of the first two, since the identification of these firms was made in the Port of Barcelona. Nevertheless, in 25 cases the firm surveyed gave us information about its relationships with two different shipping companies.

Consequently, we had 81 surveys of international road transport firms and 106 observations associated with the relationship between the transport firm and the shipping company. This number of observations can be considered adequate to carry out the subsequent analyses.

Measures

Firstly, in order to distinguish the firms that use an accompanied or an unaccompanied transport mode, it is necessary to define a cut-off point in the number of semi-trailers loaded with tractor cab. Although it is usual for some firms to load all of them with the tractor cab, it is rare to find a firm that always ships all its semi-trailers unaccompanied. The shipping with tractor cab of a small percentage of their semi-trailers is justified, in the case of these firms, by reasons such as the need to complete and/or reinforce the traction at one end of the line or the other, the need to meet a customer's requirements within a specific time, the type of freight transported (which may demand maximum care in its handling), etc. In this sense, we have set the cut-off point at a maximum of 10%, i.e. we establish as the criterion for considering that a firm makes use of the unaccompanied transport mode when it loads a maximum of 10% of its semi-trailers with tractor cab.

In order to offer a measure of the size of the international road transport firms analysed, we considered appropriate to use the variable “number of semi-trailers”, which included both the units owned by the firm and those of stable collaborators, and gave a measure of the number of semi-trailers normally moved by the firm in total (and not only in the Spain-Italy traffic flow). Volume of cargo was measured by the number of semi-trailers loaded by week. Percentage of cargo sent by SSS was evaluated as the percentage of the total traffic between Spain and Italy sent by SSS (as against by road).

With respect to nationality, we distinguished between Spanish and Italian firms. The three Portuguese firms were integrated into the group of Spanish firms. The reason is that, for operational purposes, there are no differences between a Spanish firm located in the west of the Iberian Peninsula and a firm located in Portugal, so there is no point in

establishing differences between them, even more so in view of the small number of Portuguese firms.

Related to the constructs used to analyse the relationship between road transport firms and shipping companies, different scales of measurement were taken from the existing literature and subsequently adapted to the objectives of this study. Constructs were measured using five-point Likert scales with anchors 1 (strongly disagree) to 5 (strongly agree) and they were assessed for reliability using Cronbach's alpha (Cronbach, 1951). Nunally (1987) suggested that a value of at least 0.7 indicated adequate reliability.

Traditionally, *long-term orientation* has been defined as the perception of interdependence of the results held by both parties to the exchange, according to which one of the parties hopes that both the other party's results and the joint results will benefit him in the long term (Ganesan, 1994). Long-term orientation was evaluated by means of seven items, taking as reference the study by Ganesan (1994). On this scale the international road transport firms indicated their expectations concerning their working relationship with the shipping company in the future.

Trust is a concept associated with the belief held by one of the parties to the relationship as to the reliability and integrity of the partner (Morgan and Hunt, 1994). Trust was operationalized through two dimensions (Kumar Scheer, and Steenkamp, 1995): (1) Trust in the honesty of the partner, i.e. the belief that the partner – in this case the shipping company - is sincere, keeps its word and fulfils its obligations (5 items); (2) Trust in the benevolence of the partner, i.e. the belief that it is really interested in our welfare, and consequently, will not make any decisions or undertake any actions that will affect us negatively (5 items). Trust, therefore, exists when a firm believes that its partner is honest and benevolent.

Adaptation is when one of the partners in a relationship changes or adapts its processes or the item exchanged to accommodate the other party (Walter and Ritter, 2003). In our study, the four items used to measure the road firm's adaptation were taken from an exploratory study by López-Navarro et al. (2005). Concretely, the adaptation was evaluated in connection with four aspects (1) fleet –a lower number of trucks are necessary to move the same semi-trailers that so far-; (2) staff –as consequence of the lower number of trucks, the number of drivers required is also lower and they only make national transport activities-; (3) processes and working methods to coordinate the movements in each port, and; (4) investments to work in an efficient way with shipping company.

Costs associated to the breaking off the relationship refer to the costs attached to a hypothetical interruption of the relationship with the shipping company. They were evaluated by means of two items, taking as reference the study by López-Navarro et al. (2005), based on: (1) the difficulties of transferring to the road those semi-trailers that were going shipped and; (2) the loss of profitability that would suppose the conclusion of this relationship for the road transport firm.

Shared planning refers to aspects like information exchange between partners and joint decision making in the framework of the relationship. Evaluation of *shared planning* was carried out by means of three items, using as reference the study by Johnston, McCutcheon, Stuart and Kerwood (2004) on buyer-supplier relationships.

Conflict often exists in interorganizational relationships due to the inherent interdependencies between parties (Mohr and Spekman, 1994). According to the paper by Zaheer, McEvily and Perrone (1998), the *conflict of the relationship* was evaluated through the frequency with which significant conflicts had taken place between the road transport firm and the shipping company during the last year.

Table 2 details the scales used for the evaluation of the previously specified constructs.

Insert Table 2 about here

Discussion of the results

Profile of international road transport firms that use SSS: Accompanied vs. unaccompanied mode

Size of firms

The results exposed in Table 3 show that the size of the transport road firms that use an unaccompanied mode is clearly larger than the companies that use an accompanied mode. Indeed, 60% of the first ones operated with more than 100 semi-trailers, a percentage reduced to 36% for the latter -the differences are statistically significant in the light of the value of the *Chi-squared* statistic-. This can be explained for the organizational impossibility of small and medium road transport companies to use unaccompanied services due to the insufficiency of their resources. As Torbianelli (2000) emphasized, these firms lack the necessary resources for managing tractors on the two coasts. On the other hand, large companies are capable, in principle, of implementing the network organization allowing them to use unaccompanied services (Setra, 2007).

Insert Table 3 about here

Firms' transport flows between Italy and Spain and volume of cargo

For the firms of the study, the traffic between the two countries linked by the lines analyzed has an outstanding weight (43.37% of the international traffic turnover). As shown in Table 4, this percentage is 44.3% in the case of the firms that use an accompanied mode, and 41.28% for the firms that use an unaccompanied mode -there are no statistically significant differences between the two groups-. Regarding the volume of cargo, the average number of semi-trailers loaded by week is 34.79. Significant differences exist in this case between the firms in function of the transport mode used –companies that use an accompanied mode load an average of 21.69 units per week and in the case of the firms than use an unaccompanied mode this value rises to 64.11 units (Table 5)-.

Insert Table 4 about here

Insert Table 5 about here

In accordance with the results exposed in the tables 4 and 5, we can point out that for companies that use SSS between Spain and Italy the traffic between both countries represents a significant part of their international operations. What really lead them to use an accompanied or an unaccompanied transport mode is the volume of cargo (the number of semi-trailers loaded by week is practically three times higher in unaccompanied transport mode). These results corroborates one of the postulates of the study by López-Navarro et al. (2005), which pointed out that the adaptation of an international road transport firm to operate by SSS requires a critical mass of traffic between the areas linked by the line used. It makes no sense for firms to modify their traditional mode of operating with a certain destination, given the complexity of starting to work in the framework of SSS, if the traffic that they carry to it is insignificant. In the case of unaccompanied transport mode it is required a higher critical mass. The firms that use this model need to develop and maintain a logistical infrastructure at the destination, which requires large volumes of cargo to justify it.

Firms' percentage of cargo sent by SSS

Table 6 shows the percentages of the total traffic between Spain and Italy that the firms analyzed send by SSS (as against by road). Specifically, in the case of the accompanied transport mode this value is 48.32%, and for the unaccompanied transport mode 63.28% -there are statistically significant differences between the two groups of firms-. Firstly, these results show that the companies that make use of SSS between Spain and Italy do not use this modality in an exclusive way to manage their traffic flows between both countries. The road continues being used for diverse reasons: saturation of the SSS lines in peak moments, necessity of loading/unloading in certain intermediate localizations -

groupages-, characteristics of the cargo that requires a special care –for example, glass-, etc. (López-Navarro et al., 2005). On the other hand, those companies with a structure that makes feasible the use of an unaccompanied transport mode, due to their organization and also because of the greater economic advantages of this modality, will make a smaller use of the road.

Insert Table 6 about here

Nationality of the road transport firms

The comparison of the two groups of firms (Spanish and Italian) is relevant for two reasons: (1) Because they are firms whose main operational headquarters are in one of the two countries linked by the lines considered, with different traditions regarding the operation of SSS; (2) Because the Italian firms, sharing nationality with the principal shipping companies operating these lines, present a greater cultural affinity with them, and therefore incur lower transaction costs when managing the relationship (Glaister and Buckey, 1997), which may lead them to present different behaviours to those of Spanish firms.

As it can be appreciated in the Table 7, the use of a model of unaccompanied transport on the part of the Italian companies is significantly higher -according to the value of the *Chi-squared* statistic- that in the case of the Spanish companies (46% in the case of the former in front of 18.2% in the case of the latter). This difference concerning the degree of implication may be explained by the longer tradition in Italy of using SSS, especially

with regard to the flows of goods between this country and other geographical areas in the Eastern Mediterranean (Torbianelli, 2000). Also, sharing the nationality of the shipping companies operating these lines, Italian firms may find fewer cultural obstacles in the way of starting working relationships with them and increasing their commitment to the use of this mode of transport. Indeed, the literature indicates greater cultural differences between the partners lead to greater differences concerning organizational practices, expectations from the relationship, or the interpretation of and the response to strategic issues (Kogut and Singh, 1988; Scheneider and De Meyer, 1991). Communications between partners with a greater cultural distance can be more difficult, aggravating the problems of coordination that exist in the relationship and making it more susceptible to potential conflicts (Lane and Beamish, 1990).

Another element that could justify a higher use of the unaccompanied transport on the part of the Italian companies would be the differential of costs in the transport between Spain and Italy. In this way, the lower cost for kilometre in the road transport in Spain² would suppose an incentive to the Italian companies to load its semi-trailers without tractor cab and to subcontract the movement of these in Spanish territory with local partners.

Insert Table 7 about here

² According to the Spanish Ministry of Infrastructures (Ministerio de Fomento, 2004: 277), the average cost per kilometer of the road transport in Spain was lightly upper 0.8 Euros, while in the Italian case was upper 1 euro.

Analysis of the relationship between international road transport firms and shipping companies: Accompanied vs. unaccompanied transport mode

In this section we will analyze certain elements inherent to the characteristics of the relationship between international road transport firms and the shipping companies with which they work (Table 8). For the analyses carried out in this section, as indicated above, the sample consists of 106 cases representing the same number of relationships between international road transport firms and shipping companies (74 relationships associated with accompanied road transport and 32 with unaccompanied road transport).

Insert Table 8 about here

As can be deduced from the results shown in Table 8, the use of one mode or other of organizing the combined transport implies significant differences in several dimensions. Firstly, we find that the use of an unaccompanied transport mode implies, as could be expected, a longer-term orientation on the part of the international road transport firms, greater relationship-specific adaptation to operating with SSS, and higher costs associated to the breaking off the relationship.

The use of an unaccompanied transport mode places road transport firms in a more advanced phase in the framework of SSS. The greater commitment it supposes is translated into a greater long-term orientation. A high degree of long-term orientation towards the partner implies a conception of the relationship not as something transitory, seeking rapid and tangible results, but as something with a vocation of continuity, in

which the firm shows its willingness to commit itself and to make efforts beyond its short term private interests (Das and Teng, 2000). The circumstance that the unaccompanied transport mode constitutes a more advanced stage in the use of SSS also appears reflected by the greater time with which the road transport firms utilizing this modality use the services of the shipping company (4.38 years against 3.10 years in the case of accompanied transport mode). This fact would confirm that, as consequence of the economical advantages of the unaccompanied transport, the road transport firms increase their use with the time. This incremental sequence in the use of non-accompanied transport is also shown in the work of Torbianelli (2000).

The use of unaccompanied transport also implies greater relationship-specific adaptations associated to certain dimensions of the firm (fleet, staff –drivers- or processes and working methods). As a result of this greater adaptation, the costs associated with the breaking off the working relationship with the shipping company increase. This is consistent with the literature, where is suggested that asset specificity investments –and the adaptation it supposes- entails considerable switching costs (Walter and Ritter, 2003; Kwon and Suh, 2004). On the other hand, the above mentioned greater long-term orientation in the case of unaccompanied transport can be also explained for this higher adaptation. Adaptation leads to a more dependent position, which increases the road firms' willingness to maintain and extent the relationship (Morgan and Hunt, 1994) and constitutes a key ingredient in a long-term orientation (Ganesan, 1994; Lusch and Brown, 1996).

Also, the use of unaccompanied transport model implies a higher degree of shared planning with the shipping company and also a higher level of conflict with it. Joint planning reflects a move toward closer relationships, and involves the parties carrying out focal activities in a cooperative or coordinated way (Heide and John, 1990). From

an operational point of view, a higher degree of shared planning may have its origin in the greater need for coordination required of firms that use this mode of transport when managing the load/unload movements at origin and destination. Another element that would justify this higher shared planning could be the greater number of semi-trailers loaded by road firms that use an unaccompanied transport mode –greater volume of cargo requires more coordination between both firms-. Partners' cooperation in developing and agreeing on collaboration planning actions should improve the long-term strength of the relationship, as the parties involved come to understand their counterparts' interests and needs (Mohr and Speakman, 1994; Corbett, Blackburn and Van Vassenhove, 1999).

The higher level of conflict that occurs in the case of using the unaccompanied transport mode may be a consequence of the greater number of semi-trailers damaged as a result of their handling in the port terminals by the stevedoring services. The possibilities of damage occurring are always fewer when the semi-trailer is loaded and unloaded accompanied by the tractor unit. This can give place to conflict situations with the shipping company when determining liabilities. The greater conflict may also be the consequence of the higher level of shared planning in the working relationship. If this is the case, conflict should not necessarily be understood as a negative element in the inter-organizational relationship. When channel members encounter disagreements, they can use them as a means of reducing potentially harmful tensions and maintaining harmony.

In the final instance, the use of accompanied or unaccompanied mode transport does not imply significant differences in trust in the working relationship with the shipping company. From a theoretical point of view, the values of the trust (benevolence and honesty) should be greater for the case of the companies than use an unaccompanied

transport mode. The greater adaptation of these firms or their greater long-term orientation would require a greater trust in the shipping company -trust has been identified in the literature as an antecedent of long-term orientation (Ganesan, 1994; Zhao and Cavusgil, 2006; Ryu, Park and Min, 2007). And, although it is certain that the trust values are greater for the case of the companies than use an unaccompanied model, the differences are not significant, what does not give support to the above exposed argument.

Conclusions

In the context of community policies to achieve sustainable mobility, European institutions are encouraging SSS as an alternative and at the same time, a complement to land transport. Indeed, the European Commission catalogues it as the only mode of transport capable of sustaining the rapid growth of the European Union and offering real possibilities of achieving a transfer of freight from road, as well as improving competitiveness, reducing environmental costs and favouring the cohesion of the European Union.

SSS must be developed with a clear intermodal vocation, encouraging collaboration between the shipping companies that operate lines of this nature and their customers, the international road transport firms. For such firms, the use of SSS implies a substantial readjustment in their traditional way of operating, making it difficult for them to decide to use this mode of transport. It is not, therefore, a matter of confrontation between road transport and sea transport, but of encouraging cooperation between the two modes, so that competition takes place between multimodal transport chains. The success of SSS is based on the cooperation and trust between road and sea transport and the best results should be showed when both behave in a coordinated way.

In fact, the literature points out that cooperation and long-term partnership in the channel could lead to improved performance (Taylor and Jackson, 2000).

In this research we attempt, on the basis of a sample of international road transport firms using SSS lines between Spain and Italy, to analyze the profile of these companies and their relationship with the shipping companies, according to the two modalities of organizing the combined transport: accompanied versus unaccompanied. With regard to the profile of these companies, the results of the comparative analysis have shown significant differences in the company size and volumes of cargo. The use of an unaccompanied transport mode demands a more complex organization. The greatest cost generated by it requires larger companies and higher cargo flows. On the other hand, Italian firms use in a more intensive way the unaccompanied transport mode. This may be explained by: (1) Their longer tradition of using SSS routes to other countries in the Eastern Mediterranean; (2) Sharing nationality with shipping firms; (3) The lower cost for kilometre in the road transport in Spain.

With regard to the characteristics of the relationship between the international road transport firms and the shipping companies, the two modalities of organizing the combined transport -accompanied versus unaccompanied- present important differences. Firstly, the use of an unaccompanied transport mode implies greater commitment to the use of SSS, which translates into a greater long-term orientation on the part of the international road transport firms in their relationship with the shipping company. The unaccompanied transport model also implies a more advanced stage in SSS, bringing with it the necessity for greater adaptation to be able to work efficiently with the shipping company, as well as higher costs in the event of a potential breaking off of the relationship. From a managerial point of view, it is very important to take into account that the greater relationship-specific adaptation and higher switching costs denotes the

existence of a greater dependence on the shipping company in the unaccompanied transport mode. In consequence, the road transport company should be aware that although the use of an unaccompanied transport mode provides greater economies it bears the creation of a greater dependence relationship of the shipping company. And a dependent company is particularly vulnerable to retaliation by the incumbent supplier since it is constrained from being able to defect to another supplier. In a relationship where a customer firm depends on a larger supplier for a substantial part of its output, the supplier may have a degree of coercive power over the supplier.

At the same time, there have been observed higher levels of shared planning with the shipping company in the case of the unaccompanied transport. Shared planning allows mutual expectations to be established and cooperative efforts to be specified (Know and Suh, 2004), and would serve to counter the higher organizational dependence in non accompanied transport by reducing uncertainty.

The findings of this research must be viewed taking into account the limitations of the study. The findings are contingent upon the context analyzed –Spanish and Italian firms that use SSS lines between Spain and Italy-. However, in our opinion, these findings can be extrapolated to other contexts with due reservations. In order to attenuate this limitation, future research should examine the analyzed questions in some of them.

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Table 1

Comparison of the two types of short sea operations

Vessels	Ro-Ro ships	Lo-Lo ships or container barges
Cargo carrying units	Trailers	ISO Containers
Time sensitivity	High	Low
Load / unload time	Low	High
Port turnaround time	Low	High
Infrastructure costs	Low	High
Cargo handling costs	Low	High
Projected required freight rate (€/unit)	High	Low
Potential alliances with	Trucking industry	Ports

Source: Adapted from Perakis and Denisis (2008)

Table 2

Scales of measurement of the variables used to evaluate “transport road firm-shipping company relationships”

<i>Construct</i>	<i>Items</i>	<i>Studies taken as reference for the construction of the scale</i>	<i>Alpha de Cronbach</i>
<i>Long term orientation</i>	<ol style="list-style-type: none"> 1. Maintaining a long-term relationship with this shipping company is important to us^(a) 2. We believe that over the long run our relationship with this shipping company will be profitable 3. We focus on long-term goals in this relationship 4. We are willing to make sacrifices to help this shipping company from time to time 5. We are only concerned with our outcomes in this relationship^(a) (<i>scale reversed</i>) 6. We expect this shipping company to be working with us for a long time 7. Any concessions we make to help out this shipping company will even out in the long run 	Ganesan (1994)	0.768
<i>Trust:</i>			
<i>Benevolence (items 1-5)</i>	<ol style="list-style-type: none"> 1. Though circumstances change, we believe that this shipping company will be ready and willing to offer us assistance and support 2. When making important decisions, this shipping company is concerned about our welfare 3. When we share our problems with this shipping company, we know that it will respond with understanding 4. In the future, we can count on this shipping company to consider how its decisions and actions will affect us 5. When it comes to things that are important to us, we can depend on this shipping company’s support 	Kumar, Scheer, and Steenkamp (1995)	0.851
<i>Honesty (items 6-10)</i>	<ol style="list-style-type: none"> 6. Even when this shipping company gives us a rather unlikely explanation, we are confident that it is telling the truth 7. This shipping company has often provided us information that has later proven to be inaccurate^(a) (<i>scale reversed</i>) 8. This shipping company usually keeps the promises that it makes to our firm 9. Whenever this shipping company gives us advice on our business operations, we know that it is sharing its best judgment 10. Our organization can count on the shipping company to be sincere 		0.822

Table 2 (continued)

Scales of measurement of the variables used to evaluate “transport road firm-shipping company relationships”

<i>Construct</i>	<i>Items</i>	<i>Studies taken as reference for the construction of the scale</i>	<i>Alpha de Cronbach</i>
<i>Adaptation to the operation of SSS with the shipping company</i>	<ol style="list-style-type: none"> 1. In our firm we have restructured our fleet to adapt to Short Sea Shipping operations with this shipping company 2. In our firm we have restructured our staff to adapt to Short Sea Shipping operations with this shipping company 3. In our firm we have updated our processes and working methods to adapt to Short Sea Shipping operations with this shipping company 4. In our firm we have made substantial investments to be able to work efficiently via Short Sea Shipping with this shipping company 	López Navarro, Moliner, Sánchez, Callarisa and Rodríguez (2005)	0.918
<i>Costs associated to the breaking off the relationship with the shipping company</i>	<ol style="list-style-type: none"> 1. If the relationship with this shipping company ended, it would be very costly for our firm to transfer to road all the cargo that we now ship with it 2. If the relationship with this shipping company ended, it would significantly damage the profitability of our company's transport operations 	López Navarro et al. (2005)	N.A. ^(b)
<i>Shared planning with the shipping company</i>	<ol style="list-style-type: none"> 1. In this relationship it is expected that we keep each other informed about events or changes that may affect the other party 2. Our firm and this shipping company plan together the terms by which our future business relationship will be determined 3. Our firm and this shipping company make joint decisions about the ways to improve the efficiency of transport operations 	Johnston, McCutcheon, Stuart and Kerwood (2004)	0.757
<i>Level of conflict with the shipping company</i>	<ol style="list-style-type: none"> 1. During the past year, how frequently were there significant conflicts between your firm and the shipping company? 	Zaheer, McEvily and Perrone (1998)	N.A.

^(a) These items were eliminated from the scale following the analyses of dimensionality, reliability and validity.

^(b) The Cronbach's alpha is not applicable in a scale with only two items. However, the high score of the correlation coefficient between both items (0.688; $p < 0.01$) justify the joint use of them.

N.A. = Not Applicable.

Table 3

Size of firms (by number of semi-trailers)

Number of semi-trailers	Accompanied transport mode	Unaccompanied transport mode	Total
≤ 25	13	2	15
26-100	23	8	31
> 100	20	15	35
Total	56	25	81

Pearson's Chi-squared = 4.891 (p < 0.1)***Table 4**

Firms' traffic between Spain and Italy as a percentage of their international transport turnover

	Spain-Italy traffic (%)
Accompanied transport mode	44.30
Unaccompanied transport mode	41.28

*F = 0.152 (p > 0.1)***Table 5**

Firms' number of semi-trailers loaded (per week)

	Semi-trailers loaded
Accompanied transport mode	21.69
Unaccompanied transport mode	64.11

*F = 12.805*** (p < 0.01)***Table 6**

Firms' percentage of traffic between Spain and Italy sent by SSS

	(%)
Accompanied transport mode	48.32
Unaccompanied transport mode	63.28

F = 3.060 (p < 0.1)*

Table 7

Nationality of the road transport firms

	Accompanied transport mode	Unaccompanied transport mode	Total
Italian	20	17	37
Spanish	36	8	44
Total	56	25	81

*Pearson's Chi-squared = 7.261*** (p < 0.01)*

Table 8

Average values of characteristics associated with the relationship according to mode of transport

	Accompanied transport mode (n = 74)	Unaccompanied transport mode (n = 32)	ANOVA
Long-term orientation of the road transport firm	3.56	3.88	F = 3.965**
Trust in the shipping company			
Benevolence	2.72	2.75	F = 0.019
Honesty	2.99	3.06	F = 0.128
Length of the relationship	3.10	4.38	F = 5.778**
Specific-relationship adaptation	2.19	2.87	F = 7.023***
Costs associated to the breaking off the relationship with the shipping company	2.81	3.68	F = 11.012***
Shared planning with the shipping company	2.44	3.23	F = 14.269***
Level of conflict with the shipping company	2.12	2.53	F = 3.199*

* p < 0.1; ** p < 0.05; *** p < 0.01