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THE ROLE OF ICT IN THE LOGISTICS INTEGRATION PROCESS OF SHIPPING LINES

Summary

Due to the widespread adoption of the supply chain view by shippers, transport providers are increasingly required to offer global logistics service packages to better satisfy customer needs. Information and Communication Technologies (ICT) play a key role in this process, assuring the linkages between chain participants as well as a more effective control of time, cost, and quality of the service rendered.

Nevertheless, introduction of ICT is not equally distributed in the industry. In case of maritime transport, shipping lines seem to be comparatively slow in implementing ICT in comparison with parcel delivery companies or large freight forwarders. The increasing importance of ICT for logistics as well as for the Supply Chain Management (SCM) presents ocean carriers with two alternatives: either to survive in a low-cost world of transport providers or to pursue the expensive and problematic path of becoming value-added providers through an extensive use of ICT.

Apart from analysing the impact of ICT on container shipping industry, this article also shows the way shipping trade is transformed from the conventional hardware-based industry into a know-how service industry.

Keywords: liner shipping industry, supply chain management (SCM), information and communication technologies (ICT)

1. Introduction

In recent years, a growing number of manufacturers and retailers have adopted the supply chain view to manage their business. For these companies the delivery system has become an integral part of the supplied product, to the extent that transportation and logistics receive the same evaluation as the product itself. In this con-

text, transportation providers play a more important role than in the past insofar as they are entrusted with the task of co-ordinating and, secondly, accelerating physical and information flows along multiple levels of the supply chain and of making the whole logistical system more efficient and flexible in responding to swift market changes.

Information systems and integrated transport and logistics chain are closely related since a good information management is essential for a transport company to be truly integrated. ICT facilitate the management of interconnecting major information flows related to goods flows, among all actors involved in the service production process. Transportation companies have been active in developing information systems. Nevertheless, the use of ICT is irregularly distributed among the various modes. Single-mode operators such as air, railways, and road transport companies have for a long time used in-house information systems supporting their operations.

The ocean transport industry represents a good exception to the slow implementation of ICT. In the liner shipping sector, despite the efforts to open up joint information systems between shipping lines, ports and other actors in transport and logistics chain have shown growth for the last five years, sophisticated and integrated inter-operator electronic trading has not taken off. This means that the scope ICT can offer for underpinning basic services with value-added supply chain services, has not been fully exploited by liner operators.

In this article the impact of ICT on the liner shipping supply chain is investigated. What the article attempts to do is to bring together the SCM approach and perception of ICT integration in the sector. Due to the breadth of ICT and its rapidly changing nature, the work will focus on a number of key issues rather than produce a generic survey on applications and systems which would be out of date in a short time.

The article is structured as follows: starting point, in the second section, is the discussion of the importance of ICT in transportation and Supply Chain Management (SCM). The third section discusses the impact of ICT on the liner shipping supply chain and the related need of integration. In the fourth, an overview of the dissemination of and the use of ICT in liner shipping has been given. Finally, in the conclusion, issues for the better integration of liner shipping companies in a global logistics system have been discussed.

2. Transportation in Supply Chain Management and the role of ICT

In recent years, many efforts have been made by a growing number of manufacturers and retailers to balance cost savings with improvements in customer service, in attempts to enhance their competitiveness by supplying larger markets with

fewer production and distribution centres. This has led such companies to move towards the adoption of the supply chain view in managing their business.

In this context, there is general agreement that effective SCM represents a fundamental tool for achieving competitive advantage in today's business environment. Cooper *et al.* (1997) have defined SCM as "an integrative philosophy to manage the total flow of a channel from earliest supplier of raw material to the ultimate customer, and beyond, including the disposal process". The SCM approach allows addressing decisions related to supply chain in several areas such as location, production, inventory and transport both at strategic and operational level in an integrative way. With regard to transportation, the SCM approach has having considerable implications on transport activities. Firstly, the re-engineering of physical and material flows realised by shippers affects logistics and transportation management in several ways: reducing average load size per shipment, increasing frequency, reliability, punctuality, etc. Secondly, the rationalisation of the supplier networks made by large manufacturers is forcing such companies to outsource significant parts of their logistics activities, as well as select and reduce the number of logistics and transportation services providers with which to establish long-term favoured relationships. Lastly, Sheffi (1990) stated that after the liberalisation which has occurred in the transportation markets of the main industrialised countries "... further transportation cost reductions cannot come from lowering carriers' prices but from better engineering of shippers' logistics systems."

Such effects are leading towards a growing inter-dependency amongst the parties in the chain and highlight the need for integration of transportation companies in the supply chain environment. Their poor integration in the supply chain activities represents a source of chain inefficiency (Gentry, 1993).

The literature clearly shows the importance of integration in the SCM concept. Stevens (1989) has described a useful model for identifying the steps needed to attain a totally integrated supply chain. This model allows for the transition from an initial phase of complete functional autonomy within the firm (baseline organisation) to a final phase in which the firm extends the level of integration achieved with suppliers and customers (externally integrating company). In this phase, gaining competitive advantage no longer depends exclusively on the level of integration within the firm itself, but rather on exploiting the advantages derived from integrating suppliers (of goods and services) and continuous improvements in quality, cost and delivery. Womack *et al.* (1990) have shown that co-ordination among the various actors in the supply chain is thus an important prerequisite in order to achieve competitive advantage. Such co-ordination requires a high degree of organisational integration between the manufacturer and its suppliers of goods and services (Lamming, 1993; Hines, 1994). New (1996) argues that the focus on long term relationships between trading partners and the operational integration of trading organisations in the supply chain represents the path towards a more co-ordinate and responsive supply chain.

In the SCM literature, both academics and managers have emphasised the role of information and communication technology (ICT) as a key integration element. Arntzen *et al.* (1995) claimed that the importance of ICT in SCM is demonstrated by the number of companies that have designed and implemented new information systems and technologies for SCM. ICT are meant to pervade the whole supply chain, integrating not only the functions and processes of a single company, but also those of suppliers with broad and long-term implications for an organisation's competitive advantage. To this end, Christopher (1997) underlined that "the fundamental concept is that organisations in the chain seek to create additional customer value through the exchange of information. Such a process can be referred to as the value-added exchange of information. Value is created by the management of two main flows within the supply chain, namely the flow of information and the flow of materials and goods.

Pontrandolfo and Scozzi (1999) noted that ICT directly affects the management of information by reducing time and cost to manage and transfer information and improve its quality (e.g. in terms of information richness, reliability, consistency, usability). This in turn makes material flows more effective and more efficient. Indeed, the exchange of information frequently precedes the physical movement of materials and products, thus enabling firms to reduce inventories and use resources most effectively. Crowley (1998) noted that due to developments in ICT, today it is easier to replace inventory with information, since information is becoming increasingly cheap and inventory is becoming increasingly costly. For instance, Electronic Data Interchange (EDI) represent a powerful tool to optimise the inventory/information trade-off along the supply chain. While the management of information flows and availability of real-time data contributes considerably to integrating the supply chain (Christopher, 1992; Johansson, 1994), the capacity to supply real-time information closely depends on the availability and use of ICT in the every single stage of the supply chain.

With regard to the specific impact of ICT on transport industry, Crowley (1998) stated that ICT influence transport in at least three different ways:

1. the increased information content of many products has influenced the nature of the goods being transported;
2. the use of ICT has improved supply chain integration and has redefined the role of freight transport;
3. ICT has provided many new management and control tools for transport companies themselves.

For these reasons ICT is increasingly becoming a critical attribute in any company's ability to manage an integrated supply chain. This means that weaknesses in ICT, both internal to shippers and in transportation and logistics service suppliers, stand out as a source of supply chain inefficiency (Lee and Billington, 1992).

ICT resources are not only required by shippers, but also by firms which supply transport and logistics services to increase their planning capacity and improve the customer service level.

Nevertheless, in the transport sector, the use of ICT is irregularly distributed among the various modes. Vanroye and Blonk (1998) identified the following endogenous and exogenous factors, which inhibit greater diffusion of ICT within the sector:

- a. the traditional resistance of transport operators to change;
- b. the small size of transport firms (in particular, European ones) which have insufficient resources to finance investments in ICT;
- c. the lack of user-friendly ICT;
- d. the use of proprietary standards by the most important players in the transport industry, which aim is to protect information as far as possible without giving rise to processes of sharing with suppliers and customers, which prevents real supply chain integration.

Due to such constraints, the full potential of ICT to better integrate transport activities in the supply chain has yet to be realised.

Starting from the scenario depicted above, the next section discusses the impact of ICT on the integration process of the liner shipping supply chain.

3. The impact of ICT on the liner shipping supply chain

As shown above, ICT play a crucial role in the integration process of the supply chain. Information represents a key integration mechanism to the extent that control of the chain is increasingly based on connectivity in the flow of information rather than on direct ownership. Manufacturers and retailers increasingly demand that their supply chain partners conduct the business electronically.

For such companies the widespread adoption of ICT along the chain represents a powerful way of integrating their business systems with customers as well as suppliers, laying greater emphasis on the linkage of such organisations through information. Due to the fact that manufacturers, distributors and retailers are focusing on their core business, information is becoming as important to the shipper as the movement of freight.

In fact, as the exchange of information precedes physical movement of material and products, this enables firms to reduce inventories and use resources more effectively. Furthermore, as has been forecast, the trend towards outsourcing transport and logistics activities will continue to develop in the near future. Thus integration and co-ordination will become increasingly necessary for the transport and logistics service providers to satisfy the needs of shippers and consignees. Finally, the

adoption of logistics management software by manufacturers and retailers is putting transportation providers under pressure, which is why ICT is going to be a critical issue for carriers. It is evident that these trends are affecting all transport providers including shipping lines.

What is the impact of ICT on the liner shipping industry and how could supply chain integration via ICT can contribute to obtain competitive advantage and service differentiation for shipping lines? To answer this question it is necessary to firstly define the liner shipping information chain and then discuss how ICT are changing the role of participants in the chain.

3.1. The liner shipping information chain

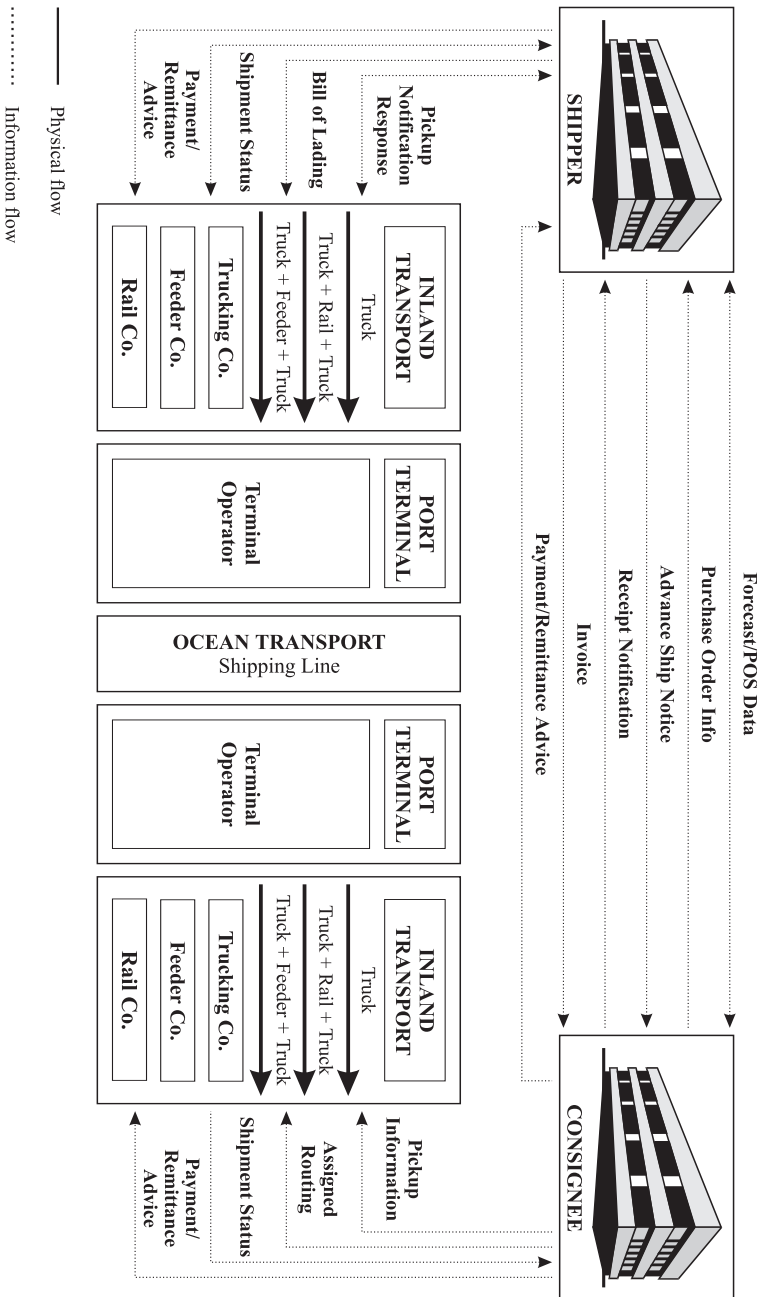
A useful way to introduce the concept of the liner shipping information chain is by referring to the structure reproduced in Figure 1.

The liner shipping business directly involves a large number of participants such as shipper, intermediaries, modal transport providers, intermodal facility operators, port-terminal operators and consignees. Each has the task of performing a number of supply chain activities concerning each phase in the whole process of the flow of goods from the original shipper to the consignee.¹ In relation to the flow of goods, it is possible to identify a parallel flow of information exchanged between the parties along the chain. To this respect, Bender and Smith (1998) make a distinction between the information flows regarding the planning of transport and the information flows related to the execution of transport. Using such an approach, in the preparation phase, the process starts with an exchange of information between shipper and forwarder about price, destination, number of containers and transport time. Starting from such information, the forwarder books slots on the ship by contacting a liner agent. In this case the information exchanged consists of price, destination, transport time, number and weight of containers. At this stage, the liner agent transmits such information to the shipping line, while the forwarder contacts inland carriers to arrange the transport of containers to the port of transshipment. Finally, the liner agent transmits booking information to the stevedore while the shipping line notifies the liner agent prior to the arrival of the ship in the port and then passes on the relevant information to other operators.

The information exchanged between parties once the transport has started regards the status of the cargo, estimated time of arrival (ETA), and tracking and trac-

¹ For the sake of simplicity, in the proposed model other actors indirectly involved in shipping operations such as banks, insurers, subcontractors and bunkers have not been considered.

Figure 1.: The liner shipping information chain



ing information. The description given above amply clarifies the nature of the business model adopted in the liner shipping industry until now.

Considering the large number of documents produced and exchanged, it is clear that the liner shipping business is an intensive information process that is increasingly driven by information technology. This requires a shift from the traditional to a new business approach in managing transport and logistics activities along the chain (see Figure 2). In the traditional perspective of the shipping business process, each stage of the chain is seen as an independent activity. In fact, although each participant is involved with the transportation of the same containerised cargo, conflicting objectives, interests and approaches have considerably reduced the efficiency of the liner shipping chain.

In such a system, many hand-overs and extensive reworking of the same information create high inefficiencies, costs and potential mistakes. For instance, the same shipment data are entered many times through the process. Thus, efficiency optimisation is fragmented, since it is constrained within the boundaries of independent firms. Finally, in such an approach, economies of scale are considered the key competitive weapon and horizontal integration the main favoured strategic option.

Figure 2.: Traditional Vs. integrated approach in liner shipping business

Traditional Approach	Integrated Approach
<ul style="list-style-type: none"> ▪ Each stage of the chain is seen as an independent activity ▪ Economies of scale are key competitive weapon ▪ Horizontal integration is the main favoured strategic option ▪ Efficiency optimisation is fragmented ▪ Uncertainties in supply chain performances of other parties ▪ ICT mainly used for internal operations 	<ul style="list-style-type: none"> ▪ Business process viewed as an integrated chain of value-adding activities ▪ Reduction of costs of both shipper and consignee ▪ Vertical co-operation Vs. adversarial relationships with partners ▪ Reductions in direct transport costs ▪ Reduction of uncertainty ▪ ICT used for internal operations and external integration

By contrast, the liner shipping process is now viewed as an integrated chain of value-adding activities involving vertically all parties. Firms along the chain become partners with information flowing freely between them to reduce uncertainty. Transport operations require tight control, co-ordination and synchronisation. To secure such characteristics a growing level of integration between parties operat-

ing in the chain is required. Frankel (1999) argues that in the liner shipping supply chain there is an urgent need of effective integration with customers and central control of multimodal transport and intermodal transfer or storage operations.² One of the reasons driving towards integration of the supply chain is the desire to have one party responsible for all door-to-door costs, with shippers and consignees assuming only delays and other costs affecting them directly. A well-integrated and effectively managed as well as controlled supply chain not only offers significant reductions in direct transport costs, but also improves the capacity and reduces the costs of both shipper and consignee. Close quality control in terms of enforcing strict schedules and transfer rates would greatly reduce costs in the liner shipping supply chain.

3.2. The changing role of participants in the chain

Another important issue in dealing with supply chain integration is relations with partners along the chain. The conservative nature of shipowners and the fragmentation of the business process has led to a situation characterised by poor cooperation between participants in the chain. Most of the participants, including intermediaries, are focused on a particular segment or set of activities rather than the complete chain. Traditionally, ocean carriers provide transportation equipment and move containers by sea (and sometimes by land). So shipping lines have tight information control on the sea-port leg, but they remain weak on the other stages of the chain. Furthermore, other participants, such as freight forwarders, NVOCCs (Non Vessel Operating Common Carriers) and shipping agents, manage customer relations usually within restricted geographical areas using their own information systems.

The increasing demand for global transport and logistic services by shippers and the development of new information and communication technologies, including electronic commerce and the internet, are radically altering the role and relationships between participants in the chain. For instance, freight forwarders are seeking to become truly global multimodal and logistics services providers, focusing on entire chain process rather than the narrow region of origin or destination under the traditional approach. Consequently their key competencies are shifting from traditional agency-based freight forwarding services (eg. freight documentation, customs clearance) to optimising the total transport and logistics needs of shippers. This can be successfully achieved by the massive use of information systems and telecommuni-

² The author claimed that in the liner shipping supply chain more than 50% of the time and costs are expended on non-transport or transport-related (loading/unloading) operations.

cations capabilities to enable them to manage and offer a comprehensive track and trace system with supply chain management functions. A similar process is affecting shipping agents and NVOCCs.

Ports have also not been immune to the winds of change. Due to the fact that they have to serve their hinterland, inland transport and their communities, ports are widening their role and approach, moving from a traditional interface with the ship to a more logistical orientation of their activities. In such a perspective, the movement of containers represents a door-to-door function which is a consequence of supply chain management of customers' requirements. Thus, while operations - and the efficiency with which business is conducted - used to focus only on the port area, now the landside impact on port operations has to be considered. From the ICT viewpoint, this principally means extending the information flow that the port operation relies upon into a wider environment. It also brings the port's system up against other requirements - such as road or rail traffic management systems. It does not follow that all these systems need to integrate with one another. ICT is now the norm and all ports need to address their competitiveness in light of these developments.

The emergence of e-business is revolutionising the above scenario, enabling participants to interact quickly at low cost without following the ordered sequence in the chain. This clearly opens the way to new types of relationships and competitive forces and can contribute to improve co-operation in the liner shipping supply chain. New types of alliances are emerging as in the case of AEI, a freight forwarder company, and P&O. They have set-up a strategic alliance to send standard EDI shipping instructions and bookings and receive tracking information in return.

Several major ports around the world including Antwerp, Rotterdam, Hong Kong and Singapore, are in the process of developing electronic port communities that use e-commerce to connect the various parties involved in moving freight shippers, forwarders, insurers, customs, terminal operators, land, ocean and air carriers.

However, technology could represent a substantial threat for shipping lines as in the case of BDP International, a logistics company with great emphasis on information technology. Such a company has created an NVOCC subsidiary that can take out block bookings of container slots on ships. Once it has taken out such a block booking, which is negotiated at a favourable rate, BDP is free to sell the slots on to its own customers. The shipping line is therefore left with nothing more than owning, managing, and operating the vessels. In such cases the final objective is the complete control of the chain. It raises the question of who is in the best position to play the role of supply chain manager. Ocean carriers such as APL, OOCL, Maersk-SeaLand which has invested heavily in ICT to support multimodal logistics services in addition to their basic ocean services, may also be able to play such a role.

4. The dissemination of ICT in the liner shipping supply chain

As shown above, the ICT impact on ocean transport sector is deeply transforming the liner shipping business. Nevertheless, the poor communication among its player and mediocre physical and informational logistics capabilities that has characterised shipping lines for long time still represents constraints that prevent the dissemination of innovation in the sector.

In terms of the adoption of ICT, liner shipping industry is characterised by strong internal EDP and EDI systems (to exchange information with some agents, main stevedores, and some large ports) and a traditional weakness on external electronic links with customers and other supply chain partners. Despite the fact that for over twenty years shipping lines have been using information systems to exchange information and replace paper documents, some of these systems are unlikely to be or cannot be readily integrated into the information systems of customers or other participants in the chain. This means that uncertainties in supply chain performances of other parties (for example in terms of time and schedule risk) can negatively affect the performance of the entire chain.

In the last few years, shipping lines have made some progresses in the use of ICT, with particular reference to use of Internet and e-business, so what is the current situation of e-business initiatives in the liner shipping industry? At a first glance the general picture that emerges appears extremely differentiated and unstable. Today all the largest liner shipping companies offer services through the Internet. Some of them have launched e-business initiatives through the management of their own Internet portals to better serve the clients (e.g. NYK, APL, OOCL, P&O, Maersk, etc.). These web sites can be used not only to browse through catalogues of their services, but also to exchange information in real time, to download or upload files such as quotations, and to add and open new applications as well as the previous ones used in specific information systems through supplying on-line booking, tracking and tracing of the goods and other information and additional services. Rarely these portals are able to give visibility of goods along the entire transport and logistics cycle (end-to-end visibility).

The web host several portals entirely devoted to transport and logistics (called infomediaries or transportation e-marketplaces) managed by companies out of the shipping industry. Most of the large liner shipping companies are connected to them. These portals are like a hub for information exchanges. Some of these initiatives are "container shipping specific" others also operate in the air and land transport business. Some of these portals (freight auction portals) have not received great attention from the SL because of they mainly focus on price rather than other service elements. Besides also from the side of the shippers these new electronic channels have not received great success due to the anonymity that accompanies the quotations of the services that put different carriers on the same footing with other carriers. This

situation is confirmed by the fact that often such portals bypassed the freight forwarders and took no responsibility for the results of transactions.

Recently has been launched some initiatives based on joined efforts among shipping lines, logistics service providers and other companies working in complementary sectors such as banks, insurance, suppliers of equipment, etc.. These initiatives have resulted in the realisation of shared platforms (portals) among all the subjects participating in transport and logistic operations that generally have the objective to drive efficiencies into the ocean transportation industry by streamlining and standardising traditionally inefficient processes. The services offered by these portals allow shippers, freight forwarders, third party logistics providers, brokers and importers to manage the booking documentation and tracking of cargo across multiple shipping lines in a single integrated process. Today there are four main initiatives in the sector GT Nexus, INTTRA, Cargo Smart and Bolero. The participation of shipping lines to these initiatives is very strong. For instance INTTRA carrier network includes among the others CMA CGM, Hamburg Süd, Hapag-Lloyd, Kuehne & Nagel International AG, Maersk Sealand, Mediterranean Shipping Company S.A., NYK Line, P&O Nedlloyd, Safmarine, etc.

5. Conclusions and implications

Reviewing the consideration of the previous sections, several conclusions can be drawn. Due to the confluence of several factors, the liner shipping industry has been in dramatic transition over the past few years. Logistics plays an ever increasingly important role in such process to the extent that full logistics services are replacing port-to-port transport services and isolated transportation transactions are giving way to long term supply chain management partnerships.

In such a marketplace, liner shipping companies are increasingly asked to fully integrate the various supply chain components through providing full sets of logistics service in which ocean transport tends to become just part of a door-to-door logistics solutions. Hence the need for liner companies to add value to their basic shipping services is becoming more important. In other words they have to give added value to basic maritime transportation services using an integrated logistics approach, such as the inland transportation of containers, warehousing, product assembly, inventory management, etc. by establishing partnerships with shippers.

A central role in the logistics integration process is played by the use of ICT resources. ICT is becoming a critical attribute in any transport and logistics company to manage an integrated supply chain. It is assuming strategic importance to improve supply chain integration and to reduce chain inefficiency through supplying timely, accurate and relevant shipment information to shipper, consignee and other supply chain partners. ICT allows rationalising costs through business procedures re-engi-

neering and, in the case of logistics services, it offers the opportunity to build closer relationships with customers through service differentiation and information system links.

A direct relationship between logistics integration and ICT co-ordination among the different stages of the chain can be underlined. Such relationship has been summarised in Figure 3 identifying three steps characterised by different level of logistics and information integration.

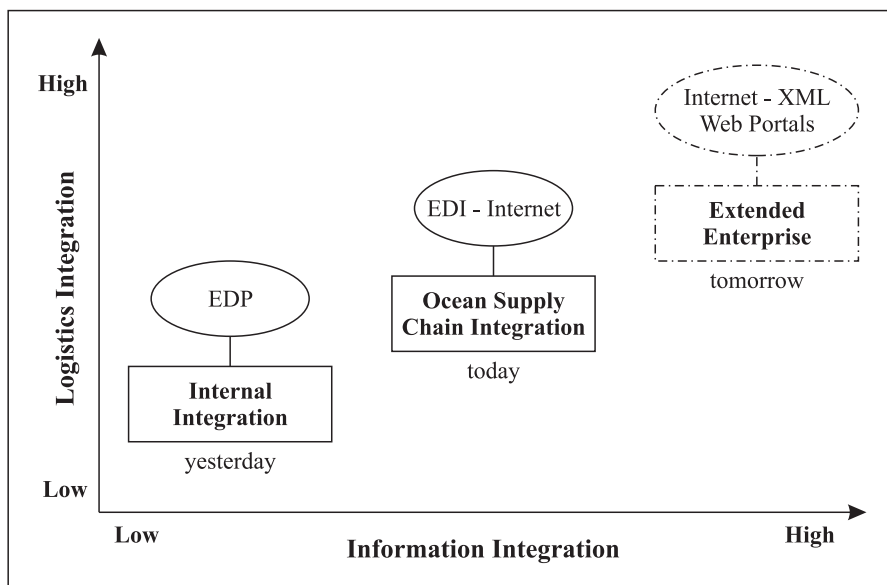


Figure 3.: Logistics vs. Information Integration

The figure shows that a higher level of logistics integration requires more powerful and sophisticated information tools.

In the first stage, the services provided by shipping lines focused on ocean services with a low level of engagement in logistics. Relationships with transport operators and customers were based on the exchange of shipment data transmitted by traditional tools such as telephone, telex and fax. The use of information technology in this stage was limited to EDP and it was mainly finalised to reach a level of internal integration between company departments to better co-ordinate operative activities with administrative and accountancy needs.

Due to the increasing customers' requirement and the need for service differentiation, shipping lines have started to provide logistics services beyond pure mari-

time transport services. For such reasons shipping lines moved to the second stage, recognizing the need for a higher degree of supply chain integration. This objective can be reached through the use of more sophisticated information and communication technologies such as EDI and, more recently, e-commerce. To make the supply chain integration process successful by using ICT tools, shipping lines have to consider two prerequisite: the interconnectivity and the interoperability. The first regards the capacity to link and get computers in communication; the second ensure that computers understand each other and properly process the exchanged information. The paper has shown that a reduced number of shipping lines have reached a sufficient level of interconnection with both customers and other service providers. Many others are well linked with port operators but the level of interconnection with other trading partners is rather low. Nevertheless, interoperability appears the area which shipping lines have to strongly improve. In the liner shipping industry information systems and tools are often based on proprietary standard. This not allows the sharing of data and messages between shipping lines information systems with those of customers or other participants reducing supply chain integration.

Finally, the third stage is characterised by the full integration driven by the massive use of ICT. Shipping lines is required to shift from hard-based company to software-based organisation driven by ICT. This new status is characterised by the blur of company boundaries. The control of information along the chain is necessary to the extent that the future challenge for shipping lines is to provide continuous stream of relevant production and shipment information to customers, from factory to assembly and distribution points, through each leg of transportation move, to the delivery destination and then enable customers to quickly, easily access, analyse and act on that information.

The paper has shown that the scope ICT offers for underpinning basic services with value-added supply chain management has not gone unnoticed by liner shipping operators. Shipping lines has recognised the importance ICT and is now investing in it. They should be in a good position to exploit this opportunities. Nevertheless, apart from a few companies, they have failed to make significant gains so far. In this scenario, the lack of systems compatibility appears the most important barriers to break down. The development of e-business and the widespread use of XML standard can help shipping lines to enhance exchange of information and the interoperability of systems which are the most important drivers in the logistics integration process.

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ULOGA ICT U POSTUPKU LOGISTIČKE INTEGRACIJE U BRODARSKIM DRUŠTVIMA

Sažetak

Zahvaljujući pogledu na distribucijski lanac koji je široko prihvaćen među krcateljima, od prijevoznika se sve češće zahtijeva ponuda paketa globalnih logističkih usluga kojima bi se bolje zadovoljile potrebe korisnika. U tomu je postupku ključna uloga informatičkih i komunikacijskih tehnologija (ICT) koje osiguravaju povezanost sudionika u lancu kao i učinkovitiju kontrolu vremena, troškova i kakvoće pruženih usluga.

Unatoč tomu, uvođenje ICT nije podjednako zastupljeno u toj djelatnosti. U slučaju pomorskoga prijevoza, čini se da linijski brodari relativno sporo uvode ICT, u usporedbi s društvima za dostavu

jediničnih pošiljaka ili većim otpremničkim kućama. Sve veća važnost ICT za logistiku kao i za upravljanje distribucijskim lancem (Supply Chain management – SCM) pomorske prijevoznike dovodi pred alternativu: ili preživjeti u svijetu prijevoznika s niskim cijenama ili, pak, skupim i problematičnim putem težiti ka dodanoj vrijednosti pomoću svekolike primjene ICT.

U ovome se radu analizira utjecaj ICT na kontejnersko brodarstvo te način na koji se pomorstvo pretvara iz konvencionalne djelatnosti utemeljene na hardwareu u djelatnost pružanja intelektualnih usluga – znanja.

Ključne riječi: linijsko brodarstvo, upravljanje distribucijskim lancem (SCM), informatičke i komunikacijske tehnologije (ICT)

IL RUOLO DELLE TECNOLOGIE INFORMATIVE E DELLA COMUNICAZIONE (ICT) NEL PROCESSO DI INTEGRAZIONE LOGISTICA DELLE IMPRESE DI TRASPORTO MARITTIMO DI LINEA

Sommario

Nel corso degli ultimi anni le imprese manifatturiere e della distribuzione commerciale hanno fortemente accelerato la tendenza verso l'integrazione delle proprie catene logistiche con l'obiettivo di aumentare il valore per il cliente in termini di performance di prodotto, di costo e di tempo. Per queste imprese, il trasporto e la consegna hanno assunto una importanza rilevante al punto che i servizi di logistici e di trasporto ricevono la stessa valutazione del prodotto stesso. In questo quadro, la diffusione delle tecnologie informative e della comunicazione (ICT) ha avuto un forte impatto sulla gestione delle attività logistiche divenendo un attributo determinante per ogni impresa che intende gestire una catena logistica in maniera integrata. In presenza di questa forte spinta dal lato della domanda, le imprese fornitrici di servizi logistici e di trasporto stanno attribuendo a queste tecnologie una rilevanza altrettanto cruciale per la gestione del loro business anche in considerazione dei guadagni di efficienza ottenibili nella produzione e nell'erogazione di tali servizi attraverso l'utilizzo delle ICT.

Nel caso delle imprese di trasporto marittimo di linea, la diffusione delle ICT e delle tecnologie web implica un mutamento profondo nella gestione del business soprattutto se si considera che queste imprese sono state meno attive nell'utilizzazione di queste tecnologie rispetto ad altre categorie di fornitori di servizi logistici.

Le imprese di shipping si trovano, quindi, in una delicata fase di transizione poichè risultano sottoposte ad una duplice spinta proveniente dalla domanda che richiede da un lato, di enfatizzare sempre più gli aspetti immateriali e informativi nella fornitura dei propri servizi e dall'altro, la fornitura di una gamma di servizi che includa sempre di più servizi logistici a valore aggiunto rispetto a quelli tradizionali di trasporto oceanico.

Ciò sta ponendo le imprese di shipping di fronte a due diverse alternative: restare semplici fornitori di servizi di trasporto oceanico o entrare nel mercato dei servizi logistici sviluppando strategie più complesse basate sull'utilizzo delle ICT.

Questo articolo cerca di approfondire il ruolo che le nuove tecnologie delle informazione possono giocare nel processo di integrazione logistica delle imprese di trasporto marittimo di linea e le motivazioni della bassa propensione verso l'utilizzo di queste tecnologie nel settore. Nel para-

grafo 2, è stata discussa l'importanza delle ICT nel trasporto e nel Supply Chain Management. Nel paragrafo 3, viene invece analizzato l'impatto di queste tecnologie sui processi di integrazione delle imprese di shipping nella catena logistica. Nel paragrafo 4, è stato fornito un quadro sintetico circa l'utilizzo delle ICT e delle tecnologie Internet da parte delle principali imprese operanti nel settore. Infine, nelle conclusioni, sono stati discusse alcune implicazioni per migliorare l'integrazione logistica delle imprese di shipping attraverso l'uso delle ICT.

Parole chiave: Integrazione della Catena Logistica, Imprese di Trasporto Marittimo di Linea, Tecnologie Informative e della Comunicazione