

Understanding ICT management in small transport and logistics service providers

Pietro Evangelista*

Institute for Service Industry Research (IRAT), National Research Council (CNR), Italy

Abstract

Information technology has become an important dimension of third party logistics service providers (3PLs) business as their competitive advantage increasingly depends on the ability to create value for customers through ICT applications. Recent industry developments have contributed to widen the technological gap between large and small 3PLs. This is particularly critical for those markets that are populated by a high number of small 3PLs such as the Italian logistics service industry. The fragmentation of the Italian market has facilitated the entry of large foreign logistics groups. These developments have further challenged small Italian 3PLs to such an extent that they could be marginalised as “tier suppliers” or even forced out of the market. From the research point of view, while the dissemination of ICT in large 3PLs has been largely investigated, there is still a lack of research in the field of small logistics providers with little empirical investigation analysing the adoption of ICT by small 3PLs. The main objective of this paper is to give an overview on the dissemination and adoption of ICT in small Italian 3PLs based on a field survey. The preliminary results show that despite the low level of technology usage of the surveyed companies, it emerges a distinctive cluster of providers that appears more dynamic in using ICT to face the fast changing business environment.

Keywords: ICT dissemination, innovation, small logistics providers, Italian logistics service market, empirical survey

1. Introduction

In today's Supply Chain Management (SCM) practices, a successful strategy depends more and more on the performance of Third Party Logistics service providers (3PLs) (Morash, Clinton, 1997). Accordingly, logistics providers play a key integrative role linking the different supply chain elements by the management of information flows connected with the entire delivery process of goods (Cooper, Lambert, Pagh, 1998).

In such scenario, Information and Communication Technology (ICT)¹ is becoming one of the main drivers of changes in the 3PL industry, posing new strategic challenges to logistics companies. ICT developments are more and more influencing the transport and logistics service market and give rise to new organisational forms for these services. For example, the volume of electronic communication along the supply chain is fast growing together with the electronic exchanges of transport documentation,

invoices, order instructions and payments (Trilog, 1999). This has created an increasing need to support customers supply chains requirements through an effective use of ICT (Atkinson, 2001).

The use of ICT in the 3PL industry can lead to substantial cost savings (Stough, 2001). Such technologies are able to improve business processes and interconnections with other trading partners operating in the supply chain. These systems allow the information exchange in real time improving the ability of planning transport and logistics activities and the level of customer service (Clarke, 1998). The result is that the competitive advantage of 3PLs increasingly depends on the ability to create value for

¹ OECD (1998) defines the ICT industry on the basis of two principles. For manufacturing industries, the products of a candidate industry must be intended to fulfil the function of information processing and communication including transmission and display and must use electronic processig to detect, measure and/or record physical phenomena or to control a physical process. For services industries, the products of a candidate industry must be intended to enable the function of information processing and communication by electronic means.

customers through ICT, since many value adding activities are directly or indirectly dependent on ICT applications (Crowley, 1998).

Nevertheless, recent industry developments have contributed to widen the gap between large and small 3PLs. The use of ICT appears irregularly distributed among large and small logistics providers. In this situation the scenario that might arise is marked by a small group of leading providers which dominate the market and manage the relationships with customers and control transportation-warehousing network and information flows, while individual links are provided by a large number of small providers (Berglund, *et al.*, 1999).

This perspective appears to be particularly critical for those markets populated by a high number of small providers such as the Italian 3PL industry. The Italian market is the fifth largest European logistics services market and is considered as one of the markets with the highest expected growth rate in Europe in the coming years. It is the highest fragmented 3PL industry in Europe and this has facilitated the entry of large foreign logistics groups. The substantial impact of foreign competition has reduced stimulus towards innovation since it has contributed to the disappearance of many advanced Italian providers. Such process has further complicated the competitive position of small Italian 3PLs. In this situation, the risk is that small Italian 3PLs could be marginalised in the marketplace as “tier suppliers” of large companies, or even forced out of the market altogether with remarkable effects on the entire Italian transport and logistic services industry.

From the research point of view, while the dissemination of ICT in large logistics providers has been largely investigated, there is still a lack of research in the field of small and medium sized logistics companies. The recent literature is almost entirely devoted to assess ICT impacts on large companies, while there are limited empirical investigations aiming to analyse and explain the gap in the adoption of ICT by small 3PLs.

This paper is part of a PhD research project whose the ultimate goal is to develop a methodological approach for identifying how the use of ICT can improve the competitive abilities of small 3PLs. The objective of the paper is to analyse the dissemination and adoption of ICT in small Italian 3PLs through a field survey. The paper has been organised into five sections. In the following section, the effects of ICT on logistics and SCM are analysed. In section 3, recent evolutions of the Italian 3PL market are outlined together with a literature review on ICT dissemination in the Italian 3PL market. In section 4, objectives, methodology and preliminary results of the empirical survey are presented. The concluding section discusses implications deriving from the analysis.

2. Current and future trends of ICT dissemination in Logistics and SCM

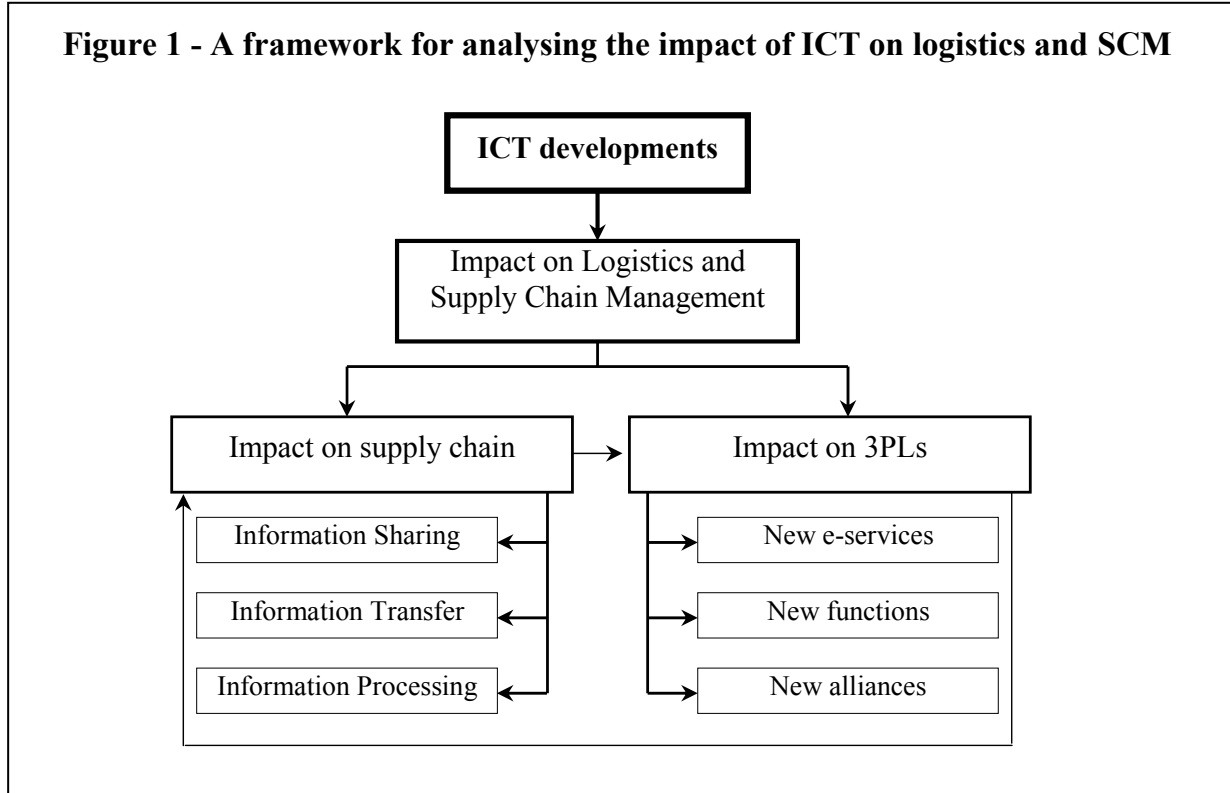
ICT are fast becoming one of the main drivers of change, posing new strategic challenges. International literature has been reviewed to analyse current and future trends in logistics and SCM that are connected to dissemination of ICT (Evangelista, 2002). The review allows to distinguish the impact of ICT on the overall supply chain from the effects of new technologies on the international 3PL industry (see Fig. 1).

2.1. Supply chain efficiency and ICT

One of the main areas of interest that has emerged in recent years concerns the effects of ICT on logistics and SCM². In the literature there are a plethora of research that have analysed general aspects (Introna, 1993; Hammant, 1995) and specific effects (Peel, 1995; Kia *et al.*, 2000) of these technologies in logistics and SCM. Considering the wide range of possible effects, the attention in this paper is focused on the supply chain efficiency improvements related to ICT usage.

² Arntzen *et al.* (1995) claimed that such interest is demonstrated by the growing number of companies that have designed and implemented new information systems and technologies for SCM.

Figure 1 - A framework for analysing the impact of ICT on logistics and SCM



be analysed with reference to three functions related to information management: production and sharing of data and information, their transfer and, lastly, the processing and utilisation of information for supply

specific technologies used as a support tool for the three functions identified above are summarised in Table 1 (Pontrandolfo and Scozzi, 1999).

Table 1 - ICT applications for SCM

| <i>Function</i> | <i>Activity</i> | <i>ICT technology</i> |
|---|---|---|
| Sharing of data and information | Access and use of data and information by supply chain partners | <ul style="list-style-type: none"> • Databases • Datawarehouse |
| Information transfer | Communication of information between supply chain partners | <ul style="list-style-type: none"> • EDI • E-mail • GroupWare • Internet/WEB |
| Information use for supply chain planning | Data and e-document processing in decision making and operations planning of the supply chain | <ul style="list-style-type: none"> • Advanced AI • CAD • CAE • ERP • MRP • Multimedia • Traditional AI |

Source: adapted from Pontrandolfo, Scozzi (1999)

Information sharing is an essential prerequisite for securing information accessibility to all supply chain partners involved in logistics operations. The creation of distributed databases fosters the development of relationships with other operators in

the supply chain. In addition, the availability of consistent information improves decision-making processes for operators. Data sharing has always been important in the transport and logistics service industry. Access to and availability of information in

intermodal transport, for instance, contribute to substantially reduced processes and thus time savings in freight transfer from one mode of transport to another and to minimise errors in drawing up freight documentation, thereby increasing overall transport efficiency.

Information transfer is probably the most relevant function in the SCM concept. It may take place through several technologies ranging from the most recent e-business applications or extranet, EDI systems, to the most traditional communication technologies such as telephone, telex or fax. EDI is the most investigated technology in SCM literature. The widespread dissemination of the Internet and e-business technologies allow to a large extent overcoming problems relating to systems and applications interoperability. This allows to extend the use of these technologies, including EDI, to smaller companies since Internet application technologies require relatively low implementation costs and show a high flexibility in information transfer.

In **supply chain operations planning** ICT also plays a major role to the extent that the benefits obtained from the application of SCM logic depend almost entirely on a company's capability to establish electronic links with customers, suppliers and 3PLs. ICT investments made by companies can range from platforms capable of satisfying the needs of single firms, such as Enterprise Resources Planning (ERP), to new applications that integrate all the stages of the supply chain and are able to support the entire planning process such as the Enterprise Integration Application (EIA), or the Advanced Planning System (APS)³. Through these new systems, companies are able to combine and align their planning with that of other supply chain partners by covering the whole area of supply chain operations, finding information available in real time at any supply chain stage and thus making the planning process more efficient.

2.2 The impact of ICT on transport and logistics service providers

The adoption of SCM concept had increasingly forced manufacturer and distributors to focus on their core business and, at the same time, to outsource their transport and logistics activities (Scott *et al.*, 1991; McKinnon 1999). Since information management has therefore become as critical as the physical movement of goods (Lee and Billington, 1992), for these companies the selection of 3PLs has an even higher strategic value and the provider's information technology capability is fast becoming a selection criterion. As a result, manufacturers and retailers are demanding that all supply chain participants an even more degree of integration of their business processes through ICT and Internet technologies (Christopher, 1997). Under this strong pressure, 3PLs are devoting increasing importance to ICT in the management of their businesses. These developments raise two important questions: what is the impact of ICT on 3PLs and how are ICT and the Internet technologies changing their business model? The answer to these questions is not straightforward. Nevertheless, some trends appear to be emerging and are briefly described below.

New e-services: One of the first visible effects is the integration of traditional services (transportation and warehousing) with "information-based services". Although transport and logistics companies have used telecommunication systems and networks for some time⁴, the sector may not be considered a leader in the field of technological innovation (Tilanus, 1997). However, over the last few years firms operating in the sector have made significant progress in their adoption of new technologies, particularly those linked to the Internet and e-business. Low-cost access to the Web and the dissemination of e-business technologies have provided these firms with a tool to satisfy customer demand by using traditional services in conjunction with growing information-based services. Today, the main transport and logistics service firms are in a position to provide a variety of information via the Internet⁵ and to secure transactions online with customers. However, the range of online initiatives appears to be somewhat diversified. There are firms that initially used their own web sites as electronic

³ Forecast indicates an increase in this market from \$5,400 mln. In 2000 to \$20,5000 mln. In 2005 (SMAU Ricerche, 2001).

⁴ The first applications were tried out in the air transport sector at the beginning of the 1960s. Later, their use was extended first to maritime transport and then, in the 1980s, to other transport modes.

service catalogues. Some firms have started to offer tracking and booking services, while others have tried to create competitive advantage by developing signature options unique to their brands.

New functions: The dissemination of ICT has opened up new opportunities for the development of new roles and functions in the supply chain, the so-called infomediaries or on-line freight e-marketplaces. The purpose of these web-based intermediaries is to give added value to transport and logistics businesses through greater efficiency and information transparency. They run Internet transport portals which bring together buyers and sellers of transport services and make communication between them faster. As for their services, whilst on the one hand there is a strong similarity between the services of different portals as outlined below, on the other hand there are significant differences in the scope and objectives of these portals. There is also a variety of e-Marketplaces typologies operating over the Internet (UNCTAD, 2000) and the dividing lines between them are somewhat blurred. Regan and Song (2001) have identified the following five different categories of freight e-Marketplaces:

1. **Spot Freight Markets (NTE, DATconnect):** allows shippers and carriers to post available loads or capacity on the web;
2. **Auction and Request for Quote markets - RFQ (Logistics.com, Celarix):** provides automated RFQ and auction capability;
3. **Exchanges (3PLEX, Nistevo, Leanlogistics, Trantislink):** may provide spot market and auction capabilities but must also provide creative e-business solutions for shippers, carriers and 3PLs;
4. **Applications Service Providers - ASPs (Manugistics, i2, Accuship, GoShip, Intershipper):** are primarily developing web-enabled and e-business enabled technology for the logistics industry;
5. **Purchasing Consolidation Markets (TruckersB2B, Transplace):** these portals provide an opportunity for member companies (typically small carriers) to purchase equipment and supplies at bulk rates over the Internet.

The use of web transport portals by 3PLs is difficult to assess due to the lack of consistent data on the overall volume of services sold. Actually, it appears that a small number of traditional intermediaries are using online exchanges to help their shipper clients to match with carriers. A study carried out by KPMG and Benchmarking Partners, on the way in which carriers use the Internet confirms the above findings (Logistics Management & Distribution Report, 2000). Logistics providers do not foresee that freight e-Marketplaces will have a significant effect on their business, while only 50% of the shippers interviewed replied that they might use freight e-Marketplaces in the near future.

New alliances: Another feature emerging alongside the Internet and e-business is the creation of a new category of service provider called Fourth Party Logistics Provider (4PL). According to Bade *et al.* (1999), a Fourth-Party Logistics Provider is a supply chain integrator who assembles and manages the resources, capabilities and technology of its organisation with those of complementary service providers to deliver a comprehensive supply chain solution. The emergence of 4PLs enables manufacturers to outsource the management of the entire 3PLs network to a single organisation and to re-engineer supply chain processes. In order to integrate their skills, some 3PLs have started to secure alliances with complementary service providers (Rockwell, 1999). Some of these alliances have been formed with management consulting companies, financial service companies and technology providers. Beyond the emergence of 4PLs, there is an ongoing trend in the transport and logistics service industry to form alliances with other firms operating in complementary sectors (Eyefortransport, 2001).

⁵ This refers to the supply in real time of information concerning for example freight rate, booking, routing and scheduling, tracking and tracing, shipment documentation and freight billing.

3. The dissemination of ICT in the Italian transport and logistics service market

The above literature review highlights that ICT is playing a major role in SCM and it is a critical driving force for integration (at supply chain level) and innovation (at 3PL industry level). As supply chain processes and planning increasingly require real-time data availability and exchange, 3PLs are forced to integrate their services (e.g. transportation, warehousing and distribution) with the ability to manage information flows along the entire supply chain (Sauvage, 2003). Despite the traditional focus of 3PLs on the organisation and management of assets such as vehicles, facilities, and inventory, the industry is moving towards a more knowledge focused approach based on the collection, coordination, and management of information. Consequently value-added services and information management could be the key to differentiate businesses and improve their competitive positions in the near future (van Hoek, 2002). Both large and small 3PLs are needed to provide transport services using traditional assets but, at the same time, these functions must be integrated with the supply of new information services using ICT and e-business tools. In this regard, large logistics companies have the potential to exploit and benefit from technology, whereas the role of ICT in small 3PLs as the driving force of innovation is unclear. There are insufficient studies in the field of small 3PLs and few empirical investigations aimed at analysing and explaining the gap in ICT adoption by small logistics providers. This is surprising considering the vast majority of companies dealing in transport and logistics throughout the European Union are small-sized. According to data from the EU Directorate General for Transport and Energy (DG TREN) an average of 7.5 people are employed per firm in the European transport and logistics service industry. Studies and empirical research to assess ICT dissemination and different approaches adopted by small 3PLs in using ICT seems to be of critical importance particularly for those markets characterised by the strong presence

of small logistics providers such as the Italian 3PL industry. The following section outlines a short overview of the Italian 3PL market, while in section 3.2 ICT dissemination in the Italian 3PL market is assessed through a review of recent surveys.

3.1. An overview of the Italian 3PL industry

Country characteristics, in terms of national logistics and production systems, entrepreneurial culture and business models, still play a major role in shaping the transport and logistics service market. Accordingly, the Italian context is an interesting field of investigation as it presents strong specific aspects affecting 3PLs and underlines national company dynamics in response to international stimuli and threats.

Several sources estimate the Italian transport and logistics service market as the fifth largest European market (after Germany, UK, France and Benelux) with the highest expected growth rate in Europe in coming years (Armstrong & Associates, Datamonitor, Dresdner Kleinwort Wasserstein, McKinsey).

One of the main characteristics of the Italian market is its high fragmentation. For example, in the road freight transport sector 67% of companies own no more than 3 vehicles. Other European markets are characterised by fewer firms and a higher number of vehicles per company. Furthermore, a recent analysis carried out by *Il Giornale della Logistica* (June/July 2004, p. 48), an Italian logistics magazine, on a sample of 1,000 Italian 3PLs ranked by turnover shows that: a) the first 100 companies produce 64% of the total sample turnover, and b) for the first 200 companies the percentage is 75%. The fragmentation of the market is also evident considering employee data. It has been estimated that about 50% of the Italian 3PLs employ less than 50 people, and that 35% of them employs less than 9 people (KPMG, 2003). However, the exact number of Italian 3PL companies remains still an open issue⁶.

Such market situation can also be attributed to the structure of logistics service demand that is characterised by a high number of SMEs in the Italian

⁶ The exact number of Italian 3PL companies remains still an open issue. The most recent estimate gives the number of firms ranging between 145,000 (Confetra) and 180,000 (Albo Nazionale Autotrasportatori Italiani).

manufacturing sector. This produces a low level of outsourcing of logistics activities beyond transportation (Evangelista, Morvillo, 2000).

The fragmentation of the Italian 3PL sector emerging from the above picture has facilitated the entry of large foreign logistics groups, among which are TNT, Deutsche Post, Eurogate, ABX and British Post Office in more recent years⁷. In comparison to the above effect, in the same period, no expansion into international markets have neither been targeted nor been achieved by Italian 3PLs. This is a further indicator for their financial and competitive weakness in comparison to foreign companies.

The Italian 3PL sector presents a complex structure that can be analysed considering its segmentation based on the following five group of firms (Evangelista, Morvillo, Passaro, 2003):

First group consisting of a myriad of small and very small firms mainly performing (often as sub-suppliers of larger providers) in the road transportation segment, where price is the main competitive leverage.

Second group consisting of well-established medium-sized firms which have already started an evolution process through intermodal transport. The large part of these companies have been acquired by large foreign groups expecting a high growth of the potential demand.

Third group consist of Italian branches owned by large multinational transport and logistics companies, often resulting from the internationalisation strategies of their customers. Despite this process contributed to industry restructuring, it does not seems to have increased to a large extent technological and organisational company's capabilities. Price still remains the main criterion used by these companies in outsourcing both traditional services (e.g. transport and warehousing) and value added logistics services.

Fourth group consisting of logistics companies that are the results of spin-off strategies implemented by large manufacturing companies (both Italian and multinational). Such companies are able to leverage their strong managerial experience acquired in the manufacturing sector together with good marketing capabilities. Relevant examples are Samec from Unilever, Number 1 Logistics Group from Barilla and Benlog from Benetton.

Fifth group consisting of small and medium-sized Italian 3PLs. These firms are focused on their ability to segment the market and identify specialised niches (in term of geographical area or type of service). Such ability is generally associated and supported by increasing investments in ICT and web technologies. In the last two decades, these companies evolved from the role of simply "tier suppliers" for large companies to capture better positions in the market (see fig. 2).

Fig. 2 - Evolution of the small Italian 3PLs in the last 2 decades

| Small 3PLs profile on 1980 | Small 3PLs profile on 2002 |
|--|--|
| <ul style="list-style-type: none"> ▪ Family-run organisational structures of companies ▪ Transport was the core business of companies ▪ Warehousing services were sold only together with transport services (no strategic value was given to warehousing services) ▪ No value-added logistics services provided | <ul style="list-style-type: none"> ▪ Companies still have a family-run organisational approach but more professional and structured ▪ Transport and warehousing services have the same importance (sold together in an unique service package) ▪ More emphasis on supply chain services Investments in ICT and related skills to provide new a more integrated services |

⁷ In the period 1998-99 MiT, acquired by Deutsche Post, other firms were acquired by European groups: Technologistica, Traco, Rinaldi, Pony Express, Spedimacc and Ase Transport has been acquired by TNT Post Group, Saima Avandero has been acquired by the Belgium group ABS and Sodilbelco has been acquired by hays. Since 2000 Corriere Executive is controlled by the British Post Office.

3.2. ICT dissemination in the Italian 3PL market

The structure and recent evolution of the Italian logistics service market outlined above have played a major role in determining the level of ICT adoption in the Italian 3PL industry. A number of surveys confirm this situation. Merlino and Testa (1998) analysed the level of computerisation and ICT investments by 3PLs in Northern Italy. The study, carried out on a sample of 197 firms, revealed that these companies are only at the initial stage of adopting ICT. Investments in new technology are still motivated by a tactical rather than a strategic logic. The survey highlighted that the dissemination of new technologies is proceeding at an intermittent and non-homogeneous pace. This can be mostly attributed to the history of the firm and its entrepreneurial culture.

A survey aimed at assessing the relationship between company culture and ICT usage, was conducted on a sample of 48 shipping agents and freight forwarders located in Southern Italy, specifically in the Campania region, by Minguzzi and Morvillo (1999). The results showed that investments in computer hardware and software are associated to entrepreneurial culture rather than to economic and business issues.

Other recent surveys report a number of interesting issues. KPMG (2003) noticed that in comparison to other industries, ICT investment in the Italian 3PL industry is limited. Furthermore, the level of outsourcing of ICT and e-business applications is very low. There is evidence of low penetration of telematics in the road transport segment due to high implementation/running costs and long investment payback periods (CSST, Cranfield University, 2002). Finally, a recent survey (Freight Leaders Club, 2003) shows that the telephone is the most widely used communication tool, while the use of web-based technologies is still limited. The results of the above studies underline a contrasting picture. Whereas, on the one hand, the awareness of ICT as a success factor for 3PLs is evident on the other, there is a limited level of ICT adoption with particular reference to the Internet and e-business tools.

4. ICT practices in small Italian transport and logistics service providers: preliminary results of an empirical survey

This section describes the empirical investigation carried out. Particularly, in section 4.1 the objectives and the methodology of the survey are outlined. In section 4.2 two case examples of small Italian logistics providers are analysed. Finally, in section 4.3 the preliminary results of the survey are presented.

4.1. Objectives and methodology

The main aim of the survey is to analyse the dissemination and adoption of ICT in small Italian 3PLs, while specific objectives of the survey are as follows:

- Objective 1: to set-up a technological profile of the surveyed companies in terms of both ICT investment size and information technology systems and tools adopted;
- Objective 2: to analyse the role of ICT in developing “customised” services;
- Objective 3: to identify approaches in the selection and use of ICT by small 3PLs and to interpret such differences based on company characteristics (market segment in which the company operates, type of customers served, etc.);
- Objective 4: to identify appropriate practices in ICT usage by small 3PLs.

The survey methodology has been organised in the following steps:

- Step 1)* Analysis of a number of small Italian 3PL case examples (see section 4.2);
- Step 2)* Definition of basic survey objectives and preparation of the draft questionnaire;
- Step 3)* Setting-up two focus groups that have been held in Rome and Milan in April 2004. According to the action research framework, key actors have been involved in these two meetings (such as ICT managers of small 3PLs, ICT consultants, directors of Italian transport and logistics service providers associations researchers and academics working in the field). The main aim of

these meetings was to submit basic survey objectives and the draft questionnaire to get useful feedback from the audience. A further aim was to get the help of associations in administering questionnaires through the use of their mailing list and the use of their logos. In addition, an agreement has been set up with four Italian magazines (two logistics/transport magazines and two ICT magazines) to give free annual subscription to respondents;

Step 4) Definition of the sample firms and preparation of the mailing list. The sample firms have been stratified taking into account the EU definition of small service companies. Accordingly, the employee number (less than 95) has been used. The company information has been obtained partly from the Italian transport and logistics service associations that took part in the above two meetings and partly from other sources (such as *Il Giornale della Logistica*);

Step 5) Re-focusing of survey objectives and questionnaire according to the focus group results. This step enables a better focus on the survey objectives and obtains useful inputs to finalise the questionnaire. The final structure of the questionnaire has been organised in 4 sections and 37 questions:

Section A - *Company information* - 15 questions

Section B - *ICT expenditure and tools* (ICT costs, personnel and tools adopted) - 3 questions

Section C - *ICT and software usage for supporting services provided* (type of technologies used, level of tracing services provided, level of IS integration, website) - 13 questions

Section D - *Reasons for investing in ICT and selection criteria* (benefits and obstacles of ICT adoption, impact on companies performance) - 6 questions

Step 6) Mailing questionnaires to 1.992 Italian 3PLs. The survey started on June 2004 and on December 2004 about 200 questionnaires have been received. Data and information presented below are related to the first 100 questionnaires received by the end of September 2004

Step 7) Validation of final results by an expert workshop.

4.2. Case examples of small and medium sized Italian 3PLs

The following case examples are focused on two small Italian 3PLs and show how these companies have been able to cope with the pressures of foreign competition and new customers' requirements through providing customised logistics services supported by ICT.

Case example 1: CABL Service Srl -The company was founded in 1990 as evolution of the Haulage Consortium CABL established in the '60s in the Lodigiano area (nearby Milan). The company was founded to meet the growing need of manufacturing companies to outsource the downstream activities of supply chain, namely warehousing and distribution. Over the years CABL specialised in the "dry" segment (non perishable packaged products) of grocery, beverage and personal care sectors.

Recently, as result of the changes in manufacturing firms that are increasingly focused on core business, CABL lost a number of major customers such as Kraft (now served by Danzas), Bolton and Seagram which outsourced logistics to a single European 3PL. This has forced CABL to specialise their services and invest in ICT. Today, CABL may be considered a highly customised services provider. The company has targeted niche customers performing in the HO.RE.CA (Hotel Restaurant & Catering) industries which require extremely flexible services. CABL heavily invested in ICT technologies, such as radio-frequency systems in all its central warehouses, on-line tracing of shipments, fully electronic controlled picking procedures and computer links with the customers for remote printing of shipment documents, etc. The strong ICT support to "tailor made" services allows CABL to serve small-sized customers successfully.

Case example 2: Italia Depositi Distribuzione S.r.l. (I.D.D.) - The company operates in the Italian logistics market since 1980. The company was founded to leverage its experience in transportation and distribution acquired since the end of the Second World War and provides a range of services including goods collection and receipt, distribution throughout Italy and abroad and integrated warehouse management (storage, picking, packing, transit point management, etc.) in the electronics, chemical, food

Figure 3 - Main findings of case examples analysis

| | Case 1: CABL Service Srl | Case 2: I.D.D. Srl |
|--------------------------------------|--|---|
| Context of operation: | | |
| Type of customers | Small and medium manufacturers and retailers and some large manufacturing industry leader | Medium-large manufacturing companies |
| Type of services | Transport and Warehousing Management, Value Added Services for HO.RE.CA (Hotel, Restaurant and Catering), small grocery retailers, supermarkets, DCs and hypermarkets, | Goods collection, Warehousing (storage, packing, picking, transit point management) and distribution supported by ICT linkages with customers |
| Scope of service | Italian wide | Italian and European wide |
| Outsourcing | Transportation to CABL consortium | ICT services and express delivery services |
| Technology and co-ordination: | | |
| ICT Tools | Radio-frequency - Bar coding - Internet real-time tracking and tracing | Radio-frequency - Bar Coding - Total supply chain tracking and tracing system - Cargo surveillance using satellite system |
| Co-ordination | Account managers for large customers - Reports and data analysis sent to every customer on daily base | Reports and data analysis sent to every customer on daily base |
| Measurement System | Deliveries rejected against the total number of deliveries made - Real delivery times against contractual delivery times | Order delivery time |

beverage and sports industries. The company is located near Milan. Its distribution network consists of central warehouses and of several smaller warehouses. I.D.D. handles the whole goods and information flow of customers which allows the company to work as full logistics partner. In recent year I.D.D. has started an “e-logistics” project that is producing a company organisational rethinking together with the redefinition of personnel professional skills. Such an undergoing project aims to manage and consolidate all the ‘in transit’ information to make them available to all supply chain players through a web portal. This provides a new communication channel for exchange information between all supply chain participants. In other words, such a project enables I.D.D. to produce new value-added functions and operations for its customers (such as customized package, labeling, track and trace, online planning of shippers’ requirements, etc.). In this way, I.D.D. assumes the role of ‘infomediary’ allowing that information flows from the manufacturer

to the inventory manager and vice versa, while delivery notifications flow from the carrier to the customer who is the recipient of the goods.

4.3. Preliminary results

To assess the core business of the surveyed companies, it has been asked to split the total turnover value by services offered. Services included range from transport (pure haulage), warehousing and distribution to more complex and value added logistics and SCM services. Respondents have then been divided into two groups according to the percentage of turnover generated by different 3PL activities. This allows a distinction between Basic Logistics Providers (where the company’s turnover associated with transport and warehousing services is higher than 50% of the total turnover) and Value Added Logistics Providers where more than 50% of the total turnover is generated by advanced logistics and SCM services (Table 1).

Table 1: Sample firms

| | |
|--|-----------|
| Companies contacted | 1,992 |
| Questionnaires received | 100 |
| Questionnaires incomplete | 9 |
| Usable Questionnaires (response rate 4.6%): | 91 |
| ➤ Basic Logistics Providers | 66 |
| ➤ Value Added Logistics Providers | 25 |

Table 2 shows how the sample firms are distributed by main Italian geographical area.

Table 3 shows the general characteristics of the sample surveyed in terms of employees.

Table 2: Sample firms by geographic area

| | North West | North East | Middle | South | Island | Total | % |
|--------------------|------------|------------|-----------|----------|----------|-----------|-------|
| Basic Logistics | 29 | 21 | 8 | 5 | 3 | 66 | 72.5 |
| Advanced Logistics | 10 | 8 | 2 | 3 | 2 | 25 | 25.5 |
| Total | 39 | 29 | 10 | 8 | 5 | 91 | 100.0 |
| % | 42.9 | 31.9 | 11.0 | 8.8 | 5.5 | 100.0 | |

Table 3: Sample firms by firm size

| Employees bands | Micro 1 - 9 | Small 10 - 49 | Medium 50 - 95 | Large > 95 | n.a. | Total | % |
|--------------------|----------------|------------------|-------------------|---------------|----------|-----------|-------|
| Basic Logistics | 17 | 33 | 10 | 3 | 3 | 66 | 72.5 |
| Advanced Logistics | 10 | 8 | 6 | 1 | 0 | 25 | 27.5 |
| Total | 27 | 41 | 16 | 4 | 3 | 91 | 100.0 |
| % | 29.7 | 45.1 | 17.6 | 4.4 | 3.3 | 100.0 | |

Exhibit 1: Service supplied beyond transport/warehousing by sample firms

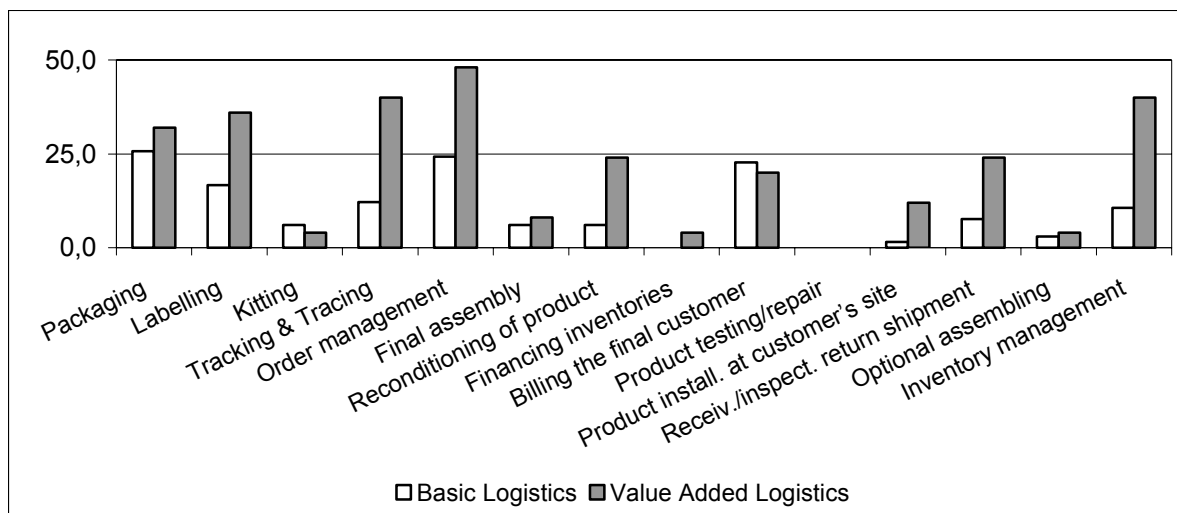


Exhibit 1, shows the range of services supplied by 3PLs surveyed beyond transport and warehousing.

The analysis of information technologies and tools adopted by the companies surveyed to serve their customer (Exhibit 2) show that all providers use tools like phone, fax and mobile.

Both basic logistics and value added providers show a high use of the most popular new technologies such as the Internet and e-mail. For example, almost 60% of the companies surveyed

have a website in place. A very low percentage of companies use advanced tools such as Enterprise Resource Planning (ERP) and Customer Relationship Management (CRM) to interact with their customers.

Apart from website and Global Positioning Systems (GPS), the picture emerging from the above data suggests that Value Added Providers are more active than Basic Logistics Providers in using ICT tools in conducting transactions and managing relationships with customers.

Exhibit 2: ICT usage

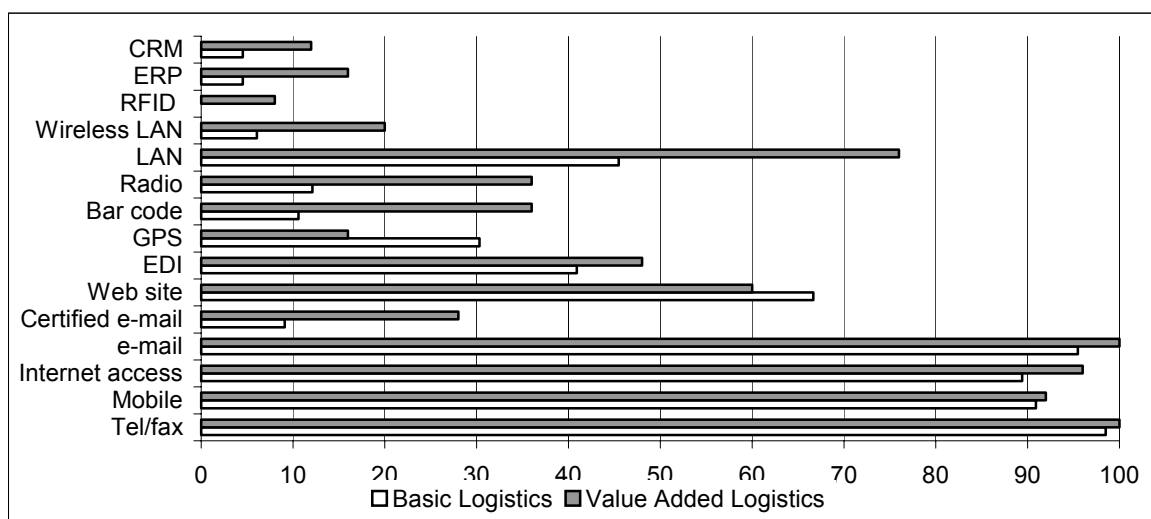


Table 4: Tracking & Tracing Services

| | <i>We don't offer T&T services</i> | | <i>We offer T&T services</i> | |
|-----------------------|--|------|----------------------------------|------|
| | n.º | % | n.º | % |
| Basic Logistics | 43 | 65.2 | 23 | 34.8 |
| Value Added Logistics | 14 | 56.0 | 11 | 44.0 |

Table 4 shows how electronic track and trace services are in an early stage.

The use of software to manage different transport and logistics activities has been investigated (Exhibit 3). However, the level of usage of these tools is generally not high. Furthermore, Value Added Providers generally have a higher level of usage of such a software.

Looking at the use of websites, the survey indicates that 40% of companies surveyed do not have a website in place, while 59 providers (60%) use websites to support their business (Table 5).

In Exhibit 4 shows data about reasons for not using websites. It is interesting to note that the higher importance has been attributed to reasons regarding the absence of Internet services required by customers.

Exhibit 3: Software usage

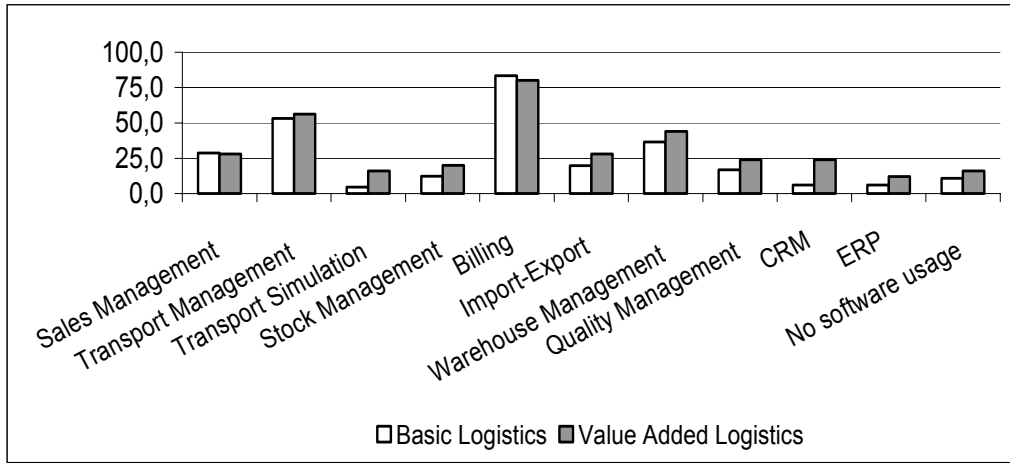
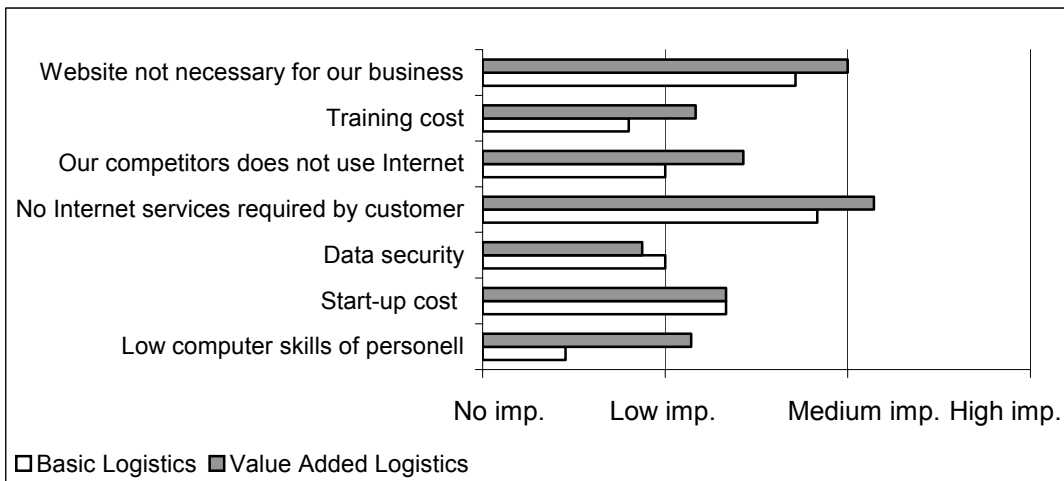


Table 5: Web site in place

| | <i>We do not have Web site</i> | | <i>We have Web site</i> | |
|-----------------------|--------------------------------|------|-------------------------|------|
| | n.º | % | n.º | % |
| Basic Logistics | 22 | 33,3 | 44 | 66,7 |
| Value Added Logistics | 10 | 40 | 15 | 60 |

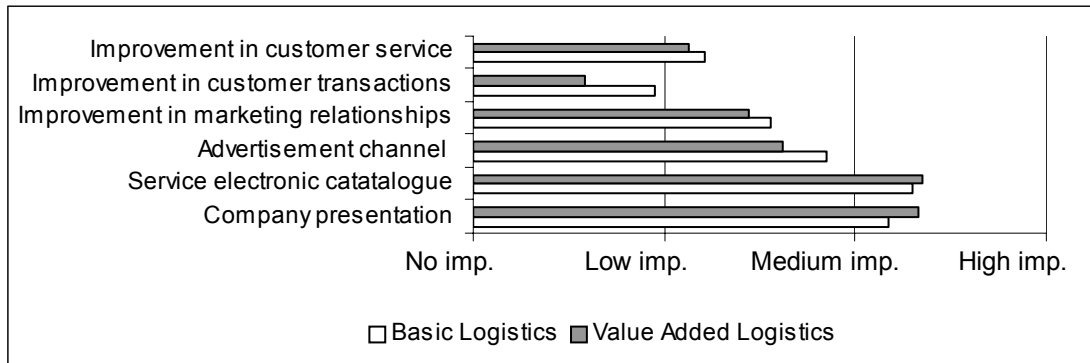
Exhibit 4: Reasons for not using website



It is worth highlighting that the highest score for this reason has been attributed by Value Added Providers. Another important reason inhibiting the use of this tool is related to the high cost of establishing websites. Furthermore, many companies do not consider websites necessary for their businesses.

Training costs and the lack of appropriate skills are also important factors for not using websites. Though the use of websites has become a necessity for many firms in the transportation and logistics industry, the survey highlighted that the usage of websites is still at an early stage (Exhibit 5).

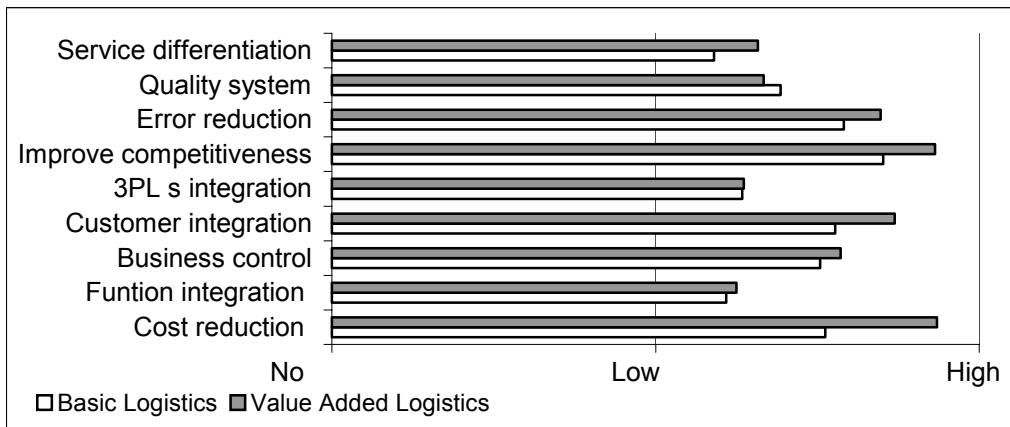
Exhibit 5: Importance of website functions



Considering data about the importance of different website functions, it emerges that most companies that use websites have attributed a higher importance to marketing and advertisement issues, while transactional and interactive issues received low scores.

The analysis of areas of ICT investment (Exhibit 6) shows a strong focus attributed to ICT for improving the internal efficiency of the company. ICT investments are also important as a tool for improving competitiveness and for customer integration.

Exhibit 6: Areas of ICT investment



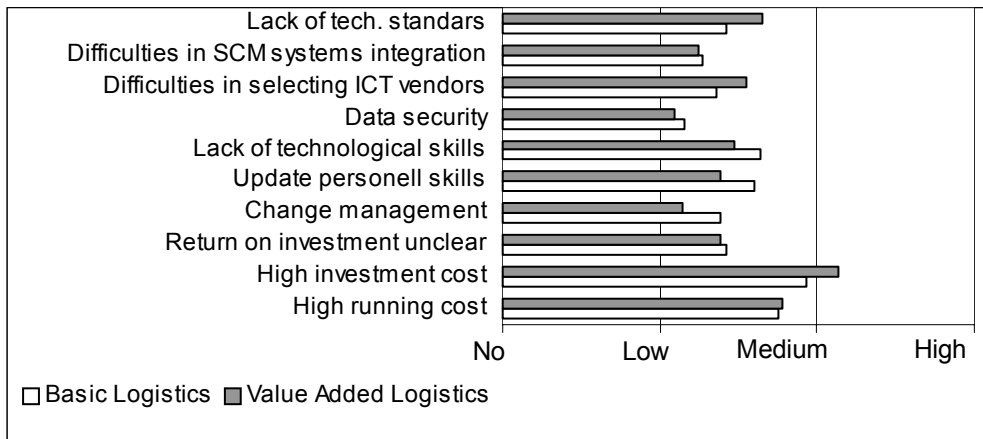
Looking at the factors inhibiting ICT investment (Exhibit 7) an interesting picture emerges. The most important reasons are of financial nature. The level of investment and operating costs are elements that have a strong impact on investment decision making. Other important issues concern human resources (e.g. lack of technological skills).

Finally, the score attributed to the lack of technical standards and difficulties in selecting appropriate ICT vendors indicates how ICT supply has an important role in affecting ICT investment.

5. Conclusions

The literature on the impact of ICT on logistics and SCM has been reviewed in the first part of the paper. The analysis focused on two different interconnected domains: the supply chain domain and the logistics service providers' domain. Regarding the first one, it appears that the effects of ICT are improving the management of the supply chain. Accurate and timely information allows to minimise inventories, improve routing and scheduling of

Exhibit 7: Factors inhibiting ICT investment



transportation vehicles, and generally improve customer service levels. Thus, modern information systems and technology offer opportunities for fast and safe sharing, as well as transmission and processing of large amounts of data. Paperless communication is coming to the forefront whereby routine tasks in order processing and scheduling will be facilitated. As a result, new ICT applications offer great opportunities to integrate and control supply chain planning at cross-organisational levels. On the other hand, the literature review has shown how ICT are redefining strategies and relationships of 3PLs. This is demonstrated by the growing involvement of 3PLs in new e-services, the entry into the market of on-line intermediaries and, finally, the widespread of alliances with new players from unrelated industries.

The main implication is that the appropriate use of ICT is playing a crucial role in the fast changing scenario of the international 3PL industry. The strong impact of ICT on the sector is forcing 3PLs to increasingly compete in two separate, yet closely linked markets: first the marketplace, where goods are physically exchanged and where traditional transport and logistics services are required for the shipment of goods; secondly, the marketpace, the virtual market of e-business where information is the main objective of transaction. Both large and small 3PLs are required to continue to provide transport services using their traditional assets but, at the same time, this function has to be integrated with the supply of new information service using ICT and e-business tools.

In the second part of the paper the recent evolution of the Italian 3PL industry has been the focus of the research work. The Italian logistics service market is the fourth largest European market and it is considered as the market with the highest expected growth rate in Europe in coming years. It is a highly fragmented market and analysts concluded that both the demand and supply sides are characterised by a very high number of small and medium sized companies. This has facilitated the entry of large foreign logistics group that have acquired the most advanced Italian 3PLs. Such process has contributed to reduce stimulus towards technological innovation since it has contributed to the disappearance of most advanced medium sized providers. These companies could have guided and disseminated technological and organisational innovations in the sector. The results of the survey review underline a contrasting picture about the dissemination of ICT in the Italian 3PL market in comparison with the international industry. While on the one hand, the awareness of ICT as a success factor for 3PLs is evident on the other, there is a low level of ICT adoption with particular reference to the Internet and e-business tools.

The scenario that might arise could be characterised by a small group of large leading providers - closely linked to their customers - who manage the transportation-warehousing network and information flows, while individual links are provided by a large number of small national 3PLs. This scenario could have a significant impact on the entire Italian transport and logistics service industry and it

presents small Italian 3PLs with two different alternatives: survive in a low-cost world of transportation carriers (commodity providers), or pursue the expensive and problematic path of becoming value added providers by ICT innovation.

In the last part of the paper the preliminary results of the empirical investigation on ICT practices in small Italian 3PLs show a low level of technology adoption in the surveyed companies. Nevertheless, interesting elements emerge from the survey. For example, Value added logistics providers are a more dynamic in using and investing in ICT. Technology allows them to better gain competitive advantage in a fast changing market context. Customer interaction, investment decision making and human resources appears to be the main factors hindering a wider ICT dissemination. In these areas interventions are urgently required. ICT supply also has an important influence. The early evidences presented in this paper represent a snapshot of ICT practices in the small Italian 3PLs context and require further investigation. The preliminary survey results presented do not allow clarification as to whether ICT can be considered as an opportunity or a constraint for small Italian 3PLs: this will have important implications under both the research and managerial point of view.

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