

2004-01-01

Information and Communication Technologies (ICT) Practices in Small Italian Transport and Logistics Service Providers: Empirical Findings and Critical Issues

Maurizio Caiazzo

National Research Council, Naples, Italy

Pietro Evangelista

National Research Council, Naples, Italy

Edward Sweeney

Technological University Dublin, edward.sweeney@tudublin.ie

Follow this and additional works at: <https://arrow.tudublin.ie/nitlcon>



Part of the [Other Engineering Commons](#)

Recommended Citation

Caiazzo, M., Evangelista, P., Sweeney, E.: Information and communication technologies (ICT) practices in small Italian transport and logistics service providers: empirical findings and critical issues. Enhancing Competitive Advantage through Supply Chain Innovation, Proceedings of the 9th Annual Conference of the Logistics Research Network (LRN2004), pp.148-156, Dublin, September 2004.

This Conference Paper is brought to you for free and open access by the National Institute for Transport and Logistics at ARROW@TU Dublin. It has been accepted for inclusion in Conference papers by an authorized administrator of ARROW@TU Dublin. For more information, please contact arrow.admin@tudublin.ie, aisling.coyne@tudublin.ie.



This work is licensed under a [Creative Commons Attribution-NonCommercial-Share Alike 4.0 License](#)

INFORMATION AND COMMUNICATION TECHNOLOGIES (ICT) PRACTICES IN SMALL ITALIAN TRANSPORT AND LOGISTICS SERVICE PROVIDERS: EMPIRICAL FINDINGS AND CRITICAL ISSUES*

Maurizio Caiazzo, Pietro Evangelista

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

Edward Sweeney

National Institute for Transport and Logistics (NITL), Dublin, Ireland

Abstract

ICT is becoming one of the main drivers of change in the international logistics service industry posing new strategic challenges to third party logistics service providers (3PLs). This has further complicated the competitive position of small 3PLs particularly in those markets where large multinational companies hold a large share of the market such as the Italian 3PL industry. While the literature has largely investigated the dissemination and the impact of ICT in large 3PLs, there is still a shortage of research in the field of small 3PLs. There has been little empirical investigation aimed at analysing and explaining the gap in the adoption of ICT between large and small logistics providers. Studies and empirical research to assess the emergent approaches in the use of ICT by small 3PLs seems to be of critical importance considering the role that new technologies has in developing competitive edge and in creating new business models. The basic research hypothesis of this paper is that the use of ICT can become an important leverage to develop innovation and the competitive capability of small Italian 3PLs. It aims to assess the use of ICT in such companies. The paper presents the preliminary results of an ongoing empirical survey on a sample of small Italian 3PLs.

Keywords: Italian logistics service market, small and medium sized 3PLs, Information and Communication Technologies (ICT), empirical survey

1. Introduction

In recent years, the competitive scenario in the 3PL industry has become much more complex, taking into account the dissemination of Information and Communication Technology (ICT) (Regan, Song, 2001). It has allowed the entry of new players in the market from unexpected industries and has led to changes in the way 3PLs conduct their business. Three trends are evident because of the impact of ICT and web technologies on the sector (Evangelista, 2002). Firstly, there has been increased integration of traditional services (transport and warehousing) with information services such as shipment tracking and tracing. Secondly, there has been widespread development of new virtual intermediaries such as online freight e-marketplaces. Finally, alliances have formed between 3PLs and other companies operating in complementary sectors, (i.e. ICT vendors, management consulting and financial services) that in some cases have given rise to the creation of Fourth Party Logistics Providers (4PLs).

According to the above trends, the competitive advantage of 3PLs depends more and more on the ability to innovate and create value for their customers through ICT, since many value adding activities are directly or indirectly dependent on ICT applications (Crowley, 1998; Clarke, 1998). ICT is of critical importance to achieving innovations needed for 3PLs to succeed in the development of new services in a customised supply chain context. In this regard, Sauvage (2003) noted that in a highly competitive business characterised by time compression, technological effort becomes a critical variable and a significant tool for differentiation of logistics service. Van Hoeck (2002) assigned a specific role to ICT for 3PLs aiming to perform customising operations for service users. The use of specific technological capabilities may leverage transport and logistics services and facilitate more effective organisational and flow integration across companies in the supply chain. For 3PLs, ICT capabilities may assure the rapid customisation of products and maintain competitive lead-times. At the same time, transparency

* The authors wish to thank Maria Elena Musella for the support given before, during and after the field survey and Carlo Mainiero for his help in digit questionnaire data and information.

of transport and logistics operations for the customer might be important to monitor performance and assure product availability.

Recent industry developments have contributed to widen the gap between large and small 3PLs considering that the use of ICT appears irregularly distributed among large and small and medium sized providers. Such changes have further complicated the competitive position of small 3PLs particularly in those markets where large multinational companies hold a large share of the market such as the Italian 3PL industry. The Italian 3PL market is the fourth largest European logistics services market and it is estimated the market with the highest expected growth rate in Europe in coming years. It is the higher fragmented 3PL industry in Europe and this facilitated the entry of large foreign logistics group that tends to marginalise the role of smaller players.

The scenario that might arise is marked by a small group of leading providers, closely linked to their customers who manage transportation-warehousing network and information flows, while individual links will be provided by a large group of small 3PLs.

The basic research hypothesis of this paper is that the appropriate use of the ICT can become an important factor to stimulate innovation and develop the competitive ability of small and medium sized 3PLs. The paper presents the preliminary result of an ongoing empirical survey conducted on a sample of small Italian 3PLs and it has been organised into five sections. The following section, outline the recent evolution of the Italian 3PL market. In the section 3, the dissemination of ICT in the Italian 3PL industry has been discussed. Section 4 presents objectives, methodology and the results of the empirical survey. The concluding section discusses implications for further research in the field.

2. The Italian Transport and Logistics Service Industry: an overview

The Italian transport and logistics service market is the fourth largest European market (after Germany, UK and France) with the highest expected growth rate in Europe in the coming years (KPMG, 2003). One of the main characteristic of the Italian market is its high fragmentation Evangelista, *et al.*, 2003). For example, there are about 180,000 companies operating in the road transport segment, 84% of these companies own less than 4 vehicles. Other European countries are characterised by fewer firms and a higher number of vehicles per company. Furthermore, a recent analysis carried out by *Il Giornale della Logistica*, an Italian logistics magazine, on a sample of 1,000 Italian 3PLs ranked by turnover show that: a) the first 100 companies produce the 60% of the total sample turnover, and b) for the first 200 companies such percentage is 73,9%. The fragmentation of the market is also evident considering employee data. It has been estimated that about 50% of the Italian 3PLs employee less than 50 people, but 35% of them employee less than 9 people (KPMG, 2003).

The structural characteristics of the Italian 3PL industry together with the cultural and financial weakness of Italian logistics companies has strongly facilitated the entry of large foreign logistics group. The wave of mergers and acquisitions, the most notable since Second World War, has been aimed to achieve wider geographical coverage and improvement of the regional network; significant economies of scale and achievement of a critical mass to sustain investments in physical infrastructures and information and communication technologies (ICT). In recent years, the largest European groups have acquired the most advanced Italian 3PLs.¹ In the same period, no significant international operations have been set up by Italian 3PLs on international markets. This is a further sign of their economic, financial and competitive weakness in comparison with foreign companies.

The substantial impact of foreign competition has reduced stimulus towards innovation since it has contributed to the disappearance of the most advanced Italian providers Such process has further complicated the market situation of small Italian 3PLs and it is forcing such companies to lag behind. In this situation the real risk is that small Italian 3PLs could be further marginalised in the marketplace as the "tier suppliers" for large companies which dominate the market and manage the relationships with customers, or even forced out of the market altogether with remarkable effects on the entire

¹ For example, in the period 1998-2000 in addition to MIT, acquired by Deutsche Post, the following firms were acquired by large European groups: Tecnologica, Traco, Rinaldi, Pony Express, Spedimacc and Ase Transport has been acquired by TNT Post Group; Saima Avandero has been acquired by the Belgium group ABX and Sodibelco has been acquired by English company Hays. Since 2000 Corriere Executive is controlled by the British Post Office.

Italian transport and logistic services industry. This 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.

3. ICT Dissemination in the Italian 3PL Industry

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. The entry of foreign competitors has produced two main effects. On the one hand, the entry of large foreign logistics groups has allowed a restructuring process in the Italian 3PL industry, on the other such process has reduced stimulus towards innovation since it has contributed to the disappearance of the most advanced logistics providers that could have guided and disseminated innovations in the sector. This has held back the development of technological and organisational innovation processes needed to compete in a market characterised by the more complex requirements of customers. This has inevitably had repercussions on the willingness of logistics providers to adopt new technologies, which remain at a relatively low level. A number of surveys seems to confirm such situation. The first survey by Merlino and Testa (1998) analysed the level of computerisation and ICT investments by 3PLs in Northern Italy. The study examined 197 firms and found that they are at the initial stage of adopting ICT and that their investments in new technology are still motivated by a tactical rather than strategic logic. The survey highlighted that the dissemination of new technologies is proceeding at an intermittent and non-homogeneous pace. This can be attributed in large part to the background history of the firm and its entrepreneurial culture.

Another survey was aimed at to assess the relationship between the company's entrepreneurial culture and the usage of ICT. It was conducted on a sample of 48 shipping agents and freight forwarders located in Southern Italy, specifically in Campania region (Minguzzi and Morvillo, 1999). It found that the willingness to invest in computer hardware and software can be associated to the entrepreneur culture rather than economic and business issue.

Other recent surveys report a number of interesting issues. KPMG (2003) notes that in comparison with other industries, ICT investment in Italian 3PLs industry is not high and the level of outsourcing of ICT and e-business applications is very low. There is evidence of low penetration of telematic in the road transport segment due to high implementation/running costs and long pay back investment periods (CSST, Cranfield University, 2002). Finally, a recent survey (Freight Leaders Club, 2003) indicates that the most widely used communication tool is telephone, while the use of web-based technologies is still low.

The results of the above studies underline a contrasting picture where ICT is concerned. 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.

4. Information and Communication Technologies Practices in Small Italian Transport and Logistics Service Providers: the preliminary results of an empirical survey

In recent literature, the dissemination of ICT in large logistics providers has been largely investigated, while there is still a shortage of research in the field of small and medium sized 3PLs. The recent literature is almost entirely devoted to the study of the ICT impact on large companies, while there are little empirical investigations to analyse and explain the gap in the adoption of ICT by small logistics providers. This section describes an ongoing empirical investigation on ICT practices in a sample of small Italian transport and logistics service providers. In the following sections, survey objectives and methodology together with the preliminary results will be presented.

Objectives and Methodology

The main aim of the survey is to deepen the knowledge about dissemination and adoption of ICT in small and medium sized Italian transport and logistic service providers. The research methodology has been organised in the following steps: 1) review of literature on dissemination ICT in 3PLs; 2) analysis of a number of small Italian 3PL case examples; 3) two focus group has been held in Roma e Milan on April 2004. The aim of these meeting was to test the draft questionnaire and research hypothesis. This step allowed to better focus the research objective and to obtain useful input for

concluding questionnaire. A further objective was to involve key actors in (such as such as ICT managers of small 3PLs, ICT consultants, responsible of Italian transport and logistics associations, researcher and academics) to get their support in administering questionnaire; 4) definition of the sample firm. The selection of the sample firms has been carried out using two variables: the company turnover (less than 10 million Euro) the number of employees (less than 100 employees); 5) sending questionnaire to 1,992 Italian 3PL companies. The survey started on June 2004 and it is still ongoing. Data and information presented below are related to the first 100 questionnaire received.

Preliminary Survey Results

In this section, the preliminary results of the empirical investigation are presented and they have to be considered as a snapshot of ICT practices of the small Italian 3PLs.

Characteristics of the Sample Firms - To assess the core business, companies has been asked to split the total turnover value by services offered by the company. The services considered range from transport (pure haulage), warehousing and distribution to more complex and value added logistics and SCM services. To asses survey results, the respondents has been divided into two groups according with the percentage of turnover generated by different 3PL activities (Berglund, *et al.*, 1999). This allows distinguishing between Basic Logistics Providers (in the case of the company's turnover associated to transport and warehousing services is higher than 50% of the total turnover) and Value Added Logistics Providers (when more than 50% of the total turnover is generated by advanced logistics and SCM services) as shown in table 1.

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

Tab.1: Sample firms

Table 2 shows the general characteristics of the sample surveyed in terms of turnover and employees.

<i>Turnover bands</i>	< 0.5	0.5-1.5	1.5-3.0	3.0-5.0	5.0-10.0	>10.0	n.a.	Total
Basic Logistics	3.0	10.6	12.1	19.7	27,3	25.8	1.5	100
Value Added Logistics	12.0	12.0	12.0	16.0	12,0	280	8.0	100
<i>Employees bands</i>	<10	11-20	21-50	51-100	>100	n.a.	Total	
Basic Logistics	25.8	16.7	33.3	10.6	9.1	4.5	100	
Value Added Logistics	40.0	24.0	8.0	16.0	12.0	0.0	100	

Tab. 2: Sample firms by turnover (in mln €) and employees (in %), 2003

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

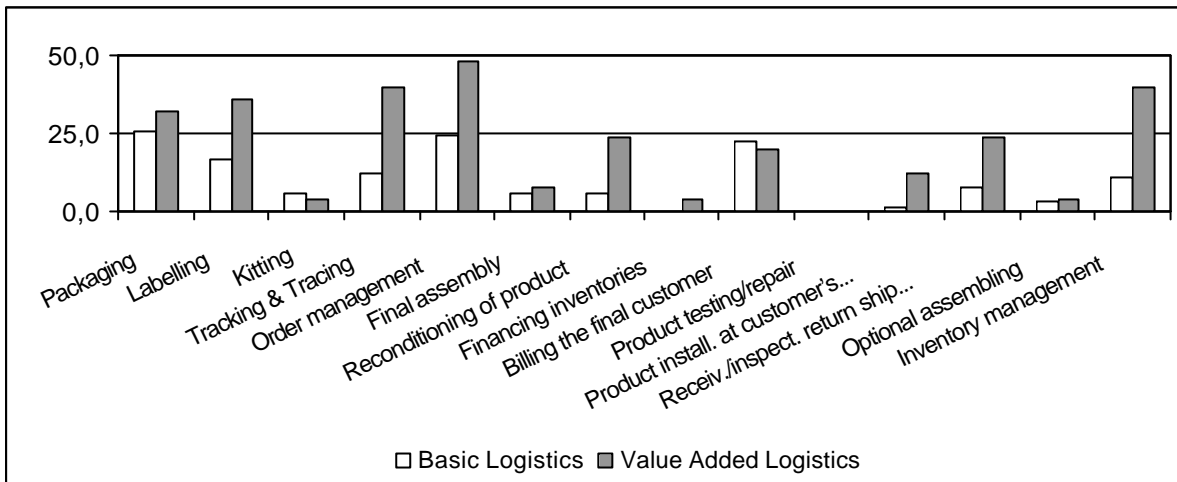


Exhibit 1: Service supplied beyond transport/warehousing by sample firms

ICT Profile - 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 and 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. Nevertheless, almost 60% of the companies surveyed have a website in place.

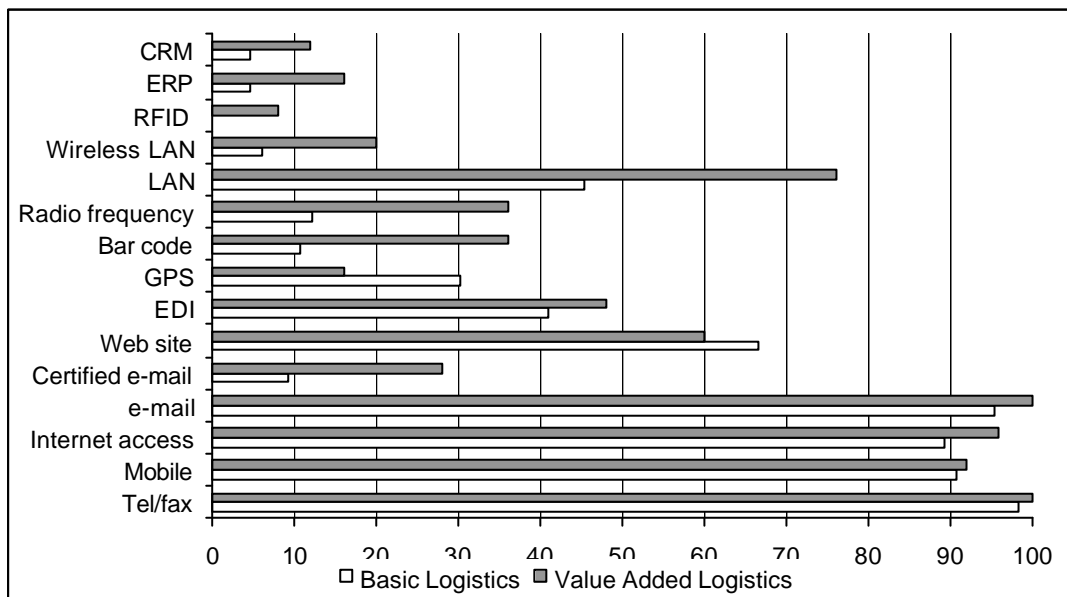


Exhibit 2: ICT usage

A very low percentage of companies use advanced tools to as ERP and CRM to interact with their customer. Apart from website and GPS, the picture emerging from the above data put in evidence that Value Added Providers are more active than Basic Logistics Providers in using ICT tools in conducting transaction and managing relationships with customer. Such evidence is confirmed by data about the level if ICT integration with supply chain participants. Exhibit 3 shows that Value Added Providers have a higher level of integration with customer, while Basic Providers are more integrated with final customer, suppliers and other 3PLs.

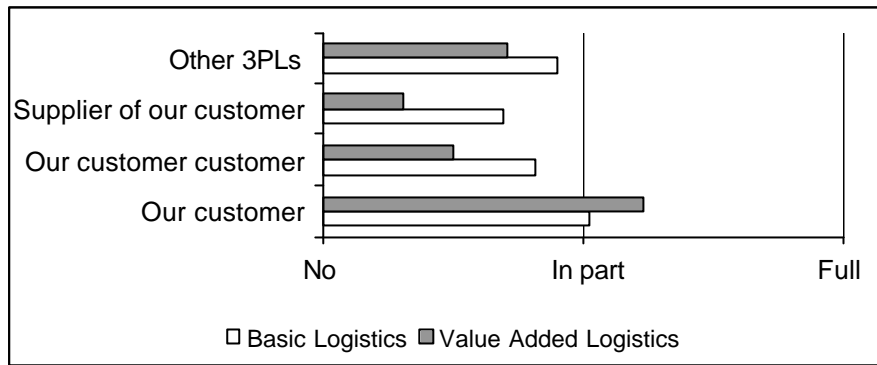


Exhibit 3: ICT integration

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

	<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

Tab. 3: Tracking & Tracing Services

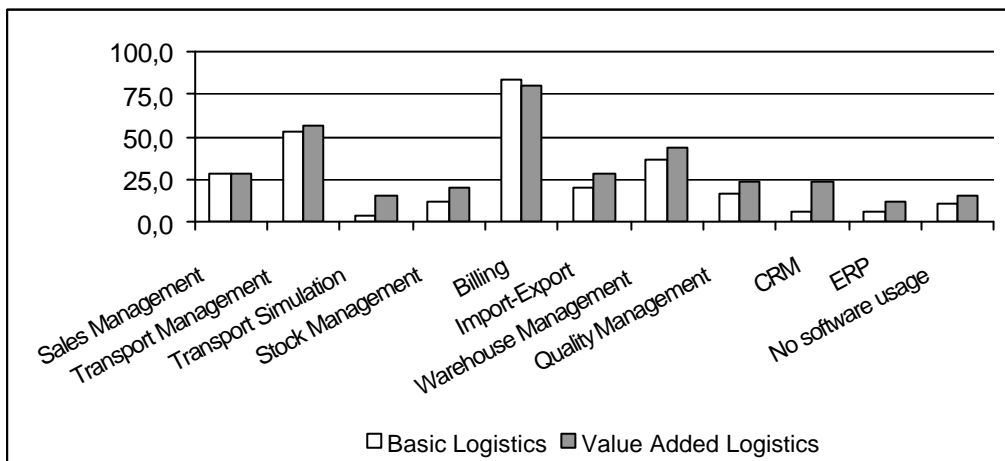


Exhibit 4: Software usage

The use of software to manage different transport and logistics activities has been investigated (Exhibit 4). However, level of usage of these tools are generally not high, also in this case, Value Added Providers have a higher level of usage of software. Looking at the use of the Internet website, the survey evidenced that more than 60% of the companies surveyed do not have a website in place, while only 34 providers use website for support their business.

	We do not have Web site		We have Web site	
	n.	%	n.	%
Basic Logistics	43	65.2	23	34.8
Value Added Logistics	14	56.0	11	44.0

Tab. 4: Web site in place

In Exhibit 5 shows data about reasons for not using website. It interesting to note that the higher importance has been attributed to reasons regarding the absence of Internet services required by customers. It is worth to note that the highest score for this reasons has been attributed by Value

Added providers. Another important reason inhibiting the use of such tool is related to the high cost for establishing website. Furthermore, such companies consider the website not necessary for their business. Training cost and the lack of appropriate skills are also important factors for not using website.

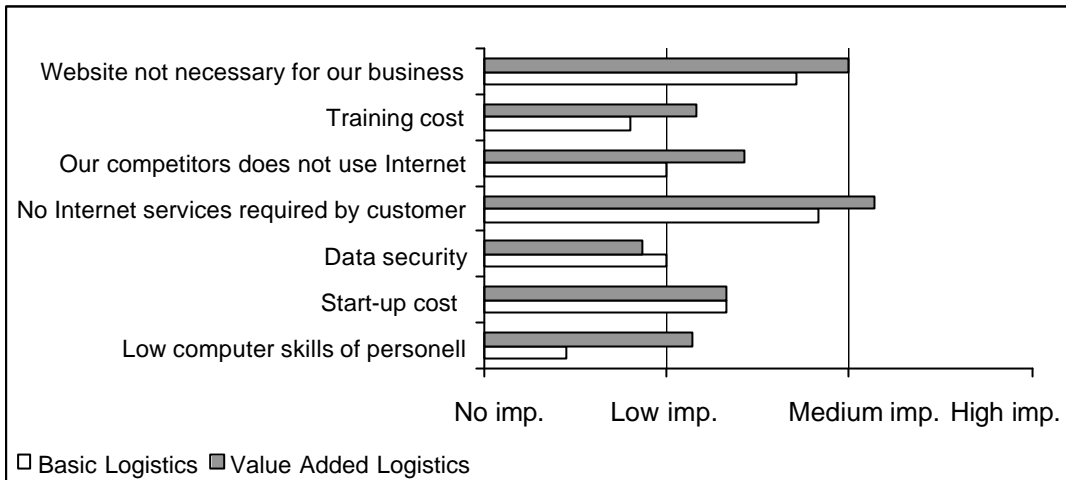


Exhibit 5: Reasons for not set-up website

Though the use of website has become a necessity for many firms in the transportation and logistics industry, the survey highlighted that the usage of website is still an early stage (Exhibit 6). Considering data about the importance of different website functions, it emerges that the most of part companies that use website have attributed the higher importance to marketing and advertisement issue, while transactional and interactive issues received low score.

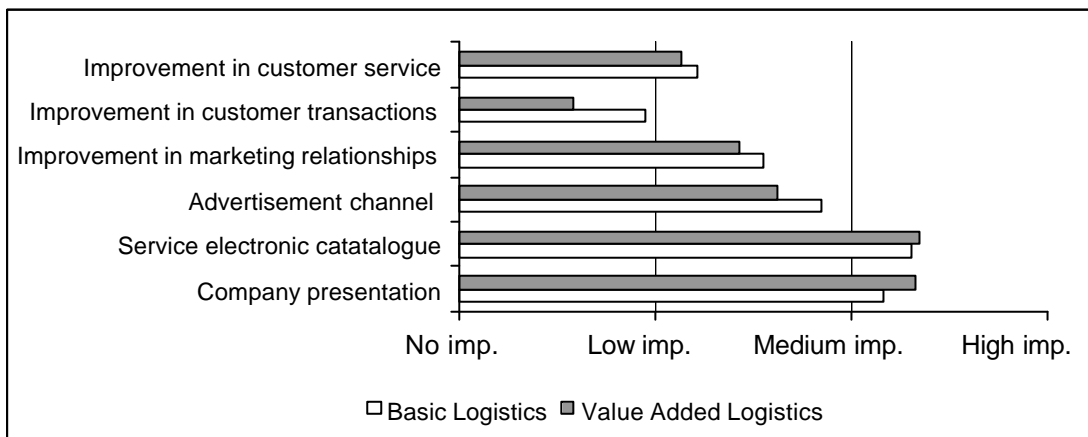


Exhibit 6: Importance of website functions

Analysis of areas of ICT investment (Exhibit 7) show the strong focus attributed to ICT for improve the internal efficiency of the company. ICT investments are also important as a tool for improving competitiveness and for customer integration.

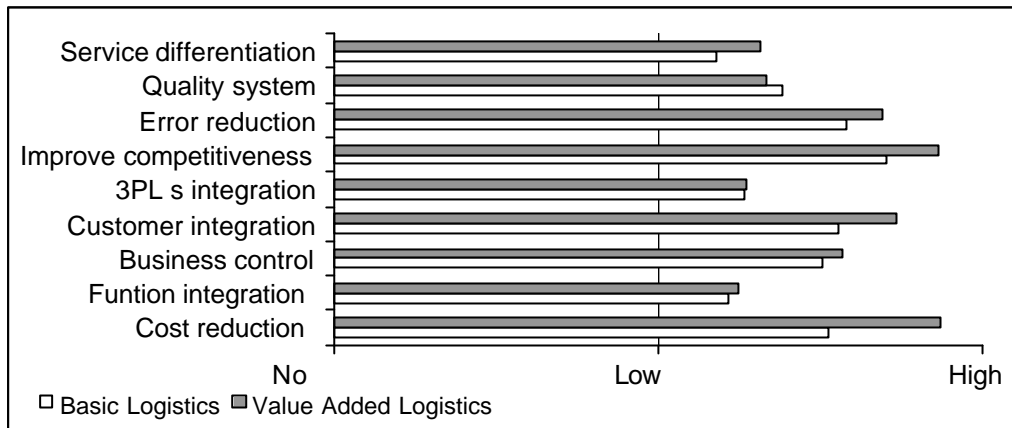


Exhibit 7: Areas of ICT investment

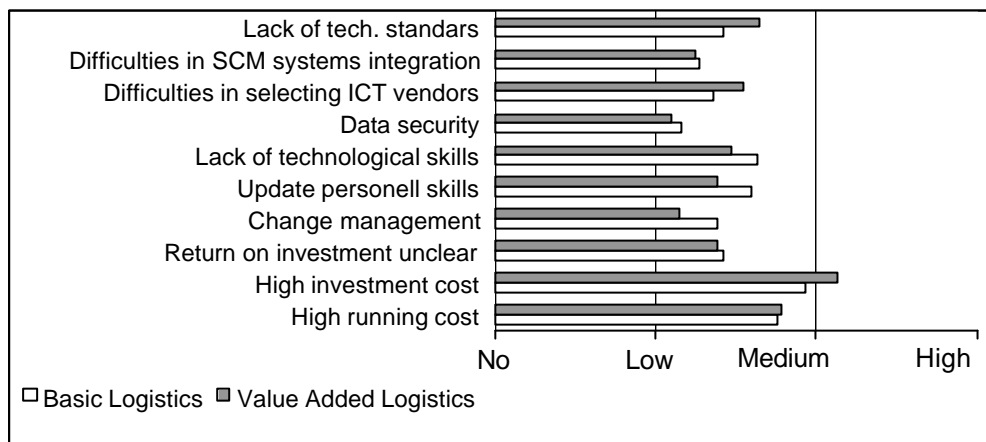


Exhibit 8: Factors inhibiting ICT investment

Looking at the factors inhibiting ICT investment (Exhibit 8) emerge an interesting picture. The most important reasons are financial issues. The level of investment and running costs are element that has a strong impact on investment decision making. Other important issue concern human resources (lack of technological and update skills). Finally, the score attributed to the lack of technical standards and difficulties in selecting appropriate ICT vendors indicated how ICT supply has an important role in affecting ICT investment.

5. Conclusions and Implications for Further Research

The preliminary results of the empirical investigation on ICT practices in small Italian 3PLs presented in this paper shows a poor technology profile in the companies surveyed. Nevertheless, interesting elements emerge from the survey. Value added providers are the more dynamic segment in using and investing in ICT. This allows such companies to better gain competitive advantage in a fast changing market context. Customer interaction, investment decision making and human resources appears the main critical areas in which interventions are required. ICT supply also has an important influence. The results do not allow clarification as to whether ICT can be considered as an opportunity or a constraint for small Italian 3PLs: this has implications for the ongoing research agenda in this area. From a managerial point of view, the survey will result in guidelines for selection and appropriate use of ICT by the managers of small Italian 3PLs. Finally, the final survey results will offer useful market information for ICT vendors (both software and hardware) and consulting companies to better market their products and services.

6. References

- Berglund, M., van Laarhoven, P., Sharman, G., Wandel, S., (1999), Third party logistics: is there a future?, *International Journal of Logistic Management* , Vol. 10, N. 1, pp. 59-70.

- Centro Studi sui Sistemi di Trasporto (CSST), Cranfield University (2002), *Transport and Logistics in the digital era: A survey of telematic use by European Road Freight Operators*, Survey Report, Fiera di Genova, October 28-29, Genoa, Italy.
- Clarke P.M. (1998), Virtual logistics. An introduction and overview of the concepts, *International Journal of Physical Distribution & Logistics Management*, Vol. 28, N. 7, pp. 486-507.
- Crowley A.G. (1998), Virtual logistics: transport in the marketspace, *International Journal of Physical Distribution & Logistics Management*, Vol. 28, N. 7, pp. 547-574.
- Evangelista P. (2002), Information and Communication Technology key factor in logistics and freight transport, in Ferrara G. and Morvillo A. (edited by), *Training in Logistics and Freight Transport Industry. The Experience of the European Project ADAPT-FIT*, Ashgate Publishing Ltd, London, UK.
- Evangelista, P., Morvillo, A., Passaro, R. (2003), Current and future trends in the 3PL industry: preliminary results of a survey on the Italian case, *Proceedings of 12th IPSERA Annual Conference "Where Theory Meets Practice"*, 14-16 April, Budapest, Hungary.
- Freight Leaders Club (2003), *Flussi informativi nel trasporto merci e nella logistica. Criticità, stato dell'arte e proposte*, Quaderni n. 14, Milan, Italy.
- KPMG (2003), *Logistica integrata ed operatori di settore: trend e scenari evolutivi del mercato Italiano*, KPMG Business Advisory Services, Milan Italy.
- Merlino M., Testa S. (1998), L'adozione delle tecnologie dell'informazione nelle aziende fornitrici di servizi logistici dell'area genovese-savonese: risultati di un'indagine empirica, *proceedings of the 2nd Workshop I processi innovativi nella piccola impresa*, 21- 22 May, Urbino, Italy.
- Minguzzi A., Morvillo A. (1999), Entrepreneurial culture and the spread of information technology in transport firms. First results on a Southern Italy sample, *proceedings of 44th ICSB World Conference "Innovation and Economic Development: the Role of Entrepreneurship and Small and Medium Enterprises"*, 20-23 June, Naples, Italy.
- Regan A.C., Song J., (2001), An industry in transition: third party logistics in the information age, paper given at the *Transportation Research Board, 80th Annual Meeting*, January, Washington DC, USA.
- Sauvage T. (2003), "The Relationship between Technology and Logistics Third-Party Providers", *International Journal of Physical Distribution and Logistical Management*, Vol. 33, No. 3, pp. 236-253.
- Van Hoek, R., (2002), "Using information technology to leverage transport and logistics service operations in the supply chain: an empirical assessment of the interrelation between technology and operation management", *International Journal of Information Technology and Management*, Vol. 1, N. 1, pp. 115-130.