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# The role of 3PL Internet technology in supporting extended enterprise integration: an exploratory survey

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## **Abstract**

Information and Communications Technology (ICT) is widely regarded as a key integration enabler in contemporary supply chain configurations. Additionally, as increasing numbers of manufacturers and retailers outsource significant parts of their supply chain functionality, the world has seen the vertical disintegration of supply chains. As a result of these and other developments, the extended enterprise (EE) business model has become more widely adopted in a range of sectors. In this environment, third party logistics (3PL) providers (the majority of which are small companies) may play a pivotal role in integrating physical and information flows in new business models through the use of ICT, namely through Internet websites. This paper presents the results of an exploratory, empirical investigation conducted on the website content of a sample of 153 small Italian logistics service companies. The results of the survey show managerial implications for small 3PL companies and indicates possible future research directions in this field. This is especially important considering the paucity of research in the field of small 3PLs and little empirical investigation into the use of websites by such firms.

**Keywords:** Supply chain integration, Extended enterprise, Small Italian logistics service providers, Website usage, Empirical survey

## **Introduction**

It is widely accepted that ICT and Internet technology have the potential to facilitate firms' innovation processes due to the fact that both offer new and more effective support to conduct business operations. This is particularly true in the context of new organisation configurations such as the EE concept, where new technologies are critical in ensuring the effective integration of physical and information flows among participating companies (Browne, Zhang, 1999).

The role of 3PLs in logistics outsourcing has evolved over the last few years (McKinnon, 1999). Such companies are transforming their business configuration from simple transport service providers to supply chain integrators. Internet technology (e.g. websites) may play an important role in this process since it allows companies to more effectively manage information exchanges and interactions with customers and other supply chain partners (Ellinger, et al. (b) 2003). Despite this, the scarcity of available research indicates that logistics service companies have not put enough emphasis on the use of websites (Ellinger, et al., (a) 2003).

This paper is part of a larger research project aimed at studying how small firms are facing new business challenges and how they are adapting to emerging organisational models, such as extended enterprise (EE) and virtual enterprise (VE). This paper presents the preliminary result of an empirical investigation conducted on the website content of 153 small Italian logistics service companies. The main goal of this survey was to provide a preliminary picture of how small logistics companies are

using websites. This survey allowed us to assess the “readiness” of 3PLs in terms of whether or not these firms can support new organisational configurations. The analysis has been carried out by distinguishing companies based on the breadth of service they provide and by using the Internet Maturity Model to estimate the degree of advancement of company websites (KPMG LLP, 2000).

The paper is organised into five sections beginning with this introduction. The second section discusses the nature of supply chain vertical disintegration and the emergence of EE business models. In the third section, the survey methodology used to investigate website content of the firms in the sample is given. The survey findings are then presented in the fourth section. The final section discusses the managerial and research implications of the survey result and a future research agenda in this field.

### **Supply chain vertical disintegration and the Extended Enterprise business model**

Companies are increasingly focusing on what they regard as their core activities or competencies. Oates (1998) defines core competencies as “the central things that organisations do well”. The result of this is that “non-core” activities are being outsourced. Greaver (1999) states that “non-core competencies take up time, energy and workspace and help management lose sight of what is important in an organisation.” Additionally, the trend towards economic and business globalisation has facilitated the outsourcing of various activities to overseas locations. These changes have resulted in a shift away from the traditional model of control through ownership, which is based on the strategic logic of vertical integration. Instead, companies are moving towards models that are based on control through effective supply chain management, which has resulted in the development of the EE model of strategic development.

Vertical integration is the degree to which a firm owns its upstream suppliers and its downstream buyers (Greaver, 1999). Harrigan (2003) provides a good description of the logic underpinning this approach to strategic development. Recent developments in ICT, in particular Internet technologies, have facilitated this process and laid the foundations for the “network economy model” (Reddy and Reddy, 2001) and the practical development of EE business architectures. According to Hugos (2002), traditional supply chain models have ‘given way to virtual integration of companies’ (p. 235). In short, as outsourcing of various elements of supply chain functionality takes place so supply chain architectures are becoming more virtual. The traditional *fully vertically integrated* approaches are being replaced by contemporary *fully virtually integrated* approaches - a new FVI is evolving with the EE business model at its core.

In this environment ICT is a critical resource since it enables both network coordination and innovation development. This is particularly true in the context of the logistics service sector, where ICT is playing an increasingly important role. More and more frequently, customers require that 3PLs have specific technological capability in order to increase the degree of connectivity in the supply chain. Moreover, 3PLs are required to be able to manage the entire logistics network and link geographically dispersed company activities, such as procurement, assembly, warehousing, distribution and customer service.

ICT allows 3PLs to innovate services in order to better serve their customers in a more personalized way (Evangelista et al., 2007). As highlighted by Flint et al. (2005), innovation (including ICT-based innovation) may impact two different areas: internal efficiency and/or customer service. Sauvage (2003) noted that in a highly competitive business characterised by time compression, technology becomes a critical variable and a significant tool for differentiation of logistics services. Van Hoek (2002) pointed out that the use of specific technological capabilities may leverage transport and logistics services as well as facilitate more effective integration across companies in the supply chain. As predicted by Crowley (1998), it seems that competitive advantage in the 3PL industry is increasingly based on creating value for customers, and many value added activities are directly or indirectly dependent on ICT applications.

### **Research approach and methodology**

The main objective of this paper is to analyse the role that logistics service providers have in supporting new organisational company configurations (e.g. EE) through the use of ICT. In particular, the paper is geared towards studying the interactive role the company website may have in this scenario. The basic hypothesis of this paper is that 3PL companies may better support emerging organisational forms if they have in place an highly interactive website.

This hypothesis is supported by the fact that the Internet is increasingly being recognised as the optimal medium for the exchange of information between customers and providers throughout the supply chain. The website is one of the most important tools to facilitate this (Fontanella, 2000; Sharma, 2002). In the view of Kleindl (2001) and Watson et al. (2000), the Internet can help companies to increase profitability, reach new markets, improve customer service, distribute products faster, and communicate more effectively with supply chain partners.

The critical role of website development and Internet presence is also stressed in logistics literature. As a result of the significant impact of ICT and e-business on the logistics service industry, Ellinger, et al., (2003a) argued that the development and implementation of Internet pages has become necessary for logistics service companies (namely road hauliers). According to Murphy and Daley (2000), an Internet presence provides logistics companies (namely freight forwarders) with the opportunity to enhance service offerings in a cost effective and practical manner. Lewis (2001) and Dresner et al. (2001) evidenced that the main benefits of using a website include: quicker information access, improved shipment tracking and tracing, improved communication with customers, better customer service, reduced costs, higher productivity, and reduced paperwork. Lynagh et al. (2001) reported evidence concerning the importance and usage of web-based informational practices among 3PLs.

A well established model has been developed in order to analyse the website content of logistics service companies. This model has been built by the KPMG consulting company, and it is called the Internet Maturity Model (KPMG LLP, 2000). This model estimates the degree of evolution of a given website, assigning each a specific stage position that correlates to its degree of interactivity (see fig. 1). The model organizes websites from stage one to four. The least evolved websites are classified as stage one, which includes basic websites that provide customers general company information (also known as the marketing stage). Stage four includes the most evolved websites, where there is a substantial amount of interactive applications that offer customers virtual product catalogs, opportunities to provide feedback, and an array of services including the ability to pay for services and fulfil orders online (also known as the interactive stage.)

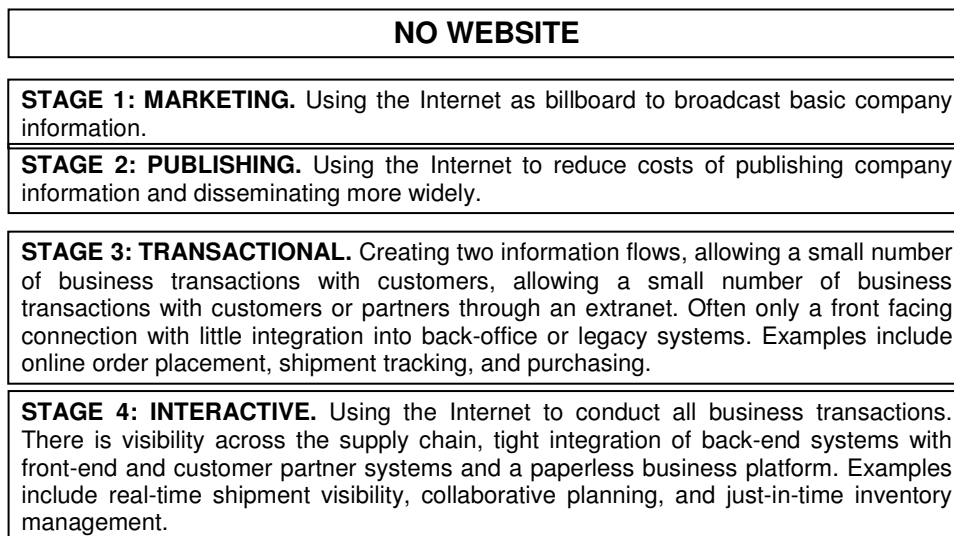


Figure 1 - The KPMG's Internet Maturity Model

This model has been used to analyse the degree of interactivity of logistics service providers' websites through an empirical survey that examined the website content of 153 small Italian 3PLs. The sample firms were split into three categories (Evangelista, Sweeney, 2006):

- Full haulage providers: Those companies within the population for which transport activities represent 100 per cent of turnover;
- Basic logistics providers: Those firms for which transport and warehousing together comprise over 50 per cent of turnover;

- Advanced logistics providers: Those companies for which transport and warehousing together comprise less than 50 per cent of turnover. This implies that the remaining percentage (more than 50%) is generated by value-added logistics and SCM services.

Before examining the websites, it was necessary to determine which transport-specific interactive features needed to be taken into account in order to effectively sort each company into one of the stages of KPMG's model. The following list of interactive content items was selected on the basis of the previous literature and surveys carried out on the subject:

- Online order tracking and tracing;
- Invitation to obtain online quotes;
- Online proof of delivery documentation;
- Online load pickup scheduling;
- Rate calculator;
- Booking space on board;
- Online notification of shipment status;
- Download of the bill of lading.

Another preliminary step that was taken before the start of the survey was the clarification of which criterion would be used specifically for the 3PL websites to organize them into stages. For this purpose the KPMG's model was used as a reference. After this preparatory phase, the website investigation was carried out. Because the list of the companies was obtained in 2005 (see Evangelista et al., 2005), it was necessary to revise the website address list. For the companies which had no websites in 2005, it was particularly important to verify if the firm had managed to develop an official Internet site in the meantime. Some problems occurred during the survey. Firstly, some companies had websites under construction. In this case, the company was counted as a website adopter (114 in total), but the company was excluded from the analysis (4 companies in total.) Another problem was caused by restrictions set up on more sophisticated websites. Often, passwords and usernames were demanded in order to enter the restricted area of the website generally devoted to customers only. This eliminated the possibility of counting all the features on the website.

### Survey findings

The main objective of the survey was to determine the level of website interactive content (as per KPMG's model) in relation to the three 3PL categories. The results are shown in Figure 2 (data from table 1) and Figure 3 (data from tables 2).

Interactive Content	Full Haulage	Basic Logistics	Advanced Log.
N. of interactive functionalities offered	13	73	57
N. of companies having a website (110 in total)	18	55	37
Average N. of interactive functionalities offered	0,7	1,3	1,5

Table 1- Interactive website content in each small 3PL group

Data in figure 2 reveals that advanced logistics companies are using most of the interactive features on their websites, while only a few full haulage companies have interactive content items on their web-pages.

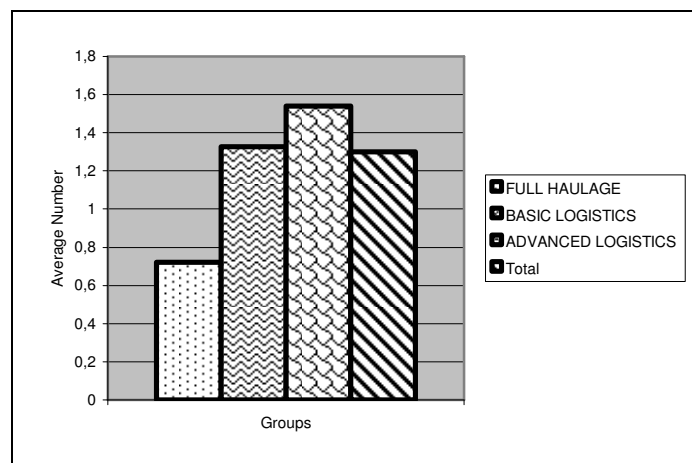


Figure 2 - Average of transport-specific interactive features in each small 3PL group

Data in Figure 3 show that Stage I (Marketing) was the most common stage for the websites of full haulage logistics companies. On the other hand, Stage IV (Interactive) was the most common for advanced logistics companies. By looking at the last group of bars in Figure 3, it is interesting to note that the difference between basic logistics and advanced logistics is small in the interactive stage of the KPMG mode.

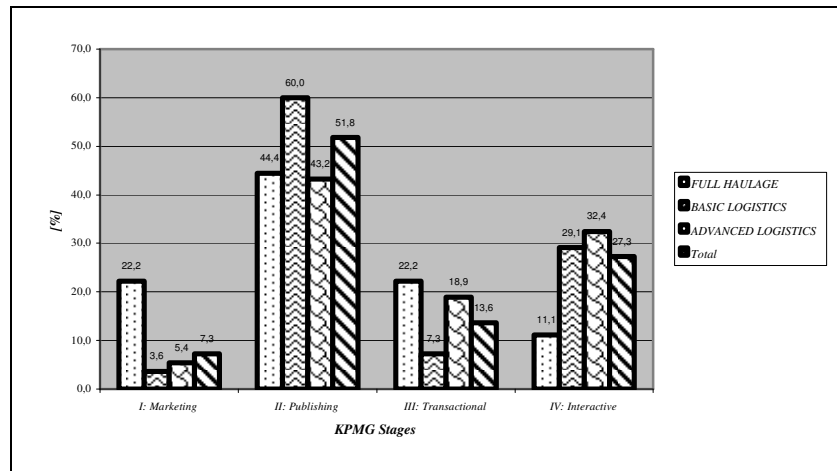


Figure 3 - Positioning of small 3PLs group in the KPMG's model stages

One possible explanation is that several companies that were originally sorted into the basic logistics group evolved into advanced logistics companies and need to be resorted; this could explain the higher levels of basic logistics companies sorted into Stage IV. However, this hypothesis should be confirmed by further investigations on the sample firms.

KPMG model stage	Full Haulage		Basic Logistics		Advanced Log.	
	N.	%	N.	%	N.	%
I: Marketing	4	22,2	2	3,6	2	5,4
II: Publishing	8	44,5	33	60,0	16	43,3
III: Transactional	4	22,2	4	7,3	7	18,9
IV: Interactive	2	11,1	16	29,1	12	32,4
N. of companies having a website in the group	18	100	55	100	37	100

Table 2 - Number of companies in each KPMG model stage per 3PL category

Data in table 2 is represented in the following graph (Figure 4), in which the diameter of each bubble corresponds to the percentage of companies in the group with respect to the website development stages.

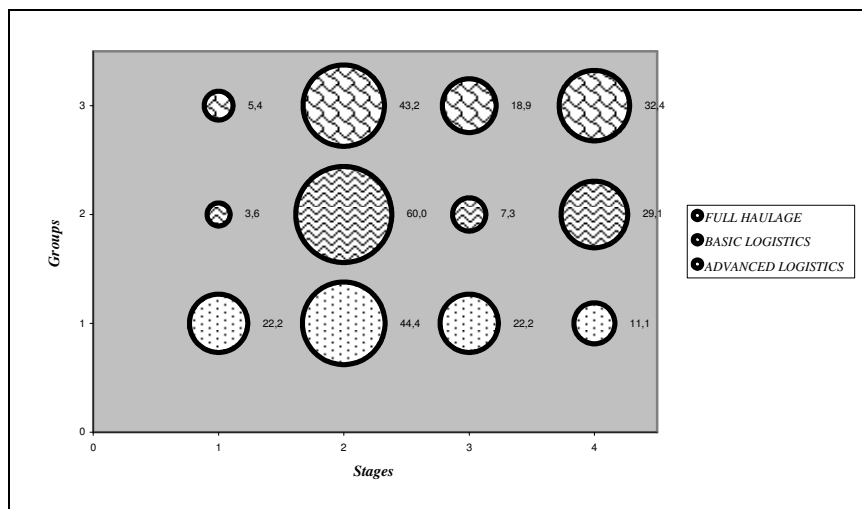


Figure 4 - Small 3PL groups in each KPMG model stage

## **Conclusions**

The survey has some limitations. First, it must be articulated that this survey could be somewhat inaccurate due to the possible evolution of some companies in the sample with regard to the three categories of firms. Also, in order to determine the amount of functionality offered by the websites that have restricted areas, it is necessary to obtain more information by contacting these companies. Despite these limitations, the results indicate that advanced logistics companies widely adopt interactive functionality on their websites in comparison to the other two categories.

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