

OUTSOURCING LOGISTIC ACTIVITIES IN PORTUGAL: CURRENT STATE AND FUTURE TENDENCIES

Norberto António Leite Bessa

ISCET | Instituto Superior de Ciências Empresariais e do Turismo

Resumo

Este trabalho pretende determinar o estado das actividades que os operadores logísticos desenvolvem em Portugal, um país com um grande potencial para as actividades logísticas devido à sua localização geoestratégica. Em 2009 foi enviado um questionário às 500 maiores empresas da indústria transformadora, sendo as empresas seleccionadas através do seu volume de vendas e número de colaboradores. As respostas foram tratadas estatisticamente, usando o *software* SPSS, para determinar o comportamento das empresas que responderam ao questionário em relação ao uso dos serviços dos operadores logísticos. Os resultados identificam Portugal como um caso de sucesso na utilização dos operadores logísticos pelas empresas da indústria transformadora, pois as mesmas indicam que estão satisfeitas com o seu uso e quase metade indica que no seu futuro prevê aumentar o uso dos serviços destes operadores.

Palavras-chave:

Outsourcing, logística, transporte, Comércio internacional, operadores logísticos, gestão da cadeia de abastecimento

JEL-Codes: F21, F23, L90, M16

Abstract

Purpose – This research aims to determine the status of third party logistics (TPL) activities in Portugal, a country with a great potential for logistics activities due to its strategic geographical location.

Design/Methodology/Approach – In 2009, a questionnaire was sent to the largest 500 Portuguese firms of the manufacturing sector, selected on the firms' total sales volume and on the total number of employees. The responses were treated statistically by using SPSS software. Several analyses were carried out in order to determine the behavior of firms in what concerns their logistics service providers and to categorize the respondents.

Findings – The use of logistic operators in Portugal can be considered as a successful phenomenon, since the great majority of companies are satisfied with the use of TPL and nearly half of the companies declare, in the near future, to increase the use of these services. More than a half of the firms indicate that the decision of outsourcing logistics activities are made at a strategic level and it is one of the administrators' priorities.

Research limitations/implications – Further research work should focus on managing TPL relationships. Case studies are needed to further investigate how multinational firms manage the TPL decision process at different organizational and regional levels.

Practical implications – The results give managers and administrators evidence to support the benefits of outsourcing logistic activities. It also contains practical information for the providers of contract logistics services on the most frequently used services.

Originality/value – This is the first thorough study about outsourcing logistics practices in Portugal. This study makes a significant addition to literature on logistics outsourcing as little empirical research has been previously reported from Portugal.

Keywords:

Outsourcing, Logistics, Transportation, Third-party Logistics, Supply chain

Paper type : Research Paper

Introduction

The logistics sector is assuming an increasing importance in the role of the Portuguese economy and the Portuguese government is demanding new laws focused on the development of the older logistics platforms and constructing new infrastructures to support this sector. The development of third party logistics - TPL, and the sector that assures the services in the supply chain management have been studied in literature by different authors. Such studies are focused on developed countries (e.g., U.S.A., Australia, Germany, France, Finland, Sweden) or on the said emergent economies (e.g., India, China, South Korea, Malaysia, Singapore), thus, there is the need for future studies in other countries of intermediate development of the European continent to verify if the conclusions observed in the developed regions and in the emergent regions are the same in countries of intermediate development, with less dimension and less sophisticated structure of logistics support.

The aim of this paper is to analyze the state of the logistics outsourcing in Portugal. We also will try to figure out the drivers that make the companies outsource their logistics activity and we will try to characterize the type of contract made, the obstacles founded in the process of outsourcing and the main impacts that the companies report when they outsource. To carry out these findings, we will use in the quantitative analyses a survey addressed to companies of different kind of activity sectors that belong to the manufacturing industry.

The rest of this paper is organized as follows: in the section 1, we review the relevant segments of literature and present our research framework. In the section 2, we map the proposed research methodology, followed by data analysis. Finally, the paper concludes with a discussion on future implications.

1. Logistic Outsourcing and third-part logistics in the literature

Defining Logistics

Logistics has having a highlight spot in the literature due to the excellent results achieved from an efficient supply chain management (Guedes, 2010). The cost reduction, the increase of the logistics activity and the increase of the transport systems makes easier to access to international markets and as a consequence the international trade is growing. The reduction of international trade market barriers leads to a faster increase of international trade than the domestic trade (Nordas *et al.*, 2006). This change is not only due to the new directions of international trade but is also due to the renewal of the logistics platforms (Ruijgrok, 2001). In literature, logistics is defined as the activity that grants that the correct products and services are delivered at the correct time, in the correct place and in the correct condition (Ballou, 1992; Meersman and Van de Voorde, 2001). The term logistics is integrated in the Supply Chain Management (SCM). We can define SCM as the network of multiple management and planning activities, since the sourcing of new suppliers, passing through production and customer service, involving all the activities of the company (CSCM, 2010). It is important to include the coordination and cooperation with strategic partners that can be suppliers, logistics operator, intermediaries or costumers. In its essence, supply chain management integrates the management of demand and supply inside and through the company (CSCM, 2010). The scope of supply chain management has been changing, passing from an operational / tactical approach – integrating the logistics function through the supply chain – to a strategic approach – integrating, managing the business and core processes of the company through the supply chain management. (Beth *et al.*, 2003).

Third-party logistics service

Logistics is the one of the supports of the economy, one of the supports of a company and due to the increase of the world economy globalization; several companies have decided to outsource their logistics activity. There are different kinds of definitions to translate the same reality, the logistics operator or the logistics outsourcing or the third-party logistics (TPL or 3PL) can be defined as agents that companies contract to perform their logistics operations. It consists in the use of specialized external companies, to perform all or part of the logistics activity (Razzaque and Cheng, 1998; Sahay and Mohan, 2006). One of the key factors for the growth of the logistics outsourcing is the growth of the globalization of company's business (Sahay and Mohan, 2006).

During the last two decades the globalization is the factor that influences more in the decisions of companies to do business: the world leader companies are obliged to design articles to a global market and perform the sourcing of suppliers in a global scale (Cooper, 1993). How the companies decide what are the activities that should be outsourced? Different kind of key factors were identified as the reasons that make the company to decide to outsource activities and they are (Bhatnagar *et al.*, 1999; Laarhoven *et al.*, 2000; Sohail *et al.*, 2002; Hong *et al.*, 2004; Sahay and Mohan, 2006; Sohail *et al.*, 2006):

- Focus on core competences

- Increase of customer service level
- Cost reduction
- The decision process of contracting logistics operators

The several logistics operations are management, analysis and design of activities related to the transport and warehousing of all kind of products (Stock and Greis, 1999). Some of the regular activities are the stock management, inventory report, tracking and tracing of products and some added-value services like product assembly, warehouse management, transport management, distribution management and supply chain management (Carbone and Stone, 2005). These increasingly complex operations oblige managers to shift their attention to activities focused on logistics area, denoting thus lack of specific knowledge of customs rules, tax regulations and infrastructure in destination countries, which leads companies to acquire this know-how in third-party logistics companies (Skjoett-Larson, 2000; Sahay and Mohan, 2006). As result of this decision, companies focus their forces on their nuclear activities and they are outsourcing non-nuclear activities of business support with specialized partners (Trunick, 1989).

Logistical outsourcing growth is following two distinct directions: on one hand, there is an increase in the number of companies that outsource logistics services and, on the other hand , a growth (increased activity) of companies which carry out the logistical outsourcing, as well as the diversification of processes that are carried out outside the company.

In typical context of logistics, the position of TPL is upstream of the logistic chain between suppliers and producers and, downstream, between consumers and distributors. In this logistics chain there are also the international freight forwarders acting as an intermediary in the logistics chain that facilitates the international transport of goods and their movement across borders (Markides and Holweg, 2006). The freight forwarder is specialized agent in international trade who facilitates the companies' import and export business. In addition, they can reduce the transport time and customs clearance time. For this, the freight forwarders dominate the spaces on ships bookings, are specialized in issuing documentation related to exports, in analyzing the documentation required. They are responsible for the payment of the freight transport (depending on the type of transport used), the organization of internal transport between the port of destination or origin of the goods and the premises of the supplier or the customer (Markides and Holweg, 2006).

In recent years, the forwarders efforts are to extend their skills to freight customs' clearance services (Murphy and Daley, 2001). The freight forwarder is one key element of the supply chain, but emerges as an intermediary, which aims to facilitate the activities of companies operating in the area of international trade and logistics operators. The freight forwarders are distinguished from third-party logistics by offering less value added services and less complexity services for their customer companies (Murphy and Daley, 2001).

The use of third-party logistics in different countries

The literature on the subject of logistics and logistics operators is extensive in the North American market (Lieb and Bentz, 2005c) and there are, however, some studies already carried out for the European continent (Laarhoven *et al.*, 2000; Lieb and Bentz, 2005a; Carbone and Stone, 2005). Similar studies have focused on thematic matters of logistics in China (Hsiao *et al.*, 2010), Bulgaria (Bloomen and Petrov, 1994), South Africa (Cilliers and Nagel, 1994), Australia (Dapiran *et al.*, 1996), Korea (Kim, 1996), Asia Pacific (Millen and Sohal, 1996), Singapore (Bhatnagar *et al.*, 1999) and French Indochina (Goh and Ang, 2000). The studies demonstrate that the countries had benefited of the use of third-party logistics (Sahay and Mohan, 2006). It is possible to identify, in these studies, different key factors that have impact in the use of TPL (Bhatnagar *et al.*, 1996; Lieb and Randall, 1996; Sohail and Sohal, 2003; Sohail and Al-Abdali, 2005; Large *et al.*, 2011), mainly:

- Level of use of the logistic operators (level of commitment, nature and duration of the contract)
- Decision making process for choosing the logistic services provider (need to focus in the key functions, e.g., better transport solutions)
- Impact of the use of the service of the logistic operator in the company organization (advantages of using the logistics operator, degree of satisfaction)

These factors are considered crucial and will dictate the future use of the services of these operators and the degree of outsourcing of the activities, for the companies that outsourced the activity. The literature points out lines of future research in behavioral and conceptual models (Marasco, 2007). Other authors point the necessity of future research in processes, in the drawing and implementation of the operations of outsourcing logistic (Selviaridis and Spring, 2007).

The level of use of the logistic operators had a crucial role in the development of countries as Bulgaria and the Indochina (Goh and Ang, 2000; Bloomen and Petrov, 2004) while in countries as Mexico and India, the level of use of these operators is reduced (Arroyo *et al.*, 2006). The profits with the level of satisfaction of the customers are pointed out as the reasons for the outsourcing, also the increase of the performance of the deliveries, which lead to an increase of competitiveness of the companies through the cost reduction (Sahay and Mohan, 2006)

These studies are mainly supported by surveys made to logistic operators and to companies that use the service of service providers (Dapiran *et al.*, 1996; Kim, 1996; Bhatnagar *et al.*, 1999; Laarhoven *et al.*, 2000; Sohail and Sohal, 2003; Lieb and Bentz, 2005b; Aktas and Ulengin, 2005; Sohail and Al-Abdali, 2005; Arroyo *et al.*, 2006; Sahay and Mohan, 2006; Sohail *et al.*, 2006; Tian *et al.*, 2009; Hilletofth and Hilmola 2010; Masteika and Cepinski, 2010).

Generally most of the companies in these studies have a high degree of satisfaction with the result reached with the partnerships of logistics outsourcing, they intend to solidify these partnerships with new forms of cooperation in other areas of activity (Bhatnagar *et al.*, 1999; Dapiran *et al.*, 1996, Selviaridis and Spring, 2007).

The main positive factors indicated by the companies, which result from the cooperation are: the positive development of the organization in the professionalization of its workers and new methods of work in the logistics area (Dapiran *et al.*, 1996; Sohail and Al-Abdali, 2005), the costs reduction (Dapiran *et al.*, 1996; Bhatnagar *et al.*, 1999; Sohail and Sohal, 2003) and the increase of the service level offered to its customers (Dapiran *et al.*, 1996; Sohail and Sohal, 2003; Kiisler, 2008).

We noticed that the decision of outsourcing the logistics activity with a logistic operator, is made at the level of operational / planning and not at a strategically level (Bhatnagar *et al.*, 1999). These studies also point some clues with respect to the reinforcement of the partnerships (Dapiran *et al.*, 1996) and for the reduction of integration costs - for companies who are considering outsourcing the activity with logistic operators (Dapiran *et al.*, 1996; Sohail and Sohal, 2003; Sohail and Al-Abdali, 2005).

These studies indicate as key factors for the logistics outsourcing the 1) need to increase the professionalization of the companies (centering them in its key competences and outsource the logistic activity), 2) the increase of the service level to its customers, 3) the increase of the efficiency level of the organization and 4) the cost reduction. In what it concerns to the obstacles to outsource logistics activities, we can divide them in two types: the development level of the country and his governmental politics (Goh and Ang, 2000). The area of activity of the company and the company's culture appear as the main barriers to the development of the activity (Aktas and Ulengin, 2011).

2. Logistics outsourcing: methodology

The approach adopted by a large number of studies in the area of TPL is based on questionnaires sent to companies that use the services of third-party logistics (Dapiran *et al.*, 1996; Bhatnagar *et al.*, 1999; Berglund *et al.*, 1999; Laarhoven *et al.*, 2000; Murphy and Daley, 2001; Sohail and Al-Abdali, 2005, Hsiao *et al.*, 2009). Other authors (e.g. Lieb and Bentz, 2005a, 2005c) used questionnaires but directed specifically to CEO of a sample of European companies and American exporters. The case study methodology is also used by a reasonable number of studies that seek to evaluate the importance of application extension/TPL (Corsi and Boysin, 2001; Boske and Cuttino, 2001; Carbone and Stone, 2005).

In line with the existing studies, the questionnaire to implement focuses the following elements (the corresponding studies are next to each of the elements):

- The extent of companies using the third-party logistics services (Dapiran *et al.*, 1996; Kim, 1996; Bhatnagar *et al.*, 1999; Tian *et al.*, 2010)
- The maturity level of the company that uses the service of third-party logistics (Laarhoven *et al.*, 2000)
- The maturity level of the company that provides the service of third-party logistics (Bhatnagar *et al.*, 1999; Sohail e Sohal, 2003; Arroyo *et al.*, 2006)
- The maturity level of the contract (Bhatnagar *et al.*, 1999; Laarhoven *et al.*, 2000; Sohail *et al.*, 2006)
- Factors affecting the final decision of outsourcing (Dapiran *et al.*, 1996; Laarhoven *et al.*, 2000; Sohail and Al-Abdali, 2005)
- The logistics contract used and the benefits obtained for user firms (Dapiran *et al.*, 1996; Sankaran *et al.*, 2002; Sohail and Sohal, 2003; Sohail and Al-Abdali, 2005; Bayraktar *et al.*, 2010);
- Obstacles encountered in the implementation of logistics contracts and its relations with the TPL (Dapiran *et al.*, 1996; Kim, 1996; Sohail e Sohal, 2003);
- The impact of logistics services contracts in logistics costs, customer satisfaction and satisfaction of employees of companies that use these services (Dapiran *et al.*, 1996; Bhatnagar *et al.*, 1999; Sohail and Sohal, 2003; Lieb and Bentz, 2005b; Stefanson, 2006; Bayraktar *et al.*, 2010; Wallenburg *et al.*, 2010);
- The future plans of the current users of logistics services contracts (Dapiran *et al.*, 1996; Kim, 1996; Bhatnagar *et al.*, 1999; Laarhoven *et al.*, 2000; Sohail and Sohal, 2003; Lieb and Bentz, 2005a; Lieb and Bentz, 2005b; Aktas and Ulengin, 2005; Lieb and Bentz, 2005c; Sohail and Al-Abdali, 2005; Arroyo *et al.*, 2006; Sahay and Mohan, 2006; Sohail *et al.*, 2006; Wang *et al.*, 2006; Tian *et al.*, 2009; Hilletofth and Hilmola 2010; Masteika and Cepinski, 2010).

- The level where the outsourcing decision is taken (Dapiran *et al.*, 1996; Bhatnagar *et al.*, 1999; Sohail and Al-Abdali, 2005)
- The variety outsourced services (Arroyo *et al.*, 2006; Sohail *et al.*, 2006; Zhou *et al.*, 2008; Hilletofth and Hilmola 2010)
- The use of electronic data information systems (EDI) (Londe and Masters, 1994; Kiisler, 2008)
- The level of satisfaction with the use of TPL (Dapiran *et al.*, 1996; Bhatnagar *et al.*, 1999; Berglund *et al.*, 1999; Sohail and Sohal, 2003; Sohail and Al-Abdali, 2005; Lieb and Bentz, 2005a; Lieb and Bentz, 2005b; Lieb and Bentz, 2005c; Sahay and Mohan, 2006)

Most of the papers published in this area, use the manufacturing companies, because they have relevant logistics needs (Bhatnagar *et al.*, 1999; Sohail and Al-Abdali, 2005). Services companies such as banking, insurance and real estate are not the subject of study; because they do not have significant logistics needs (Dapiran *et al.*, 1996; Sohail and Sohal, 2003).

The chosen data source to obtain the list of companies was the SABI database (*Sistema de Análise de Balanços Ibéricos*)¹, being selected for this purpose the codes of economic activity of companies of the manufacturing industry. The target population for this study was the 500 national largest companies of manufacturing industry, according to its sales volume for the year of 2009, being this representative sample of Portuguese economy getting online with samples of studies carried out by other authors.

In order to obtain a higher number of replies, we decided to contact by telephone all the selected companies to obtain the correct e-mail contact and after we have addressed the questionnaire to them. During this contact, we have detected 34 companies of the sample that are bankrupted and 22 companies are business groups that have several branches and for this reason the logistics function is centrally managed. The final sample of companies that received the questionnaire were 444 companies. The questionnaires started to be sent to contacts companies previously obtained on 8th April 2011 and the receipt of replies to the survey was closed on 7th June.

Questionnaire replies were received from 105 companies that generate a sales volume of 8,619,172 thousand euros representing 5.11% of national GDP and 24.21% of sales volume of sample of selected companies. Regarding the level of employees, companies that responded represent 0.64% of the national working population and 22.18% sample of selected companies.

The questionnaire designed was prepared in accordance with the literature consisting in twenty-two questions. The survey questions meant to characterize three themes: 1) the extension of the use of third-party logistics and the decision-making process of selecting the operator, 2) current use of logistic operators and type of relationship established and 3) the impact of utilization of TPL and future trends.

To characterize the first theme above, we included questions that focus on the extent of the companies that use TPL logistics services (question # 1); the decision-making process of choosing the logistics service provider in terms of motivations for outsourcing logistics activities (question # 3 and # 4); the decision-making process (question # 5); the importance attached to the maturity of the company that uses the TPL service for logistics (question # 6); the level of maturity (notoriety/market presence) of the company providing the services of third-party logistics (question # 7); the variety of services usually subcontracted (question # 8); the perception about the impact (Facilitator) that outsourcing has on imports (question # 9 and # 10) and exports (question # 11 and # 12).

In the second section of the questionnaire, questions are related to the level of use of third-party logistics (question # 13); the type of relationship established (question # 14 and # 15) and, when there is an agreement, the level of maturity (question # 15 and # 16); the obstacles encountered in the implementation of logistics contracts and their relation with the subcontracted company (question # 17) and the use of information systems and their importance in the supply chain (question # 18 and # 19).

Regarding the last theme, the survey includes questions related to the impact of the use of the logistic operator service in the organization, in the logistics costs, customer satisfaction and companies employees satisfaction with the use of this services (question # 20) and future plans for the current users of logistics services contracts (question # 21 and # 22).

The questionnaire described above has also been structured to reply to 10 research hypotheses that were raised during the literature review process we describe below:

Hypothesis 1: The logistics companies measure performance in terms of productivity (Kiisler, 2008) (# 3).

Hypothesis 2: Cost reduction is the main motivation for the use of third-party logistics (Bhatnagar *et al.*, 1999; Laarhoven *et al.*, 2000; Mietunem and Jamsa, 2006; Sahay and Mohan, 2006) (# 4).

Hypothesis 3: The decision to use third-party logistics aims to increase the level of service to company's final costumers (Kiisler, 2008) (# 4).

Hypothesis 4: The outsourcing of logistics activities decision is taken at the strategic level of organization (Dapiran *et al.*, 1996; Bhatnagar *et al.*, 1999; Sohail and Al-Abdali, 2005) (# 5).

¹ SABI - *Sistema de Análise de Balanços Ibéricos*, is the only Iberian database with economic and financial information of over 1 million companies from Portugal and Spain with monthly updates.

Hypothesis 5: Transportation is the activity that most companies outsource (Dapiran *et al.*, 1996; Kim, 1996; Bhatnagar *et al.*, 1999; Rabinovich *et al.*, 1999; Larson, and Gammelgaard, 2001; Sohail and Sohal, 2003; Aktas and Ulengin, 2005; Sohail and Al-Abdali, 2005; Lieb and Bentz, 2005b; Sohail *et al.*, 2006; Arroyo *et al.*, 2006; Sahay and Mohan, 2006; Vasialauskas and Barysienne, 2008; Hilletoft and Hilmola, 2010) (# 8).

Hypothesis 6: The use of third-party logistics contributes to increase the exports (exploratory hypothesis to analyze the impact of outsourcing on the streamlining of international trade) (# 9 and # 10).

Hypothesis 7: The use of third-party logistics contributes to increasing imports (exploratory hypothesis to analyze the impact of outsourcing on the streamlining of international trade) (# 11 and # 12)

Hypothesis 8: Logistics outsourcing increases the morale of the company's employees. (Dapiran *et al.*, 1996; Bhatnagar *et al.*, 1999; Sohail and Sohal, 2003; Sohail and Al-Abdali, 2005; Lieb and Bentz, 2005b; Arroyo *et al.*, 2006; Sahay and Mohan, 2006) (# 20)

Hypothesis 9: Companies that use TPL, are satisfied with the logistic outsourcing (Dapiran *et al.*, 1996; Bhatnagar *et al.*, 1999; Sohail and Sohal, 2003; Sohail and Al-Abdali, 2005; Sohail *et al.*, 2006; Sahay and Mohan, 2006; Vasialauskas and Barysienne, 2008) (# 21).

Hypothesis 10: The logistics outsourcing tends to increase in the future (Dapiran *et al.*, 1996; Bhatnagar *et al.*, 1999; Berglund *et al.*, 1999; Sohail and Sohal, 2003; Sohail and Al-Abdali, 2005; Lieb and Bentz, 2005a; Lieb and Bentz, 2005b; Lieb and Bentz, 2005c; Sahay and Mohan, 2006) (# 22).

3. Logistic outsourcing: Empirical results

Descriptive analysis

From the sample of the 444 companies, to whom the questionnaire was sent, answers from 105 companies were considered valid, which represent 23.65% of the received answers. It places this study inline with other made by other authors in other parts of the world (Dapiran *et al.*, 1996; Bhatnagar *et al.*, 1999; Sohail and Sohal, 2003; Sohail and Al-Abdali, 2005; Sahay and Mohan, 2006). Of the 105 companies that had answered, 84 (80%) indicated that they use a logistics operator to perform some of its logistics activities and 21 companies (20%) had mentioned that they do not use a logistics operator to perform any activity.

Above percentages are in line with results that similar studies made in developed countries had, for example, U.S.A. with a figure of 80% and Singapore with 78,7% . Regarding the fact of the companies that indicate the logistic activity as one of its core competences, the reply was 82.14%, this result is above of other studies made, e.g., in Greece with a level of replies of 30% (Kotsifaki *et al.*, 2007) and Estonia with 29% tax (Kiisler, 2008).

The level of customer service, that would be understood as the time of delivery and resolution of claims, is the most important variable for 77 of the companies, this result isn't in line with the study of Kiisler (2008) that concludes that the quality of the service is the most important variable for the companies to measure its logistic performance. We noticed that the quality of the service is not the factor that more companies have chosen, however 80% of the companies indicate it as being an excellent indicator to measure the logistic performance. Still related with the form to measure the logistic performance, we asked the companies to measure the performance from worst to better, in a 1-5 scale. The results show that the service level is the variable that better measures the performance, assuming a medium value of 4, the higher value among the possible variables that the surveyed companies had to choose in this question.

The costs reductions with the logistics activity is the main strategically reason that stimulates the decision to outsource some of the logistic activities, it is also pointed out in studies elaborated in Singapore (Bhatnagar *et al.*, 1999, where 86.8% mention this reason) and in India (Sahay and Mohan, 2006, 80.6% of the companies mention this reason). Our study, also points out the improvement of the final service given to the final customer as one strategic reason.

Regarding the decision making process to use external logistic operators, the same is taken to an administration level for 52,38% of the companies, reply in line with studies made in Australia (Dapiran *et al.*, 1996, with a 40%) and in Saudi Arabia (Sohail and Al-Abdali, 2005, with a 50%). To notice, that other studies point another solution for the decision making process, as the decision is made at the operational level (Bhatnagar *et al.*, 1999; Laarhoven *et al.*, 2000; Sohail and Sohal, 2003; Sohail *et al.*, 2006).

The maturity level of the company which decides to outsource the activity and the market notoriety of the company that provides the logistic service are relevant factors in the choice and in the contract of logistic services in outsourcing (Sohail and Sohal, 2003; Arroyo *et al.*, 2006). In the Portuguese case study, we noted that 88.1% of the companies consider the maturity of TPL (measured for the notoriety and antiquity of presence in the market) as important to extremely important, in the option to outsource. The transport is the activity that most of the companies use in outsourcing (95.24%), followed by customs brokerage (72.62%), after warehousing activities (34.52%) and devolutions (33.33%).

This result is in accordance with the conclusions obtained in most part of the studies that approach this thematic: in Denmark, Estonia, Sweden, Finland and Turkey, where more than 80% of the companies decide to outsource the transport service. In Australia, South Korea, U.S.A., India and Singapore, transport is also important but its percentage is only around 50%.

With respect to the use of operators to perform the company's international trade, the answer was that the use of TPL facilitates the exports, due to its knowledge of the market, but we cannot conclude that they contribute for an increase of the exports. In what concerns imports, the answers indicate that the use of logistics operators facilitates the imports but do not contribute for an increase of the same.

Although the companies outsource logistic activities, more than 53% of the them only outsource less than 40% of the total company's logistics budget. This result is in accordance with studies made by Sahay and the Mohan (2006) for India, Sohail *et al.* (2006) for Malaysia and Singapore and Dapiran *et al.* (1996) for Australia. It has, however a higher response rate than when we compare to studies made in more developed countries such as U.S.A. Most of the companies (about 77%) develop plans to create and keep business partnerships with logistic operators.

In relation to contracts established with logistic operators, almost 70% of companies mention that have this form of engagement, while the remaining companies only buy the service of these operators randomly. The result obtained in the study of Laarhoven *et al.* (2000) on a set of European countries, 72%, is in accordance with the behaviour of the Portuguese companies. The majority of contracts (86,2%) has the duration established between 1 and 3 years while the long duration contracts (contracts with more than 3 years) only represent 13.8% of the answers. This result is something different, from the result found in countries as Australia, U.S.A. or Singapore, where the biggest percentage of companies makes logistics contracts for 3 years or longer.

When establishing contracts with the logistic operators, there are some obstacles in its implementation and in the management of the relations. We pointed out as the most relevant difficulties the integration of the informatics systems (obstacle indicated for 33,3% of the companies), the loss of control of the activity that was contracted (32.1%), the mistrust regarding the service level of the logistics operator (23.8%) and the resistance (on the part of the operator) to adopt companies procedures (25%). The difficulties in the integration of informatics systems is also, the biggest obstacle found in the set of the European countries analyzed in the study of Laarhoven *et al.* (2000) - about 53% of the companies consider this as the main problem in the definition of the contract and in the relation management with the TPL company.

In relation to the electronic information systems, 77.4% of the companies had indicated that they use this type of technology, value very above from the one found in other countries as Estonia - only 22% (Kiisler, 2008). 79.8% of the same consider its use as strategic in the supply chain and because of this, these technologies are being expanded to include more integrated applications, in 80% of the companies that had answered.

The impact of the use of the service of logistic operator in the organization of the company that outsources is felt more significantly in the cost reduction (about of 82% of the companies indicate this factor as being the biggest impact) and the improvement of the customer service (75%). A significant number of companies (58.3%) also mentioned the improvement of the logistic activity at a process level. Very similar results had been observed in Denmark, Turkey, Bulgaria and Australia.

The satisfaction level of the companies related to the use of logistic operators is high and very high for almost 70% of the companies (69.1%). The satisfaction level is medium for almost 30% of the companies. Comparing with similar studies, we note that, in Portugal, the companies are more satisfied with the outsourcing with TPL compared with the average of the analyzed European countries in the study of Vasiliauskas and Barysiene (2008). We can emphasize that in some countries the result is different from the one found for Portugal, countries such as India, Malaysia and Singapore.

The future trends in what concerns the use of the logistic operators to perform its logistic activities is that half of the companies say they will maintain the services with logistic operators, 35.7% of the companies indicate that they will increase moderately and 10.7% of the companies indicate that they will increase substantially.

Empirical validation of the raised research hypotheses of inquiry

We have used Q Cochran² test, that in accordance with Marôco (2010) is the most suitable test for the *Hypothesis 1* with a $p\text{-value} \leq \alpha=0,05$ together with the McNemar³ test. We can conclude that, in the case of the performance measures such as *cost*, *service level* and *service quality*, it does not have equality of choice between these, and the measure *productivity*. As the alternative hypothesis to the null hypothesis is the ratio of companies which choose the measure *productivity* and this is inferior to the ratio of companies which choose one of the other measures (*cost*, *service* or *service quality*), we can conclude that, in the Portuguese case, the companies do not measure the logistic performance in terms of *productivity* (in contrast with Kiisler, 2008), but more in terms of *cost* and *customer service level*.

In regards to the *Hypothesis 2*, we have used the same statistics tests as used in the previous hypothesis. We can conclude that the percentage of companies that choose to contract TPL to obtain a cost reduction are significantly higher than the percentage of companies

2 Q de Cochran test tests the null hypothesis of the p-value proportion that is equal in all the other (k) paired samples.

3 McNemar test tests the null hypothesis equality between the proportions of 2 paired samples.

that outsource logistic activity to improve its logistic service, to have more and better logistic services or to focus their attention on the core activities of their company. Such conclusion, is in accordance with the studies made by Bhatnagar *et al.*, (1999), Laarhoven *et al.* (2000) and Sahay and Mohan (2006) that had verified the superior importance attributed to the costs reduction as the decision to outsource logistic services (instead of other reasons).

However, another paper, Sahay and Mohan (2006), defend that the motivation that is on the basis of logistic outsourcing with a TPL is the final increase of customer service level and not the cost reduction, and that is what we will test in *Hypothesis 3*.

Using the same statistics tests, the analysis of the results does not allow us to reject the hypothesis of ratio equality among the reasons to use TPL, only in the case of the first motivation (to reduce costs). Thus, in the case of the Portuguese companies, it does not have evidence that the decision to use logistic operators aims to increase the level of customer service contrasting with the results found in Europe, described in the study of Laarhoven *et al.* (2008).

To test the *Hypothesis 4*, the decisions of outsourcing are strategic (therefore, to be taken at an administration level). We started to aggregate the companies that had answered that, this decision was made to a tactical or operational level. To evaluate the statistics significance of the strategic organizational level, the Binomial⁴ test was used, in accordance with Marôco (2010), the test adjusted for the intended study. The tests with *p*-value are considered significant \leq statistical *p*=0,05. In the present study, the percentage of companies that take the decision to outsource logistic at strategic level were 52% and the ones that make the decision at an inferior organizational level were 48%. However, the inferential statistics analysis indicates that the ratio of companies that make it at a strategic level is not significantly different of 50% (*p*-value = 0,744, N=84). Therefore, the decision is not to reject 'H0'. In the case of the Portuguese companies, there is no evidence that the decision to use the logistics operators is taken at a strategic level, contrasting with the studies of Dapiran *et al.*, (1996) and Sohail and Al-Abdali (2005).

To analyze and to test the *Hypothesis 5* we will use the same statistics analysis made in the previous 1, 2 and 3 hypotheses, because it is an analogous situation. Regarding the logistic activities that the companies outsource more, we can conclude that it does not have equality in the ratio of choice between the logistic activity Transport and the remaining logistic activities. The percentage of companies that use TPL to make the Transport activity is significantly higher than the ratio of companies which say they outsource any of the other logistic activities (e.g., warehousing or devolutions). Such finding is in line with multiple studies that had analyzed this reality in other countries (e.g. Dapiran *et al.*, 1996; Kim, 1996; Bhatnagar *et al.*, 1999; Larson and Gammelgaard, 2001; Sohail and Sohal, 2003; Aktas and Ulengin, 2005; Sohail and Al-Abdali, 2005; Lieb and Bentz, 2005b; Sohail *et al.*, 2006; Arroyo *et al.*, 2006; Sahay and Mohan, 2006; Vasialauskas and Barysienne, 2008 or Hilletoft and Hilmola, 2010). In the case of the Portuguese companies, the Transport of merchandises/raw material/products is the logistics activity more outsourced.

For the *Hypothesis 6* we have used the Binomial test and in the present study, the percentage of companies which state that the use of TPL facilitates the exports is 81% and the ones that consider that they do not, is 19%. The inferential analysis statistics analysis indicates that the ratio of companies that consider that outsourcing facilitates the exports is significantly different from 50% (*p*-value = 0,000, N=83). Therefore, it is rejected null hypothesis of the ratio of affirmative answers to be equal (50%) to the one of negative answers (against the alternative hypothesis of that, that ratio is superior 50%, in the affirmative case). So, in the case of the Portuguese companies, it has empirical evidence that the logistic operators have a facilitator role in the exports, being able to contribute to the development of the international trade. What is the expected impact of this facilitator role in the increase of the exports, is what we intend to test in the next hypothesis.

Hypothesis 6a: The use of logistic operators facilitates the exports and contributes to its increase. This hypothesis tests a variable that expresses opinion and according to Marôco (2010) the suitable test to use is the signal test⁴. Using this test, we can conclude that for the Portuguese companies, although we have empirical evidence that the logistic operators have a facilitator role in the exportations, the companies consider that this fact has little or no impact in the increase of the same.

For the *Hypothesis 7* and *7a* we have used the same test made for the previous hypothesis because they are sufficiently analogous, intending only to survey if some alteration is made for the fact of the international movement of import and not of export. The used test concludes that, in the case of the Portuguese companies, although we have empirical evidence that the logistic operators have a facilitator role in the imports, in accordance with the result of the test of the signal, the companies consider that this fact has little or no impact in the increase of the same.

⁴ Binomial test tests the null hypothesis that 2 categories are equally likely to occur (proportion *p* equal to 50%).

We have used Q Cochran test and the McNemar test to analyze the *Hypothesis 8* and we have concluded that it does not have equality in the ratio of choice between improvement of the moral of the workers and the remaining impacts. Therefore, the percentage of companies that choose the improvement of the moral of the workers as the impact measure, is significantly inferior to the ratio of companies that choose any of the other impacts. In the Portuguese case, the analyzed companies do not expect that this is the most relevant impact (in contrast with Bhatnagar *et al.*, 1999; Sohail and Sohal, 2003; Sohail and Al-Abdali, 2005; Arroyo *et al.*, 2006), but the costs reduction and improvement customer service level are the most relevant impact for Portuguese companies.

To analyze the *Hypothesis 9*, that is a variable that expresses opinion, and intends to test if the replies received are significantly different from the equidistant value of the extremities (the extremities of the satisfaction level are 1- “very low”, 5- “very high”, therefore we used value 3). The suitable test, in accordance with Marôco (2010) is the signal test (with $\alpha=0,05$). The inferential statistics analysis indicates that we must reject the hypothesis of the ratio of companies that are totally unsatisfied or unsatisfied with the use of TPL to be the same one (50%) as the ratio of companies who indicate a high or very high level of satisfaction, because we get one p -value of 0,001, for $N=84$. As the alternative hypothesis establishes that the ratio of companies that are satisfied or total satisfied is superior to the percentage of very or total unsatisfied companies, in the case of the Portuguese companies it exists a high level of satisfaction with the performance of the logistic operators. This conclusion is in accordance with the studies of Dapiran *et al.* (1996), Bhatnagar *et al.* (1999), Sohail and Al-Abdali (2005), Sahay and Mohan (2006) and Vasiliauskas and Barysiene (2008).

The *Hypothesis 10* is a variable that expresses an opinion, therefore, the suitable test to be used is an inferential statistics analysis (signal test), which indicates that we can not reach a conclusion, concerning the formulated hypothesis (H_0 : the ratio of companies that say that they will increase or significantly increase the use of TPL in the future, is equal to the ratio of companies that intend to maintain or to reduce the logistic outsourcing) because we got a p -value of 0,586. The decision to take is not to reject H_0 , therefore, we can not point out the direction of the future evolution of the outsourcing of logistic activities in Portugal. More defined trends have been found in the studies of Dapiran *et al.* (1996), Bhatnagar *et al.* (1999), Lieb and Bentz (2005a, 2005b and 2005c), Sohail and Al-Abdali (2006) or Sahay and Mohan (2006).

Conclusions and future research

The constant growth and importance of logistic makes the companies realize that the impact of this activity on the results of its supply chains and on its profits (Masteika and Cepinskis, 2010) will improve the final results of the organizations. Portugal, does not become an exception, with the growth of the commercial trade with foreign countries. The importance of the logistic operators and its use is increasing and therefore, in accordance with studies carried out in countries with larger dimension, it becomes important to understand how they contribute, what type of services they offer and which are the future trends, in relation to its use.

In what concerns to the inquiry hypotheses raised during the study, the results allow us to conclude that the cost reduction is the main motivation that makes the Portuguese companies to use TPL, being the transport, the activity most used for the companies in outsourcing. In relation to the impact of TPL in the imports and exports the conclusions confirm that, the TPL facilitates the international trade but do not contribute for its growth, but we can point out that Portuguese companies are very satisfied with the logistics outsourcing. In the remaining hypotheses raised, the results obtained do not allow us to corroborate the elaborated statements.

The results obtained in this study can be used as information tool and support for the companies that decide to outsource their logistics activity and to the TPL it can be used as a support to enlarge the solutions that they can provide to fill the needs of the Portuguese companies. Future analyses should focus on the relations established between companies and operators in what concerns the decision - making process, difficulties in the integration of services, importance of the E-Commerce in the use of TPL in the Portuguese market and in the impact of the information systems on the development of logistics outsourcing.

References

- Aktas, E. and Ulengin, F. (2005), "Outsourcing logistics activities in Turkey", *The Journal of Enterprise Information Management*, Vol. 18, Nº 3, pp. 316-329.
- Arroyo, P., Gaytan, J. and de Boer, L. (2006), "A survey of third party logistics in Mexico and a comparison with reports in USA and Europe", *International Journal of Operations & Production Management*, Vol. 6, Nº 6, pp. 639-667.
- Ballou, R.H. (1992), *Business Logistics Management*, Vol. 4, New Jersey: Prentice Hall.
- Bayraktar, E., Gunasekaran, A., Koh, S.C.L., Tatoglu, E., Demirbag, M. and Zaim, S. (2009), "An efficiency comparison of supply chain management and information system practices: a study of Turkish and Bulgarian small- and medium- sized enterprises in food products and beverages", *International Journal of Production Research*, Vol. 48, Nº 2, pp. 425-451.
- Berglund, M., Laarhoven, P.V., Sharman, G. and Wandel, S. (1999), "Third-party logistics: is there a future?", *The International Journal of Logistics Management*, Vol. 10, Nº 1, pp. 59-70.
- Beth S., Burt, D.N., Copacino, W., Gopal, C., Lee, H. L., Lynch, R.P., Morris, S. and Kirby, J. (2003), "Supply chain challenges: building relationships", *Harvard Business Review*, Vol. 81, Nº 7, pp. 64-73.
- Bhatnagar, R., Sohal, A.S. and Millen, R. (1999), "Third party logistics services – a Singapore perspective", *International Journal of Physical Distribution & Logistics Management*, Vol. 29, Nº 9, pp. 569-587.
- Bloomen, D.R.V. and Petrov, I.P. (1994), "Logistics in Bulgaria: concepts for new market expansion", *International Journal of Physical Distribution & Logistics Management*, Vol. 24, Nº 2, pp. 30-36.
- Boske, L.B. and Cuttino, J.C. (2001), "The Impact of U.S.-Latin America trade on Southwest's economy and transportation system: an assessment of impact methodologies", *Research Report SWUT C/01/167801-1*, Centre for Transportation Research, University of Texas at Austin.
- Carbone, V. and Stone, M.A. (2005), "Growth and relational strategies used by the European logistics service providers: rationale and outcomes", *Transport Research Part E: Logistics and Transportation Review*, Vol. 41, Nº. 6, pp. 495-510.
- Cilliers, W.W. and Nagel, P.A.J. (1994), "Logistics trends in South Africa", *International Journal of Physical Distribution & Logistics Management*, Vol. 24, Nº 7, pp. 4-14.
- Cooper, J.C. (1993), "Logistics strategies for global businesses", *International Journal of Physical Distribution & Logistics Management*, Vol. 23, Nº 4, pp. 12-23.
- Corsi, T.M. and Boyson, S. (2001), "North America: insights and challenges", in Brewer et al. (eds.) *Handbook of Logistics And Supply-Chain Management*, Vol. 2, pp. 47-59, Amsterdam: Pergamon.
- CSCM (2010), "CSCMP supply chain management definitions" Council of Supply Chain Management, <http://cscmp.org/aboutcscmp/definitions.asp>, in January 2012
- Dapiran, P., Lieb, R., Millen, R. and Sohal, A. (1996), "Third party logistics services usage by large Australian firms", *International Journal of Physical Distribution & Logistics Management*, Vol. 26, Nº 10, pp. 36-45.
- Goh, M. and Ang, A. (2000), "Some logistics realities in Indochina", *International Journal of Physical Distribution & Logistics Management*, Vol. 30, Nº 10, pp. 887-911.
- Guedes, A. P. (2010), "Gestão da Cadeia de Abastecimento", in Carvalho et al. (eds.) *Logística e Gestão da Cadeia de Abastecimento*, Vol. 1, pp. 67-119, Lisboa: Silabo.
- Hilletoft, P. and Hilmola, O. (2010), "Role of logistics outsourcing on supply chain strategy and management: survey findings from Northern Europe", *Strategic Outsourcing: An International Journal*, Vol. 3, Nº 1, pp. 46-61.
- Hong, J., Chin, A.T.H. and Liu, B. (2004), "Logistics outsourcing by manufacturers in China: A survey of the industry", *Transportation Journal*, Vol. 43, No. 1, pp. 17-25.
- Hsiao, H.I., Kemp, R.G.M., Van Der Vorst, J.G.A.J., Omta, S.W.F. (2009), "Make-or-buy decisions and levels of logistics outsourcing: An empirical analysis in the food manufacturing industry", *Journal on Chain and Network Science*, Vol. 9, No. 2, pp. 105-118.

- Hsiao, H.I., van der Vorst, J.G., Kemp, R.G.M. and Omta, S.W.F. (2010), “Developing a decision-making framework for levels of logistics outsourcing in food supply chain networks”, *International Journal of Physical Distribution & Logistics Management*, Vol. 40, No. 5, pp. 395-414.
- Kiisler, A. (2008), “Logistics in Estonian business companies”, *Transport*, Vol. 23, N° 4, pp. 356-362.
- Kim, J. (1996), “Logistics in Korea: current state and future directions”, *International Journal of Physical Distribution & Logistics Management*, Vol. 26, N° 10, pp. 6-21.
- Kotsifaki, M., Dimitriadis, N., Ketikidis, P.H. and Missopoulos, F. (2007), “Logistics strategic planning: current status and future prospects in Greek companies”, *International Journal of Risk Assessment and Management*, Vol. 7, N° 1, pp. 44-58.
- Laarhoven, P.van, Berglund, M. and Peters, M. (2000), “Third-party logistics in Europe – five years later”, *International Journal of Physical Distribution & Logistics Management*, Vol. 30, N° 5, pp. 425-442.
- Large, R.O., Kramer, N. and Hartmann, R.K. (2011) “Customer-specific adaptation by providers and their perception of TPL-relationship success”, *International Journal of Physical Distribution & Logistics Management*, Vol. 41, No. 9, pp. 822-838.
- Larson, P.D. and Gammelgaard, B. (2001), “Logistics in Denmark: A survey of the industry”, *International Journal of Logistics Research and Applications*, Vol. 4, N° 2, pp. 191-206.
- Lieb, R.C., Randall, H.L. (1996), “Comparison of the use of third-party logistics services by large American manufacturers 1991, 1994, and 1995”, *Journal of Business Logistics*, Vol. 17, No. 1, pp. 305–320.
- Lieb, R. and Bentz, B.A. (2005a), “The Year 2004 Survey: CEO perspective on the current status and future prospects of the European third party logistics industry”, <http://web.cba.neu.edu/~rlieb/2004Europeancepaper.doc>, acedido em 6 Novembro 2010.
- Lieb, R. and Bentz, B.A. (2005b), “The use of third party logistics services by large American manufacturers: the 2004 survey”, *Transportation Journal*, Vol. 44, N° 2, pp.5-15.
- Lieb, R. and Bentz, B.A. (2005c), “The North America third party logistics industry in 2004: the provider CEO perspective”, *International Journal of Physical Distribution & Logistics Management*, Vol. 35, N° 8, pp. 595-611.
- Londe, B.J. and Masters, J.M. (1994), “Emerging Logistics Strategies” *International Journal of Physical Distribution & Logistics Management*, Vol. 24, No. 7, pp. 35-47.
- Marasco, A. (2008), “Third party logistics: a literature review”, *International Journal of Production Economics*, Vol. 113, N° 1, pp. 127-147.
- Markides, V. and Holweg, M. (2006), “On the diversification of international freight forwarders: a UK perspective”, *International Journal of Physical Distribution & Logistics Management*, Vol. 36, N° 5, pp. 336-359.
- Marôco, J. (2010), “*Análise Estatística com o PASW Statistics (ex-SPSS)*”, Editora Report Number
- Masteika, I. and Cepinskis, J. (2010), “The effects of global logistics trends on TPL: case Lithuania market”, *Proceedings of the 6th International Scientific Conference in Business and Management*, May 13–14, 2010, Vilnius, Lithuania, pp. 856-861.
- Miettunen, M. and Jamsa, P. (2006), “Strategic partnership in logistics: goals and criteria”, *Turku School of Economics*, Vol. N° 3, pp. 67-88.
- Millen, R. and Sohal, A. (1996), “Current logistics practices in the Asia Pacific region”, *International Journal of Physical Distribution & Logistics Management*, Vol. 26, N° 10.
- Murphy, P.R. and Daley, J.M. (2001), “Profiling international freight forwarders: an update”, *International Journal of Physical Distribution & Logistics Management*, Vol. 31, N° 3, pp. 152-168.
- Nordas, H.K., Pinali, E., and Grosso, M.G. (2006), “Logistics and Time as a Trade Barrier”, *OECD Trade Policy Working Paperst*, N° 35, OECD Pu.
- Rabinovich, E., Windle, R., Dresner, M. and Corsi, T. (1999), “Outsourcing of integrated logistics functions”, *International Journal of Physical Distribution & Logistics Management*, Vol. 29, No. 6, pp. 353-374.
- Razzaque, M.A. and Cheng, C.C. (1998), “Outsourcing of logistics functions: A literature survey”, *International Journal of Physical Distribution & Logistics Management*, Vol. 28, No. 2/3, pp. 89-108.
- Ruijgrok, C. (2001), “European Transport: Insights and challenges”, in Brewer et al. (eds.) *Handbook of Logistics and Supply-Chain Management*, Vol. 2, pp. 29-46, Amsterdam: Pergamon.

- Sahay, B.S. and Mohan R. (2006), "TPL practices: an India perspective", *International Journal of Physical Distribution & Logistics Management*, Vol. 36, Nº 9, pp. 666-689.
- Sankaran, J., Mun, D. and Charman, Z. (2002), "Effective logistics outsourcing in New Zealand: An inductive empirical investigation", *International Journal of Physical Distribution & Logistics Management*, Vol. 32, No. 8, pp. 682-702.
- Selviaridis, K. and Spring, M. (2007), "Third party logistics: a literature review and research agenda", *The International Journal of Logistics*, Vol. 18, Nº 1, pp. 125-150.
- Skjoett-Larsen, T. (2000), "Third party logistics-from an interorganizational point of view", *International Journal of Physical Distribution & Logistics Management*, Vol. 30, No.s 1/2, pp. 112-128.
- Sohail, M.S. and Al-Abdali, O.S. (2005), "The usage of third party logistics in Saudi Arabia: current position and future prospects", *International Journal of Physical Distribution & Logistics Management*, Vol. 35, Nº 9, pp. 637-653.
- Sohail, M.S., Anwar, S.A., Chowdhury, J. and Farhat, N.R. (2006), "Logistics outsourcing in the United Arab Emirates: Evidence and managerial implications", *Journal of Marketing Channels*, Vol. 13, No. 1, pp. 21-36.
- Sohail, M.S., Bhatnagar, R. and Sohal, A. (2006), "A comparative study on the usage of third-party logistics services by Singaporean and Malaysian firms", *International Journal of Physical Distribution & Logistics Management*, Vol. 36, Nº 9, pp. 690-701.
- Sohail, M.S. and Sohal, A.S. (2003), "The use of third party logistics services: a Malaysian perspective", *Technovation*, Vol. 23, Nº 5, pp. 401-408.
- Sohal, A.S., Millen, R. and Moss, S. (2002), "A comparison of the use of third-party logistics services by Australian firms between 1995 and 1999", *International Journal of Physical Distribution & Logistics Management*, Vol. 32, No.s 1/2, pp.59-68.
- Stefanson, G. (2006), "Collaborative logistics management and the role of third-party service providers", *International Journal of Physical Distribution & Logistics Management*, Vol. 36, No. 2, pp. 76-92.
- Stock, G.N. and Greis, N.P. (1999), "Logistics, strategy and structure", *International Journal of Physical Distribution & Logistics Management*, Vol. 29, No.s 3/4, pp. 224-240.
- Tian, Y., Ellinger, A.E. and Chen, H. (2010), "Third-party logistics provider customer orientation and customer firm logistics improvement in China", *International Journal of Physical Distribution & Logistics Management*, Vol. 40, Nº 5, pp. 356-376.
- Trunick, P.A. (1989), "Outsourcing: a single source for many talents", *Transportation & Distribution*, Vol. 30, Nº 7, pp. 20-23.
- Vasiliauskas, A.V. and Barysiene, J. (2008), "Review of current state of European TPL market and its main challenges", *Transport and Telecommunication*, Vol. 9, Nº 4, pp. 4-8.
- Wallenburg, C.M., Cahill, D.L., Goldsby, T.J. and Knemeyer, A.M. (2010) "Logistics outsourcing performance and loyalty behavior: Comparisons between Germany and the United States", *International Journal of Physical Distribution & Logistics Management*, Vol. 40, No. 7, pp. 579-602.
- Wang, Q., Zantow, K., Lai, F. and Wang, X. (2006), "Strategic postures of third-party logistics providers in mainland China", *International Journal of Physical Distribution & Logistics Management*, Vol. 36, No. 10, pp. 793-819.
- Zhou, G, Min, H., Xu, C. and Cao, Z. (2008), "Evaluating the comparative efficiency of Chinese third-party logistics providers using data envelopment analysis", *International Journal of Physical Distribution & Logistics Management*, Vol. 38, No. 4, pp. 262-279.