EFFECT OF REVERSE LOGISTICS AND FLEXIBILITY ON ORGANIZATIONAL PERFORMANCE

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Abstract
Progressively firms give more importance to management of processes of return that supposed excess inventories, customer returns, obsolete inventories and seasonal products, that is to say, to the processes Reverse Logistics (Srivastava & Srivastava, 2006). So it increases the need for information flexibility because this one helps to reduce uncertainty of these processes (Koste & Malhotra, 1999; Swafford, 2003). This paper focuses on develop knowledge about how the Reverse Logistics affects the flexibility of information distribution and organizational performance. We have found that due to the company currently operates in complex, changing and highly competitive environment 1) firms with proactive attitude towards Reverse Logistics enhance the importance of Reverse Logistics, 2) the more importance of Reverse Logistics the more important is Flexibility of Information Distribution, 3) the Reverse Logistics and Flexibility of Information Distribution improve organizational performance 4) firms should be proactive towards Reverse Logistics because it implies greater effects on flexibility and organizational performance.

Keywords: Reverse Logistics, Flexibility of Information, Organizational Performance, Green Logistics, Logistics.

Theoretical Framework
In recent years Reverse Logistics has become a major issue for scholarships and companies (Kotler, 1994; Rogers & Tibben-Lembke, 1999; Lambert & Burduroglu, 2000; Chang et al., 2005; Srivastava & Srivastava, 2006; Banomyong et al., 2008; Chan & Chan, 2008). Reverse Logistics refers “the process of planning, implementation and efficiently control of the flow of raw materials, in-process inventory, finished goods and related information from the point of consumption to the point of origin with the purpose of recovering the primary value or dispose of them properly " (Rogers & Tibben-Lembke, 1999, 43). Gradually firms give more importance to this aspect, mainly due to 3 reasons (Srivastava & Srivastava, 2006): the first one is the growing importance of environmental issues and their impact on public opinion (Kotler, 1994; Rogers et al., 1999; Porter, 2002; De Brito, 2004), second reason is benefits that the company gains by improving their return processes such as image enhancement, improved efficiency and effectiveness in management of returned materials, it allows getting new profits (Lambert & Burduroglu, 2000; Stock et al., 2002; De Brito, 2004) the third one is a new and growing environmental regulations (Stock et al., 2002; De Brito, 2004). Thus, it is drawing a new situation for many companies, in which producers are responsible for the entire life cycle of a product. Thus, proactive in Reverse Logistics is essential because the company currently operates in complex, changing and highly competitive environment (Covin & Slevin, 1986, 1991; Guth & Ginsberg, 1990; Lumpkin & Dess, 1996; Jiménez, 2009), and it expresses the attitude of anticipating the future to act on gaps and current and future needs, establishing the advantage over competitors to be the first to act (Lumpkin & Dess, 1996; Mentzer et al., 2001). This Reverse Logistics proactivity can be related to management of inattention and to the lack of importance of Reverse Logistics in the organization (Rogers & Tibben-Lembke, 1999). You can also link it to corporate strategy for the management of returns and the items that are not marketable, since if the company wouldn’t want to see how these articles cannibalize its sales or the flow of its best quality products, it could develop policies that make very difficult to return these items (Rogers &Tibben-Lembke, 1999, 2001).

Currently the number of products returned or out of use is increasing significantly, so management of these products from the point of collection to the origin present a high degree of additional uncertainty on the customer service time, on the origin and the quality of the materials returned. So Reverse Logistics is critical, and its importance increases the need of information for the proper management of material flow returned (Day 1994; Bowersox et al., 1999; Daugherty et al., 2002; Wadhwa & Madaan, 2007). So flexibility of information distribution is an important issue for Reverse Logistics (Barad & Sapirb, 2003) because it allows responding to customer needs (Bowersox et al., 1989), it reduces response times (Fawcett & Clinton, 1996), it supports a variety of delivery requirements (Sethi & Sethi, 1990) and it reduces cost of Reverse Logistics (Banomyong et al., 2008). Flexibility has become source of competitive advantage (Koste & Malhotra 1999).
Competitive potential of flexibility are accepted by CEOs (Koste & Malhotra, 1999) and scholarships (Kogut, 1985; Paik, 1991; Volberda, 1996; Hitt et al., 1998; Jenkins & Wright, 1998; Golden & Powell, 2000; De Koster & Warffemius, 2005; Wadhwa & Saxena, 2007). Environment changes compulsory require the flexibility (Evans, 1991). From 80’s flexibility of firm has become an important factor of competitiveness in nationals and internationals markets due to speed of changes in product technology, trend to free commerce, deregulation in capital market and growing fluctuation of exchange rate (Kuo et al., 2003). Thus flexibility allows increasing number of options, reducing uncertainty and improving the decisions process. Flexibility would be “the ability to provoke intentionality changes, to reply continuously unexpected changing and to adjust unexpected consequences of predictable changing” (Bahrami, 1992, 36). Also flexibility is management task because it is related to create and to encourage capacity of control of the firm (Volverda, 1997). Under this perspective we could talk about flexibility of operations that includes routines based on current structure or goals of organization and it is the ability to hand fluctuations of demand, equipment faults, complexity of production process and implement of new products and technologies (Johnson et al., 2003). Also it refers number of products with sequential plans and heterogeneity of plans used without big breaks or changes in final result (Sethi & Sethi, 1990; Krajewski & Ritzman, 1996). Flexibility of operations also include flexibility of materials handing that refers number of routes between manufacturing centers and heterogeneity of material that is carried through these routes without big breaks or changes in final result (Chatterjee et al., 1984; Schonberger, 1986; Coyle et al., 2003). In this way we could define flexibility of information distribution as capability of handing flow of information in manufacture (Chatterjee et al., 1984; Sethi & Sethi, 1990; Zahran et al., 1990; Sinha & Wei, 1992; Ramaswamy, 1996; Hope, 1997; Fitzsimmons & Fitzsimmons, 1998; Arias, 2000), and it allows variations in volume of manufacture without higher costs (Stigler, 1939) and it increases capacity of control of the firm (Volverda, 1996). In this sense information has key role on structure of firm and managing relationships between companies, so it is necessary to develop of new capabilities to manage this information in firm like flexibility of information distribution. Like flexibility, flexibility of information distribution is strongly linked to competitive advantage and the ability to get chances of market (Barney, 1991; Teece, 1998; Kenney & Gudergan, 2006; Hicks et al., 2007) and its integration in all areas of organization (Grant, 1996; Kenney & Gudergan, 2006). This integration implies diverse sources, types and ways of knowledge (Kogut & Zander, 2001) related to capabilities and strategic assets of firm (Reed & DeFillippi, 1990) and it could include knowledge of client, of product and of the market (De Boer et al., 1999) what is extent along time through staff, process, systems and other assets that are controlled by the firm (Argote & Ingram, 2000; Stokes & Clegg, 2002). Under this context flexibility is gotten through coordination of capabilities between business units, through cross-functional teams and through specialized departments (Kenney & Gudergan, 2006).

Additionally in this research we must take in account performance measures, because they are essential for effective management of any organization (Griffis et al., 2007). Continuous changes in the way of competing and technology mean that the company must maintain a customer-centric strategy and focus on those factors that provide value to them (Johnson, 1990), which include not only low costs, but also Reverse Logistics (Russo & Fouts, 1997; Wadhwa & Madaan, 2007) and Flexibility (Johnson, 1990; Heizer & Render, 1997). In short, performance measures based on cost and efficiency that capture and reflect these strategies (Macintosh, 1985; Banker et al., 1993; Abemethy & Lillis, 1995; Perera & Pool, 1997; Abemethy et al., 2001; Lillis & Mundy, 2005). Organizations that have begun to measure their intangible assets have obtained many benefits that could provide competitive advantage (Kannan & Aulbur, 2004).

Reverse Logistics proactivity enhance efficiency and effectiveness of the Reverse Logistics processes (Wadhwa & Madaan, 2007). The more importance of the Reverse Logistics programs the more necessary is for the organization to face the uncertainty in these activities (Barad & Sapirb, 2003). So it increases the need for flexibility of information distribution because it helps to reduce this uncertainty (Koste & Malhotra, 1999; Swafford, 2003). However, few studies attempting to relate Reverse Logistics and flexibility (Sethi & Sethi, 1990; Goldsborough, 1992; Fawcett & Clinton, 1996; Kopczak, 1997; Swafford, 2003) do not relate to flexibility of information distribution. Therefore we propose a model to analyse relationships between Reverse Logistics Proactivity, the Importance of Reverse Logistics and flexibility of information distribution with the main objective of better understand Reverse Logistics and its interactions with flexibility of information distribution. In addition, we also examine the effects that these variables have on organizational performance.
Theoretical background and Propositions

Due to the high degree of uncertainty regarding the timing and amount of returns existing in Reverse Logistics activities the difficult for planning type and quantity of returned materials for each company varies (Rogers & Tibben-Lemmbke, 1999), even in those industries less predictable, managers must be ready to process and handle products quickly on demand. (Ketzenberg, 2004; Wadhwa & Madaan, 2007). In these situations, exchanges of materials returned must be accurate and anticipating in Reverse Logistics activities become fundamental (Rogers & Tibben-Lembke, 1999). Therefore, the firms must be proactive towards the Reverse Logistics processes (Lumpkin & Dess, 1996; Rogers & Tibben-Lembke, 1999; Chan & Chan, 2008). Reverse Logistics proactivity is essential because the company currently operates in complex, changing and highly competitive environment (Covin & Slevin, 1986, 1991; Guth & Ginsberg, 1990; Lumpkin & Dess, 1996; Jiménez, 2009). A proactive attitude to Reverse Logistics allows the firms anticipate at a time when returns are increasing significantly due to liberal return policies, direct sales channels and environmental regulations (Wadhwa & Madaan, 2004). Also Reverse Logistics proactivity allows getting higher productivity and profitability by improving efficiency and effectiveness of the Reverse Logistics processes (Wadhwa & Madaan, 2007). In addition the proactive company can anticipate the current and future needs, improving its Reverse Logistics systems and providing an advantage over competitors (Lumpkin & Dess, 1996; Carrillo et al., 2004).

Thus, we propose that:

Hypothesis 1: The Reverse Logistics proactivity will be positively related to the importance of Reverse Logistics.

The importance of Reverse Logistics programs is growing for financial reasons (Lambert & Burduglu, 2000; Stock et al., 2002; De Brito, 2004,), the extension of corporate social responsibility (Kotler, 1994; Rogers et al., 1999; Porter, 2002; De Brito, 2004) and legal requirements (Stock et al., 2002; De Brito, 2004; Toffel, 2004). Also, the flexibility of information distribution is an important issue in Reverse Logistics processes (Barad & Sapir, 2003) to respond to customer needs (Bowersox et al., 1989), also to reduce response times (Fawcett & Clinton, 1996) supporting a variety of delivery requirements (Sethi & Sethi, 1990) and to reduce costs of Reverse Logistics (Banomyong et al., 2008), especially transport costs of central service returns, which are the increased costs of Reverse Logistics (Tibben-Lembke & Rogers, 2002). Furthermore, the more importance of the Reverse Logistics programs the more necessary is for the organization to face the uncertainty in these activities that is increasingly high (Barad & Sapirb, 2003). In this case it increases the need for flexibility of information distribution because it helps to reduce this uncertainty (Koster & Malhotra, 1999; Swafford, 2003). Reverse Logistics enables the organization to improve availability of options, reducing uncertainty and improving decision-making (Sethi & Sethi, 1990; Goldsborough, 1992; Fawcett & Clinton, 1996; Kopczak, 1997, Swafford, 2003). In Reverse Logistics programs are used information for systems improve data processing operations that facilitate or help you make better decisions (Swafford, 2003), reducing response times (Lau & Lee, 2000) and improving the flexibility of information distribution (Chatterjee et al., 1984, Sethi & Sethi, 1990; Zahran et al., 1990, Sinha & Wei, 1992; Ramaswamy, 1996; Hope, 1997; Fitzsimmons & Fitzsimmons, 1998).

Thus, we propose that:

Hypothesis 2: The importance of Reverse Logistics will be positively related to the flexibility of information distribution.

Flexibility of information distribution and knowledge are much related to competitive advantage (Barney, 1991; Teece, 1998; Kenney & Gudergan, 2006; Hicks et al., 2007) and its integration in all areas of organization (Grant, 1996; Kenney & Gudergan, 2006). Several researches have confirmed knowledge supports higher flexibility of information for organization adapts changing environment (D’Aveni, 1994; Volberda, 1996; Nadler & Tushman, 1999; Kenney & Gudergan, 2006).

Flexibility of information distribution improves the decision-making by members of the organization (Nadler & Tushman, 1999). These processes decrease uncertainty, so it also improves performance of the firm (Ramaswamy, 1996; Hope, 1997; Fitzsimmons & Fitzsimmons, 1998). Also flexibility of information distribution improves and facilitates data processing of operations, reducing response times and generating new applications that improve capacity of respond of the firm (Lau & Lee, 2000; Kuo et al., 2006).
Flexibility of information distribution enhances performance (Paiva et al., 2002). Flexibility of information distribution could be considered as intangible assets of the firm (Kuo et al., 2006). Thus organizations that have been begun measuring these assets have obtained benefits that could support competitive advantage (Kannan & Aulbur, 2004). Through this intangible the firm is able to increase value of its products and service, but only when it is from knowledge expressed as information that affects different results through reduction of respond time, higher accuracy, etc. Indeed its greater importance is greater need of information (Daugherty et al., 2002; Smaros et al., 2003) and it is reflects on performance (Chan et al., 2005). Flexibility of information distribution is a facilitator by mediating the relationship flexibility programs and performance (Bowersox et al., 1989; Fawcett et al., 1996; Closs et al., 2005). Also in the context of logistics flexibility information flow is extremely important (Bowersox et al., 1989; Fawcett et al.1996) connecting flexible logistics program with performance (Closs et al., 2005).

Thus, we propose that:

**Hypothesis 3: The Flexibility of Information Distribution will be positively related to the Organizational Performance.**

Many research works have demonstrated that Reverse Logistics is important to enhance organizational performance (Dutton & Dukerich, 1991; Fawcett & Clinton, 1996; Rogers & Tibben-Lembke, 1999; Lambert & Burduroglu, 2000; Zhao et al., 2001; Daugherty et al., 2002; Stock et al., 2002; Tibben-Lembke & Rogers, 2002; De Brito, 2004; Griffis et al., 2007; Sols et al., 2007).

Reverse Logistics could be considered as important intangible asset of the firm (Russo & Fouts, 1997; Wadhwa & Madaan, 2007). Thus organizations that have been begun taking account these asset have obtained benefits that could support competitive advantage (Kannan & Aulbur, 2004). Through this intangible the firm is able to increase value of its products and service, a much more meaningful interaction with customers, develop new skills in workers to recover the economic value of life products and all of this is reflected on performance (Dutton & Dukerich, 1991; Chan et al., 2005). Also to develop Reverse Logistics programme is extremely important to increase organizational performance (Bowersox et al., 1989; Fawcett et al.1996; Closs et al., 2005).

Furthermore, the growing importance of Reverse Logistics programs is that supposed advantages or benefits for the organization, such as that it develops and maintain a beneficial customer service policy and reducing costs, it improves the return processes, it improves image of the firm, it improves efficiency and effectiveness in the management of returned materials (Cure et al., 2006), it provides direct and indirect economic benefits such as decreasing costs, reduced use materials, or obtaining valuable from spare parts (Lambert & Burduroglu, 2000). Consequently, the Reverse Logistics improves organizational performance (Lambert & Burduroglu, 2000; Krikke et al. 2003; Cure et al. 2006).

Thus we propose that:

**Hypothesis 4. The Importance of Reverse Logistics will be positively related to the Organizational Performance.**

Performance measures are essential for effective management of any organization (Griffis et al., 2007; Savanevičienė & Stankeviciute, 2010). Continuous changes in the way of competing and technology mean that the company must maintain a customer-centric strategy and focus on those factors that provide value to them (Drucker, 1954; Johnson, 1998), which include not only low costs, but also Reverse Logistics (Stock et al., 2002; Tibben-Lembke & Rogers, 2002; De Brito, 2004; Griffis et al., 2007; Sols et al., 2007). Research of Garcia et al. (2007) has reflected the positive influence of technology proactivity to improve the value of the firm. Also the research of Chang et al. (2005) reflects the impact of proactivity on organizational performance. Being proactive is an important element of individual performance, team and organizational levels so that the lack of proactivity causes failures to identify or take advantage of opportunities that will change things, reducing organizational performance (Crant, 2000; Jiménez, 2009). The proactive nature of the organization in Reverse Logistics activities encourages the organization to achieve a greater value (Kim, 1998; Rogers & Tibben-Lembke, 1999; Liao et al., 2003).

Thus we propose that:

**Hypothesis 5. The Reverse Logistics Proactivity will be positively related to the Organizational Performance.**

**Methodology**

The sample was selected by means of a stratified sampling with proportional allocation (size and geographical location) from the database Dun & Bradstreet Spain (2008) that collected 50,000 organizations...
with highest volume of operations in Spain. Choosing a sample of firms located in a relatively homogeneous geographical, cultural, legal and political space enables us to minimize the impact of the variables that cannot be controlled in the empirical research (Adler, 1983). The Spanish market is relatively well developed and wholly integrated in the European Union. However, Spain is in a geographical area that has received relatively little attention from organizational researchers.

There are significant and positive correlations among the study variables. A series of tests (e.g. tolerance, variance inflation factor) shows the non-presence of multicollinearity (Hair et al., 1999).

Our findings show that Reverse Logistics Proactivity is highly related and affects to Importance of Reverse Logistics ($\gamma_{11}=.44$, p<.001) and is explained well by the model ($R^2=.72$), supporting Hypothesis 1. Also Reverse Logistics Proactivity is highly related and affects to Organizational Performance ($\gamma_{31}=.27$, p<.001) as was predicted in Hypotheses 5. Organizational Performance is explained well by the model ($R^2=.23$). Furthermore, we have shown an indirect effect of Reverse Logistics Proactivity on Flexibility of Information Distribution (.12, p<.001) (.44x.28); and on Organizational Performance (.44x.28x.18) (see, for instance, Bollen, 1989 for calculation rules). Thus, the global influence of the Reverse Logistics Proactivity on Organizational performance is 0.27 (p<.001).

The Importance of Reverse Logistics is also highly related and affects to Flexibility of Information Distribution ($\beta_{21}=.28$, p<.001) supporting Hypothesis 2, and furthermore Importance of Reverse Logistics affects the Organizational Performance ($\beta_{31}=.38$, p<.001), supporting Hypothesis 4. Also Importance of Reverse Logistics has an indirect effect on Organizational Performance (.28x.18). Comparing the magnitudes of these effects indicates that the total effect of the Importance of Reverse Logistics on Organizational Performance is larger than the effect of the Reverse Logistics Proactivity on Organizational Performance Globally, the Organizational Performance is explained well by the model ($R^2=.80$).

Flexibility of information distribution influences on Organizational Performance ($\beta_{32}=.18$, p<.001), supporting Hypothesis 3.

A structural equation modelling was performed to estimate direct and indirect effects using LISREL with the correlation matrix and asymptotic covariance matrix as input (Bollen, 1989). This type of analysis has the advantage of correcting for unreliability of measures and also gives information on the direct and indirect paths between multiple constructs after controlling for potentially confounding variables. Figure 2 shows the standardized structural coefficients. The relative importance of the variables is reflected by the magnitude of the coefficients.

Conclusions

Reverse Logistics proactivity and its importance increases flexibility of information distribution for material flow returned (Day 1994; Bowersox et al., 1999; Daugherty et al., 2002; Barad & Sapir, 2003; Wadhwa & Madaan, 2007). Also Reverse Logistics and Flexibility of information distribution improve organizational performance (Dutton & Duikerich, 1991; Fawcett & Clinton, 1996; Fawcett et al.1996; Grant, 1996; Rogers & Tibben-Lembke, 1999; Lambert & Burdur oglu, 2000; Zhao et al., 2001; Daugherty et al., 2002; Stock et al., 2002; Tibben-Lembke & Rogers, 2002; De Brito, 2004; Closs et al., 2005; Kenney & Gudergan, 2006; Griffis et al., 2007; Sols et al., 2007), so this research presents a structural equation model that shows how Reverse Logistics proactivity and its importance affect flexibility of information distribution and performance, establishing linkages between these variables.

Based on the literature, we have established a series of assumptions to bring together in an integrated model of key relationships between research variables. Thus we have proposed that there is a positive relationship between the Reverse Logistics Proactivity and the Importance of Reverse Logistics (H1), between the Importance of Reverse Logistics and Flexibility of Information (H2), between Flexibility of Information Distribution and Organizational Performance (H3), and between the Importance of Reverse Logistics (H4) and Reverse Logistics Proactivity (H5) with Organizational Performance.

Results reveal that there is a positive relationship between Reverse Logistics Proactivity and the Importance of Reverse Logistics that means if firm anticipates its preparation and implements proper Reverse Logistics programs then it is ready to process and handle the current growing products returns quickly and consequently its Reverse Logistics processes will be more accuracy, more important and definitely better than rest of its competitors, so it supposes a very important and sustainable competitive advantage in the current turbulent and unpredictable changing environment.
Also flexibility of information distribution is an important issue in Reverse Logistics processes (Barad & Sapir, 2003). Our results show the more importance of Reverse Logistics the more important is Flexibility of Information Distribution. Reverse Logistics information systems facilitate the flexibility of information distribution (Chatterjee et al., 1984, Sethi & Sethi, 1990; Zahran et al., 1990, Sinha & Wei, 1992, Ramaswamy, 1996, Hope, 1997, Fitzsimmons & Fitzsimmons, 1998). Also firms should be proactive towards Reverse Logistics because it implies greater indirect effects of flexibility of information and it supposes greater degree of involvement in organizing, developing multiple skills of the workforce and commitment to continue research efforts to improve processes Reverse Logistics (Chang et al., 2005).

In addition, we demonstrate how Reverse Logistics and Flexibility of Information Distribution improve organizational performance. The proactive nature of the organization in Reverse Logistics activities encourages the organization to achieve a greater value (Kim, 1998, Rogers & Tibben-Lembke, 1999, Liao et al., 2003), so it is worth for the firm to make the great effort that supposes implementing Reverse Logistics systems, achieving flexibility, since it leads the organization to limit its competitiveness, supporting a variety of delivery requirements, reducing uncertainty and anticipating the evolving features of these activities.

References