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Product return and logistics knowledge: Influence on performance of the firm

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ABSTRACT

Survey data on reverse logistics processes from 284 Spanish firms are used to test a structural model that analyzes the importance of returned materials and the creation of logistics knowledge within processes of reverse logistics and their effects on organizational performance. The results show that the cost of reverse logistics and the value of returns were found to be positively related to reverse logistics activities. Further, their proper management and the creation of logistics knowledge that improves organizational performance.

1. Introduction

Reverse logistics are responsible for the flow of items such as products, components, and materials (Krikke et al., 2003) from their place of consumption to their place of origin, in order to recover some of their initial value or to find the most appropriate use for these materials. They are used especially in the case of dangerous products, pollutants, and high-value products or products that experience a high number of returns (Stock, 1998; Rogers and Tibben-Lembke, 1999; Daugherty et al., 2005; Lambert et al., 2005; Stavrulaki and Davis, 2010). Reverse logistics constitute a complex process, more expensive than and different from distribution of a new product (Fleischmann et al., 1997; Hofmann, 2010). This process varies depending on the reason for the return (Rogers and Tibben-Lembke, 1999). The wide variety of products to be returned—from defective products to leftovers and seasonal, recyclable, obsolete or dangerous products—means that the value and fate of the products varies greatly, ranging from repair and component reuse to storage, recycling, disposal, and treatment. Organizations must thus address not only the business costs associated with manufacture and distribution of products on the consumer market, but also the control costs related to the proper management of waste generated by each product on consumption. These costs can change during the process of return of the products, since return may require activities that are not necessary when the product is new. Therefore, the costs of reverse logistics are of great importance for any organization (Rogers and Tibben-Lembke, 1999).

Reverse logistics activities can include refurbishment and re-packaging, which may also change the price, quality, and value of the items returned to compete on the market with new products (Jahre, 1995). Given the increase in returns resulting from competitive customer satisfaction policies (Srivastava and Srivastava, 2006; Hameri and Hintsa, 2009; Jack et al., 2010), reverse logistics are a key element in optimizing resources while minimizing the negative impact on costs (Rogers and Tibben-Lembke, 1999; Stock et al., 2002). Further, processes of knowledge management play an important role in reducing the high degree of uncertainty in processes of reverse logistics, since they facilitate management of the diverse and

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changing resources characteristic of these activities (Wadhwa and Madaan, 2007). Knowledge management processes are particularly important in all of these processes, especially in the creation of logistics knowledge (Nonaka, 1994; Nonaka and Konno, 1998; Stentoft and Halldorsson, 2002; Wadhwa and Madaan, 2007; Flint et al., 2008).

Due to the growing importance of reverse logistics as a tool that allows the organization to control the impact of higher costs and to improve the value of products, and because creation of logistics knowledge offers advantages for managing all of these processes, it is important to understand the potential benefits of reverse logistics for the organization by analyzing how these variables are related to each other in order to improve organizational performance. To achieve these goals, we propose an empirical model to analyze how the importance of costs and the value of returns affect the importance of reverse logistics processes. We also examine the influence of these interactions, together with creation of logistics knowledge, on company performance. We test the main relationships between these variables in an integrated model in order ultimately to analyze the results and possible implications to be derived from them. This paper is divided into an examination of the relevant literature, followed by development of the hypotheses and presentation of the methodology and the results/conclusions, implications for practice, and directions for future research.

2. Literature review and hypotheses

Reverse logistics activities refer to all recovery actions in which the company obtains economic benefit directly or indirectly. These actions involve not only benefits, however, but also a range of costs that are very significant for any organization. In the current economic scenario, growing costs of returns affect the performance of reverse logistics activities and influence the value that the company may finally obtain from the materials returned, thereby affecting profitability (Rogers and Tibben-Lembke, 1999). The significance of these costs may be due to increasing regulations, as shown for example by a study of the recycling of tyres in Brazil. Figueiredo and Mayerle (2008) note that, since 1999, a federal resolution has held tyre producers and importers responsible for collecting unrecoverable tires. Returns policies oriented to customers can also contribute to growing significance of cost of returns. According to the results of a survey conducted by Mermelstein (2006, p. 15), "92% of customers are very likely to shop again if the returns process is convenient; on the other hand, 82% are not likely or not very likely at all to shop again if the returns process is inconvenient". Customer interest in environmentally friendly companies can produce similar results, as in the case of CopyMagic, a multinational copier manufacturer that offers green products that "could attract and retain environmentally conscious customers and employees" (Thierry et al., 1995, p. 115). Consequently, the importance of costs for a company derives from the amount of the costs for returning products to the firm (Tibben-Lembke and Rogers, 2002). Even reducing these costs creates value for the company (Lambert and Burduroglu, 2000; Lambert et al., 2005). We thus present reverse logistics as a key element for optimizing resources, while minimizing the negative impact on costs (Stock et al., 2002).

The total cost of reverse logistics includes the costs of collection, inventory, transport, and storage (Hu et al., 2002; Srivastava and Srivastava, 2006). Collection costs consist of the costs of location, selection, and product collection at the end of the product's useful life (Srivastava and Srivastava, 2006). Inventory costs include the costs of control and management of inventories of the items returned and remanufactured (Krikke et al., 2003). The cost of transportation is comprised primarily of the total transport cost for activities related to the reuse and disposal of returned items, as well as the total transport cost of collection activities for dangerous and polluting items (Hu et al., 2002). In some cases, the cost of returnable transport items is estimated at an annual shrinkage of close to 29%, which increases the cost of transportation (Hellström and Johansson, 2010), among numerous other associated costs (Rosenau et al., 1996). The cost of storage refers to storage of items recovered from multiple sources unprocessed (Hu et al., 2002) and of items already processed that will be redistributed (Rogers and Tibben-Lembke, 1999).

All of these costs decrease the value of the returned material, that is, the degree of utilization of the items that are returned to the company (Carter and Ellram, 1998; Tibben-Lembke and Rogers, 2002). The cost of returns could, however, be controlled by reverse logistics, as is shown in the case study by Hu et al. (2002). This study demonstrates that reverse logistics activities for multi-type hazardous-waste treatment in international high-technology enterprises in Taiwan reduced the total cost by 31.2%, to 49.1%. Reverse logistics activities are thus becoming an important competitive necessity (Daugherty et al., 2002; Jack et al., 2010), especially at a time when the company must face increasing product returns (Srivastava and Srivastava, 2006).

Continuous changes in modes of competition and technology require the company to focus on factors that provide value. These factors include reverse logistics (Stock et al., 2002; Tibben-Lembke and Rogers, 2002) and knowledge management (Grawe, 2009), which involves knowledge creation with its four stages: socialization, externalization, combination, and internalization (Nonaka, 1994; Nonaka and Takeuchi, 1995; Yang et al., 2009). Because reverse logistics activities are quite complex and highly uncertain (Wadhwa and Madaan, 2007; Hanafi et al., 2008), the firm must be able to generate new knowledge to reduce uncertainty and improve responsiveness to continuing changes in reverse logistics systems (Galbraith and Kazanjian, 1986). According to Wadhwa and Madaan (2007, p. 11), in the creation of logistics knowledge, socialization occurs when members of an organization work in close collaboration, "exchanging their ideas and knowledge to create an innovative tool that can be used for efficient management of returns". Externalization allows the organization to incorporate and share information on returns easily throughout the firm. When combined, the data on returns are analyzed in depth and interpreted to improve reverse logistics processes. During internalization, knowledge of the product return is shared and understood by people with no background in handling product returns, thereby improving decision-making.