



The effect of global supply chain configuration on the relationship between supply chain improvement programs and performance

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ABSTRACT

This paper investigates the moderating effect of global supply chain (SC) configurations on the relationship between SC improvement programs and operational performance improvement, based on data collected from the fifth edition of the International Manufacturing Strategy Survey (IMSS). Configurations are defined through the level of sourcing, manufacturing and sales of a plant outside the continent where it is located. Four configurations emerge: Locals, Shoppers, Barons and Globals. Results show that global SC configurations do have a moderating effect. Some configurations yield higher returns on their investments in SC than others. Moreover, Locals can achieve further improvements by adopting distribution strategy and supplier development programs. However, Barons experience negative effects from investing in coordination with customers and suppliers.

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1. Introduction

The globalization of supply chains (SC) has always been simultaneously an opportunity and an issue for manufacturing companies (e.g., Dornier et al., 2008; Taylor, 1997). Increasing competitive pressures force them to expand operations beyond national boundaries in order to source materials and components, manufacture products and sell their products. Reduced trade barriers and advances in communication technologies also make this possible (e.g., Hülsmann et al., 2008; Skjott-Larsen and Schary, 2007). Thus, SCs are more complex and difficult to control and errors in management can impact a company's performance significantly (e.g., Hülsmann et al., 2008). For all these reasons, the literature has recently focused on *global SC management* (e.g., Prasad and Babbar, 2000).

Companies extending their operations globally obtain potential relevant advantages such as lower sourcing costs and access to broader markets (Ferdows, 1997b; Vereecke and Van Dierdonck, 2002). However, they also face new challenges, including longer lead times, more complex networks and higher risks (Levy, 1997; Minner, 2003; Womack and Jones, 1996).

For this reason, different approaches have been used in the academic literature to examine the analysis and management of SCs at a global level. Gereffi et al. (2005) proposed global value chain analysis as an approach to analyze the configuration and

structure of the entire chain from raw materials to final customers. Chung et al. (2004) adapted the networked enterprises concept to the global case, focusing on the network of closely related firms that contribute to manufacturing products. Several other authors (Bello et al., 2004; Cohen and Mallik, 1997; MacCarthy and Atthirawong, 2003; Murray et al., 1995) provided more management oriented contributions that adopt the perspectives of single firms that need to coordinate and manage sourcing, manufacturing and distribution activities on a global scale.

Within SC management literature, attention has been paid to the identification of SC management best practices. Specifically, several authors have focused on how companies invest in their SC in order to improve operational performance, examining factors such as cost, delivery, quality and flexibility (Craighead et al., 2007; Golini and Kalchschmidt, 2011; Jüttner et al., 2003; Minner, 2003; Tang, 2006). In this field, attention has typically been paid to specific improvement programs, such as supply strategy redesign, coordination with suppliers, distribution strategy redesign and coordination with customers. In the context of global SCs, however, the benefits of such improvement programs may be hampered by the previously mentioned challenges. For example, coordination with customers and suppliers may become more difficult due to physical and cultural distance or the presence of intermediaries (often needed when operating on a global scale). Research has not yet clarified which programs lead to real improvements when SCs become global.

Therefore, the aim of this paper is to address this specific issue, i.e., to investigate the relationship between SC improvement

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programs and operational performance in different contexts. Specifically, we adopt a configuration approach, thus analyzing the moderating effect of global SC configurations on the aforementioned relationship. We investigate this issue using a large panel of data gathered in 2009 as part of the fifth edition of the International Manufacturing Strategy Survey (IMSS 5).

This paper is structured as follows: first, we present a review of the relevant literature on the topic and then, we specify our research framework and objects. Subsequently, we illustrate our methodology and data analysis and finally we discuss our results and draw conclusions.

2. Literature review

SC management literature defines global SC management as the combination of three main operational processes: global sourcing, i.e., the management of supplier relationships from a global perspective (e.g., Murray et al., 1995); global manufacturing, i.e., the management of manufacturing activities distributed all over the world (e.g., MacCarthy and Atthirawong, 2003); and global distribution, i.e., how companies manage their sales and distribution channels globally (e.g., Bello et al., 2004).

Even if these processes have often been analyzed separately, they are typically interrelated: in order to support global distribution, companies need to invest in new foreign plants and manage suppliers on a global scale (Buckley and Ghauri, 2004). Similarly, companies that purchase on a global scale sometimes decide to invest in foreign manufacturing facilities in order to have better control over the SC (Ferdows, 1997a). Literature provides evidence of significant correlations among global sourcing, manufacturing and distribution. For example, Bozarth et al. (1998) highlighted four stages of global sourcing maturity in which the last phase is distinguished by the development of global sourcing networks with several production facilities. Other authors also provided evidence of patterns of internationalization in manufacturing and distribution processes (Chetty and Holm, 2000; Knudsen and Servais, 2007; Shi and Gregory, 1998). For this reason, these different concepts are usually considered interrelated under the term “global supply chain management” (Prasad and Babbar, 2000).

Even if global sourcing, manufacturing and distribution are interrelated, not all companies behave in the same way. For this reason, literature has investigated configurations in the use of global SC management. Rudberg and Olhager (2003) focused on sourcing and distribution processes and they identified four clusters of companies according to the number of sites per organization and number of organizations in the network. Similarly, Cagliano et al. (2008) found four clusters of companies characterized by global or local sourcing and distribution. Specifically, they identified companies that are still local, companies that have globalized only sourcing or distribution and companies that have gone global for both. These clusters provide evidence that some companies decide to stay local and manage local SCs. Other companies prefer to extend globally in either distribution or purchasing, leading to different configurations. In the end, some companies extend their boundaries over the world and manage true global SCs that involve both purchasing and distribution at a global level; however, the manufacturing component is not considered in this work.

Some authors have focused on the impact of global SCs on company performance even in the absence of conclusive evidence. Although many authors highlight the benefits of globalization, other authors claim that globalization may have a negative impact on performance. Global SCs, by definition, cannot be as fast and seamless as local ones (Levy, 1997; Minner, 2003;

Womack and Jones, 1996); lean SCs typically require short distances to accommodate frequent deliveries and lower inventories. Longer distances may also require the use of intermediaries and may increase the number of actors in the value chain, thus making the integration of the network more complex and thereby increasing the bullwhip effect (Lee et al., 1997). Cultural distances and possible lack of trust between companies can also make the delineation of agreements more difficult and can impact the return on SC investments (Levy, 1997). In the end, extending SCs globally increases lead times and, by consequence, inventory levels (Carter and Narasimhan, 1990; Frear et al., 1992; Zeng and Rossetti, 2003).

In order to improve operational performance, companies can act differently (Krause et al., 1998; Tan, 2001; Watts and Hahn, 1993). For instance, they can leverage the definition of a supply strategy and a purchasing organization (Driedonks et al., 2010). Other authors showed the positive impact of supplier development programs (Choi and Hartley, 1996; Handfield et al., 2006) and vendor rating systems (Golini and Kalchschmidt, 2011; Muralidharan et al., 2001) focusing the attention on the importance of keeping the entire network under control. Attention has been also paid to the adoption of complex distribution systems (Beamon, 1998) and coordination with customers and suppliers (Lee and Whang, 2000). Finally, risks associated with global SCs (such as strikes or political issues, fluctuating exchange rates, supply disruptions and lead time variability) can be limited by using multiple supply sources (Minner, 2003) and different distribution channels. Ensuring communication lines in crisis situations and developing joint continuity plans with customers and suppliers are other types of SC investments designed to mitigate risk in global SCs (Craighead et al., 2007; Jüttner et al., 2003; Tang, 2006). Petersen et al. (2006) showed that structures, processes, business capabilities, international language capabilities and top management commitment are critical to the effectiveness of global SC management. This is in line with other authors, including Quintens et al. (2006), Zeng (2003) and Gelderman and Semeijn (2006).

For all these reasons, the relationship between globalization, SC investment and operational performance is rather complex. In the current literature, however, few contributions analyze this interaction.

Golini and Kalchschmidt (2011) focused on the upstream component of the SC. The authors found that SC management investments have a mediating effect on the relationship between global sourcing and materials inventory level. Specifically, companies that have been increasing global sourcing over time have also increased investments in the coordination with suppliers: in this way, inventory performances are comparable to those of companies that have decided to stay local. A similar result has also been found in the downstream element of the SC: Golini and Kalchschmidt (2010) found out that companies that have invested in global distribution have also increased the coordination with customers in order to keep lead time performance under control. However, these contributions have considered the different parts of the SC separately and have focused only on a limited set of performance data.

3. Objectives

Given the limitations highlighted in the existing literature, in this work, we aim to provide a clearer understanding of the relationship between SC improvement programs, performance and globalization. Specifically, we want to extend previous findings (Golini and Kalchschmidt, 2010, 2011; Knudsen and Servais, 2007) by including different performance indicators and considering different global SC configurations.

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