



The impact of subsidiaries' internal and external integration on operational performance



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ABSTRACT

Subsidiaries of manufacturing companies operate as members of two distinct networks: the internal manufacturing network of the company and the external network of supply chain partners. Adapting the concept of “dual embeddedness” from international business literature to a manufacturing context, this paper proposes a model explaining the link between internal integration, external integration and operational performance. An international survey containing data on 470 manufacturing subsidiaries is used to operationalize the constructs. Structural equation modeling provides evidence for a full mediation model: external integration mediates the positive impact of internal integration on performance. Based on the results, it is put forward that knowledge generated within the internal manufacturing network can only be converted into subsidiary-level operational performance, if it is shared and recombined with external supply chain partners. The highest performance benefits can only be achieved if both suppliers and customers are involved in this process. A limitation of our approach is that knowledge flows are measured indirectly by assessing the level of integration of a subsidiary in the knowledge flows within the internal network, and the level of integration with suppliers and customers.

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1. Introduction

Multinational manufacturing companies operate international networks of manufacturing plants dispersed around the globe. Global competition today takes place among these networks. One of the most important source of competitive advantage of these networks is represented by the knowledge that resides within these companies, and that can be transferred between plants and exploited in a more efficient and effective manner than knowledge located outside the network (Kogut and Zander, 1993; Gupta and Govindarajan, 2000; Van Wijk et al., 2008). To realize global competitive advantages multinational companies (MNCs) need to coordinate the intra-firm flow of knowledge, and combine the dispersed knowledge residing at individual units within the network (Kogut and Zander, 1993; Ambos et al., 2006; Ferdows, 2006).

While the coordination and transfer of knowledge on the MNC level is an important determinant of competitiveness, the issue on individual subsidiary level is similarly significant. Plant managers

of individual subsidiaries should strive to use the intra-network knowledge to strengthen the competences of their own unit and reach high performances (Tsai, 2001; Van Wijk et al., 2008), thereby contributing to the performance of the whole network (Cheng et al., 2011).

The present paper focuses on the transfer of knowledge on the subsidiary level, and investigates how the knowledge residing in the network can be acquired and converted into subsidiary-level operational performance. In this process we primarily concentrate on product and process related knowledge. It is put forward that subsidiaries need high levels of *internal integration* to be able to acquire such knowledge from their networks, but they also need to integrate in their *external network* (i.e., supply chain) and share this knowledge with supply chain partners in order to realize operational performance improvement.

By pursuing this objective, the paper aims to bring the following contributions to manufacturing network literature. The starting point of the paper is offered by the fact that in practice subsidiaries operate as members of two distinct networks: manufacturing (internal) networks composed of several subsidiaries belonging to the same company, and supply (external) networks identified through information and material flows between different companies that cooperate with each other in a supply chain (Rudberg and Olhager, 2003). While literature offers strong

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support that the integration into both networks can contribute to the success of individual subsidiaries, operations management studies rarely consider the two networks simultaneously. Furthermore, there is little knowledge on how these two networks are interrelated, and whether their interplay contributes to operational performance. International business literature, on the other hand, offers a number of studies that take both internal and external integration into consideration (e.g., Schmid and Schurig, 2003; Figueiredo, 2011; Meyer et al., 2011) without, however, focusing on operations management issues. Thus, this paper adopts the concept of simultaneous internal and external integration from the international business literature, and adapts it to an operations management context: we investigate the role of external integration in converting intra-network knowledge (i.e., internal integration) into operational performance. Additionally, as we primarily concentrate on product and production process related knowledge, a more direct performance measurement is applied by employing subsidiary-level operational performance indicators.

2. Literature review

2.1. Acquiring intra-network knowledge for performance improvement – the role of internal integration

Modern multinational companies are viewed as a differentiated network of plants in which knowledge is developed and exploited at multiple units, and can be efficiently transferred to and applied at other network units (Almeida et al., 2002). Various types of knowledge can be found within an international manufacturing network (Wilcox King and Zeithaml, 2003). Gupta and Govindarajan (2000) provide examples for procedural (e.g., product design, production know-how) versus declarative (e.g., financial information) knowledge. Schmid and Schurig (2003) argue that organizational knowledge also varies according to functional activities. Acknowledging that a multitude of intra-firm knowledge types exist, this paper focuses on knowledge related to the product and the production process, i.e., that related to the operations function of the firm (Schmid and Schurig, 2003; Ferdows, 2006). Thus, financial or market-related knowledge, for example, do not constitute the focus of this study.

While knowledge is crucial for the competitiveness of the MNC, from a subsidiary perspective knowledge is perceived in a slightly different manner. On one hand, subsidiaries cooperate with other units in the network to share and develop new knowledge in a collaborative manner. On the other hand, however, they also compete for intra-network knowledge (Luo, 2005), as this knowledge can be used to upgrade the competences of the subsidiary, increase performance and thereby secure its future within the network (Birkinshaw, 1996; Fusco and Spring, 2003; Cheng et al., 2011; Feldmann and Olhager, 2013).

To be able to absorb intra-network knowledge, a subsidiary has to develop close links with other network units to enable intra-organizational learning characterized by frequent and intense interactions with other subsidiaries (Lane and Lubatkin, 1998; Schmid and Schurig, 2003; Minbaeva, 2007). Thus, a subsidiary needs to be deeply integrated into its manufacturing network, i.e., a more intense participation in knowledge sharing activities among network units is required (Vereecke et al., 2006). There are several elements which enable a higher level of internal integration of a subsidiary (Szász et al., 2016). *Information sharing* mechanisms represent one of the fundamental components of internal integration, and play an important role in coordinating activities in the network, including the flow of goods between subsidiaries (Rudberg and Olhager, 2003). The existence and richness of possible *communication channels* has been shown to relate

positively to the amount of knowledge flows that involve a specific subsidiary (Gupta and Govindarajan, 2000). *Joint decision-making* can also enhance the internal integration of a subsidiary. Participation in decision-making, i.e., cooperation with the management of other subsidiaries and the whole network, increases the ability of the subsidiary to acquire new knowledge from other network units (Colotla et al., 2003; Jansen et al., 2005). Participation in *innovation sharing* within the network represents another means of being integrated into the knowledge flows within an international manufacturing network. Joint innovation is frequently realized in practice through the exchange of employees within the network, which is essential in transferring tacit knowledge between subsidiaries (Ferdows, 2006; Vereecke et al., 2006). Furthermore, some authors argue that the development of a network-level performance management system, where targets of subsidiary management are (partially) based on network-level performance indicators fosters internal integration (Gupta and Govindarajan, 2000; Luo, 2005; Greenwood et al., 2010).

Thus, subsidiaries that are deeply integrated in their internal networks participate more intensely in knowledge sharing activities within the network. Acquiring intra-network knowledge is beneficial for the subsidiary and represents a key determinant of subsidiary performance (Tsai, 2001; Anh et al., 2006; Rhodes et al., 2008). Mahnke et al. (2005) argue that although a subsidiary might be able to acquire useful knowledge from other network units, it does not necessarily possess the capability to transform and exploit it to its own benefit (Cohen and Levinthal, 1990; Zahra and George, 2002). Nevertheless, they hypothesize and confirm that knowledge transfer has a positive impact on a subsidiary's performance. Thus, in this paper we argue that, on a general level, internal integration has a positive impact on subsidiary-level performance: subsidiaries integrate in their intra-organizational networks to acquire useful knowledge that can directly be used to enhance performance (Monteiro et al., 2008; Van Wijk et al., 2008; Szász et al., 2016). As this paper specifically focuses on the integration in product and process related knowledge flows, we employ operational performance measures instead of general business performance measures found usually in the international business literature (e.g., Tsai, 2001; Mahnke et al., 2005; Monteiro et al., 2008). Performance measures included in this study are related to the dimensions of cost and differentiation performance (Porter, 1985). This approach offers a more immediate and direct assessment of subsidiary performance, better corresponding to the potential benefits of product and process related knowledge.

H1. Internal integration in product and process related knowledge flows has a positive impact on a subsidiary's operational performance.

To underpin our hypotheses from a practical perspective, for each hypothesis a short business example is also provided. Toyota Motor Corporation is chosen as the multinational company for which company-wide knowledge sharing practices truly offer a competitive edge on the global market (Dyer and Nobeoka, 2000; Chaturvedi and Dutta, 2005). Toyota introduced, for example, the Yokoten System which stores concise reports on successful problem-solving processes implemented at various Toyota plants (Marksberry et al., 2010). All subsidiaries that connect to the system (i.e., are internally integrated in the network-wide system) have access to this knowledge accumulated within the company. Conforming to H1, the access to, and use of, such systems had a powerful impact on subsidiaries' operational performance in the past, as it "helped to prioritize best practices depending on potential impact [and] advantages" (Chaturvedi and Dutta, 2005, p. 6).

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