

THE SPECIFICS OF SUPPLY CHAIN INTEGRATION WITH SMALL AND MEDIUM-SIZED ENTERPRISES

Posebnosti integriranja dobavne verige z malimi in srednje velikimi podjetji

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Abstract

Although larger organizations have invested significant amounts of money to integrate their supply chains, the development of supply chain integration with small and medium-sized enterprises (SMEs) is slow-moving. For SMEs, integration is a significant problem due to high costs and technology requirements. Hence, they follow a different approach to integrate their supply chains. Full integration of supply chains from the procurement of raw material to the distribution of finished goods is considered to be a crucial issue as nowadays the competition among enterprises is about supply chain efficiency, which is based on tighter cooperation of all partners in the supply chain process. This paper attempts to explore this topic by exploring how SMEs integrate their supply chains and by identifying the benefits of integrating supply chains.

Keywords: supply chain, integration, SMEs, e-business

Izvleček

Čeprav so velika podjetja investirala znatne vsote denarja v integracijo svojih dobavnih verig, se integracija dobavnih verig z malimi in srednje velikimi podjetji (MSP) razvija zelo počasi. Za MSP je integracija velika težava zaradi visokih stroškov in tehnoloških zahtev. Prav zato pri integraciji svojih dobavnih verig uporabljajo drugačne pristope.

Popolna integracija dobavne verige, od nabave surovin do dostave končnih izdelkov, je v današnjem času ključnega pomena, saj temelji konkurenca med podjetji na učinkovitosti dobavne verige, kar zahteva tesnejše sodelovanje vseh partnerjev v njej. V prispevku skušamo raziskati, kako MSP integrirajo svoje dobavne verige in katere so koristi, ki izvirajo iz te integracije.

Ključne besede: dobavna veriga, integracija, mala in srednje velika podjetja, e-poslovanje

1 Introduction

In an increasingly international marketplace, many companies are finding that prosperity is best achieved from specialization, as opposed to diversification. Although the majority of the world's largest companies continue to provide multiple services to numerous markets, they now purchase many components and goods from smaller companies that serve one particular niche. As the global marketplace continues to develop, SMEs provide an effective tool for economic growth through participation in global supply chains.

SMEs drive economic development by creating a valuable source of employment; they account for 60% to 70% of employment in OECD countries. Unfortunately, SMEs fail much more frequently in these economies. They repeatedly encounter barriers to internationalization, although several of these obstacles could be eliminated through successful integration into the international supply chain.



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Supply chain management (SCM) has increasingly become an important way to enhance competitive strength, and it is commonly argued that present-day competition is between integrated supply chains rather than among individual organizations. Studies of companies exploiting the benefits of SCM have indicated that improvements such as reduced software costs, industry-wide learning of best practices, and increased probability of having to compete against rivals enjoying the advantages of SCM are driving forces behind the adoption of the SCM concept (Arend & Wisner, 2005). The integration of key business processes among the partners in a supply chain aims at adding value for the customers. This integration is achieved by connecting suppliers, through manufacturing and assembly companies, to distributors, retailers, and customers to make the process more efficient and the product and services more differentiated.

The potential benefits of SCM include product and delivery process quality such as shorter delivery times, more reliable delivery promises, fewer schedule disruptions, significant reductions in inventories, and risk reductions (Bask & Juga, 2001). Furthermore, the integration of processes in the supply chain can also enhance the ability to leverage its scalable competences, such as the enforcement of innovative product design and radical process innovation, and to access complementary partner assets (Arend & Wisner, 2005).

Despite the lack of an agreed-upon definition, SCM is generally intended to cover all business processes between vertically linked organizations. Our understanding of SCM as discussed in this paper defines SCM as the integration of key business processes from end user to original suppliers that provide products and services and information that add value to customers and other stakeholders (Lambert, Cooper, & Pagh, 1998).

The ability to develop and maintain sound business relationships across company boundaries is an important issue when managing a supply chain. It is therefore essential to recognize the power structures that exist between buyer and seller—or what Cox, Watson, Lonsdale, and Sanderson (2004) refer to as the “power resources” in the transactions. Only by understanding the existing power regime can buyers and suppliers manage relationships in an appropriate manner. Dominant players are able to direct or gain access to all crucial resources in a supply chain structure of dominance and dependency. A supply chain includes several focal organizations. In other words, the customer (with the exception of the end user) is also a supplier, and any supplier—except for the very first link in the chain—is also a customer. Every focal organization has its own supply chain and, hence, represents a complex network rather than a conventional chain. From this perspective, it is highly relevant to focus on cooperation among several parties in the network.

Over the past years, many large and medium-sized companies have made major efforts to create electronic con-

nections with their major suppliers. Despite considerable success with suppliers that can afford the up-front investments in computer systems and business applications, these buying organizations face a series of technical difficulties together with an expanding set of day-to-day operational challenges. They need to eliminate paper-based business processes while also addressing the requirements of small and medium-sized suppliers that do not have the resources to manage their own electronic supply chain. Many large and medium-sized manufacturers have yet to launch an electronic supply chain initiative and continue to rely on paper-driven business processes. With the broad use of the web and integration technologies in business environments, manufacturers now have a viable set of options for substantially reducing paper-driven business processes from its supply chain and for incorporating all of its suppliers into an electronic supply chain network to increase efficiency. Despite the substantial benefits of SCM, it is also evident that SCM implementation has its costs, hazards, and challenges. Furthermore, there are indications that small and medium-sized enterprises (SMEs) are less able to harness the benefits of SCM or encounter greater obstacles when trying to introduce SCM practices.

Integration is frequently cited as being an important issue for organizations (Daniel 2003). Integration problems affect all types of organizations, including SMEs, as enterprises are trying to integrate their applications at both the intra- and inter-organizational levels. Large organizations are turning to the adoption of integrated systems as a strategy to improve their competitiveness. For SMEs, integration is a significant problem due to its high cost, technical requirement, limited financial resources, and lack of technical knowledge. Hence, SMEs have different approaches toward integration (Chen, Themistocleous, & Chiu, 2003). Although some SMEs are moving to the adoption of integrated systems, the rate of integration technology adoption is generally low among SMEs (Buonanno et al., 2005; Hughes, Golden, & Powell, 2003; Pigni, Ravarini, Buonanno, & Sciuto, 2011).

SMEs are not only seeking ways to integrate the disparate systems within the organization, but have also moved to extend the whole domain beyond the boundaries of the organization to include their suppliers, trading partners, and customers (Butler et al., 2002; IDB, 2010). This has also affected the supply chain. SMEs might need to integrate their IT infrastructure so as to support the efficiency of their supply chains. Integrating SMEs' systems with their customers and trading partners will give them even greater competitive advantages to compete with their competitors, including larger companies (Chen et al., 2003). The emergence of supply chain integration is therefore undoubtedly a critical component to strengthen the competitive advantage of both suppliers and their customers. It is believed that, in today's world of competitive business, it is no longer companies that compete, but supply chains.

2 Supply Chain Integration through E-Collaboration

The goal of supply chain integration is to improve the efficiency with which a company buys, sells, and produces materials or services, inherently reducing the costs associated with these activities (and thus increasing profits). Various studies have been conducted to understand the reasons why organizations adopt or do not adopt information technologies in their supply chain. Kaynak, Tatoglu, and Kula (2005) found that the perceived benefits, such as market development, efficiency of sales and promotion, ease of accessibility, and cost reduction, are able to influence organizations' e-business adoption decisions. Grandon and Pearson (2004) found that organizational readiness, external pressure, perceived ease of use, and perceived usefulness affect the adoption of e-commerce. According to Thatcher, Foster, and Zhu (2006), organizational, industrial, governmental, and cultural factors play key roles in organizations' e-commerce adoption decisions. Joo and Kim (2004) demonstrated that external pressure and organizational size both have positive relationships with organizational adoption of e-marketplaces. These studies showed that the majority of the e-commerce adoption factors determined in past research can be summarized into technological, environmental, and organizational factors. These results are consistent with the technology-organization-environment (TOE) model proposed by Tornatzky and Fleischer (1990).

However, as the web becomes increasingly common in organizations, the TOE model by itself might no longer be able to explain organizations' e-collaboration tool-adoption decisions fully. For example, technological attributes such as compatibility might not be an issue for organizations, as the internet is based on consistent standards. Instead, Chong, Ooi, Lin, and Raman (2009a) and Huang, Janz, and Frolick (2008) all proposed that factors such as inter-organizational relationships (IOR) play a prominent role in affecting the inter-organizational system adoption decisions of organizations. Supply chain members will only benefit from e-collaboration tool implementation if they are integrating important business processes in the supply chain. Such integrations will allow them to have an agile, seamless supply chain that can respond to the fast-changing and unpredictable market. The implementation of e-collaboration tools to facilitate these supply chain integrations will also involve the sharing of key supply chain information. This might be a challenge for organizations, especially SMEs who are protective of their business information. Another issue to consider is that, although adoption is an organization's decision, ultimately the users of the system will play a crucial role in determining the success of e-collaboration diffusion.

In addition to TOE and IOR, an important area of research that has been discarded by most e-collaboration tool and SCM researchers is the users' perceptions of the technology. This is an important gap that has been high-

lighted by Jeyaraj, Rottma, and Lacity's (2006) studies. Jeyaraj et al. (2006) stated that it is important to include the characteristics of users as they play a decisive role on whether the organization can successfully assimilate e-collaboration tools. Studies on technology adoptions from the users' perspectives are common among standalone internet technologies such as e-mail (Straub, Keil, & Brenner, 1997), short messaging service (Brown, Dennis, & Venkatesh, 2010), and online shopping (Gefen, Karahanna, & Straub, 2003). Most of these studies have adopted the technology acceptance model (TAM) (Davis, 1989). TAM posits that perceived usefulness and perceived ease of use of the technology will influence the users' adoption decisions. Although a popular model, TAM is sometimes criticized for being too simple to explain a wide range of technologies or adoption situations (Bagozzi, 2007).

An alternate model built on TAM's foundation is the UTAUT model (Venkatesh, Morris, Davis, & Davis, 2003). UTAUT examines both the users' intentions to use a technology and the subsequent actual usage. By combining eight models that earlier research had employed to study technology adoption (e.g., theory of reasoned action, TAM, motivational model), Venkatesh et al. (2003) consolidated four main constructs that have significant influence on the adoption and usage of technology: performance expectancy, effort expectancy, social influence, and facilitating conditions. The UTAUT model was employed by Brown et al. (2010) in their study on collaboration technology usage.

The three models discussed thus far complement each other as they cover the environmental factors faced by organizations in a supply chain environment (e.g., competitive pressure), the IOR among supply chain members (e.g., partner's power, willingness to share information), and the diffusion decisions by the organizations' users (e.g., social influence).

Another area that has attracted the attention of researchers is the study of collaborative SCM (Chong, Ooi, Lin, & Tang, 2009; Kioses, Pramartari, Doukidis, & Bardaki, 2007). Cohen and Roussel (2005) defined collaboration as the means by which supply chain members work together to achieve mutual objectives by sharing ideas, information, knowledge, risks, and rewards. Supply chain members in the collaborative SCM environment will therefore work together, have common objectives, share important information, and collaborate on supply chain activities (Chong, Ooi, Lin, et al., 2009; Serve, Yen, Wang, & Lin, 2002). Although the concept of collaboration in SCM has long existed, its practicality in terms of its abilities to integrate supply chain members was much easier to achieve with the emergence of internet technologies (Frohlich & Westbrook, 2002). With the internet, organizations are able to integrate their inter- and intra-organizational business processes within functional departments and supply chain members via e-collaboration tools. Chong Chong, Ooi, Lin, et al. (2009) defined e-collaboration as business-to-business interactions facilitated by the use of internet technologies.

Unlike existing technologies, such as the electronic data interchange (EDI), the interactions in e-collaboration moved from buying and selling transactions to relationship building based on activities such as information sharing and integration, shared decision making, and process and resource sharing (Chong, Ooi, Lin, et al., 2009).

E-collaboration is defined as electronically enabled collaborative tools that facilitate interactions between an organization and its suppliers, trading partners, customers, and employees. E-collaboration tools leverage the internet to create and maintain an interactive business community of employees, trading partners, suppliers, and customers (Chong, Ooi, & Sohal, 2009). Unlike B2B, e-collaboration tools do not focus on monetary transactions in B2B; instead, they cover the exchanges of information and ideas between the trading organizations and within organizations, which allows them to collaboratively design, develop, build, and manage products through their life cycle. With e-collaboration, supply chain partners are able to automate information flows within a multi-channel distribution network (Chong, Ooi, & Sohal, 2009).

Cassivi (2006) identified eight e-collaboration tools used to exchange critical information among supply chain partners. These supply chain e-collaboration tools are categorized as supply chain planning or supply chain execution tools (Table 1). Supply chain planning tools are supply chain forecasting, capacity planning, and business strategy tools, while supply chain execution tools are direct procurement, replenishment, projected shortages, delivery and tracking, and design.

3 Specifics of Supply Chain Integration with SMEs

SCM is perceived by SMEs differently. Several studies have shown that SMEs do not perceive their suppliers to be their partners, as big firms do; rather, they perceive them to be a process that protects them against a lack of production (Udomleartpresert, Jungthirapanich, & Sommechai, 2003). SMEs do not have bargaining power against big enterprises. In order to increase SMEs' bargaining power and relationships with customers, a vertical supply chain

is proposed to SMEs to be able to implement a win-win strategy. In the vertical chain model, the aim is to maximize bilateral benefits with suppliers in the chain and gain bargaining power over suppliers through the establishment of a union by SMEs operating in the same sector. SCM provides benefits of vertical integration without reflecting them in the costs.

As the size of the enterprise is not taken into consideration in most of the studies on supply chain management, there is no sufficient research on to what extent SCM fits SMEs and whether it is right to implement exactly the same SCM implemented on larger enterprises on SMEs. Arend and Wisner (2005) investigated to what extent small enterprises fit supply chains' application. They found that SMEs do not implement SCM correctly, use SCM strategies fully, or select SCM freely. In fact, there is a weak harmony between SMEs and SCM. It was concluded that SMEs are more willing to use supply chains after they begin using their suppliers' EDI system.

The use of technologies helps organizations better manage their supply chains, as supply chain management applications built on technology platforms have enhanced the ability of organizations to integrate their processes through collaborative information sharing and planning (Chan, Chung, & Zhou, 2012; Hafeez, Keoy, Zairi, Hanneman, & Koh, 2010). With supply chain integration, companies anticipate customers' desires and meet their demands. Having too many goods in stock creates unnecessary expenses and risks, especially when goods do not sell as quickly as expected. When the goods are held in inventory for too long, they age and will be easily replaced by newer goods. As a result, those aged goods will be sold at comparatively low prices and the companies will possibly end up with losses. However, having too few goods in stock also drags down profits as impatient customers will prefer to take their business elsewhere rather than wait for orders to arrive. For retailers and manufacturers alike, a company's competitive advantage depends in large measure on the adaptability and agility of its supply chain (Iyer, Germain, & Claycomb, 2009; Lu, Zhao, & Chi, 2012).

Table 1: *Supply Chain E-Collaboration Tools*

Supply chain planning	
Forecasting	Exchanges the forecast information provided by both the buyer and supplier
Capacity planning	Determines the amount of capacity required to produce
Business strategy	Collects and shares the actions that need to be taken to support the objectives and mission of the supply chain
Supply chain execution	
Direct procurement	Forwards purchase orders to pre-qualified suppliers
Replenishment	Orders directly from the shop floor to either replenish a production line or a stockroom
Shortages	Scans the buyer's production plan to project expected component shortages
Delivery and tracking	Generates a payment and a delivery request to track components
Design	Enables the use of interactive engineering drawing and storage of CAD designs by all key stakeholders

Source: Cassivi, 2006

A competitive company has to have the ability to acquire the goods and services it needs exactly when and where it needs them, at a favorable price, and with acceptable payment and delivery terms. It needs to directly manage the flow of goods through its distribution networks in a cost-effective manner. Not only large companies, but also SMEs have come to realize that they can achieve this by integrating their supply chains. Implementing supply chain integration can be a cost-saving step for the company in many ways. It can lower the costs of labor, increase flexibility, achieve faster response times and cut down the occurrence of errors on paper based operation, reduce unauthorized buying outside preferred supplier agreements, and reduce inventory, thereby achieving a competitive advantage (Chang & Wong, 2010; Essig & Arnold, 2001; Lee & Whang, 2004). Automation processes can also shorten the cycle time from ordering to distribution, thereby resulting in enhanced production ability and increased efficiency. Suppliers can also benefit from supply chain integration as this will shorten the business transaction cycle, lower tied capital in inventory, lower labor costs, increase efficiency, enhance accuracy, and make handling time and delivery speed faster (Chen et al., 2003; Khang, Arumugam, Chong, & Chan, 2010).

Although many efforts have been made by large companies to use integration technologies to support their supply chain integration strategy, there are still problems. As most organizations' suppliers are SMEs whose abilities and resources are limited, they might want to protect their proprietary process knowledge and competitive advantages from larger companies; they also might wish to have unrestricted control of their own assets. Therefore, integrating systems with their buying organizations seems to be a significant problem for them. The supply chain cannot be efficiently integrated without the support of and cooperation from the suppliers. Using new technology to support the integration of the supply chains is much harder for SMEs due to their characteristic weaknesses from the larger organizations (e.g., lack of financial resources and technological ability). The maturity of integration technologies and the lack of cases in integration technologies adoption in SMEs have made the problem even worse for them and, therefore, the rate of adoption among SMEs is understandably low.

Vaaland and Heide (2007) found a considerable technology gap between large and small companies as virtually all methods for planning and control are electronically based. The indifference of SMEs with regard to technological issues might provide a competitive advantage to large enterprises, which tend to give higher priority to employing technology-based methods to reduce transactional costs and introduce new and more effective material and process technologies. The result might be that SMEs will lose their competitive strength. SMEs might be more flexible than larger companies, but can easily be outdistanced by larger companies with efficient transaction systems (e.g., e-business) and state-of-the-art production technology. A

company's willingness to integrate advances in information and communication technologies will largely determine, for example, its ability to develop direct deliveries. Consequently, it is difficult to see how SMEs can survive if they continue to underestimate the importance of e-commerce.

Despite these observations, it is possible to overstate the importance of technology for SMEs. A final point on the question of the importance of technology is that stressing the need for technological awareness does not necessarily imply that SMEs must control or own access to that technology. Through network collaboration and the sharing of resources, the cost of acquiring new technology can be minimized.

The main barriers to supply chain information integration are the lack of strategic alignment of information strategies in the chain, firm size of some supply chain actors, the lack of awareness of potential benefits of e-business, the lack of motivation, and a less developed industry or regional context (Harland, Caldwell, Powell, & Zheng, 2007). Bask and Juga (2001) proposed that the polarization of strategies in supply chains can lead to separation and give rise to semi-integration rather than the full integration of information. There are challenges in cooperation among firms to achieve the necessary changes in business culture, in part stemming from the diverse goals of the parties involved and unequal risk and rewards (Boddy, Cahill, Charles, Fraser-Kraus, & Macbeth, 1998).

Fisher (1997) suggested that supply chains can be managed according the nature of the product being supplied, such as "innovative" products and "functional" products. As this suggests differences in management according to product type, it is reasonable to conclude this might explain differences in management through the adoption of information technologies. Functional products include the staples that people buy in a wide range of retail outlets, such as grocery stores and gas stations. Because such products satisfy basic needs, which do not change much over time, they have a stable, predictable demand and long life cycles. But their stability invites competition, which often leads to low profit margins. To avoid low margins, many companies introduce innovations in fashion or technology to give customers an additional reason to buy their offerings. Fashion apparel and personal computers are obvious examples, but we also see successful product innovation where we least expect it. Although innovation can enable a company to achieve higher profit margins, the very newness of innovative products makes demand for them unpredictable. In addition, their life cycle is short, usually just a few months, because as imitators erode the competitive advantage that innovative products enjoy, companies are forced to introduce a steady stream of newer innovations. The short life cycles and the great variety typical of these products further increase unpredictability.

Harland, Lamming, Zheng, and Johnsen (2001) identified two dimensions that have substantial impact on how

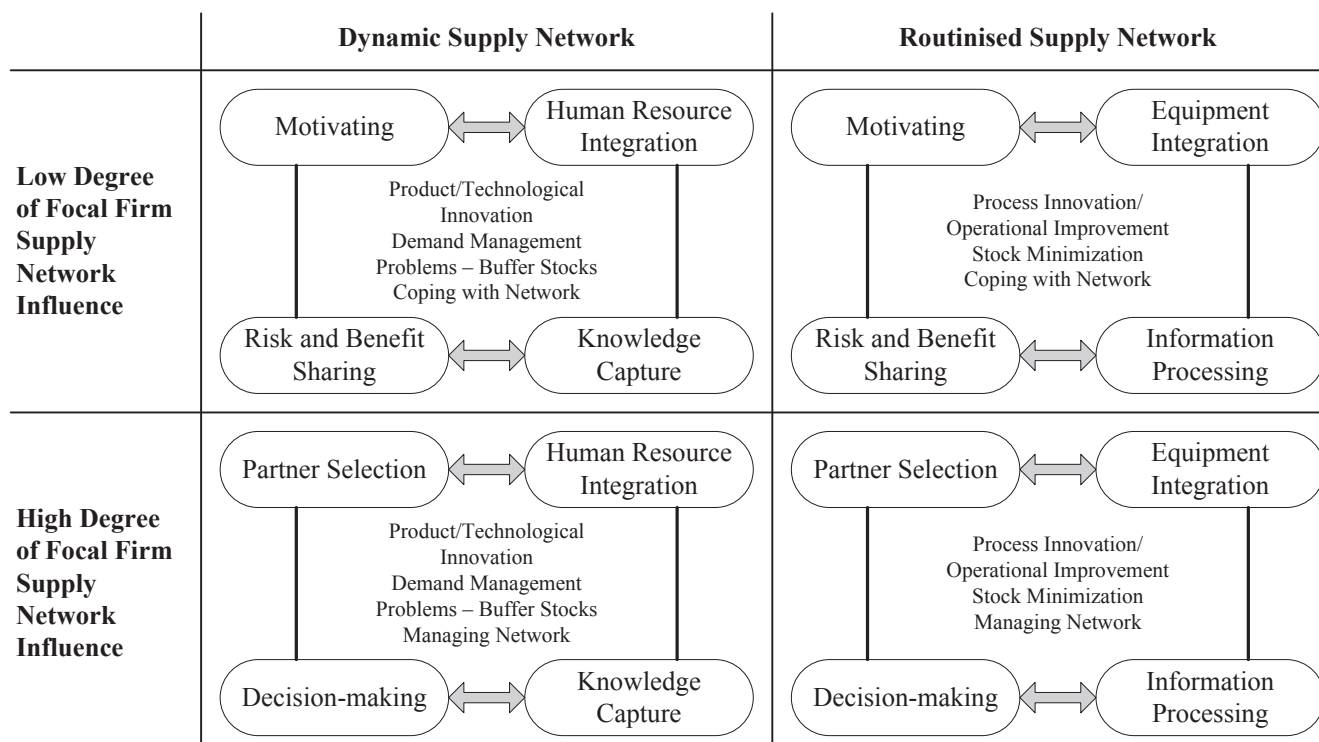
firms have attempted to manage the process of creation and the operation of supply networks: the degree of dynamics and the degree of focal firm supply network influence. The combination of the two dimensions provides four types of supply networks (Figure 1), each containing different problems, priorities, and core activities as well as showing differences in the focus on information integration according to type: Highly routinized supply networks highly influenced by a focal firm are more likely to integrate information into the network.

The literature review shows that most authors claim that benefits exist to achieving and utilizing supply chain integration through information integration. It is also stressed that the greatest benefits of e-business occur when its application is fully integrated throughout the chain. However, the empirical evidence to support this one-size-fits-all assertion is insufficient. Even large organizations, some with reputations for advanced supply chain management, appear not to be concerned with the integration of information into their supply chains (Harland, Caldwell, et al., 2007). This finding raises a real doubt as to the strength and reliability of some of the more advanced claims for supply chain management or, more cautiously, speculation that supply chain approaches are still limited largely to their logistical roots, rather than IT development; it could be that integrated information systems might only be appropriate in certain types of supply chains or within certain parts of supply chains. Customer dominance and pressure are key drivers for SMEs to adopt e-business; if customers are not pressur-

ing the organization, then this acts as an inhibitor to SMEs pursuing e-business. Therefore, the “e-isolation” of e-business strategy development in the larger downstream firms in the supply chains does not motivate the upstream SMEs to join in. If downstream, more powerful customers forced them to do so, they would implement e-business technologies; however, they will not in the absence of this pressure.

Das, Narasimhan, and Talluri (2006) stated that optimum supply chain performance will only be achieved through appropriate supply chain integration. They suggested that it is possible to overinvest in supply chain integration, giving rise to suboptimal performance. Rather, they propose a “balanced approach” to supplier integration, with a mid-range position. They suggested that different shapes of configuration of information integration might be appropriate to specific industry and market environments. E-business should be adopted in a manner contingent to the specific organization—namely, that large and small firms will have different objectives and different strategies. Koh and Maguire (2004) extended this thinking into specific e-business applications, highlighting that ERP is less appropriate for SMEs who wish to integrate tacit and cultural knowledge than for larger firms that integrate volumes of explicit knowledge. Some parts of supply chains dealing with routinized, high volume requirements might usefully employ e-business based information integration, whereas others dealing with more dynamic, innovative activities might seek integration of a richer sort of information in more tacit forms.

Figure 1: A taxonomy of supply networks



Source: Harland, Lamming, et al., 2001

It appears that larger firms have to be smarter in their e-business initiatives, differentiating between chains and within chains on the type of information they wish to integrate and how they achieve this (Harland, Caldwell, et al., 2007). Within chains, if SMEs are to remain strongly connected, this cannot easily be devolved to intermediaries such as e-exchanges as SME engagement with them is low. It also cannot be easily passed over as a black box technology without support. Rather, larger firms need to build appropriate information integration bridges to smaller supply chain members, which might require using different technologies that enhance the flows and capture of tacit, informal information. Strong bridges to SMEs would carry mutual trust. Trust toward the trading partner is a major factor leading firms to share knowledge with partners (Ke & Wei, 2006).

4 Conclusion

Conflict exists over how SCM affects SMEs. On one hand, SCM can provide quality, cost, customer service, leverage, and even risk reduction benefits for the SME. On the other hand, SCM exposes the SME to greater management and control hazards while reducing its private differentiation advantages. True vertical integration is generally not an option for the SME; SMEs are unlikely to need to consider antitrust implications in their alliances; SMEs are more vulnerable to holding specific assets and more sensitive to contract costs; SMEs are usually in a worse bargaining position; SMEs have less reputation, instilling less trust, due to newness; SMEs face greater spillover problems as their advantages are more knowledge and product based and there are likely to be cultural differences between SMEs and larger enterprises.

Different authors have demonstrated that a considerable gap exists between larger enterprises and SMEs in nearly all aspects of current and future SCM-related methods. If this gap is not reduced, SMEs are likely to lose transaction efficiency compared to their larger counterparts. Compared with larger enterprises, SMEs are less satisfied with the methods applied today and less optimistic about the future requirement fit. They are less concerned with methods supporting SCM on product quality, rationalization of operations, and capital cost rationalization. SMEs are also less focused on system integration with other actors in the supply chain; and less centered on EDI and e-based solutions both upstream and downstream the supply chain. Generally, larger companies expect their business to be more technology driven in the years to come whereas SMEs expect less change. In conclusion, SMEs appear to be far behind in the technology and system adoption that is considered vital to sustain SCM implementation. Thus, SMEs face a significant risk of losing competitive power. SMEs seem to be lagging far behind larger companies in terms of competing by means of effective supply chains.

Many developing countries are plagued by an insufficient business infrastructure. Telecommunications systems

are outdated or cost-prohibitive to most SMEs, technologies are antiquated, and access to the internet is often non-existent. Developing a stronger, modernized infrastructure dramatically improves the capability of SMEs within these countries to trade internationally. Moreover, specific development of an internet-capable landscape, which offers instant access to a global network of consumers and producers, can enhance SME participation in international supply chains and the global marketplace. The presence of transnational corporations (TNCs) provides a critical means through which SMEs can specialize and carve out a niche in the international supply chain (also known as a backward linkage). Integrating with TNCs will help SMEs when joining international supply chains.

However, the technology is only one part of the story. Those who wish to create e-business-enabled supply chains must appreciate and support the business models of chain actors and participants, which vary by size of chain actor and position in the supply chain. A traditional operations management focus on the component parts of the supply process will fail to deliver supply chain integration if strategies in the chain are not aligned. It is likely that some information integration bridges to and within supply chains should carry education, training, and investment support to strengthen ties with critical smaller firms.

SMEs have a reputation as boosters of employment, economic growth, and economic dynamics. One of the most important means through which SMEs are able to make these contributions is their ability to realize innovations. Therefore, in both developed and developing countries, many efforts have been made during the last few decades to stimulate SMEs to realize innovations. SMEs have been encouraged to make use of funding schemes and to utilize the services of knowledge centers. However, despite these efforts, knowledge is lacking about the nature and extent of SME support needs and the mechanisms for delivering it effectively. This holds true for supply chain integration needs as well.

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