

Facilitation of Supply Chain Decision Processes in SMEs, Using Information Systems

Simon Woodworth

University College Cork, Ireland

Joe Cunningham

University College Cork, Ireland

INTRODUCTION

This article discusses how Small to Medium Enterprises (SMEs) apply information systems (IS) to facilitate decisions concerning their supply chains. In the collective decision-making environment of the Supply Chain, SMEs have to strike a balance between inventory reduction to minimise working capital costs and maintaining sufficient inventory to cater for demand fluctuation. These decisions take on an additional level of complexity for food SMEs, where the products have finite shelf lives and are subject to strict traceability requirements. Nevertheless, some of the smaller SMEs have proven successful in using IS to facilitate critical decisions to minimise inventory and therefore operating costs, while still retaining the ability to cope with demand fluctuation.

BACKGROUND

Traditionally, companies have been regarded as independent self-sufficient entities, which compete with each other to survive (Christopher, 1998). However, the rise since the 1950s of the “systems approach” has led to the idea that an organization (the subsystem) exists as part of a wider group (the supersystem) and its success or failure depends on other organisations or individuals in that group (Lowson, King, & Hunter, 1999). Such a group may be referred to as a *Supply Chain*.

A supply chain consists of several organisations working together to deliver a finished product to the end customer. These supply chains are not exclusive; a single organisation may be a member of two or more supply chains (Christopher, 1998; Lowson et al., 1999). The supply chain changes the way in which organisations compete. Competition between companies has been superseded by competition between supply chains

(Christopher, 1998; Kalakota & Robinson, 2001), requiring collaboration and collective decision making processes among all organisations in the supply chain. The supply chain that can successfully deliver the right products at the right time for minimum cost and inventory is likely to gain competitive advantage over competing supply chains (Hendricks & Singhal, 2003). Therefore supply chain efficiency is regarded as a key factor for any firm seeking to gain an advantage over its competitors (Quayle, 2003). Large corporations have recognised this fact and have responded accordingly: annual investment in supply chain solutions has now reached \$11.6 billion globally (Rossi, 2003).

The same cannot be said of small to medium enterprises (SMEs). In an Irish context, the Irish Business and Employers Confederation notes in its 2001 survey of supply chain management (SCM), that, while more than two thirds of large companies have an SCM strategy, less than a third of small companies do (IBEC, 2001). This imbalance is a threat to the overall success of supply chains; they can only be as strong as their weakest links (Lowson et al., 1999) and their success depends on the smaller as well as the larger participants (Smeltzer, 2001). SMEs face particular problems in supply chains because large-scale supply chain implementations are too expensive and are also unsuitable. In addition, SMEs may have little room for manoeuvre because they are strongly influenced by the larger companies in the supply chain (Bates & Slack, 1998; Webster, 1995) who are in a position to dictate standards and methods to the smaller participants. These problems expose the whole supply chain to the risk of becoming disconnected.

The benefits of supply chain management are well articulated, as is the need for collaboration and supply chain integration to facilitate collaborative decision making. IS as an integration enabler is also well documented. However, the literature falls short

in several areas: supply chain management practices within SMEs receive very little attention (Quayle, 2003), the design and implementation of IS for SCM has not received enough attention (Gunasekaran & Ngai, 2004), and IS strategy use is under-researched and under-developed in SMEs (Levy & Powell, 2000; Levy, Powell, & Galliers, 1999). Consequently there is little understanding of how SMEs use IS to facilitate supply chain decisions they may need to take and the role of IS in collective supply-chain decision-making in SMEs has not been addressed.

SUPPLY CHAIN DECISION MAKING IN SMES

The Supply Chain and Supply Chain Management

Supply chains exist in almost every industry, particularly industries that involve manufacturing (Ashkenas, Ulrich, Jick, & Kerr, 1995; Strader, Lin, & Shaw, 1999). Definitions of supply chains tend to focus on a supply chain's structure or its function. These definitions can be synthesised into a unified definition of the supply chain as follows:

A supply chain is a network of distinct organisations, acting together in a coordinated fashion to transform inputs from original suppliers into finished products and services for end consumers.

A supply chain may simply be regarded as a group of organizations acting in concert to transform raw material (or services) into a finished product for the consumer. Those organisations are not all of the same size: While the major participants in any supply chain are frequently large corporations, as much as 80% of any given supply chain can be made up of SMEs (Smeltzer, 2001).

Supply chain models have evolved from the linear structural model described by Lowson et al. (1999) and Kalakota and Robinson (2001) to a more relationship-focused model as described by Poon (2000), Oliva (2003), and Tapscott, Ticoll, and Lowy (2000) and illustrated in Figure 1.

In the linear model, products and services move down the supply chain from the supplier, via manufacturer, distributor, and retailer, to the consumer. Payments move back up the supply chain from the consumer to the supplier. Information flows in both

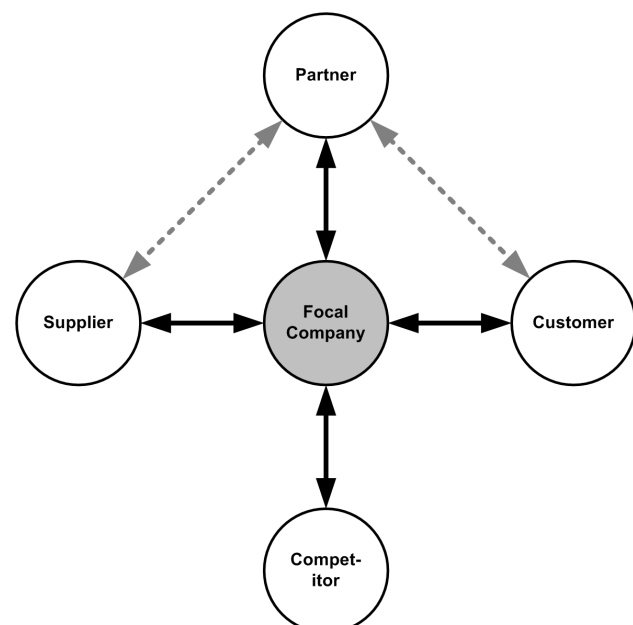
directions: Demand information (what the consumer wants) moves backward and supply information (what the supplier can provide) moves forward (Christiaanse & Kumar, 2000).

The relationship-focused model as illustrated in Figure 1, however, recognizes that the nature of a supply chain requires cooperation as distinct from competition as all parties in a supply chain are mutually interdependent (Horvath, 2001; Kalakota & Robinson, 2001; Romano, 2003). Competition then occurs between supply chains rather than individual organisations (Christopher, 1998; Kalakota & Robinson, 2001). Successful operation of the supply chain becomes critical to an organisation's competitive advantage or even survival (Humphreys, Lai, & Sculli, 2001; Quayle, 2003).

Most firms within a supply chain will have relationships with suppliers, customers, and possibly partners and competitors as well. The potential complexity of these supply chain structures implies that some form of oversight or management is required to maximise the supply chain's benefits and to optimize some or all of the relationships outlined above. These methods of coordinating and managing a supply chain are collectively referred to as supply chain management (SCM).

In 1996, Harland described the usage of the term supply chain management (SCM) as inconsistent and lacking in clarity (Harland, 1996). There is evidence

Figure 1. Key supply chain relationships



Adapted from Poon (2000), Oliva (2003), and Tapscott et al. (2000)

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