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Willingness to share information in a supply chain: A partnership-data-process perspective

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ABSTRACT

To achieve an efficient and effective supply chain, information needs to be shared. Most current information-sharing studies address the benefits gained from shared data, but neglect the effect of willingness to share, in which the benefits of sharing data may be discounted. This study looks into the factors that affect the extent of the willingness of companies to share information from a partnership-data-process perspective. To distinguish the mode of sharing, we differentiate information sharing into template based and proactive. Our results suggest that when partnerships become closer, the willingness to share template-based information increases and consequently the willingness to proactively share additional information.

1. Introduction

A supply chain is a network of material suppliers, production manufacturers, and logistics service providers that perform different value-added activities together, usually in a sequential manner, to produce value for consumers. Information sharing in a supply chain can occur in two ways. Internally, for the effective planning of purchases and company growth, leading to flexibility and coordination and a sense of ownership, and externally, sharing information with supply chain partners to enhance demand planning, physical flows, and financial work processes [20]. It can also prevent information distortion, resulting in problems such as the "bullwhip effect."

Information sharing has garnered greater research attention in recent years, but most studies have investigated the types of information shared and the gains from sharing [5]. Further, these studies make the assumption that the institutions sharing information are willing to do so, however, willingness to share information can be predetermined (where the data to be shared are specified in a contract, with templates used to describe the data format) or spontaneous (where the process is voluntary and non-predetermined).

Willingness to share reflects the quality of the information shared, including its timeliness, accuracy, adequacy, completeness, and reliability. These dimensions, combined with the breadth of information shared and level of coordinated knowledge involved, affect the quality of the decisions made by the firm [9].

In the supply chain context, willingness to share information is a trade-off between efficiency and the responsiveness of the information resources. What information is shared depends on the economics and technology of, while the questions of with whom and when information is shared require that social involvement be taken into account. This suggests that adopting a partnership-data-process (PDP) perspective can increase the partner's willingness to share information. In the supply chain context, the partners can be suppliers, buyers, or other service providers, and the partnership can extend to different strategic levels, such as causal or long-term alliances.

According to the PDP perspective, partnership and process are the main determinants of information sharing, chiefly because of the uncertainties associated with partnership relationships and collaborative processes. Successful supply chain collaboration involves partnership coordination, commitment, trust, high communication quality, participation, and joint problem solving, requiring a willingness to share information. Business process complexity is, of course, critically related to partnership success and the extent of information sharing.

Various types of data may be shared to improve the effectiveness of a supply chain, including inventory level, demand forecasts, sales and order status, and production schedules. Such

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sharing takes place at different levels, including physical, abstract, operational, and strategic. A greater correlation or interdependence between working tasks increases the need for data sharing to facilitate cooperation [13]; hence, complex processes normally require more dynamic data and involve customers or partners that have a long-term relationship with the firm.

We investigated the extent of information sharing in terms of the willingness of a company to share information with its collaborators. However, in contrast to most previous studies, we looked at the issue from a supply chain perspective, dividing information sharing into template based (when, how, what, and with whom shared) or proactive (sharing of non-predetermined information). We choose three collaborative partners in the supply chain – buyers, suppliers, and logistics service providers – as the targets and conducted an exploratory empirical study through a large-scale survey to investigate the partner's willingness to share information.

More specifically, we attempted to answer three questions:

1. Can information sharing behavior be classified into template-based and proactive behavior? If so, how do these behavior types interact?
2. Does the extent of partnership development, data characteristics, and business processes affect the way that information is shared in a supply chain? If so, what are their effects on the sharing behavior?
3. Do suppliers, buyers, and logistics service providers differ in their information sharing behavior? If so, what are the causes of these behavioral differences?

2. Research background

2.1. Role of IT in supply chain collaboration

IT plays a fundamental role in developing workforce agility by providing speed and flexibility, which are also critical to supply chain agility [26]. An agile supply chain involves close linkage among supply chain partners in key processes, improving procurement, forecasting, supply chain management, and new product development. IT enables agility by allowing supply chain partners to exchange planning and operational data, ranging from information on annual contracts and progress reports to real-time delivery and invoicing data [22].

Recently there have been many studies of the effect of IT on supply chains (e.g., [4,12]); in these, IT has been reported as having a critical effect by improving supply chain flexibility and responsiveness, which in turn improve the form's competitiveness. Interorganizational systems (IOSs) are of particular importance in facilitating the development of an agile supply chain. These IT-based systems transcend legal enterprise boundaries, offering connectivity, cooperation, and coordination among supply chain collaborators. IOSs generate consistent, timely information with visibility to all collaborators.

Early efforts focused on the management of demand uncertainty, inventory control, material planning, and reducing cycle time. Typical IOS implementations to achieve supply chain agility included electronic data interchange (EDI), advanced planning systems (APSs), material requirement planning (MRP), manufacturing resource planning (MRP II), enterprise resource planning (ERP), and e-business systems. The deployment of these IOSs not only increased information processing capability and enabled greater inter-firm cooperation but also nurtured innovation in customer relationship, manufacturing, procurement, supply chain, and other key activities [1]. An IOS can also generate a closer buyer–supplier relationship and a more cooperative governance relationship [10].

However, the benefits of an IT-enabled agile supply chains require a concerted effort among supply chain collaborators to align and integrate their business and IT activities [27]. In the context of supply chain collaboration, the role of IT as a platform enabling agility emerges primarily through its complementarity and integration with organizational strategies, designs, structures, and competencies [22]. However, the integration, of strategic aspects across the supply chain involves structural, application, and cultural complexity and thus major supply chain growing pains. Adding to such complexity are the interwoven relationships among the strategic dimensions. For example, IT alignment requires that supply chain partners be aligned in four fundamental domains of strategic choice: business strategy, IT strategy, organizational infrastructure and processes, and IT infrastructure and processes.

2.2. Studies of information sharing

When sharing information, individuals and organizations have different motives. For individuals, cognitive and relational capital, etc. are important [25], whereas for organizations efficiency due to cost reduction, productivity improvement, and product/market strategy is important. In addition, when sharing information, individuals care more about privacy, while organizations are more concerned with security. To acquire information, individuals must depend on materials provided by strangers, while organizations use contracts to guarantee sharing. However, for both individuals and organizations, trust, coordination, and interdependence are central to the success of information sharing.

Studies of information sharing at the individual and organizational level are typically rooted in social exchange and transaction cost theory, respectively. Sharing knowledge within departments is an internalization process that is closely related to the organizational culture [16]. Individuals share information primarily because of common interest, generalized reciprocity, and prosocial behavior. Thus, members of a successful community act out of community rather than self-interest.

Studies of information sharing among organizations are commonly based on a transaction cost approach. For example, Son et al. [23] developed a theory of power and reciprocal investment to investigate the effect of relationships and channel climate on EDI adoption, and found that investment and cooperation from suppliers increased both EDI volume and diversity.

2.3. Supply chain partnerships and information sharing

Traditional supply chain management research has focused on operational aspect by stressing the efficient flow of products and services but recently, more emphasis has been placed on supply chain strategy in terms of relationship building for better partnership performance. Studies generally treat supply chain partnerships as a continuum ranging from independent partnerships to strategic partnerships based on the degree of its interdependence, its exclusivity, and its strategic goals. Information integrates supply chain partners to enhance partnership success and performance [3]; information sharing is obligatory and may be split into four levels: order exchange, operational information sharing, strategic information sharing, and strategic and competitive information sharing. However, strategic partners share both strategic and operational information, whereas operational partners share only operational information. In addition, the more strategic the partnership, the greater the degree of information sharing needed for real-time, dynamic, integrated business operations.

Supply chain partnerships take many forms including vendor-managed inventory (VMI) partnerships, supplier–managed