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E-business enabled operational linkages: The role of RosettaNet in integrating the telecommunications supply chain

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ABSTRACT

A major challenge facing contemporary industrial organization lies in effective supply chain integration. Toward this end, developments in e-business technologies and standards have made the creation of operational linkages—the linking of systems, procedures, and routines of buying and selling organizations—increasingly affordable. In this paper, we evaluate the effectiveness of a particular e-business standard, the RosettaNet, in integrating the telecommunications supply chain with an in-depth dyad-level case study. We find that the RosettaNet standard alone is insufficient for creating interorganizational system-to-system integrations that benefit both transacting parties. We present two propositions for further research on e-business enabled operational linkages.

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1. Introduction

A major challenge facing contemporary industrial organization lies in effective *supply chain integration*—the relational and operational coupling of autonomous businesses to cut costs, increase revenues, and improve asset utilization (Stevens, 1989; Bowersox et al., 1999; Lambert and Cooper, 2000; Lee, 2000; Lee and Whang, 2001; Simchi-Levi et al., 2003; Chen and Paulraj, 2004; Christopher, 2005). At the business process level, the question becomes: How to efficiently and effectively couple systems, procedures, and routines of the buying and selling organizations. That is, how to create *operational linkages* (Cannon and Perreault, 1999; Schlueter Langdon, 2006), serving the purposes of both organizations with the least possible expenditures. The managerial challenge of creating operational linkages—where needed—is by no

means new, but besides gaining urgency under the last decade, enabling technological solutions are now cheaper and more abundant, following the developments of e-business technologies and standards: Most notably the Internet.

In this paper, we evaluate the effectiveness of the RosettaNet standard in integrating the telecommunications supply chain. Specifically, we investigate, in an in-depth case study, the efforts of a global manufacturer of infrastructural equipment for mobile telecommunications networks (hereafter MoblInfra, a pseudonym), to create system-to-system integration supported processes toward its customers, telecommunications operators. We contribute to supply chain and operations management research on supply chain integration by providing empirical observations on what a contemporary e-business standard such as the RosettaNet can and cannot do in terms of integrating the supply chain at the business process level. This contribution is important, since considerable ambiguities surround related concepts, including the concept of supply chain integration itself, as pointed out by several recent literature surveys (Fabbe-Costes and Jahre, 2007; van der Vaart and van Donk, 2008). We further report the

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discovery of several enabling mechanisms necessary to create e-business enabled operational linkages in the studied context. In particular, we emphasize the importance of appropriate dyadic standardization of trade item data.

The structure of the paper is as follows. We first review prior literature on e-business enabled operational linkages and the RosettaNet standard in interorganizational system-to-system integration (Section 2). Next, we describe our research design (Section 3). This is followed by the exhibit of our empirical results (Section 4). In Section 5, we conclude our study and develop propositions for further research. Evaluation of contribution and notes on further research follow.

2. E-business enabled operational linkages

The use of e-business approaches is critical in enabling modern-day operational linkages in practice (Bowersox et al., 1999; Lee and Whang, 2001). While different kinds of operational linkages between two transacting organizations are many (e.g. just-in-time systems (Schonberger, 2007), vendor-managed inventory systems (Kauremaa et al., forthcoming), collaborative planning forecasting and replenishment systems (Danese, 2007), or integrated demand chains (Heikkilä, 2002), we focus on one specific kind: Situations in which the exchange of messages between the transacting organizations is fully automated. We designate this *interorganizational system-to-system integration* (see, e.g. Emmelhainz, 1990; Linthicum, 2001; Bussler, 2003, for related terminology on the same phenomenon).

The broader context of e-business enabled operational linkages, supply chain integration, is overviewed in Section 2.1. Two particular standards for interorganizational system-to-system integration—one established,

electronic data interchange (EDI), and one emerging, RosettaNet—are reviewed, with emphasis on the latter, in Section 2.2.

2.1. Supply chain integration

Supply chain integration is commonly seen as the key goal of supply chain management (Frankel et al., 2008). Review of supply chain and operations management literature on supply chain integration reveals several distinct levels of discussion. At the relational level, the intention is to create facilities for interorganizational cooperation (Cooper et al., 1997; Lee, 2000; Mentzer et al., 2001; Chen and Paulraj, 2004; Christopher, 2005; Lambert et al., 2008; Fawcett et al., 2008), in order to nurture buyer–supplier relationships and improve decision-making within the supply chain. At the operational level, the intention is to integrate interorganizational business processes related to material, information, and financial flows (Venkatraman and Zaheer, 1990; Srinivasan et al., 1994; Lee et al., 1997; Walton and Gupta, 1999; Supply-Chain Council, 2005).

Following this we define for our purposes *supply chain integration* broadly as the relational and operational coupling of autonomous businesses along a supply chain in order to increase revenues, decrease costs, and improve asset utilization (see Fig. 1). We refer to the operational level of supply chain integration as the creation of *operational linkages*, defined as the degree to which the systems, procedures, and routines of the buying and selling organizations have been linked to facilitate operations (Cannon and Perreault, 1999, p. 442). In terms of information exchange, we regard the fully automated interorganizational system-to-system exchange of messages as the deepest level of integration.

SUPPLY CHAIN INTEGRATION

RELATIONAL LEVEL

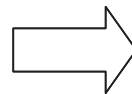
(Cooper et al. 1997, Lee 2000, Mentzer et al. 2001, Chen and Paulraj 2004, Christopher 2005, Lambert et al. 2008, Fawcett et al. 2008)

=> Support for interorganizational cooperation

OPERATIONAL LEVEL

(Venkatraman and Zaheer 1990, Srinivasan et al. 1994, Lee et al. 1997, Cannon and Perreault 1999, Walton and Gupta 1999)

=> Creation of operational linkages, enabled e.g. by interorganizational system-to-system integration



BUSINESS OBJECTIVES

- Increased revenues
- Decreased costs
- Improved asset utilization

Fig. 1. A broad schema of supply chain integration.

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