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Chapter VI

Manufacturing Connectedness: Managerial Challenges and Solutions

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INTRODUCTION

As B2B eCommerce becomes more important to the daily operations of manufacturing firms, the scope of activities will broaden to a large set of data exchange activities (Davies and Garcia Sierra, 1999; Threlkel and Kavan, 1999; Unitt and Jones, 1999). Electronic Data Interchange (EDI) has been investigated for a significant period of time (e.g., Iacovou et al., 1995; Massetti and Zmud, 1996), but other forms of interfirm exchanges such as design and manufacturing data have not received much attention. This is in spite of the fact that there is extremely strong industry interest in these activities (e.g., automotive, aerospace and other online exchanges) as well as the identification of its necessity for factories that are part of extended virtual organizations (Upton and McAfee, 1996).

Manufacturing connectedness (simply "connectedness" for the remainder of this chapter) is the sharing of business and technical data through electronic linkages. It includes business transaction-based EDI as well as the exchange of manufacturing information, design transfer and collaboration. Standards-based data exchange is a key element in effectively sharing data in digital formats. Standards that have been used for EDI include ANSI X.12 and EDIFACT. Other standards include STEP (Standard for the Exchange of

Product Model Data), SGML (Standard Generalized Markup Language) and IGES (Initial Graphics Exchange Standard). Developing standards include XML (eXtensible Markup Language). The role of standards is essential in connectedness as it reduces the need for companies to have separate exchange for each partner to more similar formats for all partners.

In 1999, the Manufacturing and Processing Technologies (MPT) Branch of Industry Canada (IC) and the Integrated Manufacturing Technologies Institute (IMTI) of the National Research Council Canada (NRC) collaborated to survey Canadian manufacturing companies about current practices in connectedness. The survey collected data on general levels of connectedness, the usage of certain standards, the barriers and benefits associated with these standards, aids to implementation and lessons learned (Industry Canada, 2000). Many respondents provided brief lessons learned, indicating that manufacturers have a significant amount of interesting and useful experience worthy of further investigation. Four themes were identified: standards development and definition, standards implementation, internal commitment to change and interorganizational relationships. The survey reported on in this chapter was based on the lessons learned submitted in response to the initial survey.

The aim of this chapter is to enable managers in manufacturing organizations to recognize and anticipate common concerns in implementing connectedness as well as to prepare to take action to minimize negative outcomes. While it does not offer all of the solutions that will be necessary for every situation, it does provide a building block for the improvement of a company's connectedness capabilities.

METHODOLOGY

The goal of this research was to further our understanding of what concerns influence managers in adopting connectedness and what actions they take to address these concerns. An open-ended survey technique was selected for two reasons. First, we wanted to allow managers to provide more contextual information than might be attained through a scale-based survey. Second, the respondents were senior managers in manufacturing facilities. It is extremely difficult to schedule these people for telephone or face-to-face interviews, especially as we were drawing from a wide geographic area. This was confirmed in some survey pilot testing. However, the managers were willing to respond to a written survey, in return for a report compiling the results. Therefore, in order to maintain consistency and to facilitate data