ABSTRACT

In today's supply networks, characterised by increased complexity and uncertainty, fast flow of information and decisions across the supply network is fundamental for improving efficiency and customer service in the global market. In such a complex, dynamic environment, the overall performance of the supply network can only be improved through better coordination of inter-related, boundary-spanning business processes in the network. This paper proposes a conceptual framework for enhanced coordination of production planning and control activities across the supply network. The framework consists of seven business processes, among which four key business processes focusing on the short to medium term are chosen for design and modelling and subsequent implementation.

Keywords: Business Processes, Information Systems, Planning and Control, Supply Chain Management, Supply Network Coordination

1. INTRODUCTION

The last two decades have seen an increased level of research interest in supply network coordination (SNC) (e.g. Hahn, Duplaga, & Hartley, 2000; Arshinder, Kanda, & Deshmukh, 2008; Holweg & Pil, 2008). Coordination is usually involved in the joint decision-making process, which could help managers to choose the best possible action from a set of alternative options (Romano, 2003). It has been broadly recognised that inventory can be significantly reduced through timely communication of accurate information on demand and inventories (Vickery, Jayaram, Droge, & Calantone, 2003; Droge, Jayaram, & Vickery, 2004; Bayraktar, Koh, Gunasekaran, Sari, & Tatoglu, 2008; Caloiero, Strozzi, & Comenges, 2008). However, the full benefit of close coordination in a global supply network (e.g. in the computer, automotive or aerospace industry (Williams, Maull, & Ellis, 2002; Yusuf, Gunasekaran, & Abthorpe, 2004)), cannot be realised unless business processes between network companies can inter-operate (Ghiassi & Spera, 2003; Xu, Koh, & Parker, 2009; Zhao, Zhao, & Hou, 2010).

Existing enterprise information systems such as enterprise resources planning (ERP) and business-to-business (B2B) systems (e.g. B2B e-hub and electronic data interchange (EDI)),
do not provide a full support for coordination of production planning and control activities in global supply networks (Puschmann & Alt, 2005; Koh, Gunasekaran, & Rajkumar, 2008). Similar to ERP, most of supply chain management (SCM) and advanced planning and scheduling (APS) systems currently available in the market do not manage the supply chain outside a company due to a centralised system architecture (Kelle & Akbulut, 2005; Stadtler, 2005). The recently emerged ERP II system has more functionalities than the traditional ERP system. However, industry analysts are cautiously optimistic about ERP II due to concerns related to failures of old ERP concepts (Koh et al., 2008).

B2B systems (e.g. B2B e-hubs, B2B portals) have the potential to facilitate information integration and cooperation between business partners (Sodhi, 2001; Zhao et al, 2010; Shaik & Abdul-Kader, 2013). However, most of these tools are still in their early stages of development for integration and coordination of the entire supply chain (Skjøtt-Larsen, Kotzab, & Grieger, 2003; Puschmann & Alt, 2005; Zhao et al, 2010). For example, process portals are mainly focused on the architecture for integration of inter-company information systems (Puschmann & Alt, 2005). Therefore, it is important to develop innovative business processes that facilitate boundary-spanning coordination and joint decision making at both the planning and the control levels between business partners in the supply network.

This paper contributes to the development of such boundary-spanning business processes for coordination of production plans and operational activities of network companies. These business processes have constituted a framework for future research in SNC. To achieve this, the paper starts with understanding of the business requirements for SNC. Then, a framework consisting of seven business processes for SNC is presented. These seven business processes are prioritised and four are chosen as the key coordination processes for the high-level design and modelling. This is followed by the implementation and evaluation of the pilot system for the four processes in the context of the Co-OPERATE project. Finally, the presented research work is concluded and future work indicated.

2. BUSINESS REQUIREMENTS AND SOLUTIONS

2.1. Business Requirements

The analysis of business requirements was based on an extensive literature review and the results of in-company interviews with managers and operational staff of six companies in the automotive and semiconductor industries covering first, second and third-tier suppliers and small- and medium-sized enterprises (SMEs) in the Co-OPERATE project. The major business requirements for a SNC system are identified in the three areas as follows:

1. Reducing the ‘bullwhip effect’ (e.g. Geary, disney, & towill, 2006), which occurs when a slight variation of demand becomes magnified as demand information is transferred back upstream along the supply chain (russell & taylor, 2011),
2. Enhancing supply chain reliability, particularly in relation to the delivery performance of the supply chain (e.g. Maltz, grenoble, rogers, baseman, grey, & katircioglu, 2000), and
3. Improving supply chain responsiveness to unexpected or exceptional events such as rush orders (nfaoui, beqqali, ouzrout, & bouras, 2009) and delayed deliveries (e.g. Krajewski, wei, & tang, 2005; xu, 2010).

2.2. Business Solutions

On the basis of the above requirements analysis, a framework for SNC was proposed, which consists of seven complementary business processes. The focus of each business process can be epitomized as follows:
A Non-Invasive Software Architecture Style for RFID Data Provisioning
www.igi-global.com/article/non-invasive-software-architecture-style/38925?camid=4v1a