Chapter 4.14
Adoption of Mobile Technology in the Supply Chain:
An Exploratory Cross-Case Analysis

Bill Doolin
Auckland University of Technology, New Zealand

Eman Al Haj Ali
Higher Colleges of Technology, UAE

ABSTRACT

The increasing utilization of mobile commerce technologies in e-business raises the question of their use in supply chain integration and management. This article presents a multiple case study investigation of the adoption of mobile technology in the supply chain. A technology-organization-environment framework of the contextual influences on technological innovation adoption is used to inform an analysis of three companies' adoption and use of mobile data solutions for sales automation, freight tracking, and service support. Analysis of the three case studies found that the relative advantage of the technological innovation and the information intensity of the company were the most important factors influencing adoption. Other factors that appeared to influence adoption included the compatibility of the technology with the company's business approach, the presence of top management support, and the degree of organizational readiness. Environmental factors such as competition within the industry or business partner influence seemed less influential for these pioneers of mobile technology use in supply-side activities.

INTRODUCTION

Supply chain management (SCM) can be defined as "the process of managing relationships, information, and materials flow across enterprise borders to deliver enhanced customer service and economic value" (Mentzer et al., 2001, p. 10). Information technology (IT) is pervasive

in SCM, and with the development of e-commerce it is playing an increasingly strategic role as supply chain activities are conducted, linked, and integrated electronically (Bhatt & Emdad, 2001). Companies are seeking to gain competitive advantage and create responsiveness to markets by adopting IT that enables them to utilize and manage information and knowledge within and across the extended enterprise (Lau et al., 2006). Of relevance to this article is the relatively recent but rapid development of mobile commerce and its application to SCM.

Mobile commerce is the conduct of e-commerce through mobile or handheld computing devices (e.g., mobile phones, PDAs, and tablet PCs), using wireless technologies and telecommunication networks (Siau, Lim, & Shen, 2003). Such mobile technologies facilitate communication, Internet access, data exchange, and transactional capabilities largely independent of time and location. The result is increased real-time interaction between companies, employees, supply chain partners, and customers, enhancing operational efficiency and providing new opportunities for customer service (Shankar & O'Driscoll, 2002).

A number of studies have examined the potential for mobile commerce to be applied to SCM. Mobile technologies are envisaged to have the most impact in areas of SCM such as e-procurement; materials handling; warehousing; inventory management; logistics and fulfilment; asset tracking; sales and field force automation; and dispatch management. For example, it has been argued that mobile applications integrated with a company's enterprise systems can provide greater visibility into supply chain operations, leading to real-time order status information and more responsive service management (Kalakota, Robinson, & Gundepudi, 2003). When deployed to mobile employees such as sales representatives or technical field service teams, mobile technologies can automate data collection, deliver necessary information to employees wherever their location, and reduce the time needed to update data from the field for the rest of the company, resulting in improved workforce productivity, process efficiency, data accuracy, and service quality (Rangone & Renga, 2006).

The idea that mobile commerce can transform SCM is reflected in the development of concepts such as "untethered" (Shankar & O'Driscoll, 2002), "adaptive" (Kalakota et al., 2003), and "responsive" (Lau et al., 2006) supply chains. However, there are few empirical studies that focus on the adoption and implementation of mobile commerce in the supply chain activities of companies—those that do have tended to report on financially modest or relatively simple applications that support mobile activities (operational mobility) rather than the mobile transmission of data (transmission mobility) (Rangone & Renga, 2006). In contrast, this article examines the adoption of more complex mobile applications that support transmission mobility as well as operational mobility, and integrate with existing company information systems and have the potential to change operating procedures and activities.

Since the organizational adoption of mobile commerce technologies in the supply chain is not well understood, we use an exploratory case study approach to provide an analysis of three New Zealand companies' development and use of mobile data solutions. We draw on the IT innovation adoption literature to inform our analysis. The next section summarizes this literature and presents a conceptual framework based on technological, organizational, and environmental factors influencing the innovation adoption decision. We then outline the research method used in the study before presenting our analysis of the three case studies. The final part of the article synthesizes some conclusions from the cross-case comparison and discusses the implications for research and practice in this area.

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