Chapter V
Global M-Logistics in North America, Europe, and Asia:
A Comparative Study of the Diffusion and Adoption of Standards and Technologies in Next Generation M-Logistics

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ABSTRACT

Mobile logistics (m-logistics) may be seen as an enabler for efficient and effective mobile commerce (m-commerce). Recent developments in mobile computing and communication standards and technologies allow more flexible operations and real-time monitoring in a supply chain. This chapter explores and examines the current status of m-logistics in North America, Europe, and Asia (mainly China, South Korea, and Japan). The chapter focuses on global m-logistics as an essential function and key factor in efficient and effective global m-commerce. Diffusion and adoption models as well as factors influencing the diffusion and adoption of standards and technologies in m-logistics are discussed. Our comparative study shows that all of the investigated regions have begun to adopt next-generation mobile logistics standards and technologies.

INTRODUCTION

Organizations have to make the movement of raw materials, goods, and services across geographic boundaries as efficient and effective as possible. Logistics is responsible for this movement. It has a unique position in linking external suppliers and customers. Moreover, it is an essential function and key factor in global commerce. In order to enable organizations to immediately react to specific events (e.g., a traffic jam), disruptions, and exceptions logistics has to become mobile itself

(e.g., a truck driver has to be able to revise tour plans using GPS and mobile devices when unexpected events occur). M-logistics may therefore be seen as an enabler for efficient and effective m-commerce.

On the other hand, m-logistics increases the amount of m-commerce transactions. With growing international trade, the cross-country and cross-continental movement of raw materials and finished goods increases. The management and monitoring of activities in a supply chain and topics like supply chain integration become global issues. Cost reduction pressures and reduced time-to-market drive the need for real-time information about the location and status of goods and services in a supply chain. Purchasing; sourcing; tracking and tracing; and supply chain management will therefore increasingly become global activities.

Recent developments in mobile computing and communication standards (e.g., Universal Mobile Telecommunications System [UMTS] in Europe, i-mode supervised by NTT DoCoMo in Japan) and technologies ranging from automatic identification (Auto-ID) technologies (e.g., radio frequency identification [RFID]) for the automatic identification of goods, wireless sensors, localization technologies (e.g., satellite tracking systems such as GPS in North America and GPS or Galileo in Europe), on-board systems in vehicles, and mobile devices for automatically sending and receiving information about unexpected events allow more flexible operations and real-time monitoring in a supply chain.

Little research has been done to examine the potential barriers to the implementation of global m-logistics in different continents. This chapter explores and examines the current status of m-logistics in North America, Europe, and Asia (mainly China, South Korea, and Japan). The chapter focuses on global m-logistics as an essential function and key factor in efficient and effective global m-commerce.

In the second section we introduce standards and technologies enabling m-logistics. Diffusion and adoption models as well as factors influencing the diffusion and adoption of standards and technologies in m-logistics are discussed in the third section. In the fourth section we discuss the influence and interrelation of these factors based on a number of studies reviewed in this chapter. Finally, we draw some conclusions and point out some future trends in m-logistics.

STANDARDS AND TECHNOLOGIES IN NEXT GENERATION M-LOGISTICS

We define next generation m-logistics (NGML) as the application of mobile information technologies and information systems, including Auto-ID technology, GPS, wireless computing, sensor networks, and mobile devices for the communication, coordination, and management of business transactions in supply networks and for the localization and automatic identification of products and raw materials. On the one hand these technologies should enable the efficient tracking of goods through the entire supply network by the use of Auto-ID technology. On the other hand mobile access to data warehouses, scheduling and route-planning systems, and so forth has to be provided to logistics managers using data supplied by Auto-ID systems as well as organizational software (e.g., enterprise resource planning systems). The use of handheld devices alone, for instance, to monitor and plan supply networks is not NGML. In the following subsections we introduce emergent technologies for NGML.

Four technologies currently have a strong impact on NGML: (1) localization, (2) Auto-ID, (3) sensor, and (4) mobile network technologies. These technologies help answer the central question:

"Where is which object, and what is its current state?"

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