Chapter XXI
The Expansion of E–Marketplace to M–Marketplace by Integrating Mobility and Auctions in a Location–Sensitive Environment: Application in Procurement of Logistics Services

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ABSTRACT
Auctioning over Wireless Networks, constitutes an attractive emerging class for m-commerce applications and formulates a procurement negotiation tool supporting the announcement and execution of geographically focused auctions. This is feasible by using the Location-Based Services (LBS), which resulted from the unification of automatic position sensing (GPS) and wireless connectivity. The present article aims to analyse and match the properties of heterogeneous wireless networks (mobile, GPS) and to set a framework for the development of Reverse M-Auction based Marketplaces operating in a location sensitive context with application in freight services procurement. A location-sensitive, reverse, M-auction application in the freight transport market where potential suppliers (carriers) are able to place bids for Less-Than-Truckload (LTL) shipments or during empty trips while on the move aiming to gain from economies of scope, is the application examined in this chapter.
INTRODUCTION

A decade ago companies used the Internet as dot com’s to advertise their products. Later, by year 2000 many such companies used the connectivity properties of Internet to form e-Marketplaces not only supporting but also promoting business transactions over it, setting the basics for the transition to the e-economy. Recent developments in mobile communications formed a new business environment, independent of time and place, allowing the transition to m-Marketplaces or to m-economy. An e-Marketplace magnifies the market size and allows participants to apply revenue management techniques to allocate perishable items or services by retrieving proper information about market demand. Operation of enterprises in the “new economy” requires not only outsourcing activities but also the development of networks and collaborations and finally the creation of holonic enterprises where different enterprises participate in a self-motivated network, acting completed and organically and providing differentiated possibilities.

Bailey and Bakos (1997) predicted that electronic markets will rapidly increase as new public and private standards are established for information exchange and electronic commerce over the Internet. Also, during 1998, the Business Week magazine published an article entitled “Good-bye to fixed pricing?” (Cortese and Stepanek, 1998) focusing on the application of Internet in dynamic pricing via electronic auctions. An Internet-conducted auction has many properties: it breaks the limitations of time and space, has lower costs and increased overall efficiency. Typically an E-Marketplace enables the development and improvement of relationships between stakeholders, mostly those between sellers and buyers. The role of intermediaries (like store owners, wholesalers, physical infrastructure providers etc.) was critical in traditional (physical) markets. Many researchers argue that the role of intermediaries in e-Marketplaces will weaken and the value of the services they provide will decline. Examining some organizational issues of e-Marketplaces one could easily realize that this is not true yet; while some roles are diminished, new types of intermediaries, new services and of course new business opportunities will emerge. Actually, traditional forms and roles of intermediaries are transformed to new ones providing more non-physical value-added services.

Procurement via manual procedures was a time-consuming business function with complex transactions showing many errors concerning evaluation, ordering, pricing and payments. Transition to e-procurement allowed companies to speed-up the process, to eliminate errors and to support activities such as advertising tenders, electronic submission of orders, electronic ordering, sourcing via 3rd parties, electronic e-mailing, contract management, research into markets, integration between procurement, financial and inventory information systems, etc. (Hawking et al., 2004). E-Marketplaces are currently an ideal landscape for business transactions between companies and 3rd Party Logistics (3PL) service providers. The latter provide services related to the supply chain of the purchaser such as freight transport, warehousing, packaging, and provision of services like vehicle routing and fleet management, custom services and combinations of them.

Actually m-commerce is more than simply a mobile Internet or a desktop replacement. The true value of m-commerce can be realized when understanding the value of mobility in transactions between companies and/or consumers. Mobile Commerce is a continuously growing research discipline since 2000. The most recent literature review has been published by Ngai and Gunasekaran (2007). Barnes (2002) also describes and analyzes the m-commerce value chain consisting of processes related to content management and infrastructure/services. Obviously m-commerce provides business opportunities for a number of players as noticed by Buellingen and Woertinger (2004). They also state that critical success factor for m-commerce operating in the Universal Mobile Telecommunications Systems (UMTS) are the transmission rate, reliability, user friendliness and interface between user and engine.

The purpose of the present article is to propose an e-auction marketplace for freight transport services trading and to expand so as to gain advantage of spatial attributes by deploying location-sensitive information retrieval and processing technology. The proposed marketplace will support both forward and reverse auction formats where the auction initiators are the carrier and shipper respectively. The proposed business model utilize wireless positioning in a two-directional way: (a) to automatically locate current users location and select which of them may act as potential bidders and (b) to identify which LBS are important for each user according to carriers' trucks current location, direction and speed. Operationally, it is designed to support all three mobility dimensions as described by Kakihara and Sørensen (2002), namely: (i) Spatiality (Where), (ii) Temporality (When), and (iii) Contextuality (What way, circumstance (e.g. available capacity), towards which actor(s)).