



Chapter VII

Intelligent Agents for Electronic Commerce: Trends and Future Impact on Business Models and Markets

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ABSTRACT

A characteristic feature of the explosive growth in electronic commerce is the rapid innovation and adoption of new technologies, which results in the creation of new business relationships between consumers, firms, and markets. One such technology that is profoundly changing the dynamics of the electronic marketplace is 'intelligent agent' technology. Agents have the ability to autonomously carry out various activities on behalf of their principals. At a micro-economic level, agents can help buyers and sellers achieve greater efficiencies of information exchange in the electronic business-to-consumer and business-to-business domains. Additionally, they facilitate the creation of vertically integrated portals that have a significant impact on the macroeconomic landscape. Using many real-world examples, we characterize the different roles that software agents play in the various e-commerce business models and also touch upon their impact on creation of new market structures. We address price-matching versus price-comparison agents. We highlight the various purchase decision criteria evident in various vertical markets and suggest the need for a cross-industry product (and service) attribute data representation model, based on the expanded capabilities of XML. We contrast the autonomous price comparisons enabled by agents with the expanded criteria comparisons facilitated by the e-commerce rating sites. We discuss the public policy implications of these second-

generation e-commerce agents with regard to data representation standardization and consumer information privacy. We present future directions for intelligent agent functions that encompass standard representation of decision criteria such as delivery and payment options, return policies, service, quality, trust, and reputation.

ELECTRONIC COMMERCE BUSINESS MODELS

Electronic commerce is the electronic exchange (delivery or transaction) of information, goods, services, and payments over telecommunications networks, primarily the World Wide Web. E-commerce activities include the establishment and maintenance of *on-line relationships* between an organization and its suppliers, dealers, customers, strategic partners, regulators, and other agents related to (or in support of) traditional delivery channels. These activities may be business-to-consumer (“B2C” such as direct book sales to the general public by www.amazon.com), business-to-business (“B2B” such as corporate procurement or supply chain management using a secure extranet), consumer-to-consumer (“C2C” such as a public auction at www.ebay.com), or within a business (such as an employee intranet or an enterprise resource planning (ERP) system). This environment enables organizations to re-engineer their internal and external functions and activities, increasing both efficiency and effectiveness. Firms can automate existing processes and dramatically reduce cycle times throughout the supply chain. They can enhance communication, collaboration, and cooperation between knowledge teams (including virtual teams) using *intranet* technologies as well as between the organization and members of its external constituent organizations using *extranet* technologies.

As in traditional markets (“brick and mortar”), e-buyers need to find sellers of products and services; they may need expert advice prior to purchase and for service and support afterwards. There is often a tremendous amount of information that the buyer must evaluate before s/he can make any final purchase decisions. Similarly, e-sellers need to find buyers and they need to provide expert advice about their product or service. Both buyers and sellers need to automate handling of their transaction processing and “electronic financial affairs.”

Ideally, in an on-line shopping environment, buyers should be able to find the products that meet their requirements from different sources, compare the products (and the sources) using multiple selection criteria, determine the product that best meets their needs, and purchase it through a secure transaction. Sellers on the other hand, should be able to not only attract new customers by making available up-to-date information about their products and services, but also maintain their customer base by providing exciting opportunities and incentives.

Several categories of new types of businesses have evolved to take advantage of the unique opportunities within this new environment. There are a number of ways these new business models can be viewed. The following sections categorize these emerging business models.

Content, Community, and Commerce Strategies

Business models that have emerged in this era of e-commerce activity have been categorized a number of ways. Most models explicitly leverage the ubiquitous and universal availability of the World Wide Web as a platform for communication between and among organizations and individuals. Web-based e-commerce models were traditionally oriented

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