



Chapter XXI

The Evolving Future of Agent-Based Electronic Commerce

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E-commerce technologies are continually evolving, bringing about innovative developments and resultant benefits. Herein one such visionary path for existing on-line systems to adopt is presented. An emerging set of models is discussed which combines intelligent systems, mobile code applications (MCAs) and Web-based systems. Such technologies are presented to illustrate the impact upon the numerous new value-adds for users brought about by e-commerce vendors. These are discussed in context of current developments in related fields, to expose the full gains from the integrated systems synergy. Furthermore, we conclude with an expected business model for electronic commerce in the new millennium and beyond.

INTRODUCTION

The introduction of e-commerce has revolutionized the way in which business transactions are carried out, allowing them to be processed over electronic networks. This has brought about new levels of sophistication to marketing strategies. Along this path, automation and overhead cost reductions have become evident. This trend has proven beneficial for everyone, ranging from suppliers to end-user consumers, translating to overall reduction in costs, decreasing of lead times, and increasing the speed to market of new products. These many benefits and cost reductions brought about by Web-based systems have left less technologically inclined businesses with little choice but to form a presence on the Internet. Moreover, the opportunities presented by on-line systems have also impacted most areas of business, and are continuing on this trend at a phenomenal rate.

It is estimated that companies will spend \$3.8 billion on electronic commerce (e-commerce) software in 2002. This is 16 times the 1998 forecast of \$235 million, made by

Forrester Research (Taggart, 1998). The exponential growth of the Internet, together with the inevitable ongoing growth in the information technology (IT) field are two key factors for significant increase in forecasts in e-commerce growth.

The introduction of e-commerce appealed to the masses, and its popularity is predominately due to its simplicity and the significant cost reductions resulting from it (Rodrigo, 1998). However, this first generation of e-commerce has its limitations. Nevertheless, newly emerging technologies, in particular agent technologies, will profoundly change the way in which e-commerce will continue to take place in the information age. Moreover, there is the potential for intelligent agents to become the most efficient sales representatives to date.

This chapter looks briefly at the limitations of e-commerce in its present form, then proceeds to discuss the next waves: second and third-generation e-commerce technologies. Some companies are already starting to realize the potential of such implementations, however, most of the work to date is in the form of research projects, not commercial applications. This is likely to change in the not too distant future, with second-generation e-commerce becoming widely used.

Third-generation e-commerce is an inevitable occurrence, although it may be years before application of such ideas are seen. However, there is little doubt that this will be the next logical step to the evolution of e-commerce, and so the likely features of this system are also briefly presented from an implementation viewpoint. In addition, the pros and cons of such systems are briefly discussed, mainly in regards to security and privacy issues. This chapter concludes with a discussion about the use of e-commerce in this way, until now unimaginable to many and touches upon some related social and legal impacts.

FIRST-GENERATION E-COMMERCE

First-generation e-commerce systems enable many business functions to be conducted without large amounts of capital investment in buildings and other infrastructures. Presently, a successful business may be conducted with a virtual shop front (Web site), using minimal staffing and resources for key functions. In this model businesses are provided with a more level playing field in which they are each judged by the appearance of their virtual shop front and the quality of goods and services supplied. In addition, the introduction of e-commerce systems has been beneficial for consumers. Prices have been driven down due to the proliferation of streamlined businesses, leading to an increase in competition.

In addition to the huge cost reductions for businesses, first generation e-commerce systems appeal to the masses due to their extravagant use of multimedia. In hindsight, these early systems employ basic uses of multimedia. Initially most sites had several linked Web pages in which they advertised their various products and services. In some cases the less interesting Web sites had predominant textual content whereas others made significant usage of flaming logo graphics, animations and the like.

Although current Web-based marketing strategies provide relatively affordable means of mass advertising, they may not necessarily be the best way in which to generate sales. These Web-based marketing strategies are often broad, unfocused, and most often do not target the right market. Many businesses often resort to the use of spam e-mail in order to target large numbers of people, many of who often have no interest at all in the product or service being offered. At times such behaviour can also have negative effects for companies,

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