

E-commerce and its impact on operations management

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Abstract

Electronic commerce (EC) is possibly the most promising application of information technology witnessed in recent years. It is revolutionizing supply-chain management and has enormous potential for manufacturing, retail and service operations. The tremendous importance of EC has prompted us to write this paper. We have attempted to define e-commerce and examine major EC elements that link organizational systems. The application of EC in manufacturing, retailing and service operations is examined, and a framework for describing EC components and their role in different areas of an organization is proposed. Finally, we summarize our findings and conclusions. © 2002 Elsevier Science B.V. All rights reserved.

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1. Scope of E-commerce

Electronic commerce (EC) is a popular topic in the mass media and in informatics circles as well. Perhaps its impact is most visible in the areas of financial services and retailing. Many EC initiatives have risen in a short period of time. Those initiatives include innovative smart cards to facilitate EC, remote payments and electronic checking [1], online trading of stocks, bonds and related financial instruments, online banking, and online retailing (e-tailing). We are now becoming comfortable with the Internet, and we are beginning to appreciate its ability to provide a wealth of diverse information from around the globe; literally millions of sites are just a click away,

opening up new opportunities for trade and information exchange. Internet use is no longer a novelty; it is becoming as much a part of our daily lives as television and telephony. We have witnessed a true revolution with the growth of the Internet and Internet use, but now we are experiencing a second Internet revolution and it is called electronic commerce. The tools and techniques to enable trading over the Internet are becoming mature, and EC is growing very rapidly. Back in 1997 the global EC market was estimated at \$10 billion, but is predicted to rise to \$200–300 billion, by 2002 [2].

One can see evidence of EC everywhere on the World Wide Web (WWW). Many commercial web sites have catalogues and support online transactions, but EC is much more than these. It includes everything from sourcing to settlement and all the processes that underlie trading. The Internet's WWW has become the primary driver of

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contemporary EC. Although the emphasis has moved from electronic data interchange (EDI) to the Internet, the focus is still on the technology required to exchange information rather than supporting inter- and intra-organizational business processes. EC is not just about facilitating individual business transactions, it also involves the management of the relationships that lead to and arise from transactions [3].

EC is the process of conducting business electronically among various entities in order to satisfy an organizational or individual objective. A key ingredient of EC, sometimes referred to as electronic trading, is the advertisement and procurement of goods and services over the Internet [4]. The success and volume of EC on the web has been widely reported. With success in establishing an environment in which EC can grow and flourish, every computer can become a window open to every business, large and small, around the globe.

The electronic medium we call the Internet has the potential to reduce actual transaction time and processing time dramatically, while at the same time making information available globally. Internet-based EC has been embraced as a means of reducing operational cost and as a high potential means of generating revenue. The ubiquity of the web and the availability of browsers across different platforms provide a common base upon which EC applications can be built, especially in the enterprise [5]. This common platform has reduced the significance of issues pertaining to software distribution and software installation, thus encouraging the expansion of EC via Intranets, Extranets and the Internet.

EC provides new channels for the global marketing of tangible goods and presents opportunities to create new businesses providing information and other knowledge-based intangible products. Although most EC is currently at the inter-corporate and inter-organizational level, services targeted at individual customers are evolving rapidly. The Internet is the most obvious example of this and is a major catalyst in the diffusion of EC, helping to foster a common environment for electronic transactions of all kinds [6]. EC encompasses all forms of interactive business

transactions, which are facilitated by networks of computers. EC is expanding because of the greater number of businesses and individuals who are able to use these networks and the growing number of ways in which businesses can conduct transactions electronically with other organizations and directly with consumers. At present, business-to-business EC seems still to be of greater volume than business-to-consumer EC, but this may change in the future. These trends are important to the global economy and to the economy of individual countries because EC contributes to economic efficiency. EC contributes to economic efficiency in five important ways. They are as follows: (a) shrinking distances and timescale, (b) lowering distribution and transaction costs, (c) speeding product development, (d) providing more information to buyers and sellers and (e) enlarging customer choice and supplier reach [7].

The organization of this paper is as follows: Section 2 presents the details and major elements of EC. Section 3 examines the application of EC in different areas of manufacturing, retailing, and service organizations. A framework describing the impact of EC on operations is proposed in Section 4. Finally, Section 5 presents a summary of findings and conclusions.

2. Definition of and major elements of e-commerce

EC is an emerging area that encompasses processes directly and indirectly related to the buying, selling and trading of products, services and information via computer networks – including the Internet. Kalakota and Whinston [8] define EC from these four perspectives: (a) *communication perspective* – EC is the deliverer of information, products/services or payments over telephone lines, computer networks or any other electronic means, (b) *business process perspective* – EC is the application of technology towards the automation of business transactions and work flows, (c) *service perspective* – EC is a tool that addresses the desire of firms, consumers and management to cut service costs while improving the quality of goods and increasing the speed of service delivery and (d) *online perspective* – EC provides the capacity to

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