



The Process and impact of E commerce on Industrial operations management

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Abstract

Since independence, under the planned process of development, the Indian industries have been making remarkable efforts for speedy development in industrialization across the globe. A variety of purposeful policies and measures has been undertaken to promote industrial development in the world. Accordingly, the industrial sectors in India witnessed significant changes by adopting the multi dimensional strategies in their operations. E-commerce is one of the dimensional strategies. EC provides benefit to business firms while reducing transaction cost, facilitates in spreading markets geographically, and improves compatibility between parties. It is a assured application of IT brought a revolution in supply chain management which includes manufacturing, retail and service operations. The article focused on the importance of E-Commerce and an attempt have been made to define different types of e-commerce as well as explored its major elements in relation with industrial management. Besides, the process of E-Commerce components may observe in different areas of industry such as manufacturing, retailing and service operations.

Keywords: E-commerce; Supply chain management; Elements and Framework.

Introduction

E-Commerce is coupled with the buying and selling of data, services and products through computer networks. To enable digital commercial transaction this application needs the support of using internet and web. From the generic perspective, e-commerce consists to facilitate reengineering of business process, which is necessary in many establishes. It is characterized of broad goals for reengineering and e-commerce are similar with each other in reduced costs, lower product cycle times, faster customer response, and improved service quality etc. The efforts of reengineering is to use e-message technologies as a key factor of e-commerce to modernize business processes by reducing paperwork and increasing automation by combined with just-in-time(JIT) manufacturing methods, enables suppliers to deliver components directly to the factory location, resulting in minimizes inventory, warehousing costs and saves time.

The effects of e-commerce is already come in to view in all areas of business from customer service to new product design. It make possible of new types of information-based business processes for reaching and interacting with customers in such a way as online advertising and marketing, on-line order taking, on-line customer services, reducing costs in managing and interacting with more number of suppliers, trading partners and services. The companies believe that e-commerce will helps to improve their efficiency in finding, interacting and communicating with customers and trading partners, and in developing new products and markets.

Research Methodology

Qualitative approach was conducted to describe the importance and impact of e-commerce in Supply Chain Management. The analysis of the study has done with secondary data. Information pertaining to E commerce and Supply Chain management has obtained through web browsing and news papers, articles, previous research reports etc.,

Objectives of this Paper

- To analyse the interaction of Supply chain management and E-commerce
- To Explore the impact of e-commerce on SCM
- To observe the major elements of E-commerce
- To Explain the impact of E-commerce in future
- To Focus on Frame work of E-commerce.

Review of Literature

Dr. Ravi Kalakota is a pioneer in the area of e-commerce. He is the CEO of e-Business Strategies, a technology research and consulting practice, and has consulted extensively with start-ups and Fortune 1000 companies.

Andrew B. Whinston is the Cullen Chair Professor of Information Systems, Computer Science and Economics, IC2 Fellow, and Director of the Center for Information Systems Management at the University of Texas at Austin. His recent research interests are Internet pricing and application of client/server computing to support groups working collaboratively.

In their Book they focused on issues, procedures, methodologies and practices for implementation of E-commerce in basic industrial operational activities of an organizations. The book also provides research findings and practices that can help in the field of operations management. Further, I focused on how supply chains, products, processes and purchasing function can supported and enhanced by the use of E-commerce.

This updated article is presenting required knowledge of the operation management with new e-commerce technologies which are offering a bunch of challenges and opportunities for those individuals to know how they are related to e-commerce for initiating new markets and to expand numerous operations.

E-COMMERCE TYPES

There exist different transaction schemas that are categorized from different types of e-commerce. The following types are described in brief.

Business-to-business (B2B)

Business-to-business (B2B) describes commerce transactions between businesses. It allows companies to buy from and sell to each other online. It is evolved to provide supply chain management. The business use B2B application such as between a manufacturer and a wholesaler, or between a wholesaler and a retailer in order to achieve faster and error-free transactions, control and maintain inventory. For example, an automobile manufacturer makes several B2B transactions such as buying tires, glass for windshields, and rubber hoses for its vehicles.

Business-to consumer (B2C)

The volume of B2B (Business-to-Business) transactions is much higher than the volume of B2C transactions. B2C e-commerce refers to the emerging commerce model where companies and consumers interact electronically. The primary reason for this is specifically sale of the finished product to the end customer. One of the best examples of B2C is Amazon.com an online bookstore.

Business-to-government (B2G)

Business-to-government (B2G) is a derivative of B2B marketing and often referred it as "public sector marketing" which encompasses marketing products and services to various government levels - including federal, state and local - through integrated marketing communications techniques such as strategic public relations, branding, marcom, advertising, and web-based communications. B2G networks invites the businesses in the form of RFPs auction to bid on government opportunities for which the suppliers responded to Public sector organizations (PSO's) post tenders in the form of RFP's, RFI's, RFQ's, Sources Sought, etc. Pre-negotiated contractual Govt agencies examines the reliability of vendors/suppliers and their products and services to set prices.

Business-to-employee (B2E)

Business-to-employee (B2E) electronic commerce uses an intra business network which allows companies to provide products and/or services to their employees. Generally, companies use B2E networks to automate employee-related corporate processes.

Examples of B2E applications include:

- Online insurance policy management
- Corporate announcement dissemination
- Online supply requests
- Special employee offers
- Employee benefits reporting

Business-to-Manager (B2M)

Business-to-Manager or B2M is a new mode of E-business. It refers to transaction between Enterprises (product sellers or any other workers) and professional managers. B2M schema consists of finding out the information on the net and earning commission by providing services for enterprises.

Consumer-to-business (C2B)

Consumer-to-business (C2B) is a business model in which consumers create value and businesses consume that value. C2B is an e-commerce **business** model in which consumers can offer products and services to companies, and the companies pay the consumers. C2B model, also called a reverse demand collection model, enables buyers to demand their own price, which is often binding, for a specific good or service. The website collects the demand bids then offers the bids to participating sellers. For example in blogs or internet forums where A student wants to fly from London to New York, but has only \$300 in the bank to pay for this trip. He put up an ad in an internet at C2B site, seeking airlines that are willing to offer the trip for 500 or less. Internet brings a number of airlines that will be interested in for this amount.

Consumer-to-consumer (C2C)

Consumer-to-consumer (C2C) e-commerce involves the electronically facilitated transactions between consumers through some third party. A common example is the online auction, in which a consumer posts an item for sale and other consumers bid to purchase it; the third party generally charges a flat fee or commission. The sites are only intermediaries, just there to match consumers. They do not have to check quality of the products being offered.

Application of e-commerce in Supply Chain Management

The explosion in e-commerce methods and technology will impact all aspects of workflow transaction management, customization and supply chain management from the tools available to decision to the automation of processes. Companies that understand the workings and business issues of e-commerce will find ways to use them to their advantage. Essentially, supply chain management is an integrating process based on the flawless delivery of basic and customized services. Simply proposed, SCM optimizes information and product flows from the receipt of the order, to purchase of raw materials, to delivery and consumption of finished goods. SCM plays an important role in the management of processes that eludes across functional and departmental boundaries. SCM goes beyond organizational boundaries, reaching out suppliers and customers. Supply Chain Management includes the following functions:

- **Supplier Management:** Supplier management reduces the number of suppliers and makes them as their business partners for the purpose to reduce Purchase order(PO) processing cycle times.
- **Inventory Management:** The goal of this management is to reduce the order-ship-bill cycle. The inventory management solution will helps to enable the reduction of inventory levels, improve turns, and eliminate out-of-stock occurrences.

- **Distribution Management:** It aims in moving documents related to shipping. The paperwork which took days in the past can now be sent in moments and contain more accurate data which allows them to improve their resources planning.
- **Channel Management:** This Function aims at spreading the information about changing operational conditions to trading partners. In this production process it links electronically with their distributors and networks which helps in eliminating repeated telephone calls and countless labor hours.
- **Payment Management:** In this process the payments can be sent and received electronically between the company and their suppliers and distributors.
- **Financial Management:** It enables the global companies to manage their money in various foreign exchange accounts while to get an ability to deal on global basis.
- **Sales force Productivity:** SFP improves the communication and flow of information among the sales, customer and production functions. It links sales force with regional and corporate markets with a greater access to provide better qualitative customer services.

The Impact of E-commerce on Supply Chain Management

The impact of e-commerce on the supply chain management will helps to interact between company and geographic boundaries to done work efficiently. E commerce affects all major areas of supply chain management such as design, procurement, manufacturing, demand and supply, fulfillment and service support and e-working. The major areas of work inside companies can be illustrated using a simple process map of a supply chain, as shown in Fig. The process map shows the impact of e-commerce on the major areas of companies supply chain management process and high-level interaction between suppliers and customers.

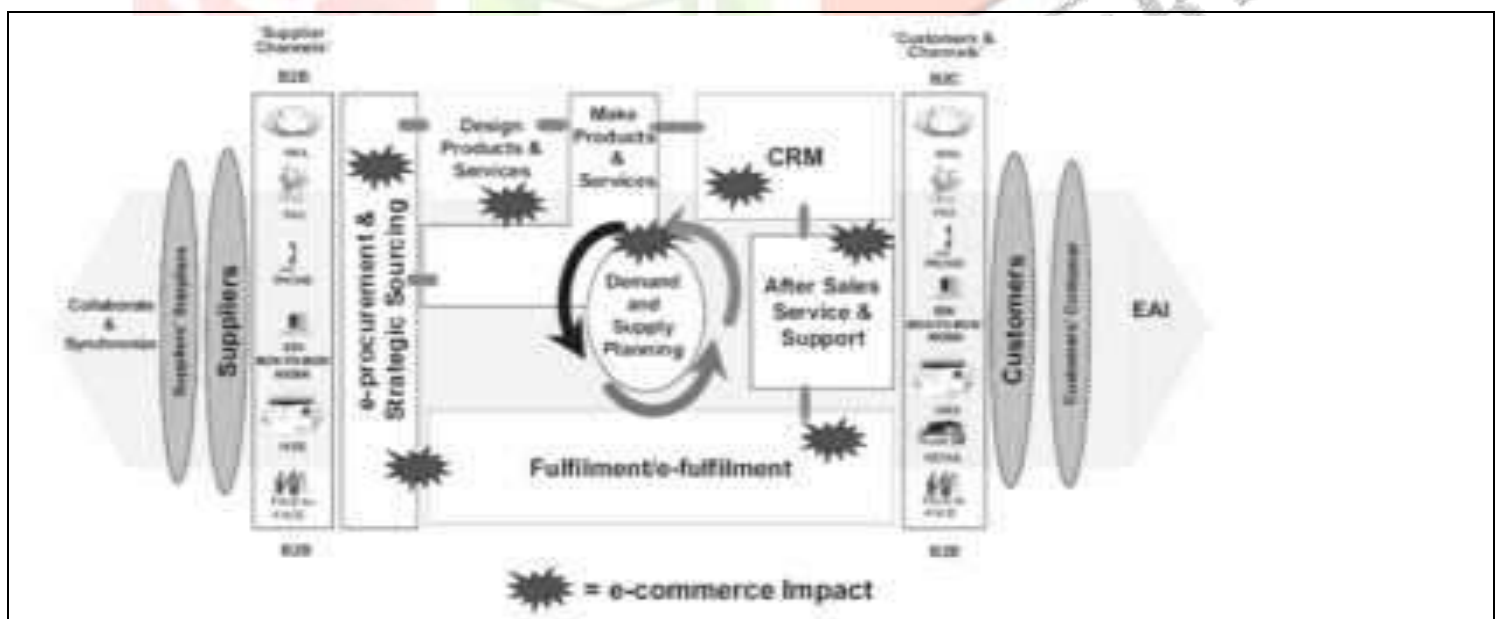


Fig. The impact of e-commerce on Supply chain management & information flows

Source: <https://www.jmest.org/wp-content/uploads/JMESTN42350058.pdf>

- **Procurement:** E-commerce has a major impact on procurement of goods and services. E-procurement has the greatest effect on direct and indirect procurement which represents change on management and

compliance. ERP and MRP are e-commerce procurement solution systems which has the capacity to provide large efficiency savings.

- **Product and service design:** E-commerce has the capacity to improve the quality of product design, reduce design time-scales and also improve the interaction between designers, engineers, suppliers and manufacturing.
- **Manufacturing:** Manufacturing area also affected by e-commerce solutions which helps to make companies more flexible and responsible of mass customization to ensure effective demand and supply strategy.
- **Demand and supply planning:** Demand and supply planning systems are increasingly using ecommerce software applications to improve the effectiveness of planning solutions. E-commerce allows greater interaction between the planning systems such as Collaborative forecasting and replenishment (CPFR) and e-marketplaces.
- **Fulfillment and e-fulfillment:** Fulfillment is a potential area underperformed of e-commerce solutions. Ecommerce has the capacity through information, such as tracking and tracing, to revolutionize the way that goods and services are delivered. It has the capacity to virtualized inventory and to change the relationship between end customers, retailers, wholesalers and manufacturers
- **Service and support:** service and support is another area where e-commerce has made some impact but there is still potential for greater change. E-commerce has the capacity to transform the effectiveness of field service forces and to change the way that returns and repairs are managed.
- **E-working:** e-working is an area that will have a more immediate impact on the supply chain. Most companies have accessed intranets and Internet, which have provided to their workers as e-working tools such as employee portals, knowledge management systems and computer-based training. Through e-mail they have revolutionized the way in which people work across boundaries of time and space. E-working capabilities have a significant impact on the working of supply chain management and on the ability of employees to manage complex events and issues in the management process.

E-commerce technology provides information visibility throughout the supply chain management. The integration of production planning, scheduling, and inventory control with procurement process makes the loop complete as illustrated in Fig. 1. Because of information visibility, suppliers could possess the information of customer demands; in the mean time customers can receive faster feedback of transaction status from their suppliers.

Such strong impact causes companies to incorporate the information visibility into their competitive advantage. E-commerce is already having a significant impact on Supply Chain Management. Adoption of e-commerce solutions has broadly increased the collaboration between companies and across countries. The broadening of e-commerce will be a gradual process, phased in over time; it will involve a lot of hard work. The benefits of supply chain management improvements will be considerable as 5 to 15 per cent of overall supply chain costs. Leading supply chain operators are likely to achieve collaboration with their key value chain partners far more speedily and effectively than their slower competitors. The benefits of cost savings and performance improvements will accrue to the companies that are the best at purveying (harnessing) ecommerce solutions.

A case study approach was conducted to describe a real practice of how Usou L.P. is part of Roper industries boosts e-commerce to enhance its supply chain management. A literature review on e-commerce and the integration of e-commerce into the supply chain management. The role of e-commerce in the supply chain management was chosen because together they are making a large impact on one another.

Del-Nat® Tires is an international Distribution, Automotive and Specialty Tires, these are sells to wholesalers and re-sellers throughout the world. They currently have over 275 customers that are actively using the powerful interactive technology which was provided by e-Commerce. Glen Tosco, IT Manager, Del-Nat® Tires has said, “We looked at e-Order but it didn’t have the ability to be customized to fit our needs or to be used as a business and information portal.”

Actually Del-Nat® needed a solution which would allow their customers to shop and place orders on-line, make enquiry about inventory levels and for company information they should have a central portal or website.

They chose the e-Commerce solutions offered by Microsoft Dynamics® GP and had identified a clear need for a fully integrated solution including e-Catalog and e-Source, due to their superior B2B e-Commerce performance. E-Source creates an on-line store and e-Catalog posts the catalog to the website, bringing products to life. The combined solution helps owners, managers, sales reps, and customers to stay connected.

The B2B solution from e-Commerce has provided Del-Nat® Tires with the tools and resources to develop their business. Del-Nat® Tires customers are able to place orders on-line, print invoices, and check inventory levels prior to placing orders. The entire system is fully integrated to Dynamics® GP. Moreover, customers can quickly access critical inventory information from a central place anytime, anywhere. Glen Tosco, IT Manager, Del-Nat® Tires said, “This has been the biggest advantage to our customers. Customers across the world can view inventory and look at expected inbound inventory. Having the right stock at the right time is critical to our industry.”

Major elements of e-commerce

E-commerce is trading by means of new application of technology which includes all aspects of trading, commercial market creation, ordering, supply chain management and the transfer of money. E-commerce is a collective title that represents a range of technologies and practices that are allowing the businesses to improve their trading relationships effectively. At the application level, the standard technologies are like telephone, fax, EDI, electronic mail, electronic funds transfer, and the Internet – more specifically the Web. Kalakota and Whinston define E-commerce from these four perspectives:

- (a) Communication perspective – E-commerce is the deliverer of information, products/services or payments over telephone lines, computer networks or any other electronic means,
- (b) Business process perspective – E-commerce is the application of technology towards the automation of business transactions and work flows,
- (c) service perspective – E-commerce 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 – E-commerce provides the capacity to buy and sell products and information on the Internet as well as other online services. It is obvious that EC can be described in many ways.

Electronic mail (e-mail)

E-mail is the message which created via tele-communication networks. The messages were exchanged through isolated computer system with network services. E-mail was one of the first uses of the Internet and is still the most popular Internet use. The term e-mail is used to interchange the text messages and attachments among individuals using the existing network file transfer services. E-mail is well established as a fast, flexible and cost-effective means of communication. It is simple to use. The E-mail system will provides the following services:

- In this system the user can compose the messages and responses.
- The recipient can transfer the message via offered network services with rapid standards.
- It enables the conversion to various terminals like printers etc.,
- The recipient can disposition the message after receipt.

A key concept in all modern E-mail system is the distinction between the message envelope and its contents. E-mail is linked to an electronic postal system wherein an addressed envelope accompanies each message sent to a mailbox. From there, the message is dispatched to a delivery network, through which it is conveyed via the message transfer service until it arrives at the recipient's mailbox. Recipients then access their mailboxes and open their mail at a time that is convenient to them. E-mail facilitates the interaction among the group of people who may communicate to accomplish their group tasks. This system has the greater control on groupware and encourages greater work related communications. A good example of such Groupware communication is Internet based – NetMeeting communication.

Electronic data interchange (EDI)

Transacting regular business via e-mail has its limitations. Beyond a certain traffic volume, EDI becomes a preferred alternative. EDI is a communication being facilitated by a technology infrastructure which permits routine information exchanges between computer based processes of business documents without human intervention. EDI can handle high volume work transactional traffic between companies. EDI is essential in industries because, manufacturers can make exchange with the huge volume of orders and records while dealing with the customers and suppliers and helps in reducing cycle and order fulfillment time and expenses of paper. EDI provides quick order responses from suppliers and automatic ordering from customers.

The primary benefit of EDI to business is a considerable reduction in transaction costs. The firms have adapted the EDI as a strategic tool to improve their ability to exchange the large volume of data such as a fast, inexpensive and safe method of sending invoices, purchase orders, customs documents, shipping notices and other frequently used business documents in a effective manner, which tends to speed up business processes and enhances the competitiveness of the companies. In e-commerce, EDI techniques are aimed at improving relationship and bringing down the boundaries to do business with trading partners. Technically described, EDI is one well-known example of structured document interchange which enables data to be exchanged in the form of document content between software applications that are working together to develop the business transactions.

Internet-based e-commerce

Effective e-commerce requires several standards of the Internet to ensure proprietary systems to interoperate their business operations by increasing the efficiency. The internet is revolutionizing e-commerce. It provides the capabilities and opportunities afforded and link the people and computers in a secure way across organizational boundaries to improve the productivity and competitiveness of participating companies, whether they are suppliers or customers. The Internet houses an on-line global marketplace that operates 24 hours a day, with millions of sellers, buyers, products and services. Internet technologies provided open standards networks to an organization e-commerce for easy to implement, quick to learn, and fast and efficient to use. These networks belong to several domains – Universities, government institutions, large private companies, and small entrepreneurial start-ups. The interconnected computers include stand-alone computers, LAN's-networks whose span is limited to one building, MAN's – networks whose span an area up to 100 square miles and WAN's – networks that cover large geographic distances.

Usually, the Internet can be differentiated based on the language spoken as protocol. In the Business internet the host computers can speak a variety of languages other than TCP/IP(Transport Control Protocol/Internet Protocol)including ISO/OSI X.25- based packet switching networks, SNA-based BITNET and other value-added networks. The Business Internet consists of on-line services, value-added networks, and other e-mail services. The Internet is a universal electronic messaging infrastructure that connects more than 154 countries.

The Internet and its capabilities also provide companies with new, more cost effective and time-efficient means for working with customers, suppliers and development partners. The Internet and WWW offer the opportunity to expand E-commerce activity in the contract cycle to enable new suppliers to service new customers electronically. The WWW enables business-to-business and business-to-consumer transactions. Tim Berners-Lee created the web protocols in 1990 that were introduced onto the Internet in 1991 using Nicola Pellow's line-model browser and the existing hypertext mark-up language (HTML). When combined with Mosaic in 1993, the web protocols brought us the World Wide Web (WWW of just the Web). The Internet, or more specifically the Web, is a key ingredient in E-commerce as we know it today. Among other things, the web provides a common platform for home pages and hence electronic storefronts, malls, auctions and more. The success of the Internet and the popularity of the Web's user friendly, graphical user interface led to the development of Intranets (intra-organizational systems) and Extranets (inter-organizational systems). Intranets and Extranets rely on Internet protocols and Web interfaces. These developments, along with the Internet, contributed to the growth of global procurement of goods and services.

Future impact of e-commerce

E-commerce will not only have an impact on the supply chain management of medium to large companies and industries. It will help to build contingency into human lives and change the way of work in our cities and communities, it will also affect the work of government at both state and national level. Internet technologies have grown out of a range of standards that are based on the need to communicate and interact openly. As such, we can expect to see day-to-day activities such as shopping, ordering, booking tickets and personal services increasingly moving online. This will have a dramatic impact in cities.

New e-commerce technologies will also emerge and have an impact, including wireless data communications such as 2.5 and 3G and radio frequency identification (RFID). This will give us the very real prospect of being able to not only track products and to transfer data using mobile communications but also the possibility of managing products and deliveries to the individual product level in real time. The amounts of data involved could be huge and will require significant enhancements to current ERP systems. Overall, we can expect a ten-year period of fundamental restructuring of the way that companies collaborate and synchronize their supply chains. The benefits of cost savings and performance improvements will accrue to the companies that are the best at harnessing e-commerce solutions.

A framework for improving the operations in an e-commerce environment

It is clear that the existed technology infrastructure will help in built up the framework of e-commerce application with various components. To better understand the integration of various infrastructure components, we must observe the analogy of e-commerce application in various business operations. To execute these applications, it is necessary to have supporting information and organizational infrastructure and system. In addition to the development of new system the key components of commercial transactions need to be examined. But the logistical issues are difficult to address in long-established transportation system. However, the E-commerce framework always rests in technical standards. A framework is an almost complete application that

users can customize or extend to address their particular needs. The framework of e-commerce will also develops Ecosystem of Internet markets because framework of e-commerce builds on application which linked via shared-services infrastructure.

Framework of E-commerce application in various Business Operations

Organizational functional areas	E-commerce applications and contributions	E-commerce tools and systems
Marketing	Product promotion, new sales channels, direct savings, reduced cycle time, customer services	B2B, Internet ordering, Website for the company
Purchasing	Ordering fund transfers, supplier selection	EDI, Internet-purchasing, EFT
Design	Customer feedback, research on customer requirements, Product design, quality function deployment, data mining and warehousing	WWW integrated CAD, Hyperlinks, 3D navigation, Internet for data and information exchange.
Production	Production Planning and control, scheduling inventory management, quality control	B2B,MRP,ERP,SP,BAAN,Peoplesoft,IBM e-com
Sales and Distribution	Internet sales, selection of distribution channels, Transportation, Scheduling third party logistics	EFT, On-line TPS, Bar-coding system, ERP, WWW integrated inventory management, Internet delivery of products and services
Human Resource Management	E-recruiting, benefit selection and management, Training and education using WWW.	E-mails, interactive websites, WWW based multimedia applications
Warehousing	Inventory management, forecasting scheduling of workforce	EDI, EFT, WWW integrated inventory management
Supplier development	Partnership, supplier development	WWW assisted supplier selection, communication using internet, research on suppliers and products with WWW and intelligent agents

Source: <https://pdfs.semanticscholar.org/8487/ae5234ec25f0c9ca15fa4c95083675612568.pdf>

The above table is the framework to understand the potential of e-commerce that how it might supports the organizational functional activities with suitable tools and systems which are applied in various business operating areas.

Conclusion of this Paper

I observed that e-commerce as the integration of network infrastructure for data management and security services to allow business applications within different organizations to interchange information with the context of business processes automatically. E-commerce applications are being built on a foundation of global hypertext system such as World Wide Web (WWW) network technology to provide an information representation scheme.

The emerging electronic marketplace is expected to support all business operations of manufacturers, retailers and service providers. E-commerce infrastructure empowers the businesses to take an advantage of new technological opportunities to reap the benefits. The Organizations should understand the significance of e-commerce components in their business operations to face rapid changes and to create eco-system internet markets. E-commerce is one of the strategic tools used in achieving competitiveness of business world. The Businesses must develop their business models in to e-commerce application which plays an important role to provide services in a better manner and to get success in future. A central theme of this chapter is that organizations are generally underestimating the impact that e-commerce will have on supply chains and over estimating how quickly change will happen.

This period is likely to be characterized by two developments. First, companies will focus on getting the basics right and rolling out existing solutions, such as ERP, e-procurement, e-order management, and demand and supply planning, across organizations. Second, there will be a period of limited experimentation around new solutions, such as e-fulfillment, tracking and tracing, collaborative design, and between supply chain partners. Some companies, for instance, could experiment with one-to-one collaboration between trusted partners.

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