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E-Commerce Strategy

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With 78 figures

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Preface

Changes have taken place in the traditional business strategic environment resulting from the development of e-commerce. Any country, industry or enterprise can survive in the new environment and continue to make progress only if it is able to make full use of opportunities brought about by e-commerce and actively carry out strategic transformation. To prepare for making a scientific e-commerce strategy, we should thoroughly understand the meaning, contents, research methods of e-commerce strategy first.

The book takes the lead in that e-commerce strategic analysis and comparisons are made at three levels of economic entities: nation, industry and enterprise. It builds awareness and sharpens readers' analytical understanding of the key issues about e-commerce strategies. To link the theory of e-commerce strategy and practice in the real world, it brings together theoretical perspectives based on academic research and a large number of cases, especially those of China. Proposing a forward-looking guiding ideology to researchers and constructors, it focuses on Chinese markets and features of e-commerce strategies for Chinese economic entities at each level. Graduates and undergraduates of e-commerce and computer science, government officials, entrepreneurs and managers will all get benefits from this book.

Both theory and practice are involved hierarchically and comprehensively in this book, which means that readers have the chance to see how the basic e-commerce strategies are varied and applied to the national, industrial and enterprise levels respectively, especially in those organizations with Chinese characteristics. What's more, lots of current situations, e-commerce strategies in use in specific environments and the latest planning and policies of the Chinese government will be discussed in the book.

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E-Commerce and E-Commerce Strategy

Located at the summit of e-commerce, e-commerce strategy plays a critical role in the developing process. In this chapter, we briefly introduce e-commerce and e-commerce strategy. We first introduce the fundamentals of e-commerce, including the definition of e-commerce, its origin and development, and what it studies. Then we introduce the concepts of strategy and strategic environment, and the relations between them. Finally, we discuss what e-commerce strategy is and how to research it.

1.1   Fundamentals of E-Commerce

Although e-commerce is a brand new concept whose history is only fifteen years old, it was one of the most significant scientific achievements in the 20th century. E-commerce has resulted in a revolution in the distribution system. It breaks through limits of time and space, alters trade patterns, improves the circulation of merchandize, capital and information, and makes enterprises more competitive by effectively reducing the cost of production. In short, e-commerce has enabled traditional business to achieve greater, faster, better and more economic results. The impact of e-commerce will go far beyond business. It will have a profound impact on every aspect of human society, such as production and employment, the functioning of government, the use of talent, law systems, education etc. It will permeate into any profile you can image: industries, logistics, finance, media, governments, enterprises, research organizations and even traditional agriculture. All these sectors will be deeply affected by e-commerce. As e-commerce develops, it will gradually affect all aspects of human life. A new economic revolution based on digitalization and the Internet has been coming. It is hardly too much to say that e-commerce is the most significant industrial revolution since the first industrial revolution, and its impact will exceed in importance what has gone before. This is because e-commerce not only can greatly raise productivity, improve the efficiency of economic operations, lower economic operating costs and make possible things that were impossible before, but also can affect people's

life styles, change their world outlook and methodologies. In the new century it will, to a large extent, depend on our participation in the third revolution as to whether we can narrow the economic gap between China and developed countries such as in Europe, North America etc., then gradually catch up with them and finally pass them. Therefore, it is inevitable that we will develop e-commerce, to join the world market, to participate in globalization and rejuvenate China.

Since e-commerce is a brand new science, it is not surprising that there are various definitions for it, none of which are well accepted. From another point of view this is not bad news and a prematurely uniform definition of e-commerce may slow down its development. This section introduces some basic knowledge regarding e-commerce, including some definitions of e-commerce, its origin and development. Throughout this section readers can acquire a fundamental understanding of e-commerce.

1.1.1 Definition of E-Commerce

In order to help readers fully understand e-commerce, which does not have a well accepted definition, we introduce some definitions given by some important international organizations, governments, multinational corporations that play a leading role in international economic activities, and some famous academic associations that play an important part in international economic research.

Here is the definition of the Organization for Economic Cooperation and Development (OECD): E-commerce is an electronic transaction which is the sale or purchase of goods or services between businesses, households, individuals, governments and other public or private organizations, conducted over computer mediated networks.

Here is the definition of the International Organization for Standardization (ISO): E-commerce is the general term for the exchange of information and requirements between companies, or between companies and their customers.

The United Nations Commission on International Trade Law (UNCITRAL) sees e-commerce as a function that adopts Electronic Data Interchange (EDI) and other communication modes to improve international trade.

The Global Information Infrastructure Commission (GII) defines e-commerce as economic activities that are enabled by electrical communication technologies, by which people can publicize, purchase and make settlement for products and services with economic value.

The International Chamber of Commerce (ICC) considers that e-commerce is to digitalize all phases of trading activities in the entire trade process.

A broader definition is given by the U.S. government: 'E-commerce is a collection of all business activities through the Internet, including advertisements, transactions, payment and services etc., and global e-commerce will involve countries around the world. As the first economic power, any action of America is paid high attention to, and many standards of the U.S. are accepted by the ISO and IEEE.

Some important multinationals present their definitions of e-commerce respectively as follows:

IBM: E-commerce = information technology + web + business;

Intel: E-commerce = electronic market + electronic trade + electronic service;

HP: E-commerce is to accomplish commercial business by electronic means.

Summarizing all the above definitions, we can say that e-commerce is the process by which people use electronic means to do business or to do other economic activities. It is the process whereby traditional trade is carried out by electronic methods. The electronic methods refer to electronic technologies, tools, equipment and systems, including telephone, telegram, television, facsimile, e-mail, electronic data interchange, computer, the communication network, credit card, electronic money and the Internet etc. Commercial activities comprise inquiry, offer, negotiation, contract signing, contract fulfillment and payment. In a narrow sense, e-commerce refers to various online commercial activities focusing on commodity exchanges by electronic methods, by computer networks in particular, between companies, factories, enterprises, industrial undertakings and consumers. In a broader sense, electronic business (e-business) refers to carrying out the business of every walk of life (including by governments, enterprises and institutional units) by means of electronic technology. In addition, the terms "e-commerce" and "e-business" are often used interchangeably. In this book, the term e-commerce is used in the narrow sense, but the connotation of e-commerce will be extended properly in the following chapter. For example, business process optimization will be mentioned when referring to e-commerce strategy in enterprises.

1.1.1.1   Components of E-Commerce

Components of e-commerce are illustrated in Fig. 1.1, which include:

● Networks: These include the Internet, Intranet and Extranet. The Internet is the foundation of e-commerce and the carrier of commercial business information. The Intranet is the platform on which enterprises carry out their internal affairs, and the Extranet is the link between enterprises and users to carry out commercial activities.

● E-commerce customer: It includes personal consumers and business consumers. The business consumers construct the Intranet, Extranet and MIS to scientifically manage their staff, wealth, goods, production, supply and sales. Personal consumers get access to information and purchase goods by connecting the Internet with browsers, set-top boxes, PDAs (Personal Digital Assistance), Visual TV, etc.
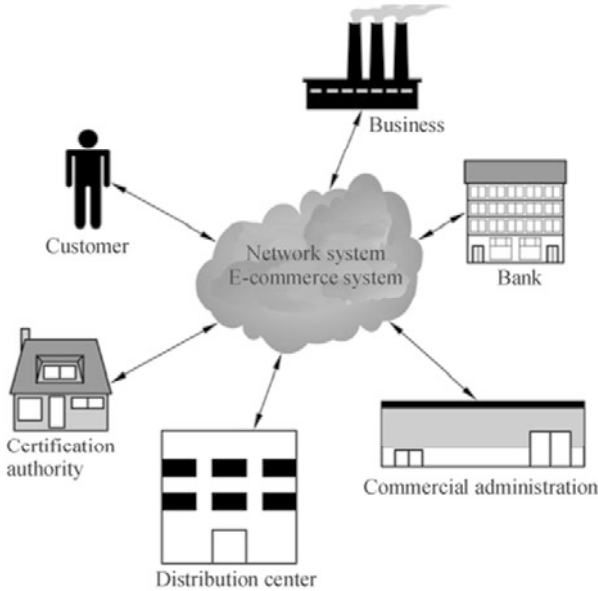
Fig. 1.1   Components of e-commerce

● Certification Authority: The Certification Authority (CA) is an authority recognized by law to be responsible for issuing and managing digital certificates, to facilitate parties involved in online sales to identify each other.

● Distribution Center: It is in charge of sending goods that cannot be delivered on line to consumers and keeping track of goods flow.

● E-bank: It realizes traditional banking business like settlement, and provides both sellers and buyers with real-time services 24 hours per day.

● Commercial Administration: It mainly consists of commercial management departments, tax departments, customs, foreign trade and economic management departments etc.

1.1.1.2   Benefit of E-Commerce

In general, the benefit of e-commerce is mainly reflected in the following three aspects.

● *Making traditional business activities better, more efficient and more economical*

Ever since the distribution of commodities emerged, business activities have been in existence. Before the invention of electronic technology, business had existed and developed for thousands of years. It's true that business activity can be carried out without electronic technology. However, with these technologies, business activity will become better, more efficient and more convenient. This can be reflected in the following areas: (1) Better management information.

Management can deal better and faster with sales data reporting and analysis. Progress in this area may lead to more efficient production, inventory and distribution, marketing and sales, better financial planning and more effective R&D and product development. (2) Better integration of suppliers and vendors. This action gives companies a better understanding of the business needs and encourages a higher quality of product and service delivery. The process can be more efficient, accelerate the interactions, and lead to a faster market response capability. (3) Better channel partnership. The benefit is enhanced by having the right products available at the right time and price, and knowing how to sell them most effectively. E-commerce processes allow companies to provide faster information about product availability, changes in the product, pricing and the company's promotional policy. (4) Lower transaction costs. Internet-based transactions systems cost much less in the long run because they reduce the need for a large organizational system. (5) Better market understanding. E-commerce transactions can automatically extract information about customers and their buying behavior. The data is captured along with the transaction, thereby creating a new mechanism for predicting market trends or targeting repeated or related sales. Loyal customers can receive loyalty discounts.

● *Breaking through the constraints of time and space*

Traditional business activities are mainly done through face-to-face negotiations. But how can we do it if the buyer and the seller are separated? In addition, people cannot work for 24 hours per day without rest, which made traditional business activities strictly limited. However, e-commerce based on the Internet can be accessed from any place, at any time. People can make business negotiations freely, no matter how far they are, how many time zones separate them, and whether there is a fax or a telephone. Thus, it eliminates barriers and allows businesses to sell and deliver products and services across the world. It is especially beneficial to small businesses in extending their reach far beyond traditional boundaries.

● *Creating some new business and making impossible things become possible*

There was no information search industry in traditional business. Although some service personnel existed who provided similar services individually, this could not develop into an industry because of the limited market. Moreover, in traditional ways of doing business, people in China cannot trade with people in the United States as they do in a bazaar. Chinese citizens cannot enjoy legal advice and financial services from American lawyers and banks; Chinese researchers cannot check whether there is a book that they are interested in, in a library in America; people cannot receive a university education from the United States if they are not in the USA. However, with e-commerce technologies all of these are feasible. People can achieve these things anytime and anywhere. Now information search has become an essential network service, and has created an important industry-search service; online C2C transactions have been thriving.

1.1.2   Origin and Development of E-Commerce

People have engaged in commerce with each other for a long time. In order to improve commerce efficiency, people have continually developed many tools and technologies such as the steam engine and telephone. These technologies would change the way in which people conducted commerce activities including buying, selling and production. With the development of the Internet, it also changed many aspects of business activities as other technologies do. Before the Internet, most traditional businesses were based on manual processing. However, as information needed to be processed and exchanges increased sharply, the process became more and more complex. It not only brought about much more repetitious work and additional costs, it made manual processing overwhelming and also decreased the accuracy rate as well as the quality of information processing. In such settings, we urgently needed a more convenient and rapid way to communicate and to handle business transactions. Continuous perfection and extensive application of information technologies led to the emergence and development of EDI and the Internet. Meanwhile the EDI and the Internet provided a new efficient way for enterprises to sell, buy and promote their products and services with low cost. Enterprises could make use of computers to gather, store and analyze important business data and transfer the data on the Internet. All the processes could be automatically achieved on the Internet and computers without artificial interference. As more and more enterprises and people realized the advantages that the Internet had brought, more and more people adopted information technology to improve the efficiency and the global society entered a new era of information automation, which made the development of e-commerce possible.

The origin and development of e-commerce is illustrated in Fig. 1.2. It has gone through three phases.
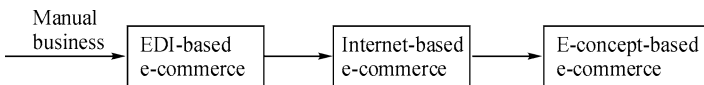
Fig. 1.2   The development of e-commerce

● *Phase One: E-commerce based on EDI (Electronic Data Interchange)*

Loosely speaking, business activities using telegraph, telephone, telex and fax were the forerunners of e-commerce, and they were a low-level form of e-commerce. In this sense, e-commerce had been around for more than 100 years. Meanwhile, banks had been using electronic funds transfers (EFTs) to exchange information of accounts over private communications networks for more than thirty years. But we just said e-commerce was a new subject, so why? Actually, people regard EDI, originating in the 1960s, as a rudimentary kind of e-commerce. By the late 1980s, electronic data interchange in developed countries had grown on a large scale.

EDI is a kind of method for transmitting the business document in a standard format from one computer to another. In the 1960s, businesses realized that most

business documents such as invoices, orders and bills were about shipping of goods. Although different enterprises had different document forms, information recorded in these documents was almost the same, including item numbers, descriptions and prices. Meanwhile, documents would be used repeatedly in similar transactions. It would take a lot of time and labor for enterprises to enter similar data into computers and print paper forms. So people began to create a set of standard documents to record important data and transfer the information electronically. As a result EDI, called "paperless trade" or "bargaining without paper", came out, which greatly reduced paper notes and avoided printing costs. As EDI developed, more and more enterprises adopted EDI to improve purchasing processes and the relationship with suppliers and customers. General Electric, Sears and Wal-Mart were the pioneers to use EDI. Since the Internet did not exist at that time, all enterprises were connected with each other by a Value-Added Network (VAN). A VAN referred to an independent network to connect enterprises with each other and transfer data in a secure way. But VAN charged a lot, including a fixed monthly fee and a per-transaction charge for implementing EDI, such as buying expensive computer hardware and software. So EDI was only suitable for large-scale transnational corporations rather than medium- and small-sized ones.

● *Phase Two: E-commerce based on the Internet*

EDI enjoyed advantages and tremendous strength in enormously decreasing labor intensity, mistakes and the cost of preparing and handling documents on the one hand, and in improving efficiency to a large extent on the other hand. Therefore, it speeded up the development of international trade. However, the high cost of VAN and EDI communication systems hindered the expansion of e-commerce based on EDI. As an advanced technology meeting the needs of business development, enterprises had to comply with uniform data standards. All of this made EDI only suitable for B2B (Business to Business) instead of B2C (Business to Customer). Furthermore, the network at that time was not fully developed, which forced a lot of e-business activities to make a tentative plan. As the information sharing demand of large-scaled transnational corporations increased, and the thirst for advanced technology grew in many minor enterprises, the establishment of a new electronic information exchange system which could realize low-cost information sharing was on the agenda.

In the early 1990s, as soon as the United States abolished the ban on the commercial use of the Internet, business activities excluded from the Internet formally stepped into the kingdom of the Internet and made e-commerce a big hit, which gave impetus to the rapid development of the Internet. Many industry experts believed the Internet would replace EDI as a cheap way of communication and transmitting. As EDI had been well used in large enterprises in all aspects of sales, purchasing and accounting, enterprises that had operated EDI gradually moved EDI to the Internet. Meanwhile small enterprises tried to participate in EDI as an inexpensive communication medium. On account of its low cost, EDI and the Internet were gradually adopted by all the businesses. We called this period, from the birth of EDI to the mid 1990s, as the embryonic stage of e-commerce.

The period after 1995 is known as Internet-based e-commerce. It was divided

into the germination stage, innovation stage and mature stage.

The period between 1995 and 1997 is called the germination stage. In this stage, the Internet was only used to publish and search product information, but was not used for on-line transactions. Most enterprises were unable to attract venture capital and new e-commerce services were also rare. In 1995, IBM put forward the concept of e-commerce (although there was no conclusion, people tended to think that the concept of e-commerce was first proposed by IBM). During the germination period e-commerce mainly meant that people could surf the Internet, browse for information, send and receive e-mails, voice chat online and so on. Most of the traditional enterprises just used the Internet as a way to provide their customers with related information. At the same time, some other enterprises discovered the Internet's potential for exchanging business information and began to explore its application to business activities.

The period between 1997 and 2000 was the innovation stage. In this period, e-commerce had been applied to the process of business activities. Online transactions began and people had visual experience of the advantages e-commerce brought. More than 12,000 Internet-related businesses started. Meanwhile, investors continually invested a great deal of money in e-commerce because they felt optimistic about e-commerce and did not want to miss the precious opportunity. A great amount of venture capital flowed into the e-commerce field, which further promoted the development of e-commerce. At this time, customers could make use of e-commerce to look up related information, look up bank accounts and pay online. A large number of new e-commerce services also emerged, such as online bookstores, web conferences, online-banks etc. These new e-commerce services had brought in new business models like the Amazon online bookstore and Yahoo search engine. Meanwhile, e-commerce brought great changes in the business process. As far as the transaction, consumers could find and buy what they wanted without going to stores. Sellers had new channels to sell products, which would result in much more revenue. In addition, e-commerce brought new innovation in the promotion. Network marketing became possible. Enterprises could promote their products on the Internet besides advertisements on TV and in the street. During three or four years, Internet-based business had given birth to scores of billionaires and world-renowned enterprises, especially like Amazon, which was historically unprecedented. From a little-known shop to a world-renowned enterprise in such a short time, Amazon's operating principle was regarded as the bible for network operation. At the same time, traditional enterprises such as General Motors Corp. and Dell Computer began to set foot in e-commerce one after another when they gradually found its enormous potential in improving labor productivity and reducing costs.

However, the development of e-commerce at this stage was immature. Because all the enterprises did not want to miss the money-making opportunity, a great number of ideas related to e-commerce were proposed and funded. As a result, many good ideas did not get proper implementation while a lot of bad ideas were greatly funded. In fact, due to the huge demonstration effect of Amazon, many enterprises established their network companies to attract venture capital without clear business strategies, products and service, which eventually led to the

failure of the investment. Defects in the development of e-commerce emerged in 2000 and finally depressed e-commerce. The dot-com bubble burst. The NASDAQ index began to adjust in early April 2000, and then fell constantly from its peak of 5000 points. As another typical representative, the price of Amazon stock fell sharply to its lowest level since 1998 on July 27th 2000, which dragged Amazon off the "altar". A domino effect caused by the slump in Amazon stocks later led to the fall in all stocks related to computer networks and the e-commerce concept, which made the NASDAQ index fell continuously until it was below 1000 points. After that, risk investors were no longer wild about the concept of e-commerce, but began to pay attention to the profitability of enterprises. Numbers of e-commerce enterprises went bankrupt. The market returned to rationality. But this never meant an end to e-commerce. People began to evaluate e-commerce enterprises objectively, based on profits.

Through rational thinking and adjustment, e-commerce met its real spring in 2004. Good e-commerce ideas with clear and feasible business models remained as the dot-com bubble burst and have achieved great development in the past few years. Meanwhile, more and more people had access to the Internet, which made online transactions on a large scale become possible. Many e-commerce enterprises began to make profits and venture capital became interested in e-commerce again. Enterprises had already invested a great deal of capital in e-commerce and could not cover the cost by abandoning e-commerce. In addition, enterprises had great power and capital to operate e-commerce. So most enterprises were still committed themselves to developing B2B. As a result, B2B sales online increased steadily, and E-commerce entered a new fast development stage. The period after Google's initial public offering was the mature stage of e-commerce.

Four stages of e-commerce based on the Internet are illustrated in Fig. 1.3.
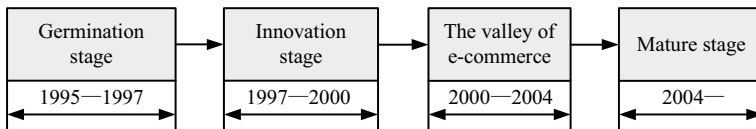
Fig. 1.3   Stages of e-commerce based on the Internet

● *Phase Three: E-concept e-commerce*

Since early 2000, people's understanding has developed from e-commerce to a higher e-concept stage. E-commerce is in fact the combination of information technology and commercial applications. Apart from business, electronic information technology can be applied in many other fields such as medicine, education, military applications and so on to form the e-concept in these fields. For instance, electronic education is the combination of electronic information technology and education; electronic medical treatment is the combination of technology and treatment; electronic administration is the combination of information technology and administration; electronic military command is the

combination of information technology and command; and online banking is the combination of information technology and finance. Various patterns of e-commerce such as E-B, E-C, E-G etc. have come into being by applying the e-concept. With the development of electronic information technology and increasing need from society, more and more e-concepts will emerge and the genuine 'E-Time' is coming. In fact the e-concept is entirely consistent with e-business.

A big change in this phase was the advanced development of broadband technology. Instead of dial-up modems, consumers could connect to the Internet by broadband which was faster. With fast speed, broadband made it possible for people to watch videos and pictures. Therefore people could get a vivid understanding of products which would help them make decisions. On the other side, enterprises could present their own products in splendid forms to persuade consumers to buy their own products. In addition, the fast speed of broadband made online transactions more convenient and people could make a deal in a short time.

Besides broadband technology, other technologies also had a great impact on e-commerce. Before, enterprises used bar codes and scanners to track inventories, and used email, fax and EDI to transfer data. But these platforms did not integrate with each other. As RFID technology appeared, it allowed enterprises to integrate all the business processes together. Enterprises would track inventories and products by scanners, communicate with each other and share transaction, inventory, logistics and customer demand information. Mobile technology also brought e-commerce into a new era. People could make a deal on the smart phone as well as on the Internet, which largely expanded the business scale of e-commerce. It also brought in a new business model of mobile e-commerce (m-commerce). Enterprises moved most transaction processes onto mobile phones including promotion, communication, selling and payment. At this time, Apple innovated a new business model called App Store. Apple opened all the APIs of iPhone, iPad and iTunes so that people could develop applications and software with APIs. Then developers could sell applications to earn money and Apple would share 30% of the total revenue. Meanwhile, categories of e-commerce products had been further expanded to music, video, electronic books and other digital products.

Moreover, e-commerce was almost dominated by the U.S. before. Now many other countries have done business on the Internet when they realized the advantages e-commerce had brought to the U.S. economy. E-commerce has become international and people could purchase across borders. Online advertising has also become one kind of key revenue for e-commerce business. Companies like Google put forward ways of delivering specific advertisements to the Internet users who were most likely to be interested in the products or services offered by those advertisements.

In the development process of e-commerce there are several major events of symbolic significance:

(1) The Internet became open to the public

The Internet originated from the American ARPAnet in the 1960s that was a

computer network for military purposes. In 1983, the TCP/IP protocol became the standard communication protocol of ARPAnet, thence the era of the Internet began in the real sense. But before the 1990s, the computer network was mainly used in military, scientific and education departments. In 1991, the US government announced it would open the Internet to the public, allowing the development of online business application systems. After that electronic information technology came to be used for commercial applications. Such kinds of application not only promoted the rapid development of the Internet, but also resulted in e-commerce.

(2) The concept of electronic commerce

In 1995, IBM put forward the concept of e-commerce which immediately gained worldwide attention and a wide response. With the active promotion of IBM, a wave of research and application of e-commerce occurred around the world. Many academics carried out academic research of e-commerce while enterprises concentrated on applications. Famous IT companies worldwide offered e-commerce solutions one after another. Many governments introduced policies to support and encourage domestic enterprises to develop e-commerce, and introduced e-commerce development strategy, such as e-Japan and the Cyberport plan by the government of Hong Kong in China.

(3) The emergence of the eBay auction model

eBay presented an Auction model in 1997 and the auction model was pursued by people around the world. In eBay's auction model, any items including services and virtual goods can be sold on eBay, as long as items are not against the law or on eBay's prohibition list. Meanwhile, eBay earns profits by charging a publishing fee for each auction and a transaction fee for each deal. Millions of items such as furniture, computers and vehicles are published and sold on eBay every day. It can be said with certainty that eBay has revolutionized the previous small-scale flea markets and created a nonstop market by putting buyers and sellers together. Now eBay is the world's largest online trading platform and has hundreds of millions of registered users.

(4) The OECD ministerial conference on electronic commerce

To promote global e-commerce strategy, the OECD held a ministerial meeting on electronic commerce during October 7-9 1998, in Ottawa, Ontario, Canada. Two major substantive documents, the 60-page "Documentation for Participants", and the 65-page "A Global Action Plan for Electronic Commerce prepared by Business with Recommendations for Government" were handed out. In them, the Business "Global Action Plan" was an important step in achieving global e-commerce joint action. As a milestone of e-commerce, this meeting made systemic but not comprehensive theoretical preparations for global e-commerce. It was just after this meeting that both the publishing industry and the IT sector began to hype the concept of e-commerce. On the other side, a series of e-commerce solutions provided by IBM, HP, MICROSOFT and ORACLE made necessary preparation for the application of e-commerce.

(5) The success of Amazon and the fall of the NASDAQ

As a book-selling website, Amazon's development gave a big surprise to traditional businesses. It took only four years for Amazon to grow into a huge enterprise with a value of 300 million U.S. dollars in 1999 from a small bookstore

website. The enormous success of the Amazon online bookstore set off a wave of worldwide e-commerce. All IT giants and multinationals began to develop e-commerce and created a succession of e-commerce myths. However, enterprises just saw the huge opportunity e-commerce without carefully analyzing the risk and business models. Bad ideas and good ideas about e-commerce mixed together and were all blindly pursued by capital. As a result, the e-commerce bubble burst. The NASDAQ index fell with Amazon as a typical representative. Venture capital withdrew from network enterprises so quickly that a lot of network companies declared bankruptcy and disappeared at that time. Network enterprises had to face a long severe winter.

(6) Google's success

The decline in the NASDAQ and disfavor of network enterprises brought a "great depression" to e-commerce. However, a new e-commerce star named Google, founded in 1998, ignited social enthusiasm for e-commerce again. Google as a search engine presented a new profit model, earning revenues by clicking web pages and posting relevant advertisements on web pages. Google can charge fees each time consumers click the web page. Google has totally changed our understanding of the Internet and inevitably brought a peak to the development of e-commerce. When Google first published its stock, its stock price rose to $85.

(7) The birth of YouTube

YouTube, founded in February 2005, is a U.S. Internet website which allows users to download, watch and share video clips. Now YouTube has been the most successful, the most powerful and the most influential online video service provider. It has created a number of Internet celebrities and inspired people's online creation enthusiasm. In May 2010, YouTube was serving more than two billion videos a day. It can be said that YouTube has led to a network revolution, transferring netizens into information providers.

(8) The App Store wave

The first App Store was launched by Apple for its product of iTunes in July, 2008. It provides a sharing mechanism between developers and Apple to earn revenues from selling developed applications to consumers. In App Store's business model, Apple only played the role of a software sales platform. Because Apple opened APIs of Apple's products including iPhone, iPad and iTunes, developers could develop any applications and software they thought consumers would need, which further satisfied consumers' individual requirements. This kind of business model has quickly obtained a high degree of recognition from society. There were over 350,000 applications available in the App Store with accumulative total download of over 10 billion on January 22, 2011. After the success of App Store, many enterprises began to copy this kind of business model and launched their own application stores including Nokia, Samsung, Google, Microsoft and Taobao. It can be said that the App Store of Apple brought a new innovative e-commerce business model.

Major events that had an important influence on e-commerce development are shown in Table 1.1.

Table 1.1   Major events in the process of e-commerce development

Year	Major events
1960	The Internet and EDI came out
1991	The Internet was open to business
1995	E-commerce was first proposed by IBM
1997	An Internet boom was triggered by eBay
1998	OECD hosted the Symposium on E-commerce in August, Canada
1999	The success of Amazon brought a global e-commerce boom
2000	The NASDQ index fell and the Internet bubble burst in July
2004	The list of Google ignited passion for E-commerce again
2005	YouTube transferred netizens into information providers, leading to a new Internet revolution
2008	Apple opened its APIs and brought in the new business model of the App Store

For Chinese e-commerce, an essential event was that the *Electronic Signature Law* was issued and implemented. On August 24, 2004, the *Electronic Signature Law* was formally approved by the Standing Committee of the National People's Congress, which came into force on April 1, 2005. It was a milestone in the development of Chinese e-commerce, which resolved the most urgent legal problems for e-commerce activities conducted in China, made e-commerce legally protected, and thus indicated that China had entered a genuine era of e-commerce. Although it was only a part of the e-commerce legal system, it was the most important and pressing part. Its implementation showed that China had stepped into the electronic society.

In the process of e-commerce development, the legislation is especially important. The core of e-commerce legislation focuses on the electronic signature, electronic contract and legal effect of electronic records. Since Utah State, USA, promulgated its "*Utah Digital Signature Act*" in 1995, dozens of countries and regions promulgated relevant legislation, such as "*The United Nations Commission on International Trade Law Model Law on Electronic Commerce*" in 1996, the "*Uniform Rule on Electronic Signature*" in 2000, the EU's "*Directive 2003/54/EC of the European Parliament and of the Council of 26 June 2003 Concerning Common Rules for the Internal Market in Electricity and Repealing Directive 96/92/EC*" and "*Directive 1999/93/EC of the European Parliament and of the Council of 13 December 1999 on a Community Framework for Electronic Signatures*", Germany's "*Information and Communications Services Act*" in 1997, Russia's "*Federal Act No. 24-FZ of the Russian Federation on Information, Informatization and Protection of Information*" in 1995, the "*Singapore Electronic Transactions Act*" in 1998, "*The Electronic Signatures in Global and National Commerce Act*", USA, in 2000, etc.

These laws have greatly promoted the development of e-commerce. For example, global e-commerce before and after 2000 was largely attributed to two laws. One was "*The United Nations Commission on International Trade Law Model Law on Electronic Commerce*" released in 1996 which laid the foundation

of global e-commerce. The other was the "*Framework for Global Commerce*" released in 1997, which was directly related to key problems of e-commerce development such as the customs, electronic payment, security, privacy, infrastructure and intellectual property protection, thus creating a good legal and policy environment for e-commerce in the US. Nowadays, the e-commerce legislation of each country has been gradually perfected. Meanwhile, e-commerce legislation gradually became international as e-commerce breaks through national boundaries. An international legal system will be formed in the near future.

Major important legislation in the process of e-commerce development is shown in Fig. 1.4.

"*Utah Digital Signature Act*" in 1995 ⟹ "*The United Nations Commission on International Trade Law Model Law on Electronic Commerce*" in 1996 ⟹ "*Directive 1999/93/EC of the European Parliament and of the Council of 13 December 1999 on a Community Framework for Electronic Signatures*" ⟹ "*Uniform Rule on Electronic Signature*" on June 20, 2000 ⟹ "*The United Nations Commission on International Trade Law Model Law on Electronic Signatures*" on Jan. 24, 2002

Fig. 1.4   Major important legislation during the e-commerce development process

We briefly introduce e-commerce in China as follows.

Though computers have been widely used in China over the past 50 years, e-commerce only has a history of 10 years. On September 20, 1987, China's first e-mail across the Great Wall opened a prelude to China's use of the Internet.

E-commerce in China can be divided into five phases:

Phrase 1: E-commerce based on EDI (1990-1993)
- Since 1990, the State Planning Committee, and the State Science and Technology Commission have put the application of EDI onto the list of the Key Technologies R&D Programme.
- In September, 1991, the Coordination Group of EDI Application and Promotion was established.
- In October, 1991, the China Electronic Data Interchange (EDIFACT) Committee was established and became a member of Asia EDIFACT Board.

Result: EDI has been widely used in sectors such as trade, communications, banking, etc.

Phrase 2: "Three Golden Projects" carried out by governments (1993-1997)
- In 1993 the State Economic Informationization Joint Meeting was initiated to lead the construction of a national network of public economic information. The "Three Golden Projects" (Golden Customs, Golden Card and Golden Bridge) were carried out.
- The "Beijing e-commerce International Forum" was hosted by the People's Bank of China, Ministry of Machine Building and Electronics Industry (MMBEI) and Global Information Infrastructure Committee (GIIC) in Beijing in May, 1994.

- The "Asia-Pacific E-Commerce Symposium" was held in Beijing in Oct. 1994.
- In 1995, the Internet in China became commercialized and the number of network companies began to increase.
- In January, 1996, the State Informationization leading group was set up.
- In 1997, the State Council Informationization Office drafted the program of information in China with other departments.
- The China Goods Ordering System (CGOS) was put into practice in April, 1997.

Result: The foundation for the development of e-commerce was established.

Phrase 3: E-commerce based on the Internet since 1998

- The first Internet transaction in China succeeded in March, 1998.
- The commodity market in China was declared to come into being in July, 1998.
- In October, 1998, the State Economic and Trade Commission and the Ministry of the Information Industry declared the start of the "Golden Trade Project" centering on e-commerce.
- Beijing, Shanghai and many other cities opened experimental units of electronic shopping centers, electronic shopping markets, online shopping and transactions; they built up a financial and non-financial certification authority and made corresponding laws and regulations.
- The spot transaction market in China was the first spot transaction market for e-commerce with a transaction volume up to 200 billion RMB in 1999.
- China's first e-commerce application system based on a SET security standard was released by the Bank of China and Telecommunications Bureau with the Bank of China in Hunan Province as its experimental unit.
- Many e-business websites were formally established in March, 1999, such as the presence of online governments, online enterprises, online taxation, online education and remote diagnosis.

Result: E-commerce reached the application stage.

Phrase 4: The pragmatic development phase since 2000

- In 2002, e-government has reached the overall implementation stage with a national government procurement investment of 35 billion (hardware of 25 billion RMB, software of 4.5 billion RMB and information services of 5.5 billion RMB).
- The State Council Informationization Office issued the "*Guiding Opinion on the Construction of e-Government in China*" in July, 2002.
- The high-value payment system (HVPS) was successfully put into practice in Beijing and Wuhan on October 8, 2002.
- A national cross-bank and cross-area information exchange network for credit cards had taken its initial shape by the end of February, 2003.
- China Post and some professional distribution enterprises joined the application of e-commerce.
- On August 24, 2004, the *Electronic Signature Law* was formally approved by the National People's Congress (NPC), which came into force on April 1, 2005.
- "*Opinions of the General Office of the State Council on Accelerating the Development of Electronic Commerce*" was issued in January, 2005.
- On October 30, 2005, People's Bank of China published the "*Electronic Payment Guidelines (No. 1)*" to regulate and guide the development of electronic payments.
- On February 21, 2006, the Chinese Academy of Social Sciences (CASS) released the "*2005 China E-commerce Market Survey Report*", the first in-depth market survey report in e-commerce.
- The Eleventh Five-Year Plan for E-Commerce Development, the first development plan at the national level in China was formally proposed in June, 2007.

- On December 17, 2007, the Ministry of Commerce announced the "*Opinions of the Ministry of Commerce on Enhancing the Regularized Development of Electronic Commerce*".

Result: E-commerce was put on the agenda for China's construction.

Phrase 5: The transformation and upgrading phase since 2008

- On April 24, 2008, the Ministry of Commerce drafted the "*Specification for E-Business Model*" and "*Service Specification for Online Shopping Transactions*".
- By the end of June 2008, the number of Chinese netizens reached 256 million, becoming the largest in the world.
- On October 7, 2010, the first "National E-Commerce Comprehensive Innovation Practice Area" was founded in Shanghai.
- On October 29, 2010, the Ministry of Commerce of China issued the "*Norms for the Accreditation of Exemplary E-commerce Enterprises (for Trial Implementation)*", which decided to launch a nationwide e-commerce pilot project and further promote the implementation of modern distribution models.

Result: The e-commerce transaction amount in China reached 4.5 trillion RMB at the end of 2010, with an increase of 3 trillion RMB during the Eleventh Five-Year period.

1.1.3   Research Contents of E-Commerce

The research of e-commerce is complex and numerous, which can be categorized in different ways from different angles. In this book, we divide research of e-commerce into four levels, shown in Fig. 1.5.
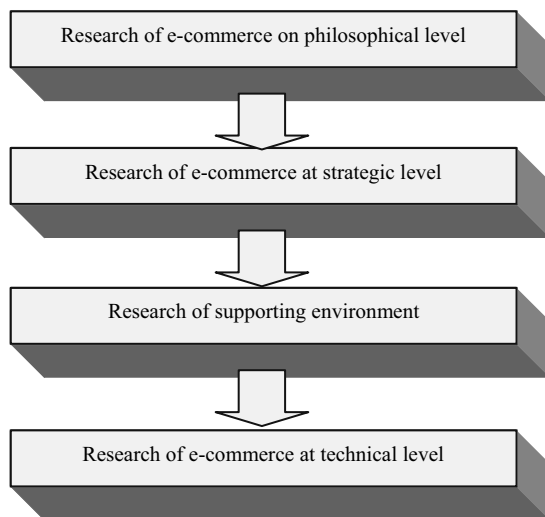
Fig. 1.5   Four levels of research of e-commerce

The first one is about the research of e-commerce on a philosophical level, which includes how to understand e-commerce and how e-commerce would affect society. It is very important but there is little achievement to show.

Next is the strategic level research, which focuses on whether and how to develop e-commerce, what the obstacles are and how to remove them, and how to promote e-commerce development. It can be divided into two parts: macro-layer research and micro-layer research. The former provides references for the government to make policies, which is research into the national strategy of e-commerce, while the latter works for a single enterprise from the aspect of a corporation.

The third level is supporting environment research, including hardware and software. It involves how to use economic and legal resources to guarantee smooth implementation of e-commerce strategy under the guidelines of public policies on e-commerce, for instance how to construct corresponding infrastructure, how to make relevant laws, how to transfer related resources and how to draw up supporting measures to manage the e-commerce system.

Last but not least, the research of e-commerce on a technical level is about what kind of technical problems would be encountered during the implementation of e-commerce and how to resolve them, including how to digitalize traditional commercial activities, how to guarantee security, how to use the e-commerce system effectively, how to manage a virtual e-commerce company, and how to design secure and reliable e-commerce websites, which can also make people feel satisfied. The research at this level laid the material foundation of e-commerce and its construction. It is the basic research of e-commerce, and lots of researchers at this level are urgently needed.

There is not enough research at all these four levels, especially in the research of e-commerce strategy in China, a developing country which has not finished its industrialization process and is facing the challenge of informationization. Nowadays, strategists are extraordinarily in demand, because without the guideline of correct strategy, the development of e-commerce and the implementation of e-commerce will never go smoothly. To make correct strategy calls for excellent strategists, and to turn out excellent strategists we need to learn advanced e-commerce strategies from foreign countries in detail, including background, conditions, contents of the strategies, effects and experience, which are all presented in this book. It can be a reference book for making e-commerce strategies.

1.2   Strategy

1.2.1   Definition of Strategy

Strategy is one of the most popular terms used in modern society, which is also

most widely abused. We can hear of strategy here and there, but many things that refer to strategy have nothing to do with strategy. So what is strategy?

The word strategy was firstly used in a military context. According to historical records in China, in 4600 B.C., Huangdi, the common ancestor of all Chinese people, had already used the strategy of luring the enemy in deep in the Zhuolu War which occurred in today's Zhuozhou City, Hebei Province, and beat the Jiu Li tribe headed by Chi You. Although it is a little different from today's strategy, it can be regarded as the earliest strategic activity in Chinese history. Later, strategy was pushed to its peak by continual wars resulting from the succession of Xia, Shang and Zhou dynasties and the rivalry among the independent principalities in the Spring and Autumn Periods and the Warring States Period. These wars produced a great number of strategists represented by Sun Wu, Sun Bin. They wrote a number of works on strategy, among which "*The Art of War*" was the most famous.

In the middle of the 1930's, Mao Tse-tung pointed out explicitly that "the strategic problem should focus on the law of the whole war" and "research on the overall guidance of war is the task of strategic studies; research on the local guidance of war is the task of campaigns and tactical studies" he says in his work *The Strategic Problem of the Chinese Civil War*. Fighting with enemies, a wise strategist always takes the entire situation into account, plans the whole war, favorable attack or defense, appropriate advance and retreat to finally win the whole war. If he only takes care of local victory in the war, but loses attention to the change in the entire situation, he will lose the war even if he achieved some local victory at the beginning.

A strategy is an overall and farsighted decision made to make the event develop in a favorable direction when facing a significant event. The strategy means a decision that strives for something and gives up other interests. Sometimes we need to give up instant interests for long-term interests, sometimes give up local interests for overall interests, and sometimes give up space for time or give up time for space.

An integrated strategy has three elements:

First of all, it is a plan designed to affect the future direction of important things, and it makes things go in the direction that is favorable to us.

Secondly, it should be forward-looking and give us a blueprint for the future if things go in the direction as planned by the strategy.

Thirdly, the aim of a strategy is to win a sustained competitive advantage over competitors, and a strategy should be guidance in all decision-making and actions.

Three elements of the strategy show that a strategy should be a long-term plan which can guide the development of an event. It should not be a temporary expedient under a specific condition. So-called strategy that changes now and then is not a strategy. A country that continually makes new strategies to replace old ones is actually a country lacking strategists. Strategy should last at least for five years. Some so-called strategy that takes one year as a time span is not a strategy in the true sense.

A strategy always needs tactics to coordinate its successful implementation. In other words, how a battle is fought is a matter of tactics and whether it should be

fought at all is a matter of strategy. Without the strategy, there exists no target for tactics; without tactics the strategic goal is impossible to achieve. So strategy and tactics are always put together, which makes it difficult to tell what is what in some cases.

Mao Tse-tung was one of the greatest strategists in human history. His strategic thoughts not only led the entire Chinese people to win the Anti-Japanese War and the civil war, but were also suitable for socialist transformation and modernization. Just before the foundation of the nation, Mao Tse-tung carefully studied and formulated the strategy for the socialist transformation of China and pointed it out explicitly as "steadily transforming China into an industrialized country from an agricultural country". He was also aware of the fact that modern industry only contributed 10% of the national economy before the Anti-Japanese War and pointed out that "this fact was our basic starting point for we dealt with all problems for a long time during and after the revolutionary war. From this point, our Party had to deal with a series of strategic, tactical and policy problems". During the period of land reform, recovery and development of the national economy, Mao Tse-tung put forward the Party's general line during the transition period, which was that "in a fairly long period of time, we should basically realize the national industrialization and the socialist transformation of agriculture, the handicraft industry and capitalist industry and commerce" ("Selected Works of Mao Zedong" Vol. 5, p. 89). The Party developed and implemented the first five-year plan for the development of the national economy according to this strategy.

A strategy is always formulated by making a judgment about what to pursue and what to give up. Regarding the strategy of socialist transformation cited above, we do not mention what to give up. This is because there are so many things to give up that we cannot list them all. For example, choosing industrialization means giving up agriculture as the leading industry, choosing the socialist transformation means giving up the capitalist system, and choosing this in the long-term means to give up doing it by seeking instant success.

Deng Xiaoping formulated the "three-step strategy" for China's economic development, which was a plan for boosting the economy by hitting three major targets over three different time spans. The first step was to double the GDP of 1980 by 1990 and to ensure that most of the population had enough food and clothing. The second step was to double the annual GDP of 1990 by 2000 and ensure that most people would live a better-off life. The third step was that China's level of development would be on par with mid-ranking developed countries by the year 2049 and China would realize this modernization. The targets of the first two stages have been accomplished. This strategy gives up the one-step plan and two-step plan, and chooses the practical three-step plan. So, in each of the three stages, people can see a wonderful future that is achievable, and can combine lofty ideals with reality. This kind of strategy is surefooted as well as synoptic. If we plan to achieve communism in one step, people will feel that the goal is up in the air and unable to be reached. This kind of strategy would take 100 years to successfully conduct. Over such a long time, it is impossible for the strategy to stay the same. At different periods, there should be different sub-strategies. China

makes a sub-strategy for the development of the national economy every five years. It is the embodiment of the long-term strategic development.

When formulating a strategy, we must firstly be aware of what the strategy is aimed at, what is the target of the strategy, who is the competitor in the game, what are the advantages and disadvantages of the competitor, and what are our own. These are the backgrounds to the strategy. After that, we should take some precautions that can exploit our advantages to the full, avoid our disadvantages, and win further competitive advantages. This is what strategy means.

Take the strategy of Tianji's horse racing as an example. It is a famous story in Chinese history. That was about 2300 years ago. General Tianji was a high official in the country Qi. He liked to go horse racing with the king and others. Both Tian and the king had three horses in different classes, namely regular, plus and super. The rule is to have three rounds in a match; each of the horses must be used in one round. The winner of a single round takes two hundred silver dollars from the loser. Being the most powerful man in the country, the king had such nice horses that in each class his horse was better than Tian's. As a result, each time the king took six hundred silver dollars from Tian. Tianji was not happy about that, until he met Sun Bin, one of the most famous generals in Chinese history. Using a little trick due to Sun, Tianji brought home two hundred silver dollars in the next match. According to Sun, Tianji used his regular class horse to race against the super class from the king, and thus he would certainly lose that round. But then his 'plus' horse beat the king's 'regular', and his 'super' beat the king's 'plus'.

The goal of the game was to win two races out of three, so Sun Bin gave up the first round to concentrate on the last two rounds. The strategy worked. Sun Bin helped Tianji to formulate this strategy of creating advantages out of disadvantages. The result was not only that Tianji won the game, but also that Sun Bin became famous in Qi, and grew into a great military strategist.

1.2.2   Main Features of Strategy

In reality, "strategy" is usually an ambiguous concept in our mind, and we have no clear understanding of strategy. This is attributed to the fact that people have not mastered the main features of strategy. Compared with other objectives, strategy has its own distinctive features. Based on distinct motivation, objectives, content and methodology of research, strategies for variable domains are quite likely different. However, they are identical in essence. The main features are as follows.

1.2.2.1   Wholeness

As the critical difference between the science of campaigns and tactics, wholeness is the first distinguishing feature of the strategy. The strategy manifests the wholeness both in time and space. First of all, the strategy plans all aspects in this domain as a whole. Secondly, the strategy provides the guideline to the overall

decision. Last but not least, the strategy also needs to consider the interaction with other related domains. It is shown that it is wholeness that brings the popularity of strategy to almost all industries.

Wholeness is pervasive with specific targets and scope for a given strategy. For instance, the national strategy of e-commerce treats the entire country as a whole, and each province, city or region as a part. Subsequently, the national market for e-commerce as a whole and the elements that compose the whole market are all partial. The leader and conductor of a strategy should focus on the wholeness and place it as the chief consideration. After grasping wholeness and the relationships among it, he/she can discover the parts, catch and try to solve the parts which are crucial to the whole.

1.2.2.2 Stratagem

Since ancient times, the stratagem is an integral part of all successful strategies. A number of strategies in Chinese history can be viewed as classics of stratagem. *Thirty-Six Stratagems*, handed down over generations, has been transplanted to all works of life nowadays. The idea that winning by stratagem is the best triumph, throughout this great work, brings out the myth of its prevalence.

In practice, how to frame a strategy is highly flexible and needs to take lots of factors into account. Generally speaking, a good strategy is based on the current situation, characteristics of the rival, conscious activities undertaken objectively, appropriate approaches and so on. When planning a strategy, the decision-maker should think deeply, respect the laws of war and make changes according to the changes made by the rival all the time. Besides the military applications, the concept of a stratagem can also be used in all kinds of industries.

In the operation of an enterprise, scrabbling for market share is always the most important thing, where the stratagem can play an essential role. For example, by using a stratagem, Unilever has defeated P&G, which owns more abundant resources and has powerful marketing in the chemical industry. Considering its objective disadvantages, Unilever made a circuitous stratagem. At the beginning, Unilever caused momentum in its all markets, resulting in P&G believing in Unilever's comprehensive promotion and follow up. But, by surprise, Unilever concentrated all resources on some critical regional markets, captured the first opportunity and surpassed P&G in its share of the market. From this case, we can see that a successful strategy can transform passivity into initiative, disadvantage into advantage and cause the strong to be beaten by the weak.

1.2.2.3 Stability

The strategy is a long-term decision and also the foundation of all activities in a specific domain. In order to retain the consistency and continuity of the developing target, the strategy should retain stability over a period. Otherwise, frequently changeable strategy will result in a large waste of labor, material and money,

seriously affect the final achievement and even block the growth of the whole domain, since the strategy stays at the highest level in the domain. If it was the strategy for the national economy, it might badly influence the economic growth of the whole country. On the other hand, the strategy must also vary with the situation. As a matter of fact, the stability of the strategy is relative over a period.

The strategy is built on understanding and planning for the whole, which includes every activity and every part of a domain. In general, the strategy ought to be stable provided that the overall or crucial partial elements have no fundamental changes. Moreover, the strategy is based on current thought, direction and policy. As a result, in spite of adjustments and modification regarding partial action, the strategy will be basically stable over a period. Finally, in a strategy, the understanding and planning of the whole is expressed in certain forms, such as the strategic target, strategic guidelines, strategic methods and so on, which should not vary in the long term but be forward looking and show guidance. In summary, the key aspects of strategy, from operational objectives to basic theory and content, all show stability somehow. We can conclude that relative stability is the other important feature of strategy.

1.2.2.4   Confrontation

A strategy needs to be planned and implemented aiming at some specific target. The essence of the strategy is to analyze and decide all the aspects of the target, determine the strategic goal, build and utilize the corresponding power, understand the features and the laws of war, adopt various fighting approaches, develop our advantages and avoid our disadvantages while evading the rival's superiority and focusing on the rival's inferiority, to obtain the maximum victory. As an important feature of strategy, confrontation is extremely obvious in military affairs, but not restricted to the military. Confrontation is universal in strategy. Kenichi Ohmae, a famous strategist in Japan, believes that the essence of managing strategy is to win the competition. The strategy is not necessary without competitors. The only intention of strategy is to guarantee the enterprise a dominant position as permanently and as efficiently as possible against its opponents. It is conceivable that in order to survive in such fierce competition, every organization, from the enterprise to the whole country, must confront and conquer its competitors in some aspects.

1.3   Strategic Environment

1.3.1   Significance of the Strategic Environment

The strategic environment is the objective situation and the explicit conditions that can affect the constitution and implementation of the strategy, including the basic conditions and strategic political, economic and technological situation at home

and abroad. The strategic environment is dynamic, and should vary along with the development of the international situation. No country, industry or enterprise can exist independently without external circumstances. The ability of enterprises to create worth for the country, the public or the clients and to make profits for themselves depends on the external circumstances in which they cannot intervene to a large extent. At the beginning of any strategic programming, analyzing the strategic environment and its development trends can help to create a reasonable e-commerce strategy. Generally speaking, the strategic environment includes the international environment and domestic environment.

1.3.1.1 International Strategic Environment

The international strategic environment covers the whole situation regarding the competition and cooperation among the countries of the world. It also represents a country's political power, economy and technology. The international strategic environment affects the existence and development of e-commerce at all levels, and it can also contribute to the flourishing or extinction of e-commerce. So properly analyzing and judging the international strategic environment are the preconditions for formulating and implementing e-commerce strategy.

Basic elements of the international strategic environment include the character of the age, the international strategic situation and strategic trends of the main countries in the world.

(1) The character of the age

The term "age" means that the world is passing through a developing process. The character of the age is a symbol of the whole world in the development phase, not an individual phenomenon of some country or changes in international society over a short time. Different symbols of the character of the age embody different effects of strategic environmental elements. Characteristics represented by productivity and technology reflect the great power of science and technology in promoting the development of society as well as promoting changes in economic concepts. With the great development of science and technology in modern technology, these changes will have more effects on e-commerce strategy, and often bring reform to the techniques, concepts and developing pattern of e-commerce. Having a good understanding of the character of the age can help the strategy-maker grasp the current developing trends macroscopically, so that it is possible to make a correct judgment about the international strategic environment, avoiding great mistakes in formulating strategy.

(2) International strategic layout

There are many gaps between different counties regarding politics, economy, culture and technology. These strengths continuously divide and merge with each other, and then form a stable structure, which is the international strategic layout. The international strategic layout reveals contrasts in strength, conflicts of interest, basic strategic relationships between different countries. While constituting the country's economic strategy, we often need to investigate the layout of the international industrial chain. As an important matter in the international economic

strategic layout, the international industrial chain has a great impact on the formation of strategy. Because of differences between the economy and technology, different countries are usually at different levels in the industrial chain. For example, the developed countries such as America and the European countries always take charge of the innovation and development of products, while the developing countries always lie on a lower level, in charge of manufacturing products. While constituting the developing strategy of industry, a country should be aware of the position at which it lies, and lay out a proper industrial policy according to its economic situation. The government should also encourage innovation, and try its best to reach a higher level in the industrial chain. If the government locates its position too high and blindly insists on rapid improvement in the industrial chain, ignoring the objective situation of the country's technology and manpower, then it will be impossible for the country to accomplish the scheduled strategic goal, and it is likely to bring about great waste of limited resources. Therefore, analyzing the international strategic layout seriously and objectively is helpful in assessing the primary countries' location in the world and estimating the global situation and the possible developing trend for e-commerce.

(3) The strategic tendency of primary nations

Due to differences in strategic interest and policy, the strategic tendencies of nations depend on each other, and also may be affected and conditioned by each other. The strategy of some powerful countries can affect the adjacent area, even the whole world. After the subprime mortgage crisis, the Federal Reserve adopted special financial rescue measures, and proposed the policy of a weakening US dollar. The policy immediately caused a shock to the international currency markets, and even caused confusion in currency policy in some countries. Many countries had to adjust their currency policies, create a corresponding policy for imports and exports and a new strategy for foreign exchange reserves. This shows, over a certain period, that the strategy of primary countries and the developing trends in strategy are important parts of the international strategic environment. Learning the strategic tendencies of primary countries is helpful in researching the international strategic environment and properly laying out the development strategies of national e-commerce.

1.3.1.2   Internal Strategic Environment

The internal strategic environment means the domestic social environment and natural environment that can affect the overall situation. And it includes the basic conditions of a country's politics, economy, technology and geography.

(1) Political environment

The scope of the internal political environment is wide. From the view of commercial strategy, politics that affect strategy most include two parts: political support from the government and the system of law in the country.

The political support from the government is a necessary condition for the implementation of a strategy. If the government decides to sustain an industry and provides support on tax, credit and allowances etc., the enterprise can then create a

proper and rapid development strategy based on this support. On the contrary, without the support of the government, the tax burden of the enterprise may be much heavier than that of other industries. The credit restrictions will also be stricter, and the enterprise cannot get many allowances from the government either. Under these conditions, creating a positive development strategy is not advisable, so the enterprise should make a development strategy in other industries.

At the same time, the enterprise should consider the legal environment while creating and implementing a strategy. Without proper law assurance, the rights and interests of the enterprise cannot be effectively protected, and this can possibly cause dissension. In this case, it is difficult for the enterprise to get the trust of the customers, and it is not easy for it to create and implement a proper strategy. For example, there are no relevant laws for the transfer of electronic funds in China. Then, if a mistake happens, it is too hard to ascertain the responsibility of the enterprise so as to ensure the transfer of the transaction capital. Besides, there is no uniform management of electronic currency and security authentication which are both basic elements of the transfer of electronic funds. All the above are hidden troubles in the development of e-commerce in China.

(2) Economic strength

The economic strength of a country or an enterprise is the most important material basis, and an important objective condition for the implementation of any strategy. In a word, the execution of any activity must be based on the economic strength, which also restricts the scope of the activity. No strategy can proceed without strong economic strength as a solid foundation, and it is difficult to put the strategy into practice without enough funds. The development of e-commerce is based on a mature network structure, but the construction of a mature network needs great investment. Thus, such a magnificent blueprint is a huge challenge to the economic strength of a country. If the country does not consider the economic strength, but creates the strategy of network construction blindly, then the overall economic construction may be affected. Therefore, the strategy-maker must adequately consider the actual economic condition of the country or the enterprise before formulating the strategy, and should direct the implementation of the strategy in a thrifty way, ensuring that the strategy is suitable for the strength of the country or enterprise.

(3) Technical environment

The development of modern techniques brings the connection between technology and production much closer. As the primary productive force, science and technology are playing an essential role in economic construction. According to the developing law of the productive force and the character of the times, Deng Xiao Ping first proposed the theory that science and technology are a productive force at the First National Science Meeting in 1978. Science and technology can affect the basic elements of a productive system, and alter the quality and quantity of these elements. By altering the structure and features of these productive elements, science and technology can totally improve the productive force. While formulating the strategy, science and technology can never be ignored. Without reasonably considering the present developing situation and the future of science and technology, laying out a proper strategy is just fantasy. The same as the

constitution, we cannot implement e-commerce strategies without the adoption and evaluation of the technique. Technique is an important part of implementing e-commerce strategy, and many enterprises make use of e-commerce techniques to win a leading position and competitive advantage. Successful e-commerce strategy should ensure that the technique is the compelling force in the development of the enterprise.

(4) Geographical environment

The national geographical environment includes the population, dimensionality, landform and the internal traffic conditions. It is the space conditions that can affect and restrict economic activities, and the important basis of creating and implementing the strategy. For example, if the population of a country or an area is very large and the land resources are scarce, then at first it is proper to develop a labor-intensive industry and then lay out the developing strategy of evolution into capital-intensive products from the labor-intensive industry, step by step. The industries of Japan, Republic of Korea, Singapore, Thailand, and Hong Kong and Taiwan of China all grew up relying on a labor-intensive industry at the beginning of industrialization. For the enterprise, the construction and application of the supply chain must adapt to the geographical environment the enterprise locates in, otherwise the commercial strategy cannot be implemented properly for some objective reasons. In the e-commerce market, the population determines the maximum number of clients, and the traffic and landmass determine the difficulty of the logistics.

1.3.2   Strategic Environment and Strategy

The strategic environment exists objectively without depending on the awareness of strategists, while strategy is the subjective reflection of the objective law in people's mindset. Any strategy, whether for a country or for an organization, will be restricted and influenced by the strategic environment. For example, during the Anti-Japanese War, the Kuomintang and Communist Party united together for the same goal – to win the war; however, after the war the strategic environment changed, these two parties quickly became rivals again to compete to seize political power; After the New China was founded, to carry out socialist construction better, the Communist Party united with the other eight democratic parties, including the Kuomintang, in equality under the multi-party cooperation system. This history shows that no matter how the strategy changes, it can never be separated from the strategic environment.

Another example is DELL, which is a computer company famous for Internet promotion and low prices. Not having understood the features of Chinese consumers, DELL lost its first battle in the Chinese market because, at that time, quite different from American consumers, Chinese consumers were familiar with buying things from stores personally and checking the commodities' qualities directly. For DELL's Internet promotion, people worried about the quality of products and the after-sales service just from looking at the pictures of products on

the Internet. Later on, along with the popularization of Internet promotion, more and more Chinese consumers bought computers from DELL online or on the phone, and DELL achieved a satisfactory performance in China. Since the change in the strategic environment leads to big differences in the effects of strategy, strategy should always be altered to adapt to the strategic environment. Therefore, before making a decision, a strategist must correctly recognize the strategic environment, find the rules hidden behind it, and adjust the strategy to the changes in a timely fashion. To do all these things, the strategists ought to retain a subjective view, stay calm, have insight, and be decisive, wise and thoughtful.

Moreover, from a dialectical perspective, strategy will also be a counteraction to the strategic environment, which means people can promote the transition of the strategic environment artificially. If a country has imperfect laws regarding networks, the government should be dedicated to the legislation of related laws to support the development of e-commerce. Take another example, suppose people in some area have not accepted e-commerce yet. A company should follow these two steps if it wants to seize the market: firstly, publicize the advantages of e-commerce using successful cases in other regions and make the consumers familiar with e-commerce; then, focus on marketing promotion. In brief, when making strategies, not only we should respect the truth, but we should also display our subjective initiative and try hard to transfer the strategic environment to serve us.

1.4 E-Commerce Strategy

Changes have taken place in the traditional strategic business environment resulting from the development of e-commerce. No country, industry or enterprise can survive in the new environment and continue to make progress unless it is able to make full use of opportunities brought about by e-commerce and actively carry out strategic transformation. To prepare for making a scientific e-commerce strategy, we should thoroughly understand the meaning, content and research methods of e-commerce strategy first.

1.4.1 E-Commerce Strategy Outline

Nowadays, economic competition between companies, industries or countries is fiercer and fiercer. Just like the saying "markets like battles", commercial competition led to so many companies closing down. With the continuous development of the economy, the strategy[1] frequently used in the past, during war, is used more and more in the enterprise's economic activities. The so-called marketing strategy, business strategy, research and development strategy, product strategy, advertising strategy, etc.[2,3], arise one after another.

It results in the concept of e-commerce strategy applying military strategic

thinking to e-commerce[4,5,6]. Applying strategy to activities is a significant event in human history, and it has provided not only a rare opportunity for each country, industry, enterprise and individual, but also serious challenges for them[7,8]. In such an event, each entity is faced with two choices, either to meet the challenge and seize the opportunity to achieve rapid growth, or to miss the opportunities and be eliminated by history.

How to seize the chances does not depend on good luck, but lies in whether we have a correct e-commerce strategy. Strategy is the key link in the fishing net. Once the key link is grasped, everything falls into place[9]. A correct strategy will make things progress smoothly, while a wrong strategy will make things stumble[10]. There never exists an exception in e-commerce strategy. A correct e-commerce strategy can take e-commerce from victory to victory, or from adversity to advantage, but an inappropriate strategy will make e-commerce hardly develop. Although the technology and route of e-commerce are not stereotyped, there is a significant risk of choosing the wrong direction in e-commerce development and implementation.

E-commerce strategy refers to a series of foresighted and overall decisions when we are facing an important event in e-commerce, in order that e-commerce develops towards our goal, is favorable to us and leads us to seize the opportunity. This decision requires us to pursue something and give up something. It includes planning a correct e-commerce developmental direction for the future, making a clear and forward-looking blueprint for e-commerce development and formulating a set of tactics which make us obtain some sustainable competitive advantages.

While creating a national e-commerce development strategy, we first need to carefully analyze what role e-commerce plays in the country's development process at this stage, which countries are our competitors, what advantages and disadvantages the competitors have, what advantages and disadvantages we have, and what is the goal of e-commerce. Different strategic positioning will make us face different competitors. Then we will have different advantages and disadvantages over different competitors, and different advantages and disadvantages require different strategies and tactics. For example, Japan's e-commerce strategic goal is to overtake the United States[11-14], so their main rival is the United States. Japan is inferior in many aspects compared with the USA, but superior compared with some developing countries. The USA's e-commerce strategic goal is to ensure the leading position worldwide[15], so their rival is not only Japan but also some European countries and some developing countries which have a certain advantage in certain areas, such as India and Ireland, etc.

To make an industrial e-commerce strategy, we should analyze the facts below in detail: the role of e-commerce in a particular industrial background, the advantages and disadvantages of the industry, the advantages and disadvantages of e-commerce implementation in the industry, the approach of using e-commerce to provoke the development of the industry, the aims of e-commerce, etc. Different industrial backgrounds, structures, advantages and disadvantages lead to different e-commerce strategies. Here, industry refers to the production units, or other economic and social management units, or individual organizations that play a specific role in the national economy. There are huge differences between

industries in view of their economic traits, competitive environment and profits, so the competition between industries is quite small, which requires no consideration when making an e-commerce strategy. However, when it comes to the same industry, different strategies lead to different competitors. For example, the long-term goal of the Chinese internal combustion engine industry is to reach an advanced world level in 2020, which means that we will be transformed to a great power in the international internal combustion engine market rather than mass production. The textile industry in Korea aimed its strategy at the textile market in China, so its competitor is the Chinese textile industry and other foreign industries eager to grab the Chinese market.

To form an e-commerce strategy for enterprises is the same. First, we should make sure of our aim in e-commerce strategy, which might help to gain a long-time advantage in a region, or catch up some enterprises, or to become a leading company. Different regions and aims will make us face different competitors, while different competitors will lead to different advantages, require various counter plans to deal with them, which will lead to different strategies. A good strategy is not enough to develop an enterprise. It's also very important for us to distribute our resources in consideration of the strategy, and make a uniform action with the strategy. The e-commerce strategic aim of IBM is to make sure of its dominant status in the word, so its competitors are all the information technology enterprises in the world. The e-commerce strategic aim of GE is to use e-commerce to cut its costs, improve products, grab opportunities from e-commerce, create a new competitive advantage for the company, make the company develop steadily, and seek to be the e-commerce leader in the electrical manufacturing industry. So its competitors do not include IBM, HP, Microsoft, Cisco, Yahoo, Google, and so on. The e-commerce competition of the IT industry is far removed from the electrical manufacturing industry.

1.4.2 Research Methods for E-Commerce

The macro research of e-commerce strategy mainly refers to the national e-commerce strategies, while the microcosmic research covers those e-commerce strategies at corporate-level.

For the industrial e-commerce strategy itself, the research is between macro and micro e-commerce strategies. The economic system of a country is built up by different industrial sectors and the development of each sector has an influence on the national economic level as a whole. At the same time, development of an industry is reflected by different enterprises within the industry. The total amount of commodities in the industry is an important reference in the evaluation of the industry's value. It can be said that industrial e-commerce strategies are part of national e-commerce strategies, and at the same time have a priority over all enterprise-level e-commerce strategies in the same sector. In comparison with national e-commerce strategies, the research field in industrial e-commerce strategy is micro. In the e-commerce strategies of enterprises, the research field is macro.

1.4.2.1   National E-Commerce Strategy

National e-commerce strategies have some common features, for example almost all countries' e-commerce strategies focus on the importance of the construction of e-commerce infrastructure and emphasize the creation of a legal system for e-commerce[11,15-18]. This is because the development of E-commerce needs both support from the e-commerce infrastructure and guarantees from the legal system. In other words, development of e-commerce is inseparable from the support of the infrastructure and the protection of the legal system. But there exists no universal guiding significance for e-commerce strategies, since each country has its own different level of economic and technological development, different strategic objectives, competitors, strengths and weaknesses, leading to different strategic choices. Therefore, the only way to analyze e-commerce strategy is to dissect the parts one by one. In order to understand one country's development of e-commerce strategy and to find out how to select an appropriate strategy in a specific scenario, we must analyze the following aspects.

(1) The level of a country's economic development

A country's level of economic and technological development forms its economic base, which in turn determines the level of a country's needs. Maslow once divided human needs into five levels. Generally speaking, a human being may step up to higher level needs only after the lower level needs are met[19]. Although there does not exist a similar point of view with regard to national needs, this can be inferred. In a country that cannot solve the problems of feeding the people, or a country at war all the time, there is virtually no demand for e-commerce. For these nations, e-commerce strategy is never mentioned. In comparison, after Japan became the world's second economic superpower, it naturally grew a strong desire to be a political power and to join the United Nations as a permanent member. In addition to the point above, the level of economic development has identified a country's strengths and weaknesses when competing with other global economies.

(2) The objectives of e-commerce strategy

The objectives of e-commerce strategy are determined by the level of economic and technological development. It is impossible for a technologically backward country to aim at becoming dominant in the world or the maker of global e-commerce standards. Backward countries can only try not to be eliminated by the tide of e-commerce, to make full use of opportunities created by e-commerce and to avoid adverse effects on the national economy brought about by e-commerce. If possible, they can try to overtake countries at a similar level of economic and technological development. Obviously, Japan's e-commerce strategic goal, to catch up with the United States, is realistic due to the narrow gap between them. In accordance with Chinese conditions at this stage, what we can do now is only to use e-commerce technology to lead the development of China's traditional industries, let e-commerce become an important emerging industry, form a new growth engine in the national economy and make great efforts to earn a place in the e-commerce world.

(3) A country's strengths and weaknesses

Once strategic objectives are identified, the competitors will be determined. After deep analysis, our strengths and weaknesses relative to competitors will be known. Sometimes, compared to competitors we may have no advantages but disadvantages in all aspects, just like in horse racing in The Art of War by Sun Tzu. Tianji's horses all ran slower than those of the King of Qi in the same class[20]. In such a case, a careful analysis is necessary to see if we can give up some local interests to lead to access to other areas. Sometimes we can focus our financial resources and manpower to obtain certain advantages. For example, in the 20th century China gathered up all the strength of its resources to create two nuclear bombs and one satellite.

(4) Overcome obstacles and disadvantages

After gaining a clear understanding of the strengths and weaknesses compared to our competitors, what we should do next is to overcome these disadvantages. Based on this, analyzing what the obstacles and resistance are, and how to overcome them, is then a matter of course. Aspects like how to overcome the disadvantages of e-commerce, and how to overcome obstacles and resistance when e-commerce is being carried out, are problems of both e-commerce strategic implementation and e-commerce tactics.

(5) E-commerce strategic implementation

Once an e-commerce strategy is established, it is necessary to strictly implement it. After a period of implementation, we ought to test whether the effect of the e-commerce implementation is satisfactory and whether the progress goes smoothly. If the process goes successfully and the results satisfy most people, the undertaken strategy is entirely correct. Therefore, the implementation of the original planning will be continued. Otherwise, it is necessary to find out the reasons, to make certain amendments to the plan or to strengthen the implementation efforts. In essence, strategy is designed to guide a long period of major policy decisions, so a careful and scientific attitude is needed in the formulation of any strategy. We should keep away from unrealistic goals, tactics and strategies. Meanwhile, avoid modifying the plan immediately when it does not go as smoothly as originally planned, because frequent modifications would lead to a vicious cycle and the strategies would lose authority and guidance. What should be emphasized is that strategy is striving for competitive advantage compared to competitors in the long term, so sometimes we may not see any obvious and immediate results in a country or an enterprise. But it doesn't mean the current e-commerce strategy is wrong. The results of a correct strategy may be seen only after a number of years and for now the analysis of the effect on e-commerce strategy might be one-sided. Therefore, the evaluation of a strategy's success must be done after many years.

1.4.2.2   E-Commerce Strategy for Industries

While researching industrial e-commerce strategy, the common strategic features between different industries are few. However, as e-commerce strategy is a

guiding document for all businesses in the industry, the strategies still need to emphasize the importance of the strengthening of the industrial infrastructure for e-commerce and the building of laws and regulations. Different industries have different industrial structures and characteristics, facing totally different economic sectors, competitive environments and prospects for future profits, resulting in no comparability between them. The degree of the information and information infrastructure is also different between dissimilar industries. Taking the banking industry and the textile industry as examples, these two industries cannot be compared with each other. Therefore, for industry-level e-commerce strategy, it is necessary to study each industry separately. We need to consider each country's economic level, do an analysis of the current competitive structure of industries, and also weigh up the feasibility of e-commerce strategy implementation in the specific enterprise. It can be said that industrial e-commerce strategy research bridges national e-commerce strategy research and enterprises e-commerce strategy research.

1.4.2.3   E-Commerce Strategy for Enterprises

When it comes to e-commerce strategy for enterprises, the situation is much more complex. Even the common features of macro strategy, such as strengthening the construction of the infrastructure and the legal system, do not exist. Different enterprises face different situations. The industry, the location, the specific economic strength are all important factors for enterprise strategy research and should never be overlooked. As mentioned above, different industry sectors do not have comparability, and then enterprises in different sectors are also not comparable. Therefore, for micro e-commerce strategy for enterprises, we need to study them by each industry sector. In this book, a few enterprises which are influential in each industry have been chosen for analysis, including the Industrial and Commercial Bank of China in the banking industry, IBM and Lenovo in the information industry, General Electric and Haier among the manufacturing sectors and Internet companies including Google and Taobao.

Through analysis, readers can understand how to formulate a correct strategy and the tactics of e-commerce, and be able to analyze whether an e-commerce strategy is appropriate or not. That would help readers lay a solid theoretical foundation for their e-commerce strategy analysis and formulation in the future. We hope readers of the study do a detailed analysis of e-commerce strategy cases in some countries, industries or enterprises, and are able to apply the knowledge of e-commerce strategy, combine theory and practice, work out e-commerce strategies for individuals, for their own business, for the industry as a whole, or for their own country. We sincerely hope that this book be helpful to those researchers in the field of e-commerce strategy.

Based on the fundamental study of e-commerce and strategy, we introduce the definition and characteristics of e-commerce strategy in this chapter, which aims to build an awareness of the key issues concerning e-commerce strategies. Considering that e-commerce strategy depends on several factors like economic

levels, laws, markets, events, or even climates, the strategic environment is introduced here and detailed analysis will be made later in this book. To sharpen the readers' understanding of e-commerce strategy, we will bring together theoretical perspectives based on academic research, integrated use of technologies and a large number of case studies, especially those in China.

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2

National E-Commerce Strategy

Before discussing national e-commerce strategies in detail, we would like to explain why we determined to write this chapter in such a rich and colorful manner and the motivation for our further research at the national level. It is this point which makes this book different from others of the same kind.

From the perspective of development, the competition between countries continues and is hotting up on a worldwide scale. In history, the competition has resulted in the rise of a super power as well as the disappearance of another. In the 21st century, the competitive advantage of a country depends not only on substantial power such as military force and economic strength, but also on soft power such as systems, strategy and culture. A balanced system, scientific strategy and appropriate culture will produce talents, advanced technology and a developed economy, which enhances national comprehensive strength to provide a country with solid power to maintain its appropriate international status. Thanks to correcting development strategies, some countries once with a weak industrial foundation and a large population have grown into world-class software bases. Owing to suitable development, East and Southeast Asia's economic miracles often happen in countries which are lacking in resources. Conversely, some countries' economic collapse may be due to too much emphasis on heavy industry and ignorance of the needs of light industry development. To analyze the financial crisis spreading around the world arising from economic imbalance, the problems lie in excessive development of finance, securities and real estate.

In a word, proper strategy and a balanced system can ensure long-term growth and a continuous competitive advantage, while an inadequate strategy may become a ponderous burden that results in the failure of a country due to fierce competition. No sooner had the concept of e-commerce appeared than developed countries responded immediately and formulated strategies that could cope. At the same time, both developing countries and regions were keenly aware of the essential role of e-commerce and put e-commerce on the agenda of state construction. Many of them highly expect e-commerce to boost their new domestic economy and realize economic recovery. As mentioned above, the prospects of a nation are closely related to the orientation of its e-commerce. The development of e-commerce can directly influence the economic construction

level and determine the fate of a country to a large extent. Therefore it is entrusted with historical significance.

From the standpoint of an academic study of strategies, researchers should have a vision broad enough to analyze e-commerce strategies on three levels: national level, sector of activity and type of enterprise. Even researchers working for enterprises are advised to grasp the overall situation at the corporate level. Especially when e-commerce strategic thinkers choose a strategy for a transnational enterprise, they should fully consider the attitude of the local government to e-commerce, the development policy, related laws and regulations etc. to ensure the feasibility of the strategy. As a result, it is inevitable that they must sharpen the understanding of national e-commerce strategy before formulating the final strategy.

In this chapter, national e-commerce strategy is introduced and analyzed to help readers finish the strategy formulation. Before writing this book, we did not find similar studies. If they exist, *E-Commerce Strategy* can be used for a comparative study or reference; otherwise, we sincerely hope it will bring attention to national e-commerce strategy and arouse the readers' research interest.

2.1 The United States

The United States is a superpower in economic, military, scientific and technological respects, in culture, education and so on. In addition, the United States is the birthplace of the information industry and e-commerce and is also an information giant. The United States formulated its relevant strategy as soon as e-commerce appeared; being the first to take advantage of e-commerce, and it has obtained an absolute advantage in developing e-commerce. Therefore, we will first introduce the e-commerce strategy of the U.S.

2.1.1   Economic Conditions

The United States of America is a federal constitutional republic comprising fifty states and a federal district [1]. The United States is the most powerful country in the world. The overall strength of the United States can be gained by analyzing all aspects of the economy, technology, military power, education, trade, resources and so on, with statistical data such as DDP, population, international trade volume, military expenditure, R&D expenditure, the number of top world universities, the number of Nobel Prize winners. These indices are listed in Table 2.1. From the historical point of view and its comprehensive national strength, the United States is in a unique position in the world.

Table 2.1 The overall strength of the United States

Item	Amount	Rank	Note
Land area	9,360,000 km^2	3	
Population	308 million	3	
GDP	$14,657 billion	1	GDP per capita ranked 9th
International trade volume	$2,608.124 billion	1	The trade volume of goods was $400.904 billion more than China and $557.35 billion more than Germany
Military expenditure	$661 billion	1	It accounts for more than 50% of global military expenditure
Military capacity		1	Armed with the full advantages of land, sea, air and nuclear power
Political power	One of the five standing members of the United Nations Security Council		The United Nations headquarters is in the United States
R&D expenditure	$5.618 billion	1	It's the US budget for scientific research in 2010
Number of Nobel Prize winners	314	1	It accounts for more than 70% of the total number of Nobel Prize winners
Number of top 10 world-class universities	8	1	80%

The United States is rich in natural resources, whether in land or in mineral resources, which provides a solid material foundation for the U.S. economy. Meanwhile the United States is the world's largest agricultural producing country owing to its subtropical climate and vast land. According to the data published by the IMF in 2010, the U.S. GDP was $14,657 billion, ranking first in the world. Its GDP per capita was $47,284. The nation successfully retained its position as the world's largest international trading nation in 2009. Its total foreign trade volume of goods was $400.9 billion more than China and $557.4 billion more than Germany. In addition, the United States was still the third largest exporter around the world with total exports $156.1 billion lower than China and $74.7 billion lower than Germany. The United States was also the world's largest importer, $557 billion higher than China and $632.1 billion higher than Germany.

U.S. businesses are very well developed. There are some American companies in every industry in the top 50 of the Fortune 500. In the petrochemical industry, there were Exxon Mobil, Chevron and Tang Fei, respectively ranked the second, fifth and seventh amongst the Fortune 500 in 2009. In the retail industry, the United States has the world's largest retail company Wal-Mart, whose revenues reached $405.6 billion in 2009. In the auto industry, General Motors and Ford are both world-wide renowned brands. The U.S. financial industry is also well developed. Bank of America, Citibank, Berkshire Hathaway and JP Morgan Chase

are world-renowned financial firms with revenues of $113.1 billion, $112.4 billion, $107.8 billion and $101.5 billion respectively. There are also HP and IBM, whose revenue respectively reached $118.4 billion and $103.6 billion in the information industry. The United States almost leads the information industry in the world, especially those key electronic information products closely related to the development of e-commerce. There are not only IBM, Intel Corporation, AMD, HP, Cisco System, 3COM, Dell Computer, Lucent Technologies, Apple Computer Inc., AT&T and so on in hardware, but also Microsoft Corporation, Oracle Corporation, Sun Microsystems, America Online, Google, Yahoo, Amazon and other online bookstores in computer software and network services.

The U.S. is the world's top scientific and technological power. The U.S. science and technology system is characterized by pluralism and diversity. National research and development is primarily carried out by the federal government laboratories, private companies, universities and other non-profit making research organizations. Among them, the number of scientific research institutions set up by the federal government is about 850. They mainly engage in applied research and technology development. The U.S. House of Representatives and the Senate approved the budget with a total amount of $450 billion in 2010. Besides the National Institutes of Health and the National Science Foundation, the Government funded the National Oceanic and Atmospheric Administration and National Institute of Standards and Technology. The colleges and universities are the main base for fundamental research. And the research institutions of large enterprises are the backbone of applied research, accounting for three-quarters of the national research. The USA is the leader in many areas such as space science and technology, information science, environmental science and technology, biological engineering, materials science and technology, agriculture, manufacturing and so on. America is the most advanced country in the world in the field of information technology. Since the Clinton administration proposed the "information superhighway", the U.S. information technology and information industry achieved rapid development. The information industry has been the dominant industry in the national economy of the United States. IBM put forward the new idea of a "smart planet", the perception of achieving more thorough, more comprehensive, more intelligent in-depth technologies such as in electric power, in the supply chain and so on. The concept of a "smart planet" is highly valued by the Obama administration, almost as a national policy. The strategic objectives of informatization development in the U.S. are to lead the research and development and information technology applications and maintain the advantages of information technology. The United States, with its strong economic strength, massive investment in fundamental research and a good venture capital system, remains the leader of the information industry in the world.

2.1.2 Background to U.S. E-Commerce Strategy

U.S. e-commerce strategy is closely related to its competition with Japan and Europe in economics, science and technology after World War II.

During World War II, Japan and Germany respectively provoked war in the Pacific and in Europe against many other countries. Due to the huge consumption of human and material resources, European countries and Japan were almost all in ruins when World War II ended. Being far away from the battlefields, the United States had hardly been damaged. In contrast, the United States made money from the war and received a lot of talented persons, such as Einstein, from Europe. As a result, the United States became the world's largest economic and military power and established its supremacy in politics, economics, military power, science and technology after World War II. At that time, there was a big gap between the United States and Japan. Nobody had ever foreseen that Japan would catch up with the United States in the following years, but Japan's economy began to take off in the early 1950s. Since then, Japan had sustained rapid economic growth for more than thirty years. Japan's GNP per capita had caught up with that of the United States in the 1970s, and further surpassed that of the United States since then. The United States was at a disadvantage in some traditional industries, especially the automobile industry compared with Japan. During the 1980s, many experts were optimistic about Japan's economy, and held the opinion that the United States would decline from its peak, just like Britain, and be replaced by Japan. But all of them neglected the tremendous value of the American system and culture which was full of innovation and introspection.

In order to consolidate its position as "the world's largest economy", the United States began to adjust its strategy of economic development and implemented a grand informatization strategy in the 1980s. Its economic growth was driven by increasing investment in information technology, improving the information industry and promoting the upgrade of industries. The so-called "Star Wars" and "re-industrialization" development projects could best reflect the strategic direction of economic modernization. The "information superhighway" project presided over by Vice-President Al Gore was the specific action to promote the development of the information industry. Popularization of the Internet and advanced computer hardware and software research were the specific strategic objectives of the U.S. government. In order to support the information industry in developing rapidly and healthily, the United States increased the investment in research, paid a lot of attention to technology innovation, implemented asset reorganization and mergers, drew up the relative laws and took a series of supporting measures. The implementation of these strategic plans re-established the hegemony of the United States. During the 1990s, the Internet extended very quickly with the support of the United States Department of Defense and the National Science Foundation. The information technology and related industries had contributed more than a third to American's GDP growth.

In order to further promote the development of information technology and information industries, the United States launched a number of development plans

at the beginning of the 21st century, including the second generation of the Internet plan, the supercomputer of 1,000 trillion calculations per second, the development of future chips, access to the Internet at school and so on. The implementation of these plans greatly speeded up the development of the information industry of the United States, greatly increased network speed, memory speed and memory size of the chip and computer applications. Militarily, the United States set the goal of applying artificial intelligence to the military. Then, robots would fight on a battlefield instead of soldiers and computers would replace the co-pilot of a fighter. The plan of 20 G FLOPS (20 G Floating-Point Operations per Second) put forward by NASA was one of those plans. In television, the United States was the first to promote the advent of digital television. In 1991, the U.S. government determined to abandon the traditional analog TV technology and to develop the digital TV technology. In 1996, the government promulgated the technical standard for digital TV. In April 1997, the U.S. government gave up revenue of about $70 billion to offer a free digital TV broadcasting license and determined to abandon analog broadcasting in 2006. In the development of mobile phones, the United States did not follow the idea of Europe, and decided to adopt CDMA which was more advanced than GSM as its mobile phone standard. CDMA not only made more efficient use of channels, but also had the potential to directly interact with multimedia and computers. Although, at the turn of the 21st century, the slowdown of the information economy hindered the development of information technology, it was still one important part of U.S. scientific and technological strategy. In 2000, the government invested $850 million in information technology and telecoms and provided $110 million to develop the second generation of the Internet, which established the material foundation for the development of e-commerce. In 2003, the Bush administration increased the expenditure on computers, software and technical services from $49.8 billion in 2002 to $58.1, up by 17%. Soon after President Obama took office in 2009, he signed the "American Recovery and Reinvestment Act of 2009", which introduced a stimulus package with a total amount of $787 billion. Obama thought America's advantage in the Internet was being lost and the most advanced and modern information infrastructure needed to be developed as soon as possible, in order to support medical information, the smart grid, education, and broadband. An amount of $7.2 billion was supposed to improve the broadband access network, particularly in remote areas. The specific measures included: developing the next-generation broadband network to meet the needs of business and communication in the 21st century; encouraging cooperation between public and private sectors to popularize the network applications especially at school, at home, in libraries or hospitals; encouraging the diversification of the media to weaken the monopoly and encourage innovation; providing more free and responsible information for children and providing effective tools for parents to protect their children from exposure to undesirable information.

As far as the development of e-commerce in the United States is concerned, we have to mention the giant "IBM". IBM firstly launched the concept of

e-commerce in 1995. Then the Internet era arrived and a great many enterprises began to build websites and purchase IT infrastructure. In 2002, IBM brought in the concept of e-business on demand, thinking that e-commerce should change according to the features and development trend of different industries. E-commerce services became popular. In 2008, IBM introduced the concept of the smart planet which meant embedding sensors into all kinds of materials and forming the Internet of goods. Then the Internet of goods would be connected with the Internet to realize the integration of human society and the physical system. Once the smart planet was launched, the concept has been widely accepted by the world and has been a new development trend of e-commerce in the United States. The smart planet focuses on the whole business ecosystem. It not only includes enterprises, but also the government, communities and so on.

2.1.3   Orientation of U.S. E-Commerce Strategy

There are three levels of orientation of U.S. e-commerce strategy. Firstly, promote the rapid and sustained development of the relative industries by the construction of an e-commerce infrastructure. Secondly, promote enterprises to conduct e-commerce business by the implementation of U.S. e-commerce strategy. Lastly, promote global acceptance of U.S. technical standards and the legal framework of e-commerce to help U.S. enterprises open up the global e-commerce market. In short, the United States can gain sustainable and competitive advantages in the economy, science and technology and ensure its hegemonic status in the world. U.S. e-commerce strategy definitely complies with the national strategy.

U.S. e-commerce strategy was originated and formed in the Clinton administration. One reason is that Clinton was very successful with the economy. During the Clinton administration, the U.S. government achieved a financial balance, even a surplus. The other reason is that e-commerce was just in its infancy in the Clinton period. At that time, there was almost no law or policy about e-commerce. In order to ensure the smooth development of e-commerce, a number of strategic policies and laws relative to e-commerce were needed. There were no obvious changes in e-commerce after President George W. Bush took office in 2000, partly because the government had been busy fighting against terrorism since 9/11. The other reason was that the related strategy, policy and legal framework had been created in the Clinton period. So it remained to implement the strategy according to the existing problems. There were no other specific policies for e-commerce after President Obama took office in 2009. However, Obama launched an economic stimulus package with a total amount of $787 billion, which would provide a good macroscopic environment for the development of e-commerce.

2.1.4 Contents of U.S. E-Commerce Strategy

The United States takes its place in the front rank of world e-commerce. Although the United States has strong economic strength and highly developed information industry, in the development of e-commerce, the government also plays an important role with an e-commerce strategy that promotes the rapid development of e-commerce worldwide. After extensive study and analysis, we summarize the following e-commerce strategy points:

(1) Creating a perfect market and institutional environment for the development of e-commerce

As a new business mode, e-commerce needs a good market environment including a social environment, competitive environment, management environment, service environment and so on. So the government emphasizes the marketing of e-commerce and the leading role of private enterprises in the development of e-commerce. Meanwhile, self-regulatory industry standards and a proper institutional environment are needed. In addition, it is necessary for the government to establish proper relative laws and regulations, tax policy, electronic payment systems, intellectual property protection, information security and telecommunications technology standards. Now there are a set of operable standards and relatively satisfactory legal system. For example, President Clinton promulgated the *Internet Tax Freedom Act* in October, 1998, stipulating Internet access taxes were exempted for three years. In June 2000, the House of Representatives passed the *Electronic Signatures Act*, stipulating the electronic signature had the same legal effect as a written signature. In addition, the Clinton administration announced that the export restrictions on data encryption product keys to e-commerce and Internet communication would be eased and some strong data encryption products would be allowed to be exported.

(2) Promoting the globalization of e-commerce to pave the way for e-commerce in the United States to open up the global markets

The Internet is globally open, which makes an online international free trade zone come true. Therefore, we must break barriers among regions and nations to establish international trade rules and a legal framework, including the recognition of electronic contracts, acceptance of electronic signatures and other similar licensing schemes, a dispute settlement mechanism and authority-responsibility. To this end, the government took the lead in the implementation of an online tax-free policy. Meanwhile the government advocated exempting the online tax all over the world. In May 1999, President Clinton persuaded other counties to support the suggestion of a permanent tax-free regime in e-commerce at the WTO Ministerial Conference. Although there were all kinds of concerns, 132 members still signed the *Declaration on Global Electronic Commerce*, stipulating tariffs in all kinds of online trade would be exempted for at least one year. Later the period was extended several times, which effectively stimulated the enthusiasm of U.S. enterprises to develop e-commerce business and further promoted the development of e-commerce.

(3) Promoting the e-commerce standard or policies of the United States to be accepted all over the world

The government considered that a different or multiple management system of the Internet would prevent the development of free trade and global business. So the government devoted great efforts to the acceptance of a *Uniform Commercial Legal Framework* by other countries and international organizations according to the principles of the *Uniform Commercial Legal Framework* and other related policies. In fact, the *Uniform Commercial Legal Framework* gained widespread support from developed countries no sooner than the framework was introduced and became the basic principle for global e-commerce legislation and policies. In December 1997, the EU and the United States issued a joint declaration on e-commerce and reached an agreement on the establishment of "duty-free cyberspace". In May 1998, 132 members signed the *Declaration on Global Electronic Commerce*. Later, OECD countries accepted the proposal of tariff exemption. Meanwhile, the WTO approved the principle. In February 1999, the EU proposed establishing an international charter on coordinating global communication, especially in e-commerce. In addition, Japan and the United States issued a joint statement. In the joint statement, the two sides identified the common basic principles on tariffs, taxes, privacy, identity, etc. and emphasized the importance of cooperation in e-commerce. The joint statement indicated that the two sides intended to maintain and enhance the leading position by setting up the global e-commerce framework.

(4) Strengthening the investment in information infrastructure

On Sept. 1, 1991, the United States Senate passed The High Performance Computing and Communication Act of 1991 (HPCA) drafted by Al Gore who was a Tennessee senator at that time and later became the Vice-President of the United States. The bill was to build the "information highway" and the "highway" laid a fundamental path for American e-commerce development.

In 1992, President Clinton launched the idea of "the information superhighway" when he ran for the presidency. On Sep 15 1993, President Clinton issued The National Information Infrastructure (NII): Agenda for Action which illustrated the importance of a national information infrastructure, the principle of which should be followed when promoting the plan as well as the role the government must take and the benefits people would gain. "The information superhighway" was the foundation of e-commerce which not only suits the United States, but also the rest of the world. In 1994, the U.S. government proposed to build the Global Information Infrastructure (GII) to connect the whole world through satellite communications and a telecommunications cable network, forming the sharing mechanism and promoting the sustainable development of the world economy. "The information superhighway" construction has provided enormous economic and social benefits. During the first phase of the information highway construction, its success has brought great economic benefits and economic advantages for the U.S. economy during ten years. In 1999, the American government promulgated a "National Information Infrastructure" (NII) action plan, planning to invest $400 billion to gradually make all users accessible

to a telecom cable within 20 years. In 2000, the U.S. government invested $850 million in the information and communication industry. In addition, the government provided $1.1 billion for the development of the second generation of the Internet, to provide a material and technical base for the development of e-commerce.

(5) Leading the enterprises to develop e-commerce

Implement "pull from the front and push from the back" strategy to encourage enterprises to develop e-commerce.

The so-called "pull from the front" was to formulate some preferential policy to encourage enterprises to adopt e-commerce technology. For example, when the Internet business activities were not popular, the government invested in the Internet to make people use the Internet for free until the Internet ran well. In addition, the government stopped collecting tax for e-commerce transactions and provided priority for goods transacted by e-commerce to pass through customs.

The so-called "push from the back" was to implement some sanctions or punitive policies to force those enterprises with little enthusiasm to adopt e-commerce technology. In the Clinton period, all government procurement and government bidding had been carried out online. If enterprises did not adopt e-commerce, they would lose a large market. Meanwhile, transactions arrived at in a traditional way would be postponed. In addition, in order to expand the e-commerce market, the government stipulated that online shopping at all the levels of government should reach $450 million to cultivate the habit of online shopping. The U.S. government also developed a series of schedules to promote the informationization. The U.S. government announced in 1998 that import and export enterprises would lose their bidding rights for their export quota if they did not develop e-commerce transactions before January 1, 2000. Through the implementation of these measures, network and computerized financial services achieved fast development.

2.1.5   Effects of U.S. E-Commerce Strategy

The United States has obtained great competitive advantages from its information technology strategy which mean its economy has developed quickly for more than 10 years. Now the United States is far ahead of Japan in economic terms. The information strategy has created a large number of information companies such as IBM, Microsoft, Lucent and Cisco. Although we cannot predict how long the U.S. competitive advantage will last or what the final effects of U.S. e-commerce strategy will be, the preliminary results show that U.S. e-commerce strategy has brought rapid economic growth for two or three years and there is no sign the competitive advantage will be weakened. Meanwhile, the U.S. e-commerce strategy has created a large number of new information-based information service industry giants such as Yahoo, Amazon, Google and America Online. The construction of e-commerce infrastructure results in the rapid development of

software, the hardware industry and other related industries. E-commerce has brought a huge potential for rapid economic growth over a long period and the potential has not been fully realized yet.

Although e-commerce still occupies small size of the U.S. economy, e-commerce is growing at a rapid rate despite a recent economic downturn. Many new Internet-based companies and traditional producers of goods and services are committed to transforming their business processes into e-commerce processes to lower costs, improve customer service, and increase productivity. According to the Census Bureau of the Department of Commerce (Table 2.2), U.S. e-commerce sales in 2009 reached $3.4 trillion, up from $2.8 trillion in 2007 with a growth rate of 20%. E-commerce key sectors could be divided into B2B and B2C. B2B included the manufacturing business and merchant wholesales business while B2C included retail sales and selected services. B2B was still the main part of e-commerce in U.S., accounting for 91.2% of total e-commerce transactions in 2009. E-commerce transaction volume in manufacturing sectors reached $1.86 trillion, accounting for 55.2% of total manufacturing revenues in 2009. The transaction volume of the merchant wholesale was $1.21 billion, accounting for 35.9% of the total sales in 2009. B2C only accounted for 8.8% of total e-commerce transactions in 2009. The e-commerce transaction volumes in the retail and selected services were $145 billion and $153 billion respectively, accounting for 4.3% and 4.5% of total sales. Compared with revenues in 2008, total revenues and B2B e-commerce revenues declined because of economic depression. But retail e-commerce still increased in 2009 because people preferred to shop online for cheaper and more convenient purchase items.

Table 2.2 U.S. shipments, sales, revenue and e-commerce: 2009 and 2008 (billions of dollars)

Description	Value of shipments, sales or revenue				Distribution of e-commerce (%)	
	2009		2008		2009	2008
	Total	E-commerce	Total	E-commerce		
Total	20,144	3,371	22,470	3,774	100	100
B2B	9,602	3,073	11,630	3,482	91.2	92.3
Manufacturing	4,436	1,862	5,468	2,171	55.2	57.5
Merchant wholesale	5,166	1,211	6,162	1,311	35.9	34.7
B2C	10,412	298	10,840	292	8.8	7.7
Retail	3,638	145	3,953	142	4.3	3.7
Selected Services	6,774	153	6,887	150	4.5	4.0

From Fig. 2.1, we can see e-commerce in B2B and B2C has grown steadily since 2002. Only in 2009, there was a slight decline. But B2B declined faster than B2C because of the financial crisis. There was some rigid demand which would not vanish even in the financial crisis, especial basic demands such as food and

clothes. People preferred shopping online for cheaper goods so that B2C was still strong. Comparing e-commerce in B2B and e-commerce in B2C, we can see B2C grew faster. B2C in 2008 was over three times as much as that in 2002 while B2B in 2008 was just twice as much as that in 2002.
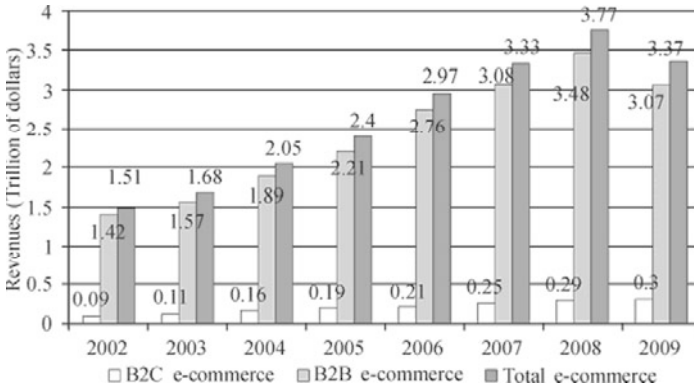
Fig. 2.1   B2B and B2C e-commerce in the U.S.
(Source: U.S. Census Bureau)

During these years, the U.S. e-commerce in manufacturing shipments and wholesale trade increased steadily in total except a slight decline in 2009. Comparing e-commerce in manufacturing shipments and manufacturing wholesale, we can see e-commerce in manufacturing shipments grew faster. The distribution of e-commerce in manufacturing shipments grew from 49.8% in 2002 to 57.5% in 2008 (Fig. 2.2), while the wholesale trade decreased from 44.5% in 2002 to 34.7% in 2008 (Fig. 2.3).
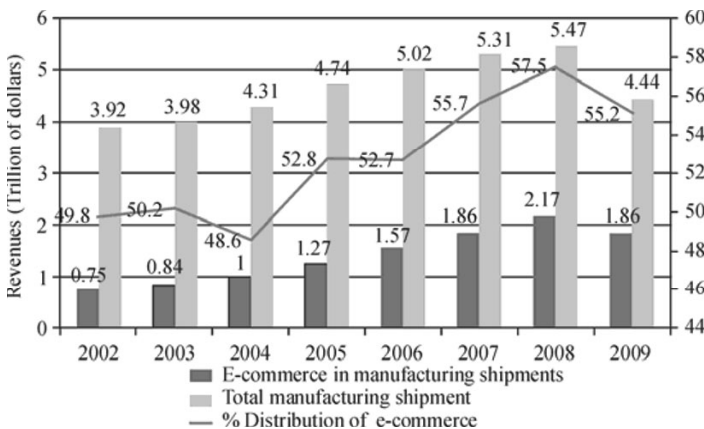
Fig. 2.2   The development trend of B2B in the U.S. manufacturing shipments
(Source: U.S. Census Bureau)
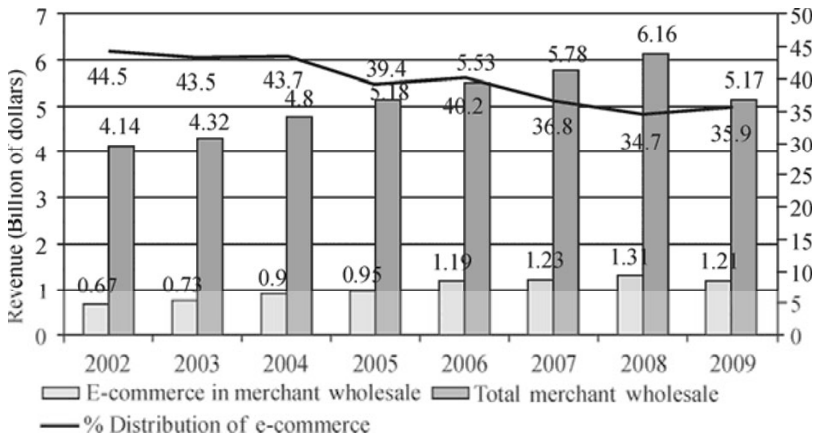
Fig. 2.3 The development trend of B2B in U.S. wholesale merchandise
(Source: U.S. Census Bureau)

During these years, the U.S. e-commerce in B2C increased steadily in total. Even in 2009, the distribution of e-commerce in B2C still increased from 7.7% in 2008 to 8.8% (Fig. 2.4). It can be seen e-commerce played a greater role in the financial crisis. The retail industry was one of the most important parts of B2C. From Fig. 2.5, we can see e-commerce in the retail industry increased in total although there was slight decline in 2006 and 2008.
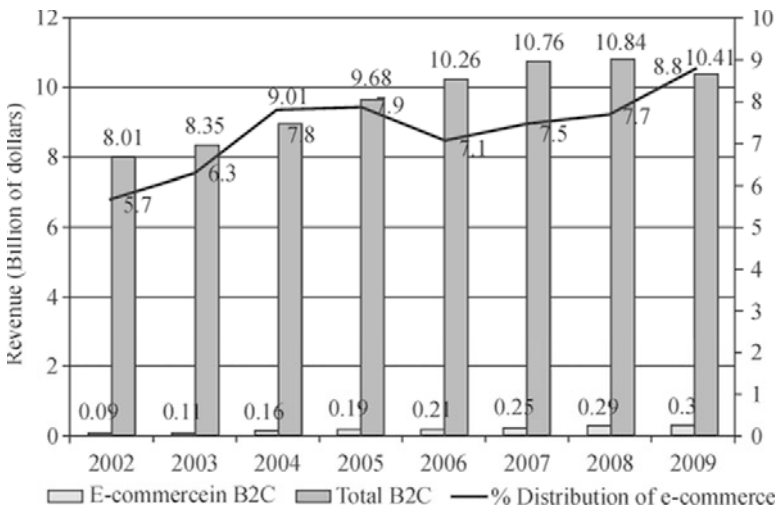
Fig. 2.4 The development trend of B2C in U.S.
(Source: U.S. Census Bureau)
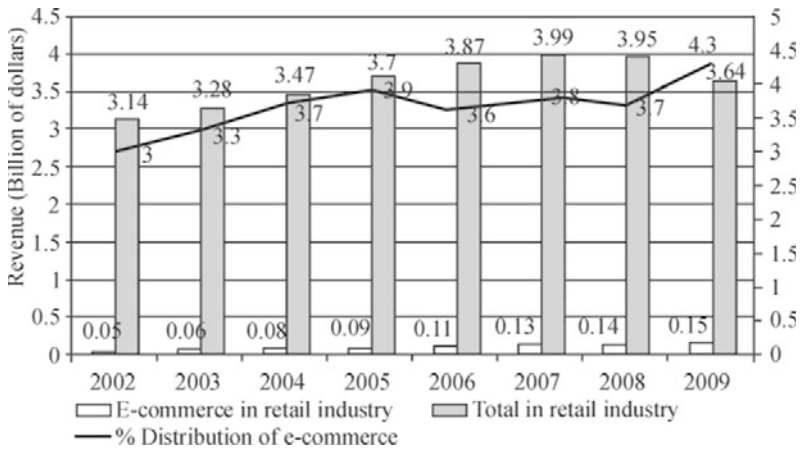
Fig. 2.5   The development trend of B2C in U.S. retail industry
(Source: U.S. Census Bureau)

In addition, the U.S. population that can access the Internet was estimated to be more than 205 million in 2010, accounting for more than 66% of the total population of the United States. At the same time, Forrester Research, an authority on e-commerce research, released a report entitled *US E-Commerce: 2005 to 2010*, which forecast and analyzed the trend in e-commerce in the United States over the next five years. Forrester forecast that the online retail sales in the United States in 2010 would increase to $329 billion. Moreover, online tourism would be the biggest sector in all areas of online sales[2]. According to another famous authority in e-commerce research in the United States, customer satisfaction with the e-commerce sector began to rebound in 2009, with a year-on-year increase of nearly 2%. The growth brought the aggregate score for the sector to 81.4, nearly matching its 2007 pre-recession high of 81.6. All scores reported were using the 100-point scale of the American Customer Satisfaction Index (ACSI)[3].

A range of policy issues would affect the future of e-commerce activities such as taxation, encryption and electronic authentication (i.e. digital signatures), intellectual property protection (i.e. patent or copyright infringement), computer network security, privacy safeguards for individuals and organizations, and telecommunications infrastructure development. Now some of them are under discussion and the others have been well completed such as telecommunications infrastructure. Meanwhile, e-commerce is one kind of global activity involved in issues including national boundaries and it means that domestic and global e-commerce policies will become increasingly intertwined.

2.2 European Union

2.2.1 EU Basic Conditions

The European Union (EU) is an economic and political union of 27 member states, located in Europe. The 27 member states include France, Germany, Italy, The Netherlands, Belgium, Luxembourg, Denmark, Ireland, United Kingdom, Greece, Spain, Portugal, Austria, Finland, Sweden, Poland, Hungary, Czech Republic, Slovakia, Estonia, Latvia, Lithuania, Slovenia, Malta, Cyprus, Romania and Bulgaria. Besides the 27 member states above, the EU has signed some specific agreements with some small countries in Europe such as Monaco and Andorra. The EU has developed a single market which ensures the free movement of people, goods, services and capital, including the abolition of passport controls by the *Schengen Agreement* between 22 EU and 3 non-EU states. Sixteen member states of the EU have adopted a common currency, the EURO, as their legal tender, forming the Eurozone. With over 500 million citizens and a territory of 43,256.75 million square kilometers, the EU has become the largest economy in the world, generating nominal GDP of 16.28 trillion in 2010 [4]. Its GDP nearly accounted for one fourth of total nominal GDP of the world.

The EU traces its origins from the European Coal and Steel Community formed between six countries, France, West Germany, Italy, the Netherlands, Belgium and Luxembourg in 1951. The Treaty of Rome was signed in 1957 by the same states to create the European Economic Community. Since then, it has grown in size and in power through the addition of policy areas. In 1967 the Merger Treaty created a single set of institutions for the three communities, which were collectively referred to as the European Communities (EC). In March 1979, the EC formally established the European currency system which laid a foundation for the European single currency. In 1985, the Schengen Agreement led the way toward the creation of open borders without passport controls between most member states and some non-member states. In 1986, the Single European Act was signed, an agreement to dismantle barriers to internal trade at the end of 1992. On December 9 1991, the EC held a special summit and signed the "European Economic and Monetary Union Treaty and Treaty of the European Union", that is "the Maastricht Treaty." On November 1, 1993, the Treaty of the European Union was approved by all members and came into force. The European Community was formally renamed the European Union (EU). Since then, the single market has been established. Goods, capital, services and people could freely move within the EU member states. .

The EU is the largest economy with a unified economic, fiscal, monetary, foreign and security policy composed of many countries. However, different countries are in different situations. Germany, one of the EU member states, is the world's fourth largest economy with nominal GDP of $3,315.6 billion in 2010. However, Malta, only with nominal GDP of less than $7.8 billion in 2010 is also

one of the EU member states.

The objective of the EU is to coordinate the economic, fiscal and monetary policy among the member states, use the single currency, implement a unified foreign and security policy, strengthening the cooperation in judiciary and internal affairs.

Although no single country in the EU has obvious advantages in the information industry, the EU has a strong advantage as an economic union. The EU's competitive industries almost cover all the critical areas of the information industry such as semiconductors, computers, consumer electronics, communications and software.

Currently, the EU's economic strength has surpassed the United States, ranking it first in the world. With the enlargement of the EU, the EU's economic strength will be further strengthened. There will be greater market size with new entrants into the EU. Moreover, the EU has a relatively free policy of exchange and cooperation, especially with some developing countries such as China. So the EU can be called an economic giant.

2.2.2   Background to EU E-Commerce Strategy

In the mid and late 1990s, the information industry had become the industry that attracted most investment, the fastest growth and the biggest potential for creating new jobs. Western media called it a "new economy", "digital economy" or "network economy". In fact, it was an economic revolution caused by information technology.

In the economic revolution, the European Union has been strongly developing information technology to improve the level of informationization. In 2009, the European digital economy continued to grow both in scale and scope. In the European Union, 60% of the population uses the Internet regularly (Fig. 2.6); Internet broadband can cover 94% of the population, 56% of households and 83% of enterprises. The rapid development of information technology and communication technology has brought a huge boost to the economy of the European Union. Between 1995 and 2004, nearly half of the increased productivity in the European Union was owing to the development of information technology.

However, the information industry in the European Union fell behind that of the United States, on the whole. The proportion of investment in information technology as part of GDP in the European Union and per capita investment were only half of that in the United States. The ICT (Information and Communications Technology) industry in Europe contributed about € 600 billion to GDP, accounting for 4.8% of the total GDP. Meanwhile, most of the research and development activities had achieved commercialization through production processes on a small scale, which were only 25% of all the research and development activities in the European Union.

Now there is only 1% of the population in the European Union who use an optical fiber high-speed network while it is 12% in Japan and 15% in Republic of Korea. Sixty percent of the population in the European Union uses the Internet regularly while about 30% have never used the Internet. The main factors that affect the percentage are age and education level. Large-capacity broadband is still at a preliminary stage presently. Although 80% of the fixed lines can sustain a network speed over 2 Mbps in the European Union, only 18% of the lines can achieve a speed over 10 Mbps. But in fact the speed is even slower. In addition, the degree to which different countries and different socio-economic groups use the network is not exactly the same. Young people are the main participants [5].
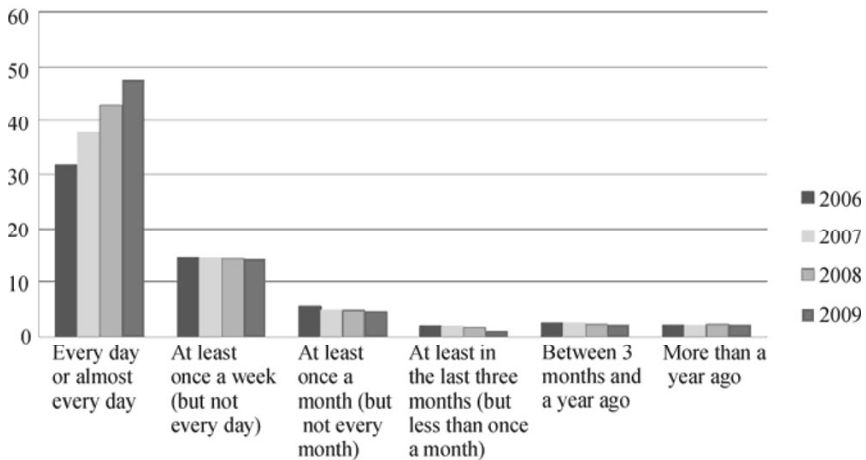
Fig. 2.6 Internet use as a percent of population (EU-27) by usage frequency
(Source: European Statistics)

Moreover, the information and communication technology professionals are getting scarcer day by day. It is estimated that there will be a shortage of 700,000 technical staff to meet demand in 2015 [6].

Development in the 27 countries of the European Union is very uneven. The Internet popularization rate in Nordic countries is higher than that in the United States, while it is far below the average level in the other European countries. This difference is even more obvious since the joining of the 10 countries of Eastern Europe, such as the Czech Republic, Estonia and Cyprus. For example, the development levels of e-government in Western Europe and northern Europe, such as Denmark, Austria and the United Kingdom, are high and in the forefront in the world but not in central and Eastern Europe.

The Internet access charges in the European Union are generally higher than those in the United States and Canada. It is proven that high Internet access fees mean a low Internet access rate. In the provision of website content, Europe falls behind the United States. The basic applications, such as email, web browsing, downloading of videos, can be fully sustained, but it cannot meet the high demand for high-definition television, high-speed downloading of images, and

simultaneous access to the Internet by family members etc.

Therefore, the development of e-commerce and e-government in different countries of the EU is not at the same level. There is a huge discrepancy among different social strata in getting public information. According to the data provided by the European Union Ministerial Conference held in Lisbon, Portugal, in December 2007, about 60% of the population of the European Union had access to government services, the latest news, the latest ways of social communication and the protection of consumer's rights to get more opportunities for advancement. However, about 30% to 40% of the population of the European Union was excluded from that lifestyle. They could not enjoy government services using mobile devices, computers or networks [7]. In Europe, 54% of network users used e-commerce (buying or ordering online), but only 22% ordered goods from other countries in the European Union. More than 60% of cross-border transactions could not be made as the seller refused to deal with cross-border consumers.

To sum up, the relative weakness of the European Union mainly includes: high cost of Internet access and e-commerce, slow speed and low security, low popularization of information technology and knowledge, unbalanced distribution of informationization and so on.

In such situations the European Union is confronted with many challenges and fierce competition. It must make policy, strategy and undertake specific measures so as to advance in the information society, and realize the potential of information technology in promoting development, employment and social coordination. Europe has to strengthen political cooperation, be committed to the development of e-commerce. The *Digital Agenda* was launched on the understanding that the European Union faces the challenge and competition of the information society. The European Union wishes to make use of the "European digital plan" to promote the development of the digital economy and further win the information war. The European Union has realized that it is necessary to retain a leading position in some critical technological domains. Meanwhile, the European Union has to fully understand its disadvantages, sustain the strong and support the weak so as to catch up, take actions promptly to guarantee that the European Union is still the most competitive economic entity in the economic revolution. This is the e-commerce background of the European Union.

2.2.3   Orientation of EU E-Commerce Strategy

Due to various reasons, the overall level of information development in the European countries appeared to be lagging behind the United States and Japan, and the digital gap was becoming more and more apparent. In this case the EU, in such a dangerous state, decided to make some changes and develop the information industry, where competition is very fierce.

European began to develop the digital economy in the 1990s. At the beginning of this century, the EU found it lagged significantly behind the United States,

Japan and Republic of Korea in the field of information and communication technology. It was determined to catch up. In 2005, in order to construct the Information Society the EU launched a five-year strategic plan *i2010 Strategy*, proposing to enhance three important focal areas of the digital economy in 2010: First, remove the internal market barriers, create a unified European information space, take a united organ to coordinate and operate the telecommunications network services and operations of the whole EU, establish rich contents and numerous channels of information, support the creation and accession of enterprises to online content, and ensure the construction of a safe high-speed network. Second, raise the research investments in information and communication technology, encourage enterprises to make use of information and communication technology to improve labor productivity, so as to make information and communication technology one of the main driving forces of economic growth. Third, eliminate digital illiteracy to ensure that European citizens have some basic information and communication skills, such as text and data processing capabilities, provide more on-line public services such as e-government, e-commerce, e-learning, etc.

Today, as the i2010 strategic plan has already been completed, the informatization level in the EU has been significantly improved. At the same time, EU informatization development has effectively enhanced EU economic growth and has played an important role in the European social structure, social dynamics and so on. All EU leaders focus on raising the level of informatization. Particularly after the international financial crisis, the European Union must strive to develop information technology to seek for an effective way out of the crisis and revitalize the economy. The EU put forward a budget of €6 billion in 2009 and 2010, of which €5 billion was for the pan-European energy networks and broadband infrastructure, €1 billion to speed up the network upgrade.

The announced "European Digital Plan" is a significant part of "European Strategy 2020" to achieve stable, sustained and overall economic growth. Differing from the statement of the U.S. e-commerce strategy, the statement from the EU includes much more pragmatic components rather than the domineering components of the U.S. strategy. The statement of the EU e-commerce strategy is to vigorously develop the competitive information industry, and strive to surpass the U.S. in mobile communications. By implementing the e-commerce strategy in the EU and speeding up the construction of the European information highway, the European Union will be the most competitive economy in the world before 2020, and will promote the rapid development of the European economy for a long time. The EU is looking forward to gaining the dominant position in aspects of e-commerce law, standards and technology, as the largest economy.

2.2.4 Contents of EU E-Commerce Strategy

The Digital Agenda was officially launched on May 19, 2010, which identified what Europe needed to focus its efforts on to put this virtuous cycle in motion.

The agenda outlined seven priority areas for action:

(1) Creating a digital single market

The EU is composed of 27 member states. Although the 27 member states have a similar culture, there are still some differences in many aspects, such as regulations, laws, etc. Europe is still a patchwork of national online markets. Commercial and cultural content and services need to flow across borders, which should be achieved by eliminating regulatory barriers and facilitating electronic payments and invoicing, dispute resolution and customer trust. It is necessary to create a digital single market to benefit from this. More can be done and must be done under the current regulatory framework to put in place a single market. In order to achieve the goal, the EU plans to do the following: MY NOTE: we are already in 2013! The info below is already old. Have these plans happened yet?

➢ Simplify copyright clearance, management and licensing. By the end of 2010, the Commission will have proposed a framework Directive on collective rights management to enhance governance, transparency and Pan-European licensing for (online) rights management. The situation will be reassessed in 2012.

➢ Build a single market for online payments. Currently, few people in the EU can buy from another country online. Cross-border Internet shopping orders fail due to technical or legal reasons such as refusal of non-domestic credit cards. Establishing an online payment for cross-border shopping is necessary.

➢ Foster private and public e-commerce by modernizing e-signature rules in 2011 so that secure e-authentication is interoperable and recognized across borders.

➢ Strengthen citizens' rights and enhance their confidence by updating the EU's data protection regulatory framework by the end of 2010.

➢ Make sure that consumers are well protected in cyberspace by issuing a digital code that summarizes the rights of citizens in a cyber world in a clear and accessible way. Currently many consumers find it difficult to know what their digital rights are, especially when these are scattered across various complex legal documents.

➢ In order to give consumers the confidence that they can get a fair deal online, the EU online Trustmark and EU-wide online dispute resolution system for e-commerce transactions are being planned.

(2) Improving the framework conditions for interoperability between ICT products and services

In order to reap the full benefits of ICT deployment in Europe, it is essential to enhance the interoperability between devices, applications, data repositories, services and networks. There are various ways to improve the framework conditions for interoperability, one of which is to ensure that good ICT standards are available and used, notably in public procurement and legislation. Furthermore, the Commission plans to achieve better coordination between e-government and other public services by implementing a new European interoperability strategy.

(3) Boosting Internet trust and security

Without trust and security, people will not engage in any online activities. It is essential to address the rise of "cyber crime" and develop responsive mechanisms.

Meanwhile, the multiplication of databases and new technologies raise new challenges. The issues of privacy and the protection of personal data must be effectively solved online and offline. In order to achieve the goal, the EU plans to do the following:

➢ Set up a European rapid response system to cyber-attacks, including a network of Computer Emergency Response Teams (CERTs), and the European Network and Information Security Agency (ENISA).

➢ Formulate tougher laws to combat cyber-attacks against information systems.

➢ Support hotlines where children and parents could report illegal content online and work with EU countries to offer the teaching of online safety in schools.

➢ Operators and service providers will be obliged to notify breaches of personal data security. In addition, the obligation will be extended by the ongoing review of the EU's general data protection framework.

(4) Guarantee the provision of much faster Internet access

With competitively-priced fast and ultra-high-speed Internet, more and more people will be willing to use the Internet, which will give a fundamental boost to the development of e-commerce. The EU aims to bring basic broadband to all Europeans by 2013 and to ensure that, all Europeans would have access to much higher Internet speeds of above 30 Mbps and 50% or more of European households would subscribe to Internet access above 100 Mbps by 2020. In order to achieve this goal, it is developing a comprehensive policy, based on a mix of technologies, focusing on guaranteeing universal broadband coverage (combining fixed and wireless) and the take-up of next generation access networks (NGA) in most parts of the EU to get the speed above 100 Mbps. Meanwhile the EU and member states will stipulate many relative documents to encourage investment in competitive Next Generation Access networks.

(5) Encouraging investment in research and development

In order to achieve the goal, the EU plans to do the following: The ICT industry is a fast-developing industry in which the technology changes fast and research and innovations are continually required. Meanwhile, information technology has been implemented in the whole of European industry. If the investment in ICT R&D is not enough, the entire EU manufacturing and service sectors will be affected. Now the EU public sector spends less than €5.5 billion per year on ICT R&D, far below the levels of competing economies. In addition, market fragmentation and widely dispersed research funding limit the growth and development of ICT innovative businesses. In order to achieve the goal, the EU will leverage more private investment through pre-commercial procurement and public-private partnerships, by the use of structural funds for research and innovation and by maintaining a 20% yearly increase in the ICT R&D budget. Moreover, the Commission will also develop 'light and fast' ways for SMEs and young researchers to access EU funding for ICT research. Last but not the least, the member states will increase their investments in ICT R&D, to about double of annual public expenditure.

(6) Enhancing digital literacy, skills and inclusion

Nowadays, using the Internet has become an integral part of daily life for many Europeans. Those who rarely use the Internet are largely made up of people aged 65 to 74 years old, people on low incomes, the unemployed and the less educated. In addition, Europe is suffering from a growing professional ICT skills shortage and could lack competent practitioners to fill as many as 700,000 IT jobs by 2015. In order to narrow the gap, the EU plans to do the following:

➢ Bridge the digital skills gap by promoting greater coordination of ICT skills initiatives at Member State level, especially by proposing digital literacy and competences as a priority of the European Social Fund.

➢ Promote the supply and demand of ICT skills in the labor market by developing tools to identify the competences of ICT practitioners and users.

➢ Ensure that the public services websites provided are accessible to all citizens, including the elderly and persons with disabilities.

(7) Apply ICT to address social challenges such as climate change, rising healthcare costs and the ageing society

Applying ICT properly can address social challenges such as climate change, rising healthcare costs and the ageing population. To achieve these goals, the EU plans to do the following[8]:

➢ Ensure that the ICT sector leads the way in reporting its greenhouse gas emissions, opening the way for other energy intensive sectors to follow.

➢ Set-up wide-scale pilot actions that give Europeans secure online access to their medical health data so that, wherever they are, they can also give doctors access to their medical records.

➢ Increase safety and medical assistance to Europeans.

➢ Propose a sustainable model for financing for the EU public digital library and for digitizing Europe's cultural works.

➢ Make e-government an everyday convenience for European citizens and businesses by establishing a list of common cross-border services.

2.2.5   Internet Use and E-Commerce in the EU

Because the Digital Agenda was only launched in 2010, effects cannot be seen right now. However, the EU *i2010 Strategy* has been completed and we can now see the results of *i2010 Strategy*. As mentioned before, the EU *i2010 Strategy* has three goals: to boost the single market for businesses and users, to stimulate ICT research and innovation and to ensure that all citizens benefit from Europe's lead in ICT. Over the past four years, ICT policies have confirmed their role as a major factor in Europe's economic and social modernization and have made Europe more resilient in times of financial crisis. In addition, e-commerce has developed, although cross-border e-commerce has not yet developed satisfactorily, which limits the impact of the Internet on the single market. Now let us take a look in more detail at the development of Internet use and e-commerce in the EU.

● Internet use

Now the number of regular Internet users is more than half of the total population, increasing from 43% in 2005 to 56% in 2008. Regular Internet use is becoming more inclusive. More and more disadvantaged groups (the inactive, the less educated and those between 55 and 64) have started to use the Internet in their daily lives. In addition, the EU has become the largest broadband market in the world with 114 million subscribers. Half of all European households and more than 80% of European businesses could access broadband Internet in 2009. With the extensive use of the Internet habits have changed a lot, especially in the means of communication. Now there are 80% of regular Internet users engaging in increasingly interactive activities, online financial services, sharing and creating new content and innovations. More and more online public services are provided, especially since the implementation of e-government. The supply of available services to citizens has increased from 27% in 2004 to 50% in 2007 while the supply of available services for businesses has increased from 58% in 2004 to 70%. About one third of European citizens and almost 70% of businesses in the EU use e-government services. Meanwhile, the investment in the ICT industry has largely prompted the development of information technology [9]. The EU has broken into Giant Magneto-Resistance technology, which revolutionized the hard disk business and won the 2007 Nobel Prize in physics. ADSL technology also has achieved rapid development as the basis for broadband Internet.

● Technology research and innovation

The EU fell behind the US, Japan and Republic of Korea at the field of ICT in the first decade of the 21st century. So the EU has increased the investment in ICT and launched many research programs to support the development of ICT and e-commerce development. The EU passed its largest budget of more than €10 billion for ICT research and innovation from 2007 to 2013. There are also many research programs such as the Future and Emerging Technology schemes to support high-risk research to maintain EU's competitiveness in ICT. Meanwhile, the EU has invested a lot in e-infrastructure including GEANT, grids, supercomputer and data repositories that may be the most popular and important technologies in the future. In addition, the EU is committed to establish the partnership between public sectors and private sectors. In order to help EU industry achieve the leadership, the EU launched the *Artemis* and *Eniac* Joint Technology Initiatives, and the *Ambient Assisted Living* Initiatives. The *Artemis* and *Eniac* Joint Technology Initiatives focus on embedded computing systems, nanoelectronics address technologies to keep manufacturing competitive while the *Ambient Assisted Living Initiatives* focus on developing new digital solutions for Europe's elderly people. Moreover, the EU is devoted to design and establish a future Internet with faster speed, more data, more IP addresses and more security so that it can provide better infrastructure for the development of e-commerce. RFID technology is also one kind of important technology the EU is committed to develop. Although technology research and innovation is very important to develop e-commerce, marketing and good services are the key to the e-commerce growth. Considering the imbalance among member states of the EU, the EU has

made a great effort to coordinate research and innovation in Europe. The EU issued a renewed strategy for ICT research and innovation to facilitate the emergence of new markets and businesses for ICT [9].

● E-Commerce

With widespread Internet use, more and more Europeans go shopping online. The number of Internet users who ordered goods or services increased from 47% in 2006 to 54% in 2009. Taking the base into account, the United Kingdom and Denmark have achieved significant increases, although the growth rate is not high. Meanwhile some countries such as Poland, The Netherlands, Estonia, Latvia, United Kingdom, Cyprus, France and Belgium, have achieved faster development in e-commerce, gaining between 12% and 22% in the last three years. Compared with purchasing online, the Internet is mostly used to find information about goods and services. But it also has relevant economic effects because the information gathered online can help consumers purchase online or offline. The proportion of online purchase is between 30% and 80% while offline purchase is between 50% and 90%, depending on the country. In addition, travel and accommodation are the most popular categories among services while clothes and sports are the most popular categories among goods. Meanwhile, online financial services are becoming more and more popular.

Concerning enterprises, the average proportion of e-commerce turnover that was e-commerce in the 27 EU countries increased from 12% in 2007 to 13% in 2008. However, more and more enterprises are willing to purchase online instead of selling online because selling electronically requires setting up an IT infrastructure whereas buying online only needs access to the Internet. Among those enterprises selling electronically, tourism companies are the major ones, followed by information and communication and trade sectors. The machinery and electrical equipment sectors also play an important part, with online sales accounting for 23% of the total turnover. Moreover, more and more enterprises have their own websites to display their products, not only large enterprises but also small enterprises. In 2009, the average proportion of enterprises which had their own websites had increased from 61% in 2005 to 65% in 2009 (81% of small and medium enterprises and 90% of large enterprises).

However, cross-border e-commerce has not achieved great development because of the maturity of domestic e-commerce, the legal barriers, the size of the country and linguistic problems. The growth was just from 10% of Internet users in 2008 to 12% in 2009. In addition, the development of cross-border e-commerce is different in different countries. The cross-border e-commerce in Denmark and Finland developed better. Some countries such as Cyprus mainly depend on selling goods and services to other EU countries with a common language. Other countries such as France, The Netherlands, The United Kingdom and Sweden have a small market for cross-border e-commerce but a large domestic market. There are also some countries with low levels of both domestic and cross-border e-commerce [10].

2.3   Japan

2.3.1   Introduction to Japan

Japan is the most developed country in Asia. As of 2010, Japan is the third largest national economy in the world in terms of both nominal GDP of U.S. $5.4 trillion and the PPP of U.S. $4.3 trillion.

As an island country, the national surface-area of Japan just covers 377,873 square kilometers. About 75% of the national surface-area is taken up by mountainous regions and hills, and is unsuitable for agriculture. In addition, Japan is short of natural resources so that Japan has to import most kinds of materials. 94.7% of coal, 99.7% of oil, and 96.1% of natural gas are all imported. So how did Japan achieve such fast economic development? Japan is an export-oriented country. Its GDP mostly depends on imports and exports. Because Japan has no advantages in resources, Japan focuses on the development of core technology.

During the ten years from 1945 to 1955, the government carried out the reform of the economic system, realizing the transformation from a ruled economy to a market economy. From then on, the economy of Japan began to grow fast. During the 15 years from 1956 to 1970, the actual GDP rose 9.7% every year, exceeding the UK in 1965, France in 1967, and West Germany in 1968, quickly becoming the world's second economic power behind America. Since then, Japan was the world's second economic power until China became the second in 2009. Japan's main industries include steel, automobiles, engines, ship building, petroleum and chemical products, electronics and industrial machinery. In Japan, the transportation and communication industry are quite well-developed, which provides a great foundation for the development of Japan's economy. Large harbors such as Kobe, Yokohama, Tokyo, Nagoya, Chiba etc. are the ones whose annual throughput exceeds a hundred million tons. The total length of the railways exceeds 30 thousand kilometers and many high speed railways connect the industrial regions, forming a convenient railway network. The urban subway systems are quite well-developed and efficient. There are 1.2 million kilometers of public road, among which more than 100,000 kilometers are express highway. Air traffic is efficient, owing to large international airports such as Haneda, Narita, Kansai, and Fukuoka. The postal system is also well-developed, especially to individual homes. There are large shopping centers and wholesale markets spread all over Japan. Convenience stores exist everywhere and are of great help to local residents. This basic infrastructure is a benefit in the development of e-commerce.

Japan has a powerful information industry, in research and manufacturing, second only to America with sophisticated products. It owns a large amount of proprietary technology, has high labor productivity, advanced operations and management and excellent worldwide marketing and distribution. As it is superior in many specific products, this has a crucial effect in the development of the worldwide information industry. Japan is also second only to the United States in

developing products and in market share. In the key computer technologies Japan is just behind the United States. As for technologies like data compression and laptop displays, Japan is also in a leading position. The growth of the information industry helps in the development of the Japanese economy, and the output of the information industry helps to increase the whole industrial production in Japan.

2.3.2   Japan's Information Industry Strategy

Information technology development in Japan can be divided into three stages, and different stages have different strategies: The strategy of the first phase was largely importing. The strategic aim of the first phase was to rapidly narrow the gap with Europe and the United States, adopting a "used" policy, introducing a large number of advanced technologies from Europe and the United States, and access to patented technology through the payment of transfer fees. As early as 1957, the Japanese government passed the Electronic Industry Promotion Act, aimed at electronics and "micro" technologies. To enable Japan to take the lead in the development of the micro-chip industry, they have taken the following strategy: Introduced advanced key technologies from the West, made appropriate improvements and sold at a higher price in the domestic protected market. Then, they penetrated the overseas market at lower prices, with leading critical components and chips sold in large numbers. When they occupied a particular market share, they raised prices of the critical components and more advanced products to foreign consumers and earned high profits. The results of the first phase achieved the strategic goal of narrowing the gap with Europe and the United States.

The second phase was to develop Japan's own self-development of the technology. The strategic goal was to become the leader in information technology by following Europe and the US. The government established a strategy "*Building the Country through Science and Technology*", emphasizing basic research and self-development of technology, through technology-intensive and mentally intensive "software technology" implementation. There were two specific measures: firstly, to develop and implement the "Technology City" program in the 1980s, making use of the research achievements of universities and research institutes to realize rapid industrialization. The development mainly focused on electronics, biology, software and other high-tech industries. Secondly, in July 1986, they formulated the "*Industrial Development Promotion Law of High-Tech-Intensive Areas*" to promote the development of high-tech industries and establish a series of high-tech parks, such as Kyushu Silicon City, Tsukuba etc.

Through the development of the first two phases, especially the great success of microchips, Japan has become a leader in the information industry. Between the late 1980s and the early 1990s, Japan owned six of the world's top ten micro-chip companies, five of the top ten electronics companies. In 1996, the Japanese

information industry's production amounted to 37.52 trillion yen, accounting for 11.4% of the total amount of Japan's industrial production. The information industry had become a locomotive for economic development. Since 1996, the number of patent applications in Japan has surpassed the U.S., ranking first in the world.

The third stage was to strengthen international technical exchange and cooperation, using the world's technical personnel to serve Japanese information technology development to maintain the leadership of Japan's information technology. The first main measure adopted was to increase the investment in research and development. The Japanese National Institute of Science and Technology increased the total budget to 162 billion yen in 1997, up by 14% compared to previous year. The second measure was to establish a large number of multinational research institutions. Japanese companies set up 224 research institutes in the United States, more than any other country. Japan also signed a wide range of bilateral scientific and technological cooperation agreements with other countries, in which the *Japan-US Science and Technology Agreement* planned cooperation in 50 projects in 1991 alone. Japan also established a ten-year plan for "*Developing 5th Generation Computer Project*", aiming to "overthrow IBM", and this was implemented as MITI's national project.

In 2000, the Strategy Headquarters of Japan established the e-Japan strategy, aimed at making Japan the world's most advanced IT country, which clearly stated, "by 2005 we will build an environment in which 30 million families can access broadband Internet and 10 million families can access ultra-wideband (30–100 Mbps) Internet". This goal had already been reached ahead of schedule in 2003. On July 2, 2003, Japan's IT Strategy Headquarters, whose minister was Prime Minister Junichiro Koizumi, established the *e-Japan Strategy II* which adjusted the focal points and the development direction of information technology. *E-Japan Strategy II* clearly stated that targets of the e-Japan strategy of popularizing information and communication infrastructure in November 2000 have been fulfilled ahead of time. Japan's information technology will shift to "support using information technology and create a new industry in the medical, food, life sciences, SME finance, education, employment and administrative fields".

After the first IT revolution, which was marked by coming to an end ahead of schedule, the Japanese government put forward the development direction for u-Japan (where the "u" abbreviation for ubiquitous means "everywhere"), following on from e-Japan. The release of u-Japan strategy meant that Japan formally entered the second IT revolution.

In u-Japan, the idea of everywhere is expressed as a u (ubiquitous) and is u-universal, u-user-oriented and u-unique. U focuses on infrastructure, guides the infrastructure driven by technology, and connects all people and objects in series by the "everywhere" infrastructure, achieving the goal of "anyone, anywhere can access the Internet at any time to find anything". The three small 'u' focus on promoting the results of future expectations: universal to let everyone (including the elderly and physically and intellectually disabled people) easily use it,

achieving more intimate contact between people and communication; user-oriented stresses that the new product should pay attention to the user's convenience, combining the user-oriented and production-oriented; unique means a social personality and vitality springing up through ICTs, creating new business forms and services, and creates a new social system and values which means that it activates resources to promote regional regeneration. Compared with the e-Japan, u-Japan has achieved a new leap forward. For example, in broadband, u-Japan not only has promoted the development of the broadband infrastructure, broadband technology is also proposed as a useful tool in life and industry, creating an environment in which the seamless way is used in the wired and wireless Internet. In addition, *u-Japan* also proposes to use ICTs to solve social problems. In *e-Japan*, Japan had proposed the goal that 30 million families could achieve high-speed Internet access and 10 million ultra-high-speed Internet access. But some cities cannot use xDSL technology access. In view of this situation, u-Japan proposed to increase the overall level of broadband so that all Japanese can use a high-speed or ultra-high-speed network in 2010.

At present, the Japanese government is actively implementing *i-Japan2015*, which was proposed in 2009, hereinafter referred to as *i-Japan*. It hopes, through the implementation of *i-Japan*, to develop Japan's new industries which support the development of the long-term economy, to strive to develop environmental technologies which are presented by green information technology and intelligent transport systems and other major projects. Compared to early IT development policies, the perspective of policy planning was changed. Previous information strategy emphasized the R&D of digital technology, demanded a comprehensive industrial development. Summing up the past, *i-Japan* now pays more attention to people's needs, focusing on creating the digital society which is accepted by most people, through the application of digital technology, bringing the lives of Japanese the greatest convenience. *i-Japan* comprises three key components, setting up e-government, health care and education, activating industry and nurturing new industries, as well as rectifying the digital infrastructure. In the specific measures there are many strategies deserving concern. For example, in the building of e-government, the setting up of a chief information officer (CIO) by amending the law, to be responsible overall for e-government and administrative reform, and equipping a team of experts to help explore new mechanisms to promote e-government. Widespread implementation of the "National Electronic Personal-Mail" will mean people can access and manage tax information, pension records, military service documents and personal health insurance information and other information related to various administrative matters. In addition, *i-Japan* plans to further improve the digital infrastructure, making an ultra-high-speed broadband upgrade to "fixed broadband speeds up to Gb-class and a mobile broadband speed of 100 Mb-class".

From *e-Japan* to *u-Japan* then *i-Japan*, the information construction in Japan will have achieved a "triple jump" within 15 years.

2.3.3   Background to the Japanese E-Commerce Strategy

From the 1950s, by exploiting the technology gap between home and abroad, Japan's economy maintained rapid development for nearly 40 years, by introducing new technologies. At the same time, the information industry had leapfrogged the United States. In the 1970s and 1980s, even through the oil crisis, Japan's economy still grew at high speed, making many Japanese optimistic that they could become the world's largest economy with a little more effort. However, when it came to the 1990s, a big reversal happened. The information industry in the United States was booming and the economy kept growing rapidly. Because of a bubble the Japanese economy burst, the banks' had bad debts and other issues. The Japanese economy has been in the doldrums and that has resulted in a "lost decade." Japan had been unable to shake off the recession following the deflation which appeared in 1991, while in the United States the so-called "new economy" represented by the information industry grew up and a number of information industry giants such as IBM, Intel, Microsoft, Cisco, Lucent, Amazon, AOL, Yahoo, Google etc. were born. The new economy stimulated robust U.S. growth for 10 consecutive years, while Japan lost its drive. After ten years of development, the United States once again had flung Japan far behind.

Recalling the painful experience, the reason why they missed a golden opportunity to overtake the U.S. and why the economy fell into trouble, the Japanese believe can be attributed to the fact that they lagged far behind the United States in information technology, so Japan decided to catch up. Based on such a clear understanding of the huge gap, the Japanese government proposed the "Construction of a High Degree of Information Society", and this quickly evolved into the strategy "support Japan by the Information Industry". In this case, the focus on the application of information technology gradually shifted to e-commerce. The development of information technology almost needs no materials to be imported, only a need to use local resources, and this has avoided the disadvantages of limited resources, to the advantage of Japan. So Japan, following the United States, has developed its own e-commerce development strategies. From 1996, the Japanese government began to increase investment in IT, from 1.3 trillion yen in that year to 1.7 trillion yen in 2000. Under the impetus of the government, the investment from the private sector is even much greater, 7 times more than the annual government investment. The Japanese government shifted the focus of development to the information industry. The Japanese government in 2000 launched *Digital Japan Beginning—the Action Plan*, and e-commerce strategies had begun in Japan. The action put forward directional suggestions from the national strategy, including networking, broadband services, mobile communications, image networks, electronic commerce and so on. In July, 2000, the Japanese government decided to establish an IT Strategic Headquarters, to comprehensively promote the IT revolution, in the difficult circumstances of economic structural reform, pinning the hope of Japanese revival on IT and e-commerce.

After 2001, the Japanese IT industry started to slide synchronously with the

global IT industry, especially after the attacks of 9/11 on account of the weakening demand for information technology and related industries. The Japanese IT giants all had a deficit in 2001 except for Sony. Equipment investment fell to historically low levels. However, this did not affect the strategy of developing the information industry. In May 2002, IT Strategy Headquarters issued an e-Japan priority plan to correct the problem, and the Japanese Industrial Competitiveness Strategy Association also reported strong promotion of the IT revolution as a strategic area. In order to reverse a difficult situation, a cut in IT investment tax was proposed. The successful implementation of e-Japan strategy promoted infrastructure construction in various regions in Japan. In May, 2004, Japan's IT Strategy Headquarters issued a u-Japan strategy, hoping by means of the u-Japan project to promote the development of the Japanese economy, to reduce the digital isolation of Japan, and to narrow the gap with advanced countries. In 2009, many countries launched new information technology strategies. The Japanese government, which was unwilling to lag behind, added a 1 trillion yen budget allocated for the development of information technology, and in such a context two IT development policies were passed in a row, which were a 3-year emergency plan and a long-term IT development plan "*i-Japan* Strategy 2015" for the next five years. They will pool resources to develop e-government and e-autonomous organizations, to promote digitalization of the medical, health and education sectors.

2.3.4   Strategic Orientation of Japanese E-Commerce

The aim of Japanese e-commerce strategy not only lies in promoting the development of e-commerce, but also in promoting economic and social development ubiquitously throughout the whole network and enhancing the competitiveness of Japan. By catching up with Europe and the United States through e-commerce, Japan's overall economic objectives of catching up with Europe and the United States can be achieved. Through the implementation of this ambitious strategy, Japan hopes to be the most advanced country in information technology and overtake the USA within 5 years. Japan's economic downturn resulted in the information products market continuously slipping after 2001 but, in the Japanese view, information technology is still the "Light Tone" of future development, which can help Japan get rid of the problem. Therefore, the orientation of Japanese e-commerce strategy is to take advantage of e-commerce, get rid of the predicament, improve the national competitiveness and promote the revitalization of the Japanese economy to achieve the dream of overtaking the United States as the world's economic and technological superpower.

2.3.5   *Contents of Japanese E-Commerce Strategy*

In the new century Japan regards electronic technology, biotechnology and new materials technology as three big pillar industries, among which electronic technology is ranked the first. Facing the revolution in e-commerce driven by rapid development of the Internet, the Japanese government saw a new opportunity to stimulate economic growth and strategically decided to launch an Information Industrial Revolution and to build the nation relying on the information industry. With the vision of "e-Japan as No.1", Japan, the world's second largest economy, was determined to fundamentally reform its economic structure and to enhance international competitiveness during the Information Industrial Revolution. Japanese e-commerce strategy was stated in the *e-Japan Strategy* and *Action Plan* formulated by the Japanese government.

To achieve the ambitious goal of "e-Japan as No. 1", the Japanese government gathered more than 100 prominent people from industrial circles, academic circles and government departments, coordinated and cooperated with Japanese computer communication sectors, telecommunications sectors and the Telecommunication Agency, forming the "Next Generation Internet Policy Research Group". This group was divided into several working teams, which respectively study the economic, technological, social and legal issues related to the network. In June 2000 *Digital Japan Beginning—the Action Plan* was put forward in the form of a government document.

The action plan classified all policy problems related to the IT revolution into three categories and respectively presented directional opinions from the viewpoint of strategy and at the macroscopic level. The first category referred to policies related to network infrastructure, which suggested thoroughly applying the principle of market competition, to promote the diversification of networks, to decrease the online fees and to push forward the development of the bandwidth service. Up to now the number of Internet users in Japan has ranked third in the world, only next to the United States and China. These motivating policies about network infrastructures will further encourage the Japanese to use the Internet, and thus further increase netizens.

The second category contained the policies related to technical platforms, which aimed to develop the world's leading technology in Japan and seize the right to establish technical standards. The Action Plan advised an increase in investment in the leading technical fields of great potential like mobile communications and image networks, then to claim the right to establish technical standards under the principle of remaining in cooperation and competition with the United States. In the rapidly developing Internet world, whoever establishes technical standards will gain an absolute advantage. The above suggestion from the Action Plan will prove to be farsighted.

The third category focused on the e-commerce policy, of which the core problem was to build a highly reliable business platform. In the Action Plan, matters concerning the growing trend of e-commerce, the construction of electronic certification systems, the definition of network service suppliers'

responsibility, promotion of cross-border e-commerce and network domains were analyzed and discussed in detail. After a comparison with the United States and the European Union, suggestions relating to the situation of Japan were put forward.

It can be seen from the Action Plan that Japanese e-commerce strategy is not an isolated plan, but is an important component of national strategy bound up with the fortunes of the whole nation. To make a conclusion, details about Japanese e-commerce strategy are summarized as follows:

(1) Introducing competition mechanism to strengthen the construction of a network infrastructure, to accelerate the construction an ultra-high-speed network infrastructure and to promote the development of an ultra-high-speed network

It was essential for the purpose of the realization of the IT revolution that all people can utilize, at affordable rates, the network infrastructure that enables distribution of a huge amount of information, regardless of time and distance, among such factors as individuals, businesses and governments. While increasing the investment in network infrastructure, the principle of market competition was applied, the online fee was decreased to promote the diversification of networks and push forward the development of the bandwidth service. The targets for establishing the ultra-high-speed network infrastructure were: Promoting the establishment of one of the world's most advanced Internet networks within five years, and enabling all the people who need it to have ultra-high-speed access networks (30 – 100 Mbps as a standard) at affordable rates[11], which meant providing ultra-high-speed constant access to 10 million households by optical fiber and high-speed constant access networks to at least 30 million households by DSL and CATV routes by 2005. Using the ultra-high-speed network, movies of two hours could be sent and received in 15 min while animation images could be transferred instantaneously. In addition, through the Internet, people could engage in remote medical diagnosis and remote property negotiations. To enable all people to have access to the network, the Internet fee started to reduce from 2001. The preliminary goal was to integrate with the world price at 2,000 yen per month and the ultimate goal was for it to fall to about 1,000 yen.

In order to introduce a competition mechanism, it was necessary to modify the laws relevant to the communication industry so as to be open to the public. All public channels owned by communications companies should be open to facilitate the laying of optical fiber and the DSL lines. The Electronic Transactions and Contract Intermediary Bill were stipulated to perfect electronic contract management. Laws should always be beneficial to the development of e-commerce. The introduction of a competition mechanism was intended to cultivate and expand the consumers of e-commerce in Japan, strengthening the network infrastructure construction aimed at increasing consumers, lowering the cost of e-commerce and laying a solid material base and market foundation for e-commerce development.

(2) Intensifying the support for the development of commercial chips which is also a basis of e-commerce, so as to ensure the leading status in the field of commercial chips

In the government expenditure budget on technology 2001 – 2005, the expenditure on commercial chips reached $1,850 million, 40% more than that of the last five-year plan. In early 2001, soon after the Japanese government allocated $250 million as special funds for manufacturing a new kind of high density chip, the Ministry of the Economy, Trade and Industry (METI), cooperating with eleven semiconductor manufacturers, including Fujitsu, Hitachi, Panasonic, Mitsubishi, NEC, SHARP, SONY, Toshiba and other international manufacturers, put the nanometers plan *Asuka 90* into practice. In early 2002, the Diet of Japan passed another $2.4 billion additional budget on technology to share the construction cost of 0.10 micron microchip testing plants. The Japanese government, together with 25 companies, established two sterile rooms especially for testing higher density system chips. In the following years, Japanese chip giants continuously invested a tremendous amount of money in the most advanced chip technologies. New lines of 90 nanometers had been built successively by 2004. The government planned to promote Japanese SOC design techniques to 70 – 50 nm within two years.

(3) Perfecting e-commerce relevant laws and regulations, eliminating blind spots in e-commerce laws, establishing a perfect legal environment for e-commerce and protecting the legitimate rights and interests of e-commerce participants

The effects mainly included:

➢ Checking regulations and modifying relevant commercial acts, altering laws and regulations that obstructed the development of e-commerce and establishing the legal force of e-commerce documents.

➢ Protecting and utilizing intellectual property reasonably, to promote the circulation of information and to actively protect consumers' benefits.

➢ Implementing electronic signatures and authentication systems and establishing the basis of public personal authentication.

➢ Solving the problems of language, exchange rates and tax to keep e-commerce laws in line with international rules.

In order to realize the reasonable protection and utilization of intellectual property on the Internet and ensure the normal distribution of computer software, movies and music, imperative laws on copyright and patent rights were enacted. For the smooth circulation of information on broadband networks, rules on transactions of information content from broadcasters and television stations should be formulated, together with corresponding technical measures to avoid bad behavior such as illegal copying. To properly settle consumer complaints, measures like providing relevant information and protecting private information were adopted to positively protect the interests of consumers. For the smooth implementation of an electronic signature and certification system, the legislation of the Electronic Signature Law had been completed in 2001, which adopted the international two-way acknowledgement system in authentication services, along with investigation and technology assessment concerning the security and reliability of the authentication business. In addition, universal development activities were held among Japanese citizens. To allow local public organizations to use residents' basic accounts data, the public personal authentication system

was established, on which empirical experiments could be made and the legal system would be constructed.

In order to overcome obstacles of language, the jurisdiction of courts, applicable laws based on the Japanese legal system, taking rules about the infringement of intellectual property rights, the protection of the interests of consumers, information security, international jurisdiction and so on from WIPO, OECD, UNCITRAL, and the Hague Conference on Private International Law and WTO all into account, the government drafted the trans-border e-commerce Contract Text, actively formulating the legal regulations in line with the international standards, and set up quicker and low-cost dispute processes, except for judicial adjudication.

(4) Motivating enterprises to adopting e-commerce by completely implementing electronic government

The entire business process is tightly linked to government departments in many activities, such as handling the export and import licenses, customs declarations and inspection of imports and exports, export rebates, quota bidding, business tax payments, government procurement bidding. If all related government departments adopted e-government, enterprises would not walk a step forward without e-commerce technologies. As a result, enterprises would be compelled to introduce e-commerce technologies to business. In this respect, various measures the Japanese government adopted are as follows:

Regarding administrative measures such as the informationization and electronization of public affairs, the government's objective was to make electronic information as valid as paper documentation in official affairs by 2003. In 2002, a universal basic system was established which realized the electronization of the process of application and submission in all ministries of the government. In addition, the Japanese government actively promoted administrative information computerization and government procurement electronization. According to the *Basic Principle on Providing Public Administration by Electronic Means* and the *Policies on Promoting the Implementation of Electronic Information* formulated by relevant ministries, taking basic information about the administrative organization, budgets and final settlement, and data about the effective use of social capital as the key points, they achieved the goal of providing administrative information by electronic means.

In order to realize the electronization of the process of application and submission, the following tasks were achieved:

➤ Construction of authentication system and general acceptance system.
➤ Construction of electronic payment systems.
➤ Gradual construction of some electronic formalities systems.
➤ Effective improvement of internal transaction efficiency, construction of auxiliary database for examination and approval, adjudication and office-copy management.

To bring about the electronization of government procurement, measures taken included:

➤ Dealing with non-public utilities, according to results of the study on

electronic submission and opening of tenders, establishing and test running related operation systems.

➢ For the public utilities, adopting an electronic procurement system for certain utilities on a fixed scale and establishing the system in support of various bidding modes.

What's more, all ministries and departments were able to process affairs without any paper. To match the requirement, they enhanced the current system performance to connect the ministries, departments and local branches through a LAN, building a network of state and local public organizations. They realized the informatization of public domains such as science and technology, academic research, art, culture, health care, medical treatment, welfare, the environment, disaster prevention and public traffic by carrying forward R&D. They positively introduced an advanced information communication platform and put key planning into efforts in fields of ITS and GIS. They were expected to build an electronic government at full strength before 2003. That was to say, administrative affairs like the disposal of internal official documents, laws, files and statistical investigation data in government agencies should become totally computerized and paperless. Meanwhile, applications, declarations, annual revenue and annual expenditure between central and local government and citizens, government and enterprises, purchase of supplies and calls for bids should all be processed online.

As for the public services and facilities, the government would build a super-fast science and technology information network, establish the virtual research environment, a database of science and technology and cultural information in an integrated system, realizing the informatization of domains such as health care, medical treatment, hygiene and welfare etc., constructing an environmental integrated database, GIS and comprehensive disaster prevention information system.

(5) Guaranteeing the security and reliability of the infocom network to make e-commerce securer and more reliable than traditional commercial activities

In order to build a highly reliable e-government, the following tasks were carried out:

➢ Ensuring the information security of e-government, to assist the information security work of each ministry, department and local public organization, constructing an integrated system which could evaluate and monitor the security level of all entities and send emergency responses.

➢ Continuing to formulate and deliberate the security plan in all ways including simulation attack experiments so as to find the best response measures.

➢ Vigorously supporting the information security work in local public organizations by establishing the emergency corresponding system and implementing local finance measures.

To strengthen countermeasures to handle terrorist activities on the network, the Japanese Government sectors collected and recorded information about terrorist activities to build a "terrorist network correspondence database" shared by official and non-governmental bodies, while enhancing the functions of the database, fostering senior professional and technical personnel who could handle

emergencies. They increased the information security consciousness of all citizens and implemented a training plan in various fields with the help of local organizations. To help these local organizations adopt information security policies, the government applied the following two methods:

➢ The official information security organs and groups provided security information to local organizations and enhanced the guidance function. Police agencies in Japanese Prefectures could accept appeals from non-governmental organizations and strengthen the system of high-tech crime countermeasures.

➢ Along with the popularization of information security, they encouraged private enterprises to introduce advanced safety equipment and develop an information security service.

Apart from all the above measures, the government also encouraged the development of basic technologies like cryptology and information security evaluation. Besides, while not leaking state secrets, supply technologies connected national defense and public security with other government departments and the people.

(6) Nurturing high-quality human resources

As in other countries, a skills shortage presented the biggest problem during Japan's development of e-commerce. According to a joint investigation by Microsoft and IDC, Japan's scientific skills gap over the next 10 years will cover about 1.6 million to 4.45 million jobs, which mainly is due to a lack of IT skills. In order to meet the manpower demand during the development of the IT industry, the Japanese government also proposed a two-part strategy: On the one hand they trained high-level talent in e-commerce in Japanese universities and enterprises, and put forward the grand plan that the number of Japanese PhD's and Masters engaged in the IT industry would exceed that of America in 2005. On the other hand, they absorbed foreign e-commerce talent to serve Japan's economic construction by striving to attract 30,000 outstanding foreign IT technicians to work in Japan by 2005. Japan's Prime Minister and senior leaders from enterprises went to India, China and other countries, especially to developing nations. Simultaneously, the government also emphasized the strengthening of IT education for ordinary citizens, to enable them to enjoy the conveniences brought about by a highly developed IT society.

Overall, Japan's *Action Plan* aimed not only at promoting the domestic development of e-commerce, but also at promoting Japan's economic and social development in the network environment. The *Action Plan* reflected a strategic choice of Japan in the 21st century, which quickly absorbed the experience of developing e-commerce in America, Europe and other countries and designed a suitable future development road with Japanese characteristics, as the outstanding feature.

2.3.6   Strategic Efforts

The *Electronic Signature Law* was promulgated and put into effect, while other relevant regulations are advancing. E-government has been realized; great achievements have been made in the training of all types of personnel. This is the material guarantee of Japan's economic growth.

The Government's powerful promotion of information technology has made the industry develop rapidly. The number of Internet users grew by 18% from 58 million in September 2008 to 68 million in September 2009, which gave Japan the second highest growth rate Asia[12]. By February 2009, mobile phone net users reached 31.41 million. Through the development of the mobile net, the service to business has been greatly extended. The citizens of Japan can not only shop on the Internet and settle their business, but they can also travel and buy movie tickets using the Internet.

Although the Japanese economy is stagnant and retail sales have declined by around 1% annually for years, revenues of e-commerce still expanded by around 17% since 2005. According to the analysis of Euromonitor and McKinsey, revenues of e-commerce would grow at around 10% annually from 2010[13]. Online shopping in Japan grew by 22% between September 2008 and September 2009. This increase in online retail is happening for a number of reasons. Firstly, people paid more attention to the convenience and price rather than the security and privacy in the midst of the global recession. In addition, the recession brought strong attention to old and antiquated business models that were no longer going to work. Online retail offering cheaper overheads, cheaper marketing costs, and a growing global customer base soon became a popular business model.

Amazon Janpan,Rakuten and Yahoo Japan are all the leading e-commerce players in Japan. Among them, Rakuten is the greatest e-commerce enterprise in Japan. Rakuten has pursued a "shopping mall" strategy, providing all the services that enable merchants big and small to set up digital shopfronts, including hosting their sites, broking their advertising and processing their payments. This greatly simplifies things for both seller and buyer. There are around 90 million Internet users among Japan's population of 130 million; a massive two-thirds use Rakuten. Online retailing, though growing fast, remains small in Japan at a mere $30 billion a year in sales (excluding digital downloads and travel), but Rakuten handles nearly one-third of all transactions. Now the company is using its strength at home to go abroad. Rakuten has closed a transaction to acquire a 75% stake in Ikeda, a leading provider of e-commerce services to many of Brazil's largest retailers [14].

Through legislative activities in recent years, Japan has already formed a *Fundamental Law of Japanese Information Technology*, a legal system which includes the *Constitution of Japan*, *Japanese Civil Code*, *Commercial Code of Japan*, *Japanese Economic Law*, *Intellectual Property Law*, *Penal Code*, and *Procedural Law* together with more than 200 legal operations departments to coordinate with the development of e-government. The e-government regulations such as electronic signature and identification, the legality of electronic evidence, electronic documents and e-commerce behavior, internet ads, consumers'

protection, internet crime, protection of personal information, protection of intellectual property, e-voting, illicit competition rules, etc. have solved the bottleneck problems limiting e-government development.

Japan has its own distinguishing features in informatization. Based on the high popularity rate of the PC and the mobile Internet, together with a variety of kinds of ADSL such as fiber optics, wireless and special lines, Japan planned to have 5 million broadband net users by the year 2012. Up to the end of 2008, the broadband user numbers had reached 3.01 million; the average net speed was ten times that of America, which is the fastest in speed but lowest in charge.

Through the promotion of e-commerce's strategy, trade strategy and long-term structural adjustment, Japan has successfully come back on the right track.

Under the direction of Japan's business strategy mentioned above, Japan's government, enterprises, schools and individuals all devoted themselves to vigorous business activities. Main features are as follows:

(1) Carrying out the B2B e-commerce pattern in multinational companies, for Japan's international corporations are almost all huge ones, and the trade volume of each may exceed that of many small nations, which make these huge corporations dominate the Japanese economy. If these huge corporations develop, so does the Japanese economy. So the Japanese government first promoted the B2B e-commerce pattern in the famous transnational corporations.

(2) Considering Japan's advanced manufacturing technology, Japan devoted major efforts to develop manufacturing e-commerce. Japan's manufacturing capacity and manufacturing technology are among the best and no other country can match them. Applying e-commerce in manufacturing industry can help Japan exploit the advantages, be more competitive and push forward its economy. Therefore, Japan's manufacturing industries are also actively using e-commerce systems.

(3) Adopting the B2C e-commerce pattern in Japan based on large numbers of convenience stores in the retail sector. Similar to Chinese small grocery stores, there are numerous convenience stores in Japan. Differing from Chinese stores, these convenience stores are part of a chain operation on a network, and point of sale (POS) and multimedia terminals are widely applied. The tremendous potential of online transactions in convenience stores was gradually realized, thus Network Enterprises, a traditional logistics company, turned its eyes to convenience stores. The relationship between convenience stores and a comprehensive trading company was transformed into a new partnership which is based on e-commerce. Since the end of 1999, Network Enterprises constantly combined their business with that of convenience stores to compensate for inconvenience caused by low credit popularity and business discontinuity caused by the consignee being absent. Secondly, putting the digital sales terminals for music and games into convenience stores could increase the sales and meet the demands of customers, and also remove a customer's worries about online payment.

Japanese businessmen believe that a key problem of e-commerce is how to bridge the gap between imagination and reality, and convenience stores have the advantage to overcome this difficulty. Customers can choose delivery to the

nearest convenience store and pay as when buying in shops. Also, multimedia terminals set in convenience stores form an entrance to e-commerce. By combining realistic nets with electronic networks, the transactions provided by convenience stores are almost unlimited. In November 1999, Seven-Eleven's took the lead in providing a "collection on delivery" service, then taking advantage of the Internet and multimedia terminals in the store to sell products related to music, video, games content and online sales service. As the convenience stores became the focus of e-commerce, many existing commercial networks such as filling stations and professional corporate chains also began to explore the possibility of a network gateway. In 2001, Japan Post lengthened its business hours by 3 hours and had ATMs distributed in 37 main post offices operating all over the nation. To compete with a 24 hours a day service of POS in convenience stores, the post offices extended their opening hours to 24 hours a day soon after.

Japan owns some unique technological products and services such as the first color screen mobile phones in the world, phones that can take pictures and surf the Internet, the world's fastest servers, high-speed telecommunication services that can transmit a two-hours-long digital video within one second, a high-resolution LCD system in mobile phones and so on, thus guarding the leading position in the world.

2.4 China

2.4.1 Basic Situation of China

China, with a population of 1.335 billion and an area of 9,600,000 km^2, is a developing country. It was the second largest economy in the world with nominal GDP of U.S. $5.75 trillion in 2010.

Since the reform and opening up started in 1978, the Chinese economy has maintained rapid growth. Now China is already a trade giant and becomes the second largest economy. The foreign trade volume was U.S. $2.97 trillion in 2010 [15]. It shows that China has become a huge trading nation with certain competitiveness. But China highly depends too much on foreign trade and the domestic consumption is not sufficient enough to support sustained and rapid economic growth. In addition, the GDP per capita was just U.S. $4,283 in 2010, ranking it 95th. In order to stimulate the domestic demand, the government has introduced a large number of policies such as heightening the threshold for individual income tax and "sending electronic appliances to the countryside". To fight the financial crisis, the government has taken various measures to reduce the negative impact that the financial crisis may bring such as economic contraction, high unemployment rate. In monetary policy, the government implemented a loose monetary policy such as buying and selling securities on the open market as a way of softening the blow. Since July 2008, the central bank has suspended the

three-year central bank bills and reduced the frequency of one-year and three-month central bank bills to lead the proper decline of the banknote discount rate and ensure liquidity. In addition, the prime rate and deposit reserve ratio declined three times relatively in September, October and November 2008, which aimed at increasing the money supply and expanding investment and consumption. Meanwhile the central bank was no longer applying hard constraints to the lending plans of commercial banks and encouraged the financial institutions to increase the loans for quake reconstruction, the "three rural issues", small and medium enterprises (SMEs). In the international balance of payments, the government increased the export rebates and maintained the currency exchange to sustain the competition in exports. In fiscal policy, the government launched a plan of public spending with the amount of 4 trillion RMB to boost domestic demand. At the same time the government reduced the burden on enterprises through the adjustment of labor law-related measures and increased the expenditure in social security to maintain the stability of the socio-economic development environment. Through these active and effective measures above, China successfully achieved the often stated target of GDP growth of 8%, but negative effects of these measures, such as severe inflation, repetitive construction etc., have emerged.

Since the establishment of the People's Republic of China in 1949, China has developed an independent and relative integrated industrial system and national economic system. China has abandoned traditional surpassing strategy which gives priority development to heavy industry and the labor-intensive industries have achieved great development since the reform and opening-up in 1979. Now the products of the textile and electronic appliance industries in China have occupied the world market. Although China has great advantage in traditional labor-intensive industries, the advantage is not sustainable. In addition, dozens of Chinese products exported to other countries have been subjected to antidumping proceedings. China has been involved in many anti-dumping investigations, the only country with so many investigations. According to WTO statistics, there were 73 cases of anti-dumping investigation and 10 cases of countervailing duty investigation against China in 2008, relatively accounting for 35% and 71% of the total number of the corresponding cases all over the world. Chinese enterprises have still been charged with dumping and failed to defend themselves effectively in 2009, especially in the tire industry. In contrast, the high-tech products are rarely charged with dumping and set quotas. Thus, it is a concern as to whether China can maintain rapid economic growth just relying on the traditional industries.

2.4.2   Background to Chinese E-Commerce Strategy

As a developing country, there are sufficient workers in China. Therefore China has a comparative advantage in the most labor-intensive industries such as food, clothing and housing. These traditional industries have a huge and stable demand.

So China can still depend on the development of labor-intensive industries. But the new economy is a key factor in future international competition. China cannot be unresponsive to the development of the new economy. The development of traditional industries focuses on current interest while the development of the new economy focuses on long-term interest. Developing both the traditional industry and new economy is the right strategy for China.

In fact, the new economy which takes the information industry as representative, will not hamper the development of traditional industries but will greatly promote its development. Just because of the strength of traditional industry, the U.S. economy did not suffer a hard landing at once after the new economic bubble burst. This is because the information industry just provides information services, but the major consumption is provided by the traditional industrial products such as clothing, food, housing and tourism. The relationship between the information industry and traditional industry is not absolutely contradictory but dialectically unified as they supplement each other. The luxury consumption of hi-tech millionaires needs to be satisfied by the production of traditional industries. Thus the rapid development of the new economy can promote the development of traditional industries from the aspect of demand. Meanwhile the information industry provides the services such as information collection, information storage and information processing which are needed by any industry. Information technology makes machine handling easier and takes less time than manual handling. Therefore information management based on computers can cut the management costs whether inside an enterprise or among the enterprises and improve the productivity of traditional industries. Any people or enterprise can connect with the others by the Internet with less cost. The development of the new economy with the information industry as representatives will expand the market of traditional industries, refine the division of labor and improve economic efficiency. Based on this understanding, China is facing challenges of informatization although China has not completed the task of industrialization.

From the historical point of view, industrialization is the basis of information and the information industry is developed in the process of industrialization. From the practical point of view, many developing countries achieved mixed progress with advanced technology and the experience of developed countries or, making use of the information industry, achieved a more advantageous position in the international division of labor. Thus the strategy of China is to persist in using information technology to propel industrialization which means accelerating the Chinese industrialization process, renovating conventional industries and speeding up the upgrading of products by information technology.

Informatization can allocate resources more efficiently and raise labor productivity. The Internet provides us a new platform for economic development and practical activities. Informatization is having a greater and more profound impact on economics, politics, military and cultural issues on a global scale, resulting in major changes in the economic development mode and economic system. Specifically, making use of information technology in the overall process

of manufacturing production can speed up the industrial restructuring which is more meaningfully than technical reform and equipment replacement. In return, it may promote innovation of information technology to broaden application fields and meet the growing demand for new technology and management mode in the process of industrialization. Therefore, using informatization to propel industrialization not only shortens the process of industrialization but also provides a broader application prospect for information technology.

The strategy of using informatization to propel industrialization is clearly shown in the *National Economic and Social Development Five-Year Plan of the People's Republic of China*. The specific contents include:

● Promote the industrial development and techniques reconstruction through micro-electronics, computer and network technology.

● Promote the reform of marketing, transportation and services through e-commerce, especially in e-business among enterprises.

● Increase product added value through the integration of information products and traditional products, and the wide application of information technology in new products.

● Speed up the informatization process of production technology and operating management.

During the 'Ten-Five' period, e-commerce in China has gone through continuous exploration and adjustment together with the development of informatization, and it had reached a certain scale by 2005. E-commerce has gradually permeated into all levels of the economy and society, and network management and consumption online has gradually formed. In 2005, the total amount of online procurement of commodities and services was 1.6889 trillion Yuan, accounting for about 8.5% of the total procurement. The total amount of online commodity sales and services was ￥909.5 billion RMB. Small and medium-sized enterprises (SMSs) are the main active practitioners. Meanwhile, the framework of e-commerce has developed to a certain degree. Electronic authentication, electronic payment, logistics and credit system are gradually being implemented. The local governments and industries are trying their best to speed up the development of e-commerce and the establishment of the platform. In addition, telecom operators, software providers etc., have been involved in e-commerce services. A number of new business models are emerging. However, there are still many problems such as a low level of informatization.

Therefore, the development of informatization, and high-technology industries are still a development priority in the *National Economic and Social Development Five-Year Plan* of *People's Republic of China*. In the *Eleventh Five-Year Plan*, a great deal of high-tech is put forward, for example, establishing a new generation of networks, including the China Next Generation Internet (CNGI), nationwide digital TV network and mobile communications demonstration network with independent intellectual property rights, developing the next-generation key network technology, key equipment and key software industry to establish the next-generation network infrastructure, developing the latest digital audio and video technology industry, developing the high performance computer system

whose calculation can reach petaflop speed and establishing the advanced computing platform based on grid computing. Meanwhile, the overall strategy put forward in the *Eleventh Five-Year Plan* is still to utilize informatization to propel industrialization and drive industrialization with informatization to improve social informatization. The specific contents include:

- Apply information technology to reconstruct traditional manufacturing industries, promoting the digitalization of production equipment, promoting the intelligence of the production process and realizing the informationization of business administration.
- Speed up the construction of a national information database to promote information-sharing.
- Optimize the structure of information resources and improve the broadband communication network to heighten the broadband Internet speed.
- Construct the digital TV network which can transmit digital flows through cables, terrestrials and satellites.
- Build the next generation Internet and speed up its commercial application.
- Develop and refine the network standards to promote interoperability and resource sharing.
- Strengthen safety monitoring, emergency response, key management and other information security infrastructure to ensure the security of information systems.
- Improve risk assessment and security access systems.

Now China will soon face the *Twentieth Five-Year Plan*. Chinese informatization construction is entering a deeper and more solid stage. But there are still many problems such as unbalanced development between districts, a low level of informatization, inadequate infrastructure, an inadequate information environment, lack of professionals etc. During the 'Twentieth Five-Year Plan', China will adhere to the integration of industrialization and informatization and promote the informatization process based on the three following aspects: the key industrialization project, extensive application and core-technologies development.

From now on, Chinese informatization strategy targets are:
- Information infrastructure will be basically popularized.
- The capability of independent innovation in information technology will be significantly enhanced.
- Industrial structure will be fully optimized.
- National information security will be highly improved.
- National economic and social informatization should achieve remarkable achievements.
- The institutional environment and policy system for national information development will be basically completed.
- The national capacity of information application should be highly improved.

2.4.3   Orientation of Chinese E-Commerce Strategy

Chinese e-commerce strategy is very practical. It is determined by China's economic development level and the development level of science and technology. Although China has been the world's third largest economy, its GDP per capita still ranked lower than 96th in 2009, in the bottom half of the list even in developing countries. China's scientific and technological development is also not satisfactory, falling behind the United States, Europe, Japan and even India. Therefore the orientation of Chinese e-commerce strategy can only be based on the reality. Now e-commerce technology is mainly used to promote industrial restructuring from extensive to intensive and improve the efficiency and quality of the national economy to achieve a comprehensive, coordinated and sustainable economic and social development.

2.4.4   Details of Chinese E-Commerce Strategy

China started to study an e-commerce development plan in 1999, which was originally expected to be promulgated by the State Council in 2000 but not disclosed without any certain explanation. In January 2005, the State Council formally announced the *State Council views on Accelerating the Development of E-business*, when Chinese e-commerce development strategy was basically formed. On June 1, 2007, the National Development and Reform Commission and the State Council Information Office jointly issued China's first e-commerce development plan, the *Eleventh Five-Year Plan of e-commerce*, firstly establishing e-commerce strategy and mission at the national policy level. On December 17, 2007, the Ministry of Commerce announced the *Opinions of the Ministry of Commerce on Enhancing the Regularized Development of Electronic Commerce.*
    Here, we just briefly summarize Chinese e-commerce strategy as follows:

The target
● Promote industrial restructuring;
● Promote economic growth mode transformation from extensive to intensive;
● Improve the efficiency and quality of the national economy and form a new driving force for national economic development;
● Respond to challenges of economic globalization, seize the development initiative, improve international competitiveness and enhance the capability of allocating resources on a global scale to enhance its international status;
● Eliminate the constraints on fair competition, reduce transaction costs and promote the formation and improvement of a national unified market to optimize allocation of resources.

The guiding ideology
● Integrate government promotion and business-led development

Improve the management system, optimize the policy environment, strengthen the infrastructure construction and improve the service quality, fully play the main role of enterprises and form a positive interaction mechanism between the government and enterprises to promote coordinated development of e-commerce and e-government.

● Integrate a proper environment and widen the applications

Strengthen the construction of supporting systems such as policies and regulations, credit services, security certification, standards, online payment and modern logistics. Create a favorable environment for the development of e-commerce to promote e-commerce application in all fields.

● Integrate the network economy and the real economy

E-commerce serves as the realized pattern to combine the network economy and the real economy. Make use of technological innovation to promote management innovation and system innovation, and transform traditional business processes and the operation mode from extensive to intensive.

● Integrate prioritized development with coordinated development

Conduct pilot projects to solve key problems and key links in the e-commerce development process, promote e-commerce applications in key areas of the national economy and explore a multi-level and multi-mode e-commerce development mode with Chinese characteristics to promote the coordinated development of various types of e-commerce applications.

● Integrate the accelerating development with strengthening the management

While vigorously promoting e-commerce applications, establish a management system conducive to the development of e-commerce and strengthen market supervision in the Internet environment, regulate online transactions and ensure information security to maintain the normal role of e-commerce activities.

The content

● Improve the policies and legal environment

The purpose is to standardize the development of e-commerce. The principal measures are:

i. Strengthen overall planning and coordination. Make the objectives clear in the tasks and priorities of e-commerce development. Establish the security system and working mechanism with mutual cooperation and close coordination.

ii. Strengthen the construction of e-commerce laws and regulations. Carry out the *Electronic Signature Law of the People's Republic of China*. Implement the relative laws and regulations on electronic transactions, credit management, security authentication, online payment, taxation, market access, privacy protection, information resource management and so on.

iii. Formulate fiscal and tax policies to promote the development of e-commerce. Strengthen e-commerce tax management; formulate proper preferential policy, increase the support dynamics in the basic and key areas of e-commerce; support enterprises to sale and procure online in the international market and promote enterprises to participate in international market competition. Government procurement should actively adopt e-commerce mode.

iv. Consummate a financing mechanism of e-commerce. Establish a diversified investment and financing mechanism and formulate the relative policies to coordinate the development of financial sectors and e-commerce enterprises. Increase the investment in e-commerce to encourage the enthusiasm of society and enterprises.

● Speed up the construction of a credit system, certification system, standards, e-payment system and modern logistics system.

The purpose is to establish a supporting system for the development of e-commerce. The principal measures are:

i. Speed up the construction of a credit system. Strengthen government regulation, industrial discipline and interdepartmental coordination and integration. Encourage enterprises to develop e-commerce. Establish scientific, rational, authoritative and impartial credit service organizations. Establish a related mechanism to share credit information and gradually form an online credit information service platform which can achieve dynamic credit data collection, processing and exchange. Establish a feasible mechanism penalizing bad credit and a credit monitoring system to gradually form a credit service system that conforms to China's national conditions and international standards.

ii. Establish and improve the security certification system. In accordance with relevant laws and regulations, develop an e-commerce security certification management method to further standardize the management of a secret key, certificating and certification authority. Emphasize the establishment of a responsible system. Develop the encryption and authentication technology with independent intellectual property. Improve the security certification infrastructure, establish a reasonable security certification system and realize alternate attestation in industries and districts.

iii. Establish and improve national standards of e-commerce. Raise awareness of the standardization, fully mobilize the enthusiasm of various sectors to establish and improve national standards of e-commerce. Encourage enterprises as the mainstay, with universities and research institutes, together to set the standard for key technology and specifications and participate in international standard setting to actively promote e-commerce standardization.

iv. Promote the construction of an online payment system. Draw up online payment standards and technical standards, research risk prevention measures and strengthen supervision and risk control. Actively study relative regulations for third-party payment. Guide commercial banks and China Unionpay (CUP) to establish a secure, fast and convenient online payment platform and vigorously popularize bank cards, online banking and other online payment tools. Further improve the online settlement system to promote the standardization of online payment and integrate it into international practice.

v. Develop a modern logistics system. Fully make use of railway, highway, civil aviation, postal services, warehousing, commercial networks and other logistics resources to improve the logistics infrastructure. Make use of advanced logistics technology and equipment to optimize business processes and enhance the informatization of the logistics industry. Vigorously develop third-party

logistics to effectively support the wider use of e-commerce.

● Promote enterprises to play an important role in the development of e-commerce

Enterprises are the principal actors for developing e-commerce. The principal measures are:

i. Promote information construction in enterprises. Enterprise informatization is the foundation of e-commerce. To promote the development of e-commerce we must continuously optimize business processes and organizational structures, optimize the resource collocation, improve the abilities of market-response and increase economic benefits.

ii. Focus on promoting e-commerce applications in backbone enterprises. The backbone enterprises should play the leading role in the procurement and sales. Integrate upstream and downstream resources to achieve the integration of the business process among enterprises and interconnections among information systems.

iii. Promote e-commerce applications. Formulate the e-commerce norms in different industries, conduct pilot projects in key industries, promote the e-commerce experiences with industrial characteristics, explore the mode of e-commerce development and establish the mechanism of information sharing and exchange among industries to promote competition and cooperation in industries.

iv. Support e-commerce applications in SMEs. Raise the SMEs' awareness of the importance of e-commerce, support the construction of a third-party e-commerce service platform for small and medium size enterprises to solve problems in investment and human resources and reduce transaction costs.

v. Promote consumer-oriented e-commerce applications. Develop a new consumer-oriented e-commerce model and new services, establish and perfect the credit mechanism for online transaction, expand the scale of C2C and B2C businesses, the scale of consumers e-commerce applications. The application and development of mobile e-commerce also need to be paid more attention.

● Improve the technology and service quality of e-commerce

The purpose is to promote the development of relative industries. The principal measures are:

i. Develop the hardware and software related to e-commerce. Actively introduce, digest and absorb foreign advanced technologies for e-commerce, encourage technological innovation, speed up the industrialization process of the hardware and software related to e-commerce with independent intellectual property rights and improve the independently developing capability of the e-commerce platform, application software, terminal equipment and other key products.

ii. Promote the construction of an e-commerce service system. Fully utilize existing resources, give full play to intermediary organizations; strengthen the construction of high-level networking, provide services such as engineering research, technological achievement transformation, consulting services and project supervision and gradually establish an evaluation system to promote the

healthy development of e-commerce.

● Improve the technology and service quality of e-commerce

The purpose is to improve awareness and apply e-commerce to enterprises and citizens. The principal measures are:

i. Increase the scope of propaganda. Fully utilize different kinds of media and various forms to enhance the promotion of e-commerce and security education. Strengthen morality education, raising community awareness to the importance of developing e-commerce and enhancing the awareness of e-commerce applications and information security of enterprises and citizens.

ii. Strengthen e-commerce education and theoretical research. Higher research institutions and educational institutions should further improve the development of subjects relative to e-commerce and cultivate all kinds of technical professionals and inter-disciplinary talent. Improve the existing training and educational institutions, and strengthen continuing education and on-the-job training through a variety of channels.

● Strengthen cooperation and take part in international competition

The purpose is to improve the development of e-commerce, making use of the international and domestic market. The principal measures are:

i. Strengthen international exchanges and cooperation. Actively enter international organizations of e-commerce and participate in the forming of international rules, treaties and model laws of e-commerce. Closely track the international development and trends of e-commerce. Strengthen technical cooperation and promote market integration to improve e-commerce in China.

ii. Actively participate in international competition. Enterprises should strengthen the sense of international competition, actively explore the international market, and make use of e-commerce to enhance international competitiveness. Relevant departments should raise service consciousness, enhance service standards and give play to the advantage of information resources to provide timely and accurate information and quality services for enterprises in international competition.

The obstacles

● Tariffs and taxes

Although the traditional tariff and tax system in China is satisfactory to some extent, it is usually used in traditional transactions. For online transactions, it is impossible to adopt traditional tariff and tax systems for e-commerce. It is necessary to find a suitable solution as soon as possible.

● Electronic payment and foreign exchange

E-commerce is different from traditional commerce. The traditional management mode of payment and foreign exchange is not applicable to e-commerce. It is also necessary to learn from successful foreign experience to create a convenient, secure and effective payment instrument and settlement system. In addition, formulating the relative laws and regulations is greatly needed. For international e-commerce, cross-border settlement and foreign exchange management should be properly solved.

● National economic security

National economic security stands in the first place. It means to strictly observe the *National Security Law* and the related policies. Therefore, it is necessary to make use of proper technology and equipment to ensure the safe operation of information systems and networks and take effective security authentication technology to ensure the integrity, confidentiality, effectiveness and anti-denial of electronic data.

● Strengthen the information infrastructure

Since the mid-1990s, China has been emphasizing information infrastructure and achieved notable results. The infrastructures such as the database, information transmission system, information processing system and software environment have greatly improved. However, they cannot always adapt to the rapid development of e-commerce. We must further strengthen the construction of the information infrastructure to ensure fair and reasonable access. Lower operation costs and better service are necessary.

● Pay attention to demonstration projects and promote them steadily

The informatization level of various regions in China differs significantly. The consciousness of e-commerce is very inconsistent too. Therefore, we should choose some key regions, industries and enterprises as pilot projects. Sum up the experience in information infrastructure, payment authentication and relevant policies and regulations and promote it steadily. China's eastern coastal region is of strong overall strength. Shenzhen, Guangdong, Shandong, Shanghai, Beijing and Tianjin were selected to execute the pilot projects. In those cities, the development of e-commerce has taken the first step, and their successful experience should be followed in other provinces or cities. For those industries and enterprises committed to the development of e-commerce, they can select the industries with a proper environment in the aspects of logistics, payment, credit, as the breakthrough.

● Personnel training

The key factor in e-commerce is professionals. They are very important for the development of e-commerce and the application of e-commerce. Without abundant e-commerce professionals, it is impossible to popularize e-commerce, let alone gain the international competitive advantages. It is the most urgent task to cultivate a large numbers of professionals proficient in computing, economics and foreign languages.

2.4.5   *Effect of Chinese E-Commerce Strategy*

Although systemized e-commerce strategy in China was put in place by 2005, it was early in 1997 when China first tried to develop e-commerce. By 2009, there had been 12 years since e-commerce emerged in China. In the past 13 years, e-commerce has developed rapidly.

By June, 2009, there was 338 million netizens in China. For the past 13 years,

as the closest connected business with the manufacturing area, the circulation of the national economy and service industries, e-commerce had not only developed itself to be a large industry, but has also facilitated the transformation and upgrade of the manufacturing industry, and the service industry of the national economy to a great extent. There were 12,282 e-commerce websites of a certain scale in China by June, 2009, among which the number of B2B e-commerce service companies was 5,320 (Fig. 2.7) while the number of B2C, C2C and other non-mainstream companies was 6,962 (Fig. 2.8). The figure below described the increase in e-commerce service companies between 1997 and 2009. It could be found in the figures that from 2002 to 2009 B2B e-commerce websites in domestic industries increased substantially and rapidly. In particular B2C, the C2C category and e-commerce websites of other patterns developed rapidly in 2004 and 2008 respectively, which had a close relationship with the awareness of netizens to shop online after the 'SARS period' and the idea of shopping online to reduce costs in the financial crisis [12].
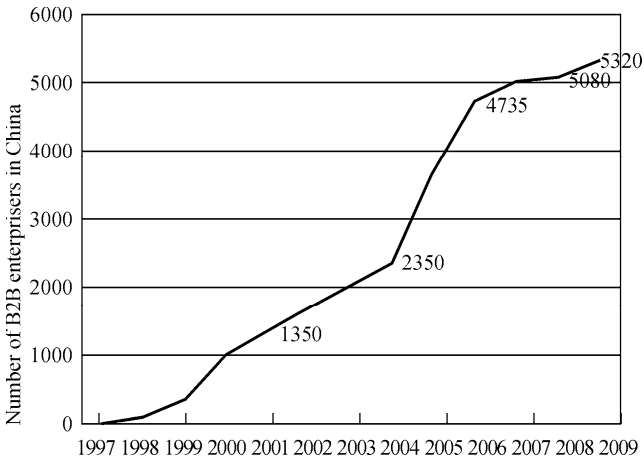
Fig. 2.7   Number of B2B enterprisers in China from 1997 to 2009
(Source: B2B.toocle.com)

E-commerce companies in China are mainly located in the Yangtze River Delta area, Zhujiang Delta area, Beijing and other developed provinces and cities. According to B2B.toocle.com (Fig. 2.7), the Yangtze River Delta area accounted for 33.52%, the Zhujiang Delta area accounted for 32.04%, and Beijing for 8.86% by June, 2009. Hangzhou City in the Yangtze River Delta area is acknowledged as the 'e-commerce City of China'. Most of these places have a well developed economy, huge government support, which forms a good matching industrial environment for the development of e-commerce.
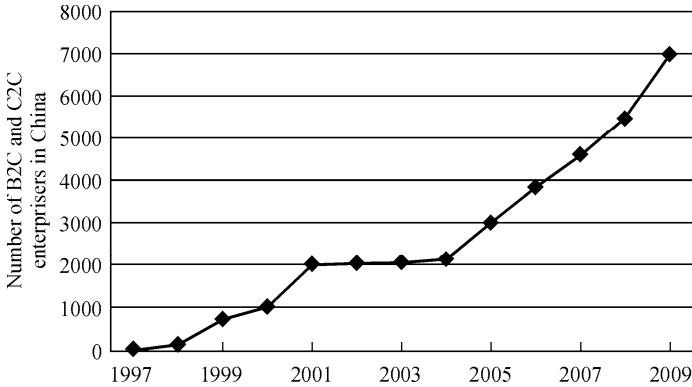
Fig. 2.8　Number of B2C and C2C enterprisers in China from 1997 to 2009
(Source: B2B.toocle.com)

E-commerce firms are mainly located in the industries closely related to our daily life such as the textile and clothing industry, the digital and home appliance industry. The two accounted for 14.32% and 10.35% in the whole industrial distribution of e-commerce firms respectively while iron and steel machinery, chemicals and pharmaceutics, building materials, agriculture and forestry, ironware, package printing, food, candy and wine, gift items, and other industries accounted for 8.3%, 6.35%, 6.2%, 5.89%, 4.53%, 5.42%, 4.3%, 3.69%, 30.65% respectively[16]. Meanwhile, the revenue of e-commerce firms has increased dramatically. By June, 2009, the accumulative revenue of e-commerce service firms (including B2B, B2C, C2C, B2M, B2G) in the first half year of 2009 was 7.53 billion RMB. Revenues of the two most important parts—B2B and B2C were 3.25 billion and 4.02 billion RMB respectively. Fig. 2.9 described the increase in accumulative revenue of e-commerce service firms in China between 1997 and 2009.
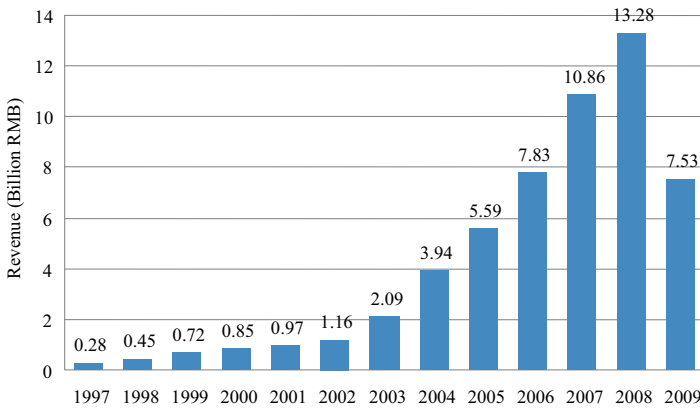
Fig. 2.9　1997 – 2009: Revenue growth of e-commerce enterprises in China (billion RMB)
(Source: B2B.toocle.com)

   With the development of e-commerce, the number of employees in e-commerce also increases fast. There were 0.5 million people directly involved with e-commerce services in China by June, 2009 [17]. Besides, e-commerce has promoted the development in the areas of network basic services, warehouse logistics, payment channels, network marketing, network advertisements and other extended industries or Internet areas. Those employees indirectly driven by e-commerce were more than 6 million.

   From the above we can see that e-commerce in China itself has developed to a certain level. There are high-speed developments in the number of companies or employees. Just see the clients and trade in e-commerce. By June 2009, the number of domestic medium-sized and small enterprises clients of a third-party e-commerce platform had exceeded 10 million and the scale of China online shopping clients had also exceeded 100 million RMB. According to iResearch (Fig. 2.10), the trade volume of China e-commerce market had reached 2.9 trillion RMB in 2008 and 3.6 trillion RMB in 2009. In addition, iResearch estimated that the e-commerce market of China would continue to develop with a fast growth rate of more than 30%. It was expected that the trade volume of China's e-commerce market would reach 12.7 trillion RMB in 2013 [5].
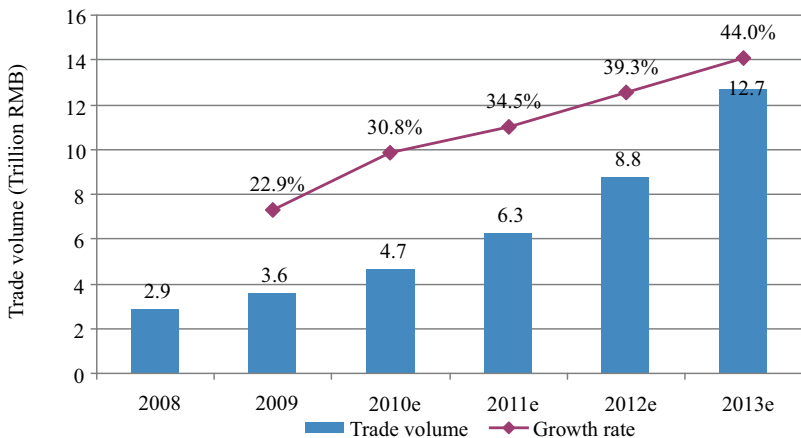
Fig. 2.10   Trade volume of e-commerce in China from 2008 to 2013
(Source: iResearch)

   China has also made achievements in the aspect of the cultivation of e-commerce talents. There are 275 universities and colleges, and nearly 700 higher vocational schools which have established undergraduate majors in e-commerce. Among them, fifty-one '211' universities inaugurated graduate programs of e-commerce including Zhejiang University, Nanjing University, Wuhan University, Huazhong University of Science and Technology, Sichuan University and other famous universities [18]. By October, 2006, the number of students the universities had recruited accumulatively was 30,021, the number of undergraduates was 5,891,737 per year on average. Junior colleges had recruited 24,130 students,

3,016 per year on average [19]. There are also many e-commerce expert committees established in China such as Mobile e-commerce Committee, e-commerce Expert Committee of Chinese Institute of Electronics, Chinese Institute of e-commerce. China has upgraded the subject of logistics related to e-commerce to a first level discipline. In addition, the government is actively considering upgrading e-commerce to a first level discipline too.

In the high-speed development progress of e-commerce, the Chinese government has also put in place a great deal of policies to protect and guide the development of e-commerce. For example, in 2005, the People's Bank of China established the *Electronic Payment Guidelines (No.1)* which comprehensively specified rules, security, technical measures, and responsibilities in electronic payment. Afterwards, the Department of Commerce also established the *Suggestion of Department of Commerce on Development of e-commerce* to regulate the development of e-commerce.

But the development scale of China's e-commerce still has a lot of problems compared with Europe, America and Republic of Korea and other countries whose Internet popularization is much higher. For example, the proportion of online shopping is relatively low, the proportion of online payments is relatively low, development among regions is unbalanced, laws and regulations of e-commerce are imperfect, the e-commerce security system is not sound, and all of them need further resolution.

Those issues will be solved in further development of e-commerce in China. Now e-commerce is under rapid development in China and the trade volume will continue to grow in the next three or five years. In the development, the potential of central and western regions in China should not be ignored. In addition, services Chinese e-commerce enterprises provide are not only simple online queries and online transactions but also the integration of sales channels, corporate branding, marketing and other aspects. The value of the Internet should be utilized more and deeper. Moreover, terminals for e-commerce are becoming diversified. Besides online shopping, TV shopping and mobile shopping is becoming more and more popular. It is a trend that Internet business combines with mobile commerce.

2.5 Australia

2.5.1 Basic Condition of Australia

Australia is a highly developed country. Australia is the thirteenth largest national economy in the world with a GDP of over U.S. $1.2 trillion in 2010 by the international exchange rate and the 18th largest measured by PPP adjusted GDP. Its per capita GDP is slightly higher than that of the United States, United Kingdom, Germany, and France. It ranks the third in the Index of Economic

Freedom in 2010. Australia also ranks the 21st largest importer and 23rd largest exporter. Australia is a member of the APEC, G20, OECD and WTO organizations. It has free trade agreements with ASEAN, Chile, New Zealand, Singapore, Thailand, and the United States.

Australia is a resource-rich country with abundant minerals, coal, natural gas, uranium ore, lead and aluminum, gold, diamonds, iron ore, uranium and so on. Australia is a major exporter of agricultural products, particularly wheat, wool; minerals such as iron-ore and gold, and energy in the forms of liquidized natural gas and coal. Although the agricultural and natural resources constitute only 3% and 5% of GDP respectively, they contribute substantially to export performance, accounting for 57% of the total export. The Australian economy is dominated by its service sectors, including tourism, education, and financial services, accounting for 68% of Australian GDP.

2.5.2   E-Commerce Background of Australia

Australia is one of the earliest countries that used the term "information economy" or "knowledge economy". Its national strategy for knowledge or the information economy has been always widely advocated in the international community. At the end of the 20th century, with economic globalization and the revolution in information and communication technologies, the Australian government realized that, in the 21st century, Australia's wealth, international competitiveness, national security system, social cohesion and culture would be deeply affected by the development of the nation, the ability to use intellectual capital and the control of information and communication technology. As early as 1997, the Australian government began to use the concept of the "information economy" to describe the "the transformation of economic and social activities caused by information and communication technology", and defined the "information economy" as "the economy in which information, knowledge and education are the main inputs of commercial and social activities". The aim of the Australia information economy is, "the government, business organizations and the community should be fully connected and cooperate with each other to achieve the maximum economic and social benefits."

The ICT (Information and Communication Technology) industry always obtains the support of the Australian Federal Government. Australia has set up a special office-National Office for information economy, subordinated to the DBCDE (Department of Broadband, Communications and the Digital Economy, the primary replacement for the former Department of Communications, Information Technology and the Arts (DCITA) disbanded in 2007 with the election of the Rudd Government), which is responsible for formulating strategies, providing suggestions for the federal government and congress on the development of information and communication technology. The federal government, the state governments and local governments formulate specific

development strategies. The Australian government has promulgated a number of related policies.

In 1998, the Government first promulgated the Strategic framework for information economy. In July, 2004, the Australian government updated and issued *Australia's Strategic Framework for the Information Economy 2004-2006: Opportunities and Challenges for the Information Age* (referred as Opportunities and Challenges below). The *Opportunities and Challenges* analyzed opportunities and challenges brought by the information economy in detail, and proposed specific information economy strategies and relevant specific measures. The Australian information economy strategies can be simply summarized: to establish highly developed and reliable information infrastructure; to establish a more secure environment; to establish a strong national innovation system and to establish a highly efficient and effective system of government service system.

According to Australian informationization strategy, the Australian government has taken many effective measures in the construction of network, sector infrastructure and network security which provided a good foundation for the development of electronic commerce in Australia. In order to meet the different demands for a network by different people in different strata and different areas, especially the socially vulnerable groups and marginalized people, the Australian Government provided 1.8 billion Australian dollars for consolidating the communication network in different areas. Now, Australia has a world-class network communication system. The Internet access rate of enterprises and families is always among the best in the world. According to 2004 Global Digital learning readiness rankings in the Economist, Australia was in the forefront, which makes Australia have a good environment to develop e-commerce (ranked 12th among 64 countries). Meanwhile, Australia took the freight transportation industry and the health-care industry as a priority, establishing an online service project. An e-business guide website (www.e-businessguide.gov.au) was established to help small and medium-sized enterprises get better online information, and to achieve the maximum benefits of electronic business. In terms of network security, the Australian government set up a specialized agency and enacted numerous laws to make online transactions secure. In 1999, Australia enacted the Electronic Transactions Act, allowing individuals to make deals with government departments and agencies electronically, and defining the general principles by which people would sign contracts through electronic means. It removed the legal obstacles to using all kinds of electronic transactions. Moreover, the Australia government provided more facilities for the application of e-commerce in Australia to encourage private and public sectors to use authentication technology. The Australian National Office for the information economy formulated a "cross-recognition" policy to encourage the interflow of the public key infrastructure domestically and internationally. Meanwhile, Australia also promulgated the *Privacy Act, Spam Law, Interactive Gambling Act* to ensure online transaction security and legality.

2.5.3   Orientation of Australian E-Commerce Strategy

The Australian Government recognized the importance of information technology in the early 21st century, and has been promoting the development of the information economy in Australia actively. The aim was set as "the government, business organizations and the communities are fully connected and cooperate with each other to achieve the maximum of economic and social benefits." And e-commerce was one of the most important measures. But the Australian Government thought that the specific activities of e-commerce should rely on the promotion of the private sector. The Australian Government was primarily responsible for eliminating obstacles to develop e-commerce. The development of e-commerce in Australia mainly relied on the private sector. The specific measures of e-commerce were mainly carried out by the enterprises.

2.5.4   Contents of Australian E-Commerce Strategy

Australia's administrative system consists of federal, state and municipal governments. As far as the development of e-commerce, the federal government is responsible for the deployment and the planning, while the practical measures are taken by the local governments. In the federal government's point of view, the federal government is mainly to formulate relevant laws and regulations and policies in order to regulate the conduct of e-commerce. The federal government mainly invests in the national education system and information security through the tax and so on. Meanwhile, some specific application projects such as the construction of E-government, e-commerce, the digital community, are arranged by the state and local governments according to the requirement of the federal government's information economy development framework in order to improve the competitiveness of each state and local governments.

The contents of Australian e-commerce strategy can be summarized as follows:

(1) To perfect the related infrastructure

Australia's investment in infrastructure is mainly to achieve full network coverage, especially in the rural areas. Since 2000, the federal government has invested more than 70 million Australian dollars within 5 years, to support the development of a rural network and network services. Within 5 years, 45 million Australian dollars were appropriated by local governments for them to provide online information for the public. Within three years, 10 million Australian dollars were invested in the rural areas for providing online government services. Within 3 years, 36 million Australian dollars were invested to open more websites in the countryside. Moreover, 20 million Australian dollars were allocated to develop the Block Island's telecommunications infrastructure so that residents would obtain a cheaper Internet service.

(2) To establish Australian e-commerce network and encourage SMEs to use

e-commerce

Australian Electronic Business Network is funded by the federal government, and the state governments have also participated in its establishment. It is a non-profit organization, which aims at encouraging SMEs to use e-commerce, providing e-commerce knowledge training, business management training and internet-based online service for SMEs. The services provided by this network include: e-commerce training programs, the publications on the use of e-commerce for SMEs, e-commerce transaction systems and programs for demonstrating and testing, the cooperation with the Australian Trade Commission to improve export competitiveness. At the same time the Australian government would provide seed money to fund enterprises to develop e-commerce projects. The projects accepting the imbursement from the Government have covered a wide range of industries, especially the application of B2B e-commerce.

(3) To establish and perfect the relevant laws

In 1999, the Australia enacted the *Electronic Transactions Act*, allowing individuals to make deals with the government departments and agencies by electronic ways and making the general principle explicit by which people could sign contracts through electronic means. The *Electronic Transactions Act* on the basis of *The United Nations Commission on International Trade Law Model Law on e-commerce* removed the legal obstacles to using all kinds of electronic transactions and successfully promoted the implementation of e-commerce in Australia. Furthermore, each state made similar laws in its area of jurisdiction, which complemented the *Electronic Transactions Act*. In the meantime, the Australian National Office for the information economy formulated a "cross-recognition" policy to encourage the interflow of public key infrastructure within domestic and international scope. Australia also promulgated the *Privacy Act, Interactive Gambling Act, and Spam Law* and so on, concerning the protection of personal privacy on the Internet and online data. Besides, Australia raised many key points mainly involved in consumer interests in electronic transactions, the tariffs of e-commerce products, electronic authentification and relevant laws to promote the development of cross-border e-commerce.

(4) To popularize the knowledge of e-commerce and develop e-commerce market

The Australian Government held seminars in various places to spread the application of e-commerce technology in enterprises and the implementation of e-commerce in remote areas. At the same time, Australia implemented "online Australia" activities. In the activities, the Australian National Office for the information economy with industrial organizations and other governmental agencies chose a subject each month and held a series of national activities such as conferences, exhibitions, technology demonstrations, publications, lectures and so on, to encourage enterprises and governmental departments at all levels to participate in the discussion on the Internet economy and e-commerce. The Australian Government also proposed best practice models (BPM) for e-commerce to protect the consumer interests in the domain of e-commerce. In addition, the Australian government issued a guide manual on e-commerce to help

SMEs to launch e-commerce.

(5) To promote the development of network security technology, and popularize the knowledge of network security

Australia has established the Information Infrastructure Protection Group. Australia has set up the Infrastructure Assurance Advisory Council, Critical Infrastructure Advisory Council and three IT Expert Advisory Groups — IT Security Expert Advisory Group, Critical Infrastructure Protection Future Group and the Security Environment Building Experts Group about the aspects of information safety since 2003. Meanwhile the Australian Government established an Australian High-Tech Crime Centre and the National Authentication Framework. With the network being more and more popular, the Australian government not only improved the technology of network security, but also improved the security of e-commerce by popularizing the knowledge about network security among the public. In 2010, the Australian government proposed the "National Network Security Week" with the purpose to improve people's awareness of network security, presenting how to protect personal information through some examples about protecting personal online information.

2.5.5   *Effects of Australian E-Commerce Strategy*

The implementation of specific measures above not only has made Australia's information industry develop rapidly, but also contributed to the rapid development of e-commerce in Australia.

● Connectivity

Many Australians now have access to the Internet in their home and at work. In June 2010, 77% of the population aged 14 years and over had access to the Internet at home, 40% at work and 15% at other locations. Sixty-six percent of persons aged 14 years and over had access to home broadband services, up from 63% in June 2009. Meanwhile, mobile networks are playing a more and more important role in people's daily life. Thirteen percent (about 2.4 million persons) of the population in Australia aged 14 years and over were estimated to have undertaken some form of activity online via their mobile phones during June 2010, up from 9% (1.6 million persons) in June, 2009. There were 3.5 million mobile wireless broadband subscribers in Australia, up from 2.8 million in June 2009 while the number of fixed broadband subscribers remained steady [16]. Therefore, mobile networks are changing the dynamics of Internet use and at the same time influencing the development of e-commerce.

● Consumer engagement in e-commerce

The majority of Australians have engaged in a wide range of e-commerce activities online. According to a survey by the Australian Communications and Media Authority (ACMA), there were 88% of household Internet users who had performed one or more e-commerce activity during June and November 2009. A wide range of e-commerce activities had been adopted by Australians such as

banking transactions online, paying bills online, selling products or services online, purchasing products or services online, getting government services online and gambling online. Among them, banking transactions, purchasing products or services and paying bills online were the most popular e-commerce activities (Fig. 2.11). In the survey, 26% of Internet users performed between one and three activities while 43% between four and six e-commerce activities, and 18% between seven and nine activities. About 1% indicated they had performed more than ten kinds of e-commerce activities. It can be seen nearly two-thirds of respondents undertook at least four different kinds of e-commerce activities. Meanwhile the age, gender, household income, level of education and employment all had an effect on people's adoption of e-commerce activities. In general, young consumers with high levels of education and income are more likely to adopt e-commerce. Consumers between 25 and 34 in Australia were the main group across age groups. In addition, the higher the levels of education and income, the more likely it is for consumers to engage in e-commerce. Moreover, males (74%) were more likely than females (65%) to purchase online. But they purchased different goods. Males preferred to purchasing household goods including furniture, electronic appliances or computers while females preferred to purchasing health and beauty products.
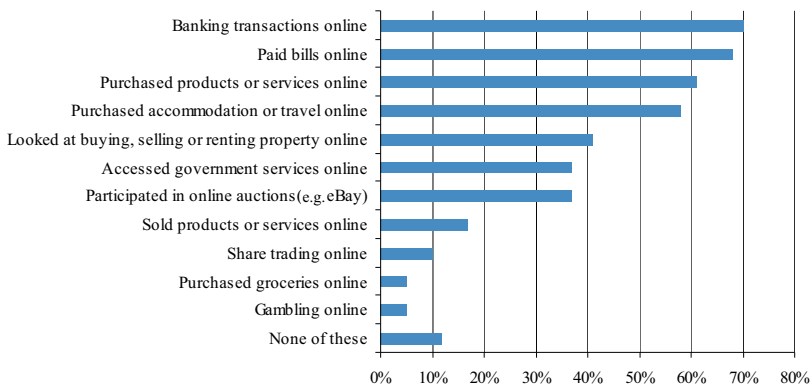
Fig. 2.11 Adoption of e-commerce by household Internet users during June and Nov., 2009
(Note: multiple responses allowed)

As far as goods and services purchased online are concerned, the most popular items were goods and services, accounting for 56%. 43% of respondents purchased entertainment events, concerts and movie tickets online because of the convenience and low cost. In addition, household goods, books and magazines were also popular goods purchased online. Over a third of respondents chose to purchase them online. E-government services were one of the popular services online too [17]. Details are shown in Fig. 2.12 [18]. According to the Australian Bureau of Statistics, the value of Australian business Internet orders was estimated to be Australian $123 billion in the 12 months over 2008 – 2009, up from Australian $81 billion in 2007 – 2008. The two most important factors as to why

so many people purchased online were the convenience and low cost of e-commerce. In addition, e-commerce made it possible for consumers to purchase goods or services overseas, which was more convenient than shopping abroad.
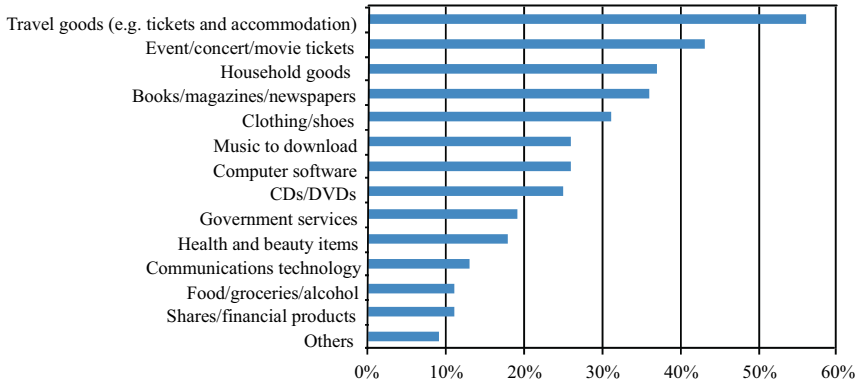
Fig. 2.12   Goods and services purchased online during June and Nov., 2009
(Note: multiple responses allowed)

● Small and medium enterprises engagement in e-commerce

Small and medium size enterprises are the main participants in the development of e-commerce. Nearly all the small and medium size enterprises (SMEs) in Australia have owned a computer of some description. About 94% of SMEs had access to the Internet in September, 2010. As for websites of their own, 60% of small businesses had their own websites in 2010, up from 54% in 2009. Website penetration also rose for medium size businesses. About 89% of medium size businesses had their own websites in 2010, up from 85% in 2009.

With the development of e-commerce, more and more SMEs use the Internet for procurement. In 2001, SMEs used the Internet mainly for looking for information on products or services. Recently, more and more SMEs used the Internet for placing orders for products or services, and paying for products or services. In addition, medium size businesses adopted e-commerce better, compared with small businesses. In 2010, 79% of medium size businesses placed orders online and 81% of medium size businesses paid for products or services online while only 73% of small businesses placed orders online and 76% of medium size businesses paid for products or services online (Table 2.3). The most common online purchases made by SMEs were airline bookings, accommodation, software, and stock and merchandise.

With the development of e-commerce, online selling grows rapidly, whether in taking orders or receiving payments. In 2001, less than 40% of medium size businesses had ever sold products or services online while less than 20% of small businesses had ever sold products or services online. In addition, the growth in medium size businesses selling online was stronger than that in small businesses. The percentage of medium size businesses taking orders online rose from 56% in

2009 to 66% in 2010, with those taking payments rising from 70% in 2009 to 75% in 2010. For small businesses, the percentage of those taking orders online rose only from 57% in 2009 to 58% in 2010, with those taking payments rising from 67% in 2009 to 70% in 2010 (Table 2.4). Compared [19] with taking orders online, SMEs have made greater achievements in receiving payments online.

Table 2.3 Buying over the Internet of SMEs

Year	Small businesses				Medium size businesses			
	Look for information on products or services	Place orders for products or services	Pay for products or services	Access to the Internet	Look for information on products or services	Place orders for products or services	Pay for products or services	Access to the Internet
2001	51%	26%	23%	75%	79%	49%	39%	95%
2002	64%	41%	40%	79%	82%	61%	39%	94%
2003	67%	45%	47%	81%	91%	64%	66%	98%
2004	75%	55%	58%	86%	94%	74%	73%	99%
2005	76%	51%	62%	87%	92%	72%	72%	97%
2006	82%	60%	65%	90%	93%	75%	80%	99%
2007	78%	58%	66%	92%	93%	72%	77%	99%
2008	82%	66%	70%	93%	96%	82%	81%	98%
2009	87%	74%	74%	95%	94%	84%	79%	98%
2010	86%	73%	76%	94%	94%	79%	81%	100%

(Source: Sensis e-Business Report, 2010)

Table 2.4 Selling over the Internet of SMEs

Year	Small businesses			Medium size businesses		
	Take orders	Receive payments	Access to the Internet	Take orders	Receive payments	Access to the Internet
2001	19%	13%	75%	35%	29%	95%
2002	29%	26%	79%	47%	50%	94%
2003	32%	32%	81%	49%	63%	98%
2004	39%	44%	86%	50%	60%	99%
2005	41%	50%	87%	51%	59%	97%
2006	46%	52%	90%	54%	63%	99%
2007	47%	54%	92%	54%	62%	99%
2008	53%	62%	93%	56%	72%	98%
2009	57%	67%	95%	56%	70%	98%
2010	58%	70%	94%	66%	75%	100%

(Source: Sensis e-Business Report, 2010)

2.6   The United Arab Emirates

According to the International Monetary Fund, the world economy was expected to grow by 4.2% in 2009, spearheaded by Asia and the Middle East, with Gartner forecasting 5.3% increase in IT spending to hit U.S. $3.4 trillion in 2010, with a further growth of 4.2% in 2011 [20]. Although the countries in the Middle East have not been considered as active countries in e-commerce around the world, their economic strengths are too enormous to be neglected. The development of e-commerce in every part of the world should not be ignored, especially for the Middle East with advanced economies. To give a reference for the readers who are paying attention to Middle East, we simply introduce the e-commerce strategy of the United Arab Emirates which is a typical country in Middle East.

2.6.1   Introduction to the United Arab Emirates

The United Arab Emirates (UAE), often shortened to the Emirates, is situated in the southeast of the Arabian Peninsula in Southwest Asia on the Persian Gulf, sharing sea borders with Iran, Iraq and so on and bordering Oman and Saudi Arabia. The country lies between the dry tropics across Asia and North Africa, characterized by a tropical desert climate [21].

The UAE is extremely rich in oil and natural gas, especially famous for oil. The proven oil reserve is 13.34 billion tons, accounting for 9.5% of the world total and ranking fifth in the world. The proven gas reserve is 6.06 m^3, also ranking fifth in the world. Its national economy mainly depends on petroleum extraction and the petrochemical industry. The petroleum revenue accounts for more than 85% of government revenue. Behind the guidance of the petroleum industry, other industries, especially the processing industry including liquefaction of natural gas, aluminum metallurgy, plastics manufacture, building materials, garment and food processing account for a considerable proportion of GDP. In addition to the petroleum industry, the main industries in the UAE include food and beverage processing, textile and garment processing, timber processing and furniture manufacture, paper products manufacture, the chemical industry, nonmetallic minerals processing, steel processing, metallurgical industries and jewelry manufacture. In recent years the total investment in industrial projects has reached nearly U.S. $10 billion.

However, the output of agriculture, animal husbandry and forestry accounts for only 2.4% of GDP in the UAE. The grain totally depends on importing; moreover most meat products and seafood are imported from other countries. Although the government has put forward several policies to encourage farming, severe weather and water scarcity have always been the bottleneck for the further development of the agricultural economy.

There is a well-developed public transportation system in the UAE. Each emirate of the UAE is connected by modern highways. 15 coastal ports and 308

docks have been constructed, handling 700 million tons of cargo every year. There are six international airports and ten heliports throughout the country. The Emirates Airlines has ranked first among the Arab world in terms of competitiveness. Bilateral agreements on air transportation have been signed between the UAE and other 82 countries including China. At present, scheduled flights from 109 airlines all over the world land within the airports of the UAE.

Foreign trade occupies an important place in the national economy of the UAE. Entering the WTO in 1995, the UAE has had trade relations with 179 countries or regions. The bilateral trade arrangements and double taxation arrangements have been signed between the UAE and more than 40 countries. The total foreign trade volume reached 660.4 billion dirham (about 181 billion dollars) in 2009 [22].

There are three stages in the economic development of the UAE. Before oil was discovered, the UAE had not been formed and every emirate remained sealed off. Each emirate maintained a fragile tribal economy through picking up and selling pearls. The first oil exploration agreement was signed between Abu Dhabi and the Occidental Petroleum Corporation in 1936 and the first batch crude oil cargo was exported from Abu Dhabi in 1962. A substantial transition from a tribal economy to a petroleum economy was finished during this period. During the early 1970s, a great change had taken place in the world petroleum market, featuring the shift from a buyer's market to a seller's market. The UAE and other OPEC members entered a new stage during which every member can control its petroleum industry and sets the export price of oil independently. On December 2nd, 1971, the UAE was formed. In the same year, due to political benefit and war factors, Arabic oil producing countries began to hike the price of oil. The price of light crude oil increased from $3 per barrel to $10.46 in 1974 and reached $11.51 in 1975. Meanwhile, oil consumption throughout the world grew from 49.16 million barrels per day in 1971 to 57.15 million barrels per day in 1973. In this favorable market environment, the oil revenues of the UAE reached 25.5 billion dirham in 1974. After the first oil crisis from 1973 to 1975, OPEC decided to increase the oil price to $25 per barrel in 1978. In 1980, Iran and Iraq, as two main petroleum exporting countries, slid into war, leading to sheer panic in the worldwide petroleum market. In 1981, thirteen members of OPEC held a meeting which decided to set the standard oil price at $34 per barrel. This event triggered the second oil crisis. The considerable increase in petrol prices delivered a heavy blow to western countries, but created a great opportunity to OPEC members for the blooming of their national economies. According to IMF, the GDP of the UAE was only 1.5 billion dollars in 1972, but after only nine years it increased to 32 billion dollars. The GDP per capita increased from $4412 in 1972 to $30,198 in 1981, up 24% year-on-year, making the UAE the richest country in the world. However, when it reached $34 per barrel, the highest point, the oil price began to decrease due to a slump in demand and implementations of new low-energy consumption materials. Although OPEC adopted the strategy of limiting production for turning around the decline, the oil price fell below $10 per barrel. As a result, the economic development of the UAE faced some challenges.

According to government figures, the GDP of the UAE has been going up

steadily since the economic era called "petroleum economics" came into being. In 1995 the GDP was below 40.984 billion dollars [23], while only ten years later it reached $132.3 billion in 2005. The GDP grew to 163.66 billion dollars and 190.683 billion dollars in 2006 and 2007, respectively [24]. A report released by the Chamber of Commerce & Industry, said the GDP grew 14.7% in 2008 and reached 800.3 billion dirham (about $219.26 billion). Forbes said, on its web site, the GDP per capita of the UAE ranked fourth in the world in 2008, up to $55,200.

2.6.2   Strategic Background of E-Commerce

Since the establishment of the UAE in 1971, oil revenue has transformed the UAE from a dry and sparsely populated state into a modern prosperous one. However, fire and water are good servants but bad masters. In the process of formulating national development strategies, the government has realized the UAE's over-reliance on oil revenue. Fluctuations in oil prices have led to uneven developments of other industries, especially agriculture, tourism, transport and communications sectors. Oil resources are finite, and oil-related industries also have brought serious environmental problems to the UAE. So in the past 20 years, the UAE government has been committed to the diversification of non-oil sectors and made a top priority of developing a diversified economy, expanding trade, and increasing the proportion of non-oil income in the gross domestic product.

In the industrial field, in addition to building up a large number of oil and natural gas processing plants, the UAE has gained a lot from food and beverages, textiles, leather, wood and wood products, paper and paper products, basic metal products and industrial minerals. Moreover, the UAE has also achieved some success in tourism, finance, insurance and other service industries. Presently the UAE has become a trading center and tourist center in the Middle East, especially in Dubai Emirates. Every year millions of people go to the UAE for exhibitions, commercial negotiations, purchase orders, or do other business trips.

For the sake of trade development, the UAE has also constructed a large number of cold storages and warehouses. Up to now the UAE has already built modern storage and transportation facilities, and has also implemented the latest technology for transportation and communications to ensure the development of the logistics industry. The UAE has run the most advanced airport systems in accordance with the most stringent quality management system. Overall, the UAE has a sound internal highway network, and a three-dimensional traffic system covering land, sea and air, which provides an excellent objective environment for the development of e-commerce.

As well as developing the traditional economy, the UAE is developing the IT industry. The UAE has built *Dubai Technology, Electronic Commerce and Media Free Zone* in Dubai Emirates to make Dubai an e-commerce and IT research center in the Middle East, and the Silicon Valley in the Bay Area. The establishment of Dubai Internet City is an important measure to set up the first

"Silicon Valley" in the Middle East.

Until 2006 the UAE had 1.4 million Internet users, covering 33.3% of its total population. The proportion ranked first in the Middle East and ninth in the world. There are totally 8713 web sites in the UAE, and 1347 of them can not be viewed[25]. The UAE's Telecommunications Corporations are primarily operated by Etisalat and EITC-du; other companies can only lease cable from these two corporations. In 2006, Etisalat was the only telecom operator in the UAE, with a monopoly of the fixed telephone, mobile telephone, Internet access and cable television business. By 2008, Etisalat had over 7.3 million mobile phone users, 1.15 million Internet users and 1.36 million fixed-line users. EITC was listed in the Dubai Financial Market in 2005. 40% of the shares are controlled by the UAE Federal government. In December 2007, EITC said that mobile phone users passed 3 million after operating only 21 months. In 2008, the number of phone users increased to 1.8 million, fixed telephone users reached 0.28 million with a year-on-year increase of 72%; the profit was 830 million dirhams (about U.S. $227 million) with a year-on-year increase of 58%. In 2009, ETIC planned to invest another 2.0 billion dirhams ($546 million) for constructing communication facilities to improve capacity, coverage and call quality.

A research made by the Economist Intelligence Unit shows the UAE's high and mature electronic level, ranking it 33rd in the world. The UAE has demonstrated a way for other countries to conduct e-commerce in the Middle East. Its established results will be used in e-commerce and will be playing a significant role in our society. Currently, the development of e-commerce is not subject to any regulatory obstacles in the UAE [26].

2.6.3 E-Commerce Strategic Orientation of the UAE

The e-commerce strategic orientation of the UAE is to solidify the strategic position which can guarantee its key trade hub in the Arab Gulf region. Its relatively liberal social standards will continue to attract western investments from wealthy regions, which help the UAE lead Arab States and the Middle East in developing e-commerce.

2.6.4 E-Commerce Strategy in the UAE

In 2006 the UAE developed Act No.1 specifically for e-commerce, which defined e-commerce and set the target of promoting the development of e-commerce. The UAE e-commerce strategy can be summarized as the following aspects.

(1) Establishing e-commerce free trade zone and building e-commerce center

In January 2000, the governor of Dubai Emirates, Maktoum bin Rashid Al Maktoum, promulgated a decree to build an e-commerce free trade zone of 4

million square meters; it would be built into an international e-commerce center which would have nearly 20 million consumers from South Asia to Africa. By providing digital economy solutions to corporations, establishing electronic money and the accounts system, developing international digital trade rules, and ensuring e-commerce security and other channels, the free zone would build an international trading platform for the regional digital market, so that national businessmen can do business online at any time just by clicking the mouse. According to the design planning, network universities, software development centers, e-commerce transaction centers, electronic products industrial parks, computer accessories and other related assembly area network industries would gradually be improved in the e-commerce free zone, and the world's largest commercial IP phone network would be built in this region. The Network University being constructed would become the world's first Internet university, providing e-government, e-finance, e-market, multimedia, e-management, and correlative education to train more e-commerce professionals for the Middle East [27]. By 2007, the trade area had attracted more than 400 registered companies, including Microsoft, Oracle, MasterCard International, IBM, Dell, Cisco, Siemens, Compaq, Emirates International Bank and other major companies engaged in e-commerce. There were more than 5,000 managers here, and staffs reached a total of more than 8500. Another 350 companies were applying for business licenses in this network city. Experts believed that Dubai e-commerce free zone would play a positive role in maintaining and strengthening the regional trade hub of Dubai and increasing economic influence of the UAE around the world.

(2) Establishing a management system fitting for e-commerce and electronic trade

The UAE telecom has set a system fitting for e-commerce and electronic trade. According to the State's plan and *Federal Law No. 1 of 2006 Regarding Electronic Transactions and Commerce (the 'E-Commerce Law')*, the UAE Economic Department has promulgated two decisions and constituted a department for making laws and suggestions on e-commerce in 2006. The Telecommunications Regulatory Authority (TRA) of the UAE is responsible for technical support and human resources. The department which is responsible for monitoring and promulgating relevant laws has also been established.

(3) Establishing, managing and spreading the e-commerce platform by the government

On June 20, 2000, the UAE government set up a portal website "Tejari.com" for B2B e-commerce. This platform, owned by the Dubai government and based on Oracle, provided service for all B2B e-commerce trades in the UAE. Dubai official said that all business will be done through the website. Tejari has rapidly become the largest digital market in the Middle East. At present, more than 100,000 corporations from 15 countries do trade online through Tejari. Moreover, the Tejari trading platform has possessed total trade over $5 billion and became the eighth EC trading platform in the world up to 2008.

(4) Removing the concept that e-commerce is insecure and establishing a security system to boost e-commerce trust

Although the telecoms infrastructure may already be in place in the UAE, the majority of consumers psychologically fear shopping online. The security issue on the Internet tops the list of concerns of most users, especially those who desire to buy via the Internet. According to a survey conducted by security solutions provider Symantec in 2008, about 75% of UAE Internet users avoided shopping online because they perceived it to be "insecure" and "too risky" [28]. To eliminate the incorrect conception about e-commerce security, a nationwide Internet trust mark scheme to boost confidence in e-commerce in the UAE was launched by the Telecommunications Regulatory Authority (TRA) and Dubai e-Government (DEG) in 2008, which would be managed and developed as a joint venture [29].

2.6.5 Implementations

The UAE is the first Arab country to issue laws to regulate e-commerce. With the implementation of e-commerce strategy, the UAE has been acknowledged as the most important and most advanced Arab country in e-commerce.

According to the survey report *UAE Internet Users and E-Commerce Survey 2007* concluded by the Arab Advisors Group, 51.2% of Internet users in the UAE reported purchasing products and services online and through their mobile handsets over the past 12 months. Based on the survey findings, the Arab Advisors Group estimated that e-commerce users in the UAE had exceeded 1.16 million who had spent over $1.15 billion in 2007 [30], accounting for 1.6% of GDP, which ranked first in the Arab world and Middle East countries.

In 2008, the e-commerce trade volume of the UAE was more than U.S. $1.36 billion (Dh 5 billion). In Feb 2008, Dubai Chamber conducted a survey to monitor the e-commerce market in Dubai, its applications, regulations, impact and future prospects in order to provide policy recommendation for improving the practices of e-commerce and to be the best environment in the region/world for doing e-commerce. Fig. 2.13 ranks the major uses of e-commerce in companies in Dubai. It is evident from the figure that the majority of companies are engaged in e-commerce. In addition, electronic payment is the most common e-commerce application (Fig. 2.14).

As per the survey by MasterCard Worldwide, the highest average online shopping spend in Asia, Middle East and Africa regions was in the UAE, with an average spend of $1,048 in the last quarter of 2009. Airline tickets (43%), books and arts (34%), CDs, DVDs and VCDs (30%) and home appliances and electronic products (29%) were the most popular items bought by online shoppers. Due to the endeavor of the UAE government, consumers were becoming happier with shopping on the Internet, with 52% of the respondents stating that it is convenient to shop online in 2009, versus 47% in 2008 [31].
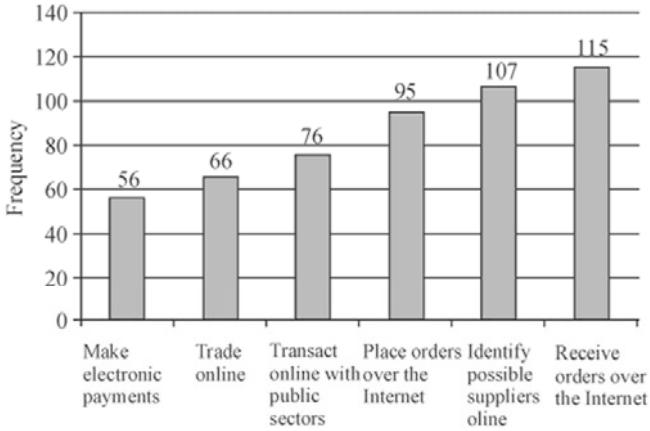
Fig. 2.13   Uses of e-commerce in companies in Dubai
(Source: zawya.com. Dubai traders are optimistic about the future of ecommerce[R/OL].
(2009-01-15) [2009-05-20]. https://www.zawya.com/story.cfm/sidZAWYA20080512070358)
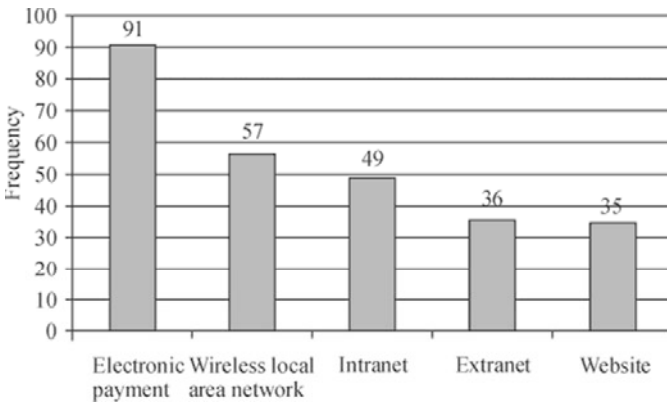
Fig. 2.14   Methods of e-commerce in Dubai
(Source: zawya.com. Dubai traders are optimistic about the future of ecommerce[R/OL].
(2009-01-15) [2009-05-20]. https://www.zawya.com/story.cfm/sidZAWYA20080512070358).

Nowadays, the technology environment in the UAE has become a model for attracting investments, especially in Dubai Internet City, one of the most important technological landmarks of the Arab world, which has the best environment for the launch of e-commerce projects. A quarter of UAE residents used the Internet for commercial transactions. Studies indicate that global e-commerce is expected to reach some $13 trillion (Dh 47.7 trillion) in 2012, with the involvement of 850 million people around the world. Studies have also shown that UAE e-commerce alone will account for more than $36 billion by 2010 [32].

2.7   India

2.7.1   Overview of India

The Republic of India lies in South Asia, which is the largest country on the South Asian subcontinent, and the second-most populous country with 1.2 billion people (2011 census by the Interior Ministry). India is a country with abundant natural resources. A good range of minerals were found and exploited including coal, iron, manganese, chromium, titanium, magnesite, beryllium, zirconium, monazite, mica, fluorite and oil. Mica reserves and production rank the highest in the world, whose volume of exports takes up 60% of the global volume. The reserve of coal in India is the second-highest, and both coal production and bauxite production rank fifth in the world.

India's economy is dominated by agriculture, and the agricultural population accounts for 74% of the total population. Mining and the textile industry make up the main manufacturing industries, and iron and steel, power, petroleum, chemicals, rubber, coal, matches, jute and tea are also involved. In the international business world, India's major trade partners include the United States, Japan, Britain and Russia, exporting jute products, tea, iron ore, cotton, leather, while importing food, machinery equipment, vehicles, petroleum products, steel, metals and chemical products. Since January 1991, the Indian government implemented comprehensive economic reform, gaining impressive economic growth. During the "Ninth Five-Year Plan" (1997 – 2002) period, the average annual economic growth reached 5.5%. During the "Tenth Five-Year Plan" period, the corresponding statistic was 7.8%, which was even higher. This made India one of the fastest growing countries around the world. With the influence of the international financial crisis, the rate of Indian economic growth suffered a decline from above 9% to around 5.7%. Its GDP reached Rs 5264.676 trillion rupees, or $1.215 trillion. This data ranked it at the 13th place in the world, which was slightly lower than the expectation of the CIA *World Factbook*, at $1.237 trillion. When it came to the 2009 to 2010 fiscal year, agriculture, fisheries and manufacturing performed very well, driving a development rate of 7.4% over the previous year. According to the Indian government's expectation, due to global economic recovery and remarkable prospects for agricultural production, the number will rise again. It is noteworthy that the quality of economic growth in India is much higher than that of China. The share of the services sector accounted for is greater, which is less dependent on imports and exports. In other words, its economy is driven by domestic demand. India has reached a considerable level in many research domains, including astrophysics, space technology, molecular biology, electronic technology and other high-tech fields.

Railways makes up the major component in the Indian transport system, and the railway sector is the largest state-owned department. India has 62500 km, of track, ranking it first in Asia and fourth in the world. In recent years, rapidly

developing road transport has undertaken 85% of passenger traffic and 70% of freight, which makes it one of the world's largest road networks.

With a population of over one billion, the Indian economy has remained undeveloped. Over 40% of residents still live below the poverty line. However, India rose rapidly to be a software superpower over recent years because of proper decision-making and positioning. Software value soared from $50 million in 1990 to $1.2 billion in 2004, which was an increase of over 200%. Therefore, the Indian software industry has become the main driving force of the national economy, outshining other industries. As early as 1998, India had set up the blueprint of a superpower in information technology by the year 2008, and expected that the exports of its software industry would reach $50 billion. In recent years, Indian software manufacturing and service industry has been developing at a remarkable rate. The Indian software industry is now ranked the world's second following the United States, leaving Japan and Europe far behind. According to the statistics from the National Association of Software Service Companies (NASSCOM), the output from the information industry and outsourcing reached $29.6 billion, increasing by 33% over the previous year. Up to 95% of the Indian software industry is oriented to the international market, and more than 200 enterprises in the world's top 500 outsource software business to India. Estimated by the authorities, the Indian software industry output reached about $85 billion in 2010, amounting for 33% of its total exports. In the United States, the most developed country in the information industry, Indian software accounts for more than 60% of market share.

2.7.2   *Background to Indian E-Commerce Strategy*

"Since World War II, there was one region whose economy took off every ten years. Europe took off in the 1950s, Japan in the 1960s, Hong Kong of China in the 1970s, Southeast Asia in the 1980s, and mainland China in the 1990s; now it is India's turn." said Surjit Bhalla, an Indian economist, who considered it a great possibility, "because India has long been below its potential for growth" [33]. It should be admitted that his view is based on facts.

In the global software market, India has aroused worldwide attention. According to the survey reports on the strength of national software exports made by the World Bank, based on three composite indices of scale, quality and cost, India's software exports rank first in the world. India is one of the world's five largest suppliers of software, and the second largest exporter of computer software after the United States. India's software products have been exported to 91 countries, among which the United States is the largest market for Indian software products. Competitive advantage makes India the world's software center. Many leading information industry companies, such as Microsoft, Intel, Siemens, Oracle have all set up their R&D base in India, and there are more than 250 foreign companies in Bangalore alone. In the global software development market, India

accounted for a 16.7% share. Bill Gates predicted that the software superpower of the future is not the United States, not Japan, nor Europe, but India.

The Indian government played a major role in the evolution from a poor and backward country, to a major software exporter. In the 1950s, the Parliament of India passed the *Scientific Policy Resolution (1958)*, putting forward clearly the importance of science and technology as basic national economic and social principles. The support and policy of the state made India a great software exporter in the modern world. Additionally, it is very important to grasp opportunities in the international market, and integrate it with national developing strategies.

Since the mid-1980s, successive Indian governments have all regarded the development of the information technology industry, especially the software industry, as the start of the priority, to promote the improvement of overall national strength.

In the early 1980s, the Indian government announced the *Technology Policy Statement*, which further confirmed that science and technology was the basis of India's economic growth, and reiterated the significant sense of scientific research by its own resources. Rajiv Gandhi, prime minister then, emphasized again that India had missed opportunities in the previous technological revolution, and must seize later chances. He regarded the electronics industry as "the nerve of the state". The government clearly stated that India should bring itself into the 21st century by an electronics revolution, and it is the software industry that makes up the entry point of the government's promotion. This was probably the first of the developing countries that formulated a clear national IT strategy. In 1984, the Indian government enacted a policy on IT, which has specified the software industry as a preferential industry. The government promulgated in 1986 the *Policies on the Export, Development and Training of Computer Software*, which made it clear that the software industry should be provided with all necessary investment, such as providing foreign exchange facilities when importing or exporting, financial support, personnel training, high-speed transmission, streamlining procedures for both investment and import or export, and so on [34]. What's more, tax incentives are also provided, such as exemption from taxation if a company exports all its software products.

Singh put forward a new policy to promote the development of the software industry after coming into power. His government took three measurements to encourage exports: exemption from profit tax for software companies exporting 100% of output; reducing the import duties from 65% to 25% for software companies whose actual export totals reached 3 times the foreign ordered amounts; and the last one, exempting dual taxation on exported software. Although Singh's government stepped down only 2 months after the policy was put forward, Sekar's government, the successor, contributed to the Parliament to pass the bill, even though upset with troubles both at home and abroad.

In the 1980's, Rajiv Gandhi's government had changed the import substitution policies and stressed: "Whatever contributes to technological updating and benefits exports, be they raw materials, industrial equipment or capital, can be

imported." The policy, together with the cancellation of import controls for equipment and industry, greatly stimulated the development of India's export-oriented software industry.

After establishment, the Vajpayee government announced making India a "global information technology superpower" and the "pioneer of the information evolution era". Molasuoli Malone, Minister of Commerce and Industry, said, "We missed all the previous industrial revolutions, but do not want to miss this information industrial revolution sweeping the world." He also declared, "We will become an information industry power." At the same time, Prime Minister Vajpayee clearly stated that both information technology and biotechnology are two of India's major knowledge-based industries which he would focus on.

Software Technology Park of India (STPI) was a government agency in India, established in 1990 under the Ministry of Communications and Information Technology. The first three STPIs were Bangalore, Bnubaneshuar and Poona. By 1998, India had already established 25 STPIs around the country. Software companies in the parks developed rapidly under the guidance of policies published in 1984 and 1986.

In 1998, Prime Minister Vajpayee formed a "National Information Technology and Software Development Committee", which was composed of a wide range of people, and had considerable power. The Committee issued the famous "Information Technology Development Project of 2008", and clearly claimed to achieve the goal of "software superpower" by 2008 which was also the sixtieth anniversary of Indian independence. It is also stated that India aimed to achieve output value worth $87 billion, and export $50 billion, as well as the requirement that "information technology permeates the entire country."

To encourage software exports, the Indian government has supported the software industry in tax revenue, including exemption from profit tax for software companies exporting 100% of output; exemption from taxation of domestic goods; allowance of a 4% rate of depreciation for software imports with the purpose of promoting software exports, or domestic sourcing; allowing companies to use 30% net revenue from foreign exchange for investment abroad, establishment of a related organization, hiring foreign experts, purchasing design drawings etc. Moreover, the Indian government adopted a series of preferential tax policies to attract foreign investment, and encouraged software companies and manufacturers to set R&D groups, undertaking new research programs. It also introduced the software industry to the venture capital industry, providing financial support, loan priority and preferential rights.

Establishing STPI has not only attracted foreign investments, but also promoted the development of India's software industry. The Indian government formulated a long-term strategy to focus on developing computer software. Since 1987, the government has invested 50 million Rupees in establishing related facilities for each STPI. Today, Bangalore is not only India's software capital but also the world's fifth-largest information technology center, as well as one of the world's top 10 "Silicon Valleys".

To further develop the software industry, the Indian government established a

series of software technique parks from the south to north, forming a national software technique network. Up to now there are 17 STPIs and over 1,300 companies registered in these parks from home and abroad. The Indian government provided these software companies with a series of favorable terms, including exemption of income tax for five years; exemption from import duties for computer and related hardware; and exemption from income tax for software companies whose products are all exported.

From the perspective of personnel training, the Indian government has been taking various steps to accelerate the education of IT talents. First, the investment in the internationally famous Indian Institute of Technology was increased. Second, information technology institutes were built in all the states, following the example of the Indian Institute of Technology, to cultivate and educate high-level IT professionals. Thirdly, civilian-run schools were strongly encouraged to train qualified IT personnel. Last but not least, famous software companies were also encouraged to provide education. A number of internationally known IT companies have joined the project of Indian education, for example the Intel Corporation has recently decided to fund India to train 200,000 IT teachers in order to promote information technology education.

The successful implementation of information technology strategies mentioned above contributes to the evolution of India from a poor and backward country to a software power. The government has been fully aware of the tremendous power of information technology and benefits a lot from it. At the stage of the transition from software to e-commerce in information technology India took advantage of the opportunity, and published e-commerce strategy in the new developing era, further promoting its domestic economy.

2.7.3 Orientation of E-Commerce Strategy in India

India has benefited a lot from the rapid development of information technology. As the continuation and extension of India's information technology strategy, its e-commerce strategy undertakes the relay of making India an economic power. Specifically, the orientation of e-commerce strategy of India is, by virtue of the implement of the strategy, to seek new growth points for India's information economy, enhance the rapid development of the Indian information industry, computerize Indian traditional economic activities, to bring India to the fast track in economic development with an electronic revolution, and to achieve great-leap-forward development. What's more, the strategy will help India improve its economic competitiveness in the global economy and make India an information technology power. Above all, India's e-commerce strategy differs from that of the United States, Europe or Japan. The strategy, carrying more hope, is the driving force of India's dream to become a powerful country.

2.7.4   *Details about India's E-Commerce Strategy*

Since the emergence of e-commerce, the Indian government positively promoted its development, which made e-commerce develop very well in India. The main aim of publishing 'Development Plan of Information Technology in 2008' was to meet the country's requirements in various fields, such as information infrastructure, access to networks, software development and exports, hardware production, electronic commerce, IT research and development, and human resources training and education. From 1999 to 2000, e-commerce turnover in India was 4.5 billion rupees; in 2002, this figure had reached 150 billion rupees. At the end of FY 2007, the e-commerce market volume was projected to be 7080 Crores (1 Crore = 10 million rupees). E-commerce has seen an explosive growth in India on the back of rising plastic card issuance. 2010 has been defining for the Indian e-commerce sector. India is one of the dominant countries in software manufacturing and selling, and its software industry occupies an important position in the world, therefore the development of e-commerce software industry is advantageous in India. Software, which is an indispensable product in the process of e-commerce development, greatly promotes e-commerce development and, in turn, e-commerce also pushes the fast development of the software industry. There will be more and more people engaging in e-commerce software development.

The Indian government spared no efforts in promoting e-commerce development, and it introduced a number of strategic measures in recent years. The author collected comprehensive information on all aspects and the contents of e-commerce strategies are summarized as follows:

(1) Opening the market and attracting private capital and foreign capital to participate in e-commerce development and construction

In order to promote e-commerce development, the Indian government made some adjustments in the proportion of foreign investment. As a result, the maximum proportion of foreign investment in the B2B field broadened from 49% to 100% (but foreign investors should transfer 26% of the shares to Indian investors within 5 years). In addition, following the practice of the United States, the Indian government decided to offer e-commerce transactions tax-free concessions in the following three years to encourage private capital and foreign capital to participate in e-commerce.

(2) Establishing a legal environment compatible with e-commerce

While the e-commerce market is in the open, the Indian government strengthens the work of legislative norms related to e-commerce. Back in 1998, the Indian government laid down the *Electronic Commerce Act of 1998*, removing the obstacles induced by paper-based laws. It involves many areas such as evidence, finance, and criminal responsibility, not merely limited to transaction type, and it is strong operationally. In 2000, the Indian government carried out the *Computer Piracy Law* and the *E-Commerce Law*, which provided a legal framework scrutinizing digital signature system and became the legal guarantee for the smooth development of e-commerce. The *Information Technology Act*

2000 (ITA-2000) (IT ACT) which became effective on December 18, 2000, provides specific penalties for some illegal activities such as unauthorized access to computer networks and databases, spreading computer viruses, interference with service, software copying, tampering with the original file, forging electronic signatures and so on, and identifies the legal basis approving electronic contracts, electronic writs, and digital signatures, which makes India the 12th country owning such laws. This indicates that the management of e-commerce in India has stepped into a new legal management stage, and its law-based control toward e-commerce marches at the forefront of the world. Besides, the related departments of the Indian government are studying defining laws to regulate the Internet, and setting up a special committee to research on how to levy taxes on e-commerce activities.

(3) Establishing and improving related infrastructure

The rapid development of e-commerce relies on the improvements of related infrastructure and enhanced application coverage in information technology and communication technology. In view of the low popularization rate of telephone and Internet in the early development of electronic commerce in India, the related departments of the Indian government strengthen the infrastructure, communication and network facilities.

First of all, in terms of infrastructure, the government of India reinforces the investment and constructions in harbor installations, intermodal facilities and storage facilities to enhance the flow rate of goods or services, and to match the information stream created by e-commerce.

Then, in terms of the communication facilities, India has recently further relaxed restrictions on foreign investment in communications, increased investment in communications infrastructure, expanded the communications network, and taken measures to reduce the communication cost effectively. Also, the Indian government and the business community are planning to construct the National Communication Backbone and develop the satellite phone. Following the designation of 2007 as the year of broadband in India, a former minister of Communications and Information Technology proposed the plan of universal free broadband, which made free access to 2 Mbit/s broadband services become a reality and attracted extensive attention from the international ICT industry.

Finally, in terms of the network facilities, India has already begun to construct a National Internet Centre by NASSCOM as the core, while the DGFT of India takes the lead in designing and constructing network architecture and a platform for e-commerce transactions to make possible transactions via the Internet. Also, it has exploited an Electronic Payment System connecting banks and other financial institutions.

(4) Actively promoting the application of e-commerce

In order to promote the application of e-commerce, the government of India organized and constructed an e-commerce network linking DGFT and related companies as well as all foreign trade companies, and it requires that all the trade data should be registered on the DGFT website. In the beginning period of this measure, exporters suspected that their export data might be exposed to

competitors and had the risk of being tampered with, so they were reluctant to abide by it, but after operating for some time, exporters' concerns had been greatly reduced with their increasing understanding of the system.

(5) Organizing seminars and exhibitions on electronic commerce, popularizing e-commerce knowledge, and fostering the e-commerce market

The India NASSCOM organized two international symposia and exhibitions on e-commerce in 1999 and 2000 respectively. More than 800 people participated in the first one and more than 100 people made a presentation, more than half of whom were senior executives of large companies; in particular, the second one held at the end of July attracted more than 1500 participators from various parts of India, and the number of lectures reached 170. These measures helped to train the user base of e-commerce to some extent.

(6) Supporting the development and export of e-commerce software

Like the software industry, e-commerce in India will not have sufficient demand if just relying on the domestic market because India's e-commerce market is still too small. Therefore, India first adopted an export-oriented strategy to meet the needs of the international market by carrying out research and development, as well as to develop the basic economy and foster the domestic e-commerce market.

2.7.5   *Implementation of E-Commerce Strategy*

India's information industry development strategy leads to a leap forward and big growth for India's economy. Although India's economic scale is still not large enough, with its traditional economic sectors still relatively backward, India's software industry, or IT industry, has already become the world's most competitive industry. India's development driven by the software industry has remarkable advantages over Chinese development in terms of both quality and cost. Therefore, India is welcoming a bright and promising future. It is less than one decade since the implementation of India's e-commerce strategy, during which it experienced a severe decline in e-commerce from 2001 to 2004. From an overview, only initial achievements of the strategy in India have been made by now. These achievements include:

● The strategy of improving e-commerce infrastructure drove the construction of the communication network, the Internet, ports, railways, highways, airports, and so on, which directly stimulated the growth of the traditional economy. Some radiating effects of the IT industry have emerged in those traditional economic sectors. Additionally, the number of Internet users in India increased sharply. According to the survey by NASSCOM, only 100 cities in India could access the Internet in 2000, and individual Internet service was provided in only 25 cities. However, the population of netizens in India reached 38.5 million by December 2005, and the number was up to 100 million after two years, which has launched a widespread user base. In 2006, the Indian government invested $17 billion in the IT and telecom industry, in which $15 billion was injected into the telecom

industry. Although India's broadband penetration was very low, with only 1% of family Internet users having ordered high-speed services, it was predicted that the utilization ratio of the high-speed network would continually increase together with the utilization ratio of e-commerce. India was ready for the massive growth of the Internet industry. At present India has 650 million mobile Access Points with more 20 million accesses per month, which cultivated a huge market for the growth of Mobile e-commerce.

● The implementation of e-commerce strategy attracted a large number of information technology giants like IBM, etc. to establish e-commerce enterprises and E-business software enterprises in India. American companies such as Yahoo, Google and eBay all expanded their business in India and attracted large amounts of venture capital inflow, which contributed to the development of local enterprises. India's biggest Internet companies are two news web portals similar to Yahoo: the private company "Indiatimes.com" with total sales of more than 2000 million dollars and "Rediff.com" listed on NASDAQ, of which the revenue in 2005 reached $12.6 million dollars [35]. In the first quarter of 2006, there were three Internet companies who got $7 million to $10 million dollars as venture funds from India's leading WestBridge Capital Partners. Beginning in 2006, India stepped into the Internet era.

● A relatively sound legal system of e-commerce was established, which has cleared the way and laid a foundation for the further development of e-commerce.

● The economic growth was boosted, dependent on the software service. It reached the objective of "educating and attracting millions of software talents and export software products valued at $50 billion in 2008". Up to May 2010, the gross value of the global software outsourcing market was $250 billion – $300 billion, while India, just one nation, occupied a market of $50 billion, with rapidly growing speed [36]. By virtue of the diversity and flexibility of its services, less dependence on capital, taking advantage of a powerful middle class, the ability to provide and enjoy services, skilled English and a favorable education, as well as strong consumption, considering the IT industry as a leading indicator following the uncommon economic development theory from agriculture to industry then to services, India is very likely to have an information technology industry that is the leader of economic growth.

● E-commerce market turnover grew sharply and meanwhile the application of e-commerce was extended to all industries. With the three triggers of shopping convenience, time saving and the availability of a wide range of products, e-commerce has boomed in India. A survey conducted by IMRB and Internet & Mobile Association of India (IAMAI) says that the average growth rate of the e-commerce market during 2007 – 2008 was projected at 30%. According to IDC, online sales of airline tickets, car rentals, and hotel reservations make the travel-related services the biggest e-commerce online markets in existence today. As per an airline IT trends survey, 49.9% of tickets were sold through GDS channels, 26% through all web channels in 2009. However, this break-up is expected to change to 37% and 41% respectively by 2013. Similar to the travel

industry, other sectors like Online Classifieds and eTailing have all turned to e-commerce or e-distribution channels.

It can be foreseen that, along with the implementation of e-commerce strategy, in the near future we may see India standing on the commanding heights of the economy as an economic giant in Asia.

2.8   Ireland

2.8.1   Introduction to Ireland

The Republic of Ireland is a country with a long history of more than 5000 years. The country covers five-sixths of Ireland[1], which is the third largest island in Europe and the twentieth largest island in the world [37] with a total area of 84,421 km[2]. The population is estimated to be more than 4.5 million according to the Central Statistics Office (2011 estimate).

Rich in lead-zinc ore, Ireland now ranks as the seventh largest producer of zinc concentrates in the world, and the twelfth largest producer of lead concentrates. Other mineral deposits with actual or potential commercial value include coal and peat. The combined output from these mines make Ireland the largest zinc producer in Europe and the second largest producer of lead [38]. But generally speaking, Ireland lacks natural resources. Scarce minerals can only meet 30% of the local needs of energy and all others completely rely on imports. Due to the geography, most international transportation is undertaken by sea. Income from foreign exchange from international tourism takes up a large proportion of total income and this maintains steady development.

There are various industries in Ireland. Electronics, telecommunications, chemical industry, pharmaceuticals, machinery manufacturing, mining, textiles, garments, leather, papermaking, printing, food processing, tobacco and wood processing can be all found. In recent years, modern industries like chemicals, electronic engineering and software have advanced by leaps and bounds, while the proportion of traditional industries such as clothes, shoes and leather has decreased clearly. Animal husbandry is the key factor determining the gross output value of Ireland's agriculture. Over 77.5% of the earnings come from livestock and related products. In Ireland, the cultivated land and woodland cover 75% of the entire land area, creating 7% of the whole labor force who engage in farming.

Ireland declared itself a republic in 1949. Historically, Ireland was a state focusing around agriculture and livestock, so it was once called the "European countryside", also known as the "European farm". During the initial independence, the Irish government utilized tariffs and trade barriers to protect domestic

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[1]   Here it means the island of Ireland. In this book, all the words like "Ireland" refer to the Republic of Ireland except for footnoted ones.

industries like many other countries. Under these protectionist policies, Ireland was driven to become one of the poorest countries in Western Europe and experienced high emigration. While other European countries enjoyed fast growth, Ireland suffered economic stagnation [39]. The policy changes were drawn together in *Economic Development*, an official paper published in 1958 that advocated free trade, foreign investment, productive investment, and growth rather than fiscal restraint as the prime objective of economic management [39]. Before the 1960s, little manufacturing was developed except for the last factories inherited from Britain. Until the 1980s, the Irish economy still lagged far behind West European developed countries, with high unemployment at 17% and an inflation rate jumping over 10%, uprooting the young to look for jobs. An economic crisis led Ireland to start large-scale economic reforms from the agricultural and husbandry economy to the knowledge-based economy in the late 1980s [40]. On the one side, Ireland reduced taxation and regulation dramatically, compared to other EU countries. On the other side, it made great effort to develop software and bioengineering. The Irish economy grew rapidly during the 1990s, which saw the beginning of unprecedented economic growth in a phenomenon known as the "Celtic Tiger" [41]. Since 1995, the economic growth rate has been sustained at a high speed of 9%, and it rose to 10.5% in 2000. It is the accurate strategy of the Irish government that contributed to the economic take-off.

In the 1960s, especially after the 1970s, Ireland began to adjust national policy fundamentally. In 1973, the state joined the European Economic Community (European Union, EU). At the risk of failure, the government began to put the proposal of *Economic Development* into action. This bold decision has been maintained and proved absolutely right by successive Irish governments. After being a member of EU, the strategy of attracting foreign investment to accelerate industrialization was adopted in Ireland. With the aid of the EU, Irish communications facilities were greatly enhanced, but the scale of manufacturing still posted disappointing growth. Nowadays, Dublin is considered as a small but very prosperous international financial services center. The Tax Preferential Policy with a simplified process that stipulates that foreign manufacturing enterprises and financial service companies needed to pay only 10% of Corporate Income Tax until January 2003, and then the tax rate was modified to 12.5%. Even so, the tax rate remained the lowest in European countries. At the same time, the government founded a special investment institution responsible for providing quality services to foreign investors.

Ireland has formulated various incentive mechanisms to encourage the development of Irish industries. For many years, efforts at optimizing the mechanism to meet the changing needs of modern hi-tech industries were never stopped. For the purposes of encouraging individuals and foreign capital to invest in software, networks and related services, the government established high-tech venture investment funds in 1996. Three years later, relevant departments put forward the "international trade services plan of high-tech field", presenting the entire development strategy in detail.

(1) Orientating towards high-tech industry: The Irish market was too small for low-profit companies to succeed at home. Therefore, Ireland sought to develop profitable enterprises producing hi-tech goods. It is the key to Ireland's success that the government realized the problem in time and formulated corresponding strategic objectives and policies as soon as possible. From then on, industries like electronics and pharmaceuticals were classified as vital industries for future development with a large amount of government budget infusion. From the 1970s to 1980s, the government concentrated on developing burgeoning software and telecommunications. In the 1990s the state paid great attention and offered extended support to the field of the Internet and multimedia, including e-commerce and remote services.

(2) Taking infrastructure construction seriously: To wake up the hi-tech product economy, Ireland has stuck to constant perfection of the infrastructure since 1960. In the mid-1960s, the government implemented a large-scale investment plan in telecommunications which pushed Ireland to have the leading digital switching system in the world. In later years, parts of the nationalized telecom company were hived off to private ownership, giving birth to foreign and local private telecommunications companies. At present, Ireland has been ranked as the first choice Internet center. In 2007, 23.5% of the Irish, totaling nearly one million citizens, used the Internet, well above the average (18.8%) of industrialized countries published by the OECD in June 2007.

(3) Devoting major efforts to developing education: Thanks to the official support, the Irish educational sector regained its thriving vigor. Growth in the economy since the 1960s has driven much of the change in the education system. From the early 1970s, general universities and colleges increased the number of new entrants year by year. Irish citizens have needed to pay less and less for education during the past twenty years. The proportion of the national revenue that public education expends ranks second among developed countries. Now education in Ireland is free at all levels, including college (university), not only for citizens, but also for students applying from other EU member states [42]. This series of innovations has sent more individuals to universities and as a result created one of the world's most highly educated workforces, making an enormous contribution to the new economic development.

(4) Opening and joining the EU: Along with the development of the EU, Irish export corporations gained access to the European market, exempted from duty. This policy has been attracting foreign direct investment for such a long time that the market for free trade achieved rapid expansion. While constructing Irish infrastructure, generous aid was also sent to Ireland by the EU. From this point of view, it can be said that Ireland stands among the biggest beneficiaries of the EU Structural Funds.

The continuous long-term stimulus makes Ireland one of the most open economies in the world. Enterprises that invested and settled in Ireland have reached more than 1000, including Microsoft, Motorola, Lotus, HP, Symantec, Sun Microsystems, Plantinum, Novell, SAP, EDS, IBM, Dell, Intel and Apple, which has made a solid base for the Irish economic take-off in the 1990s. In 2006

Ireland had the second highest GDP per capita in the EU-27 [1] at 45.4% above the EU average [43] with a low unemployment rate at 4.3% and an inflation rate at 2.5%. Based on net assets, Ireland turned into the wealthiest nation second to Japan and prior to America among all members of the OECD. The financial crisis of 2007 – 2010 significantly impacted the Irish economy, but Ireland still led the world in GDP per capita. In 2010 Ireland is ranked 13rd in the *List of Countries by GDP (PPP) Per Capita* [2] by the IMF and eighth by World Bank.

2.8.2   E-Commerce Strategic Background

The successful implementation of the economic strategy brought Ireland an economic takeoff. Software as a new force suddenly rose, stimulating the economy to increase at a remarkable speed. The development and prosperity of the Irish software industry has achieved a notable international competitive capacity, representing the brilliant achievements of the Irish economy. More than 40% of software packages and 60% of software for business applications sold in Europe come from Ireland. The report of the OECD in 2000 has shown that Ireland has overtaken the United States as the world's biggest exporter of software, with a rate at 35% of GDP occupied by high-tech products. By the end of 2005 over 1,200 software enterprises had registered in Ireland containing 200 foreign-controlled businesses. All top ten software vendors on the world's ranking had branches there and some of them also set up R&D centers with 0.3 million employees to work for them. In 2007 Irish software products grossed 22 billion EUR. Moreover, the export values exceeded 21.5 billion EUR accounting for about 95% of total sales. Irish local software enterprises earn 1.4 billion EUR and exports rose to 1.2 billion EUR, 73% of the overall sales. Irish software enterprises mainly engage in development and customization, localization and internationalization, production and sales and technical support, and are involved in fields such as communication products, bank/finance, software tools and middleware, Internet applications, multimedia and computer training, etc. Due to years of efforts, Ireland has grown gradually into an international leader in OLE, mobile communications, enterprise management, middleware, encryption technology and safety. Besides, great progress has also been made in the service sector like financial services, customer services, long-range learning and contact centers. From the very beginning Irish indigenous software companies sold the software products overseas and established an export-oriented sector. More than 90% of the domestic software products were exported. Therefore, Ireland has won various reputations such as

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[1] EU-27: Austria, Belgium, Bulgaria, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Ireland, Italy, Latvia, Lithuania, Luxemburg, Malta, the Netherlands, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden and the United Kingdom.
[2] Lists of countries of the world sorted by their gross domestic product (GDP) at purchasing power parity (PPP) per capita. GDP dollar estimates here are derived from purchasing power parity (PPP) calculations.

European Software Center, new Silicon Valley, software kingdom, energetic high-tech state and so on.

In the late 1970s, the Irish government made a significant decision to concentrate on expanding high value-added industries, especially to pull up the employment proportion of college graduates in these fields. High-quality personnel inspired American software companies to select Ireland as their localization base spreading to European and other markets. IBM, Lotus, Digital Equipment (HP) and Microsoft took the lead to enter Ireland, and soon after that Ireland turned into an ideal option for the localization of software companies. Oracle, Novell, Informix (IBM) and SAP moved to Ireland one after another and some companies like Sun Microsystems, EDS and Motorola even chose Ireland as the productive base for new software projects. In the 1990s, a number of computer hardware manufacturers changed direction to software development, including Ericsson, Amhahl (DMR) and Nortel Network (Nortel Telecom).

The majority of Irish indigenous software enterprises were set up in 1996 – 1998. Although a small quantity of them emerged during the 1970s, the real software industry was formed in the late 1980s. Thanks to the unremitting efforts of the Irish Software Association, the government realized the strategic position of the software industry and founded the National Software Directorate in 1989 that promoted the development of the software industry. As a crucial fundamental construction, a Venture Capital fund supported by the government was established in 1996, which played an important role in the expansion of the software sector.

There are some common characteristics among all the successes which constitute the crucial factors in the improvements. First of all, different from India, the Irish software industry is product-oriented rather than service-orientated. Before 1990, Irish local software companies mainly developed software customized for different kinds of customers. This kind of service earns little and is exported rarely. From 1990 to the mid-1990s, an obvious change happened. A service economy was transformed to a product economy and the home market was converted into a foreign one. Second, the export market takes a priority. Irish domestic market is so small that companies had to rely on exports. Third, a perpendicular professional market was set as the objective. With highlighted special product orientation, technology and experience were integrated to avoid competitors like Microsoft and Oracle. It vividly described the outstanding insight into the underlying market of Irish enterprises. Fourth, product quantity and flow control highly concerned Irish enterprise managers. Most enterprises passed the quality certification. Finally, enterprises paid much attention to the common sense of business management and artistic managerial skills.

The history of the Irish software industry can be divided into three phrases:

● From 1970 to 1985 the industry started developing slowly by mainly providing service to customers using foreign software products. The government followed its initial target that to draw multinational companies into taking advantage of their official language and culture.

● The software industry developed steadily in the following decade from 1986 to1995, named the second phrase. Irish domestic software gradually bloomed into an infant industry. Indigenous software enterprises together as a strong industrial army growth began to sell abroad and participated in the international software market competition.

● Since 1996 the Irish software industry had been exploding. Abundant social capital, venture capital, foreign capital and transnational software companies rushed into the Irish market. World-class enterprises such as IBM, Microsoft, Motorola, Lotus and Sun Microsystems opened plants there. The number of software companies increased sharply from 390 in 1995 to more than 1,200 in 2005. Seven top-ten software giant built factories in Ireland that brought numerous employment opportunities, strengthened the capacity to earn foreign exchange through exports as well as enhanced Irish comprehensive economic strength. After half a century, the pattern of coordinated development of local and foreign-funded enterprises has formed in the Irish software industry.

The success of the Irish software industry results from the joint influence of the following factors:

(1) The assistance from the government and relevant industrial policy

Profiting from the policy support since the late 1970s, the Irish software industry has developed dramatically. How to select the industrial way was of paramount importance to Ireland then as the economy started quite late and the agricultural country was not so rich in resources. With a long-term strategic vision, the Irish government put forward its strategy and policy that set the export-orientated strategic direction and took software industry as a strategic keystone for national sustainable economic development. Ever since the strategy was addressed, more and more of the state financial budget was invested in the software industry in successive years. To encourage the development of Irish companies as well as to attract foreign hi-tech companies, the Irish government launched and continuously consummated a series of planning attaching new incentives to adapt to the changing needs of the industry and to inspire the growth of this high-tech field.

A high-tech risk fund was set up by the government to guide international or private capital into the software field. The relevant departments did enough preparations to response to the challenges of globalization and economic informatization. Efforts were made to cut down the marginal cost of general software products to nearly zero so that the overseas software market would be actively explored and the sales volume would increase. Therefore, the Irish government tried to help local software companies put their hand to export and market promotion to European and other corresponding areas of the world. To conclude, the Irish government provided support to enterprises with might and main to reduce the cost of enterprises and simplify all business affairs. This policy assists enterprises to obtain more and better chances of success.

The Irish government strengthens the organic integration of production, education and research and stresses the transformation from science and technology into actual productivity. Based on this principle, the Irish government

not only united with enterprises but also banded education and industry together. The government signed agreements with all enterprises that had cooperated with colleges and invested in equipment and software. Owing to these agreements, eight software development centers were established with joint capital and many real technology and training centers were formed. Another help came from the Overseas Incubation Service System, especially for the exploitation of American markets. The comprehensive service system became the important guarantee of the international market for Irish enterprises. These incentives played extremely effective roles in the process of drawing direct investment and developing local companies, and resulted in an unprecedented success of the Irish software industry.

(2) The positive influence of education

Ireland was listed as the European country with the highest quantity of education in an independent report about international competitive force. In the 1970s, realizing that the world would step into the age of information technology, the Irish government established the department of computer science in famous Trinity College and twelve technology institutes to foster IT talents. As a carrier for development, the software park was also built. It can be concluded that "education first" was the most important experience for the rapid development of the Irish software industry. The reason why Ireland is favored by foreign corporations is that Ireland has large quantities of high-quality talents who make Ireland more adaptive to the development of high technologies than other countries. Altogether 140 thousand Irish citizens were hired by foreign corporations. Education has contributed a great number of high quality employees to the long term development of foreign corporations which strengthens corporations' confidence in Ireland.

Besides building two polytechnic universities and eight regional technical colleges, the government reformed the curriculum provided by traditional universities and educational institutions, encouraged private education institutions to establish colleges and set high teaching standards for them. In order to maintain the strength of software and other high-tech industries, Ireland launched the project of technology and education with the theme of "schools and IT in 2000", investing $47 million within five years to reinforce the universal education of computer science and ensure the Internet connected to all Irish primary and middle schools. The Irish Council for Science, Technology and Innovation (ICSTI), Science Foundation Ireland (SFI) and Advisory Science Council (ASC) [44] were established successively with an additional investment fund equalling $390 million to improve education facilities and expand fresh research fields like software. In the Irish state development planning of 2000 – 2006, the government deployed an investment of 2.5 billion EUR into science, technology and innovations. In these funds of higher education, 698 million EUR went to higher education to strengthen the connection with industry and the fostering of engineering graduates; 711 million EUR went to establish the "Foresight Fund" to support the basic research in biotechnology and ICT; 267 million EUR was used for promoting the cooperation network between universities, research institutions

and industries; the rest was allocated to research plans related to industry, agriculture, fishery and environment technology [45].

With a unique education mode, graduates major in information technology are all technically advanced. Students in the software departments need to finish their one-year internship in the forefront of work and production when they come to the third school year and then complete independent design before graduating. As a result, once students get their degrees, they have fully mastered practical experience and ability of software project leadership. Some experts consider IT talents cultivated in Ireland more creative and well-trained than those from America. After the systemic training, Ireland has possessed a batch of first-rate software developers, electronic engineers and integrated circuit designers.

(3) The advantage of the geographical location and language

Language is a very important factor that leads current Irish achievement. Apart from using English as the second official language, most Irish citizens can skillfully speak another or even a third language. Due to historical reasons, numerous European persons have immigrated to Ireland. The incomparable advantage of language and cultural background brought Ireland a stable position in the international software market. Ireland shaped itself as the processing base of European visions for American software companies. Based on supporting policies of the Irish government and the endeavor of software enterprises, Ireland gradually became a collecting and distributing center to Europe for American companies. The European Union is one of the world's largest and most wealthy markets with a population of 500 million and annual GDP exceeding $1.45 trillion. Ireland joined the EU in 1973 and accumulated quite a number of experiences and skills in merchandising in Euro-markets.

(4) The support from Venture Capital and other funds

There were few venture capital funds before 1996. Sponsored by the European Regional Development Fund (ERDF), the government established the "EU Seed Fund and Venture Capital Project" within the framework of domestic industrial development plan in 1995. Enterprise Ireland was in charge of the seed and VC fund to provide a capital base to Irish newly-established companies and SMEs. The funds of private venture investment management companies still should be invested in key areas defined by the government. Both the "special high-tech industry venture capital fund" set up in 1996 and the Foresight Fund set up in 2000 were devoted to promoting the development of the software industry.

2.8.3   E-Commerce Strategic Orientation

Ireland realized that the Internet would bring global challenges much earlier than many other countries. As early as 1998, the government set up the Irish Information Joint Committee (IJC) and expressed the first Information Society Action Plan one year later with the intent of helping all citizens earn benefit from the use of the Internet as well as trying to participate in the fierce competition of

the international information industry. Meanwhile the Irish government also committed itself to develop electronic communication infrastructures, strengthen the environmental construction, look for the opportunity for e-commerce, strive to digitize the public service domain and to advocate using the Internet across society. The government also set up the information industry fund to coordinate the implementation of the plans. Irish information industry development strategy has gained a huge success that has changed Ireland from a developing country of poverty and backwardness to a developed country owning high technology. Irish e-commerce strategy is aimed at the continuous economic development momentum in Ireland through the implementation of e-commerce strategy. "Ireland has the potential to become a world center for software digital distribution over the Internet and a niche player in key areas of electronic commerce" said John Travers, CEO Forfás, when he presented a major new e-commerce policy action report entitled *E-Commerce—The Policy Requirements* to the Tánaiste and Minister for Enterprise, Trade and Employment, Mary Harney, T.D (29 July 1999) [46].

The strategic positioning of Ireland e-commerce strategy is to utilize e-commerce to push the development of the IT industry, thus to ensure the healthy developing tendency of the Irish economy; to foster Ireland as a robust athlete in the global e-commerce arena by the development and application of e-commerce technology; to transform Ireland into a calling center and an e-commerce center through providing large multinational companies with e-commerce services. All these together will lead Ireland to be one of the world's most developed countries.

2.8.4   E-Commerce Strategy in Ireland

The Irish government takes exports as the center, the software industry as its long-term economic development strategy to stimulate economic growth successfully, and take the state with a great step forward toward a great power from being a backward agricultural country. But the government has never been satisfied with the achievements. Irish leaders understand that if they want to stimulate new rapid economic growth in the fields of the Internet and e-commerce, they have to formulate the strategic planning from a higher point of view in future. This idea forms the soul of Irish e-commerce strategy. The Irish government has been supplying positive support with the development of e-commerce. After the financial crisis in 2008, the developing speed and status of e-commerce in the new economic system were further confirmed. The comprehensive analysis of e-commerce strategy of Ireland is as follows:

(1) Establishing the e-commerce management service system conducted by Irish government to advertise e-commerce, direct the development of e-commerce and put forward suggestions on problems met during developing e-commerce

To ensure the leading position in the international IT industry, the Irish government improved the first Information Society Action Plan entitled *New*

Connections in March 2002. In order to further enhance the efficiency, IJC was restructured. In October 2004 a second improvement was made to *New Connections* that proposed a series of guidance plans focusing on electronic communication infrastructure, environmental protection laws and regulations, E-government, e-commerce, R&D, and the Digital Content Industry etc.

Since 1999, the Irish government has taken measures to advocate the concept of e-commerce and help enterprises acquire potential profit through IJC. Moreover, the government has also published a series of constructive reports to promote information technology and the application of information communication. In 2000 the government invested 300,000 EUR in an e-commerce recommendation project and another 3.6 million EUR in founding EMPOWER Association to popularize the utilization of e-commerce in domestic small businesses. In 2003, Irish eBIT and the chamber of commerce Prism III were established one after another to provide enterprises implementing e-commerce with consultation, equipment and training, etc. Besides organizing management and service organs, Enterprise Ireland invested multiple funds to accelerate the development of e-commerce.

In 2003, Forfás released a report entitled *Forfás E-Commerce Report 2003*, showing that Irish local e-commerce enterprises had done well in founding and attracting foreign capital but still lagged behind those enterprises with a high level of engagement with e-commerce in other EU countries. With the purpose of narrowing the gap with developed countries, the Irish government established the IT Industry and e-commerce Group in December 2003 consisting of Forfás, Enterprise Ireland, Shannon Development and City and County Enterprises Board [47]. A national e-business strategy was devised by the Department of Enterprise, Trade and Employment, and published in December 2004, based on the outputs from a project group established in 2003 to assist SMEs, including microenterprises and particularly those in the non-ICT producing sectors of the economy, to use ICTs in a way that will maximize their competitive advantage [48].

The groundbreaking work of the Irish e-commerce Group dated from November 2003. In that month the Central Statistics Office Ireland issued the *Irish IT Industry Statistics Report 2003* which presented in detail the development of Irish telecommunications and IT industry including a survey of the engagements in enterprises and families. The survey showed that in 2003, 95% of Irish enterprises worked with computers, 85% used email and 86% integrated the Internet into their work.

Since the Lisbon conference in 2000, the EU has set out the actions and targets agreed at EU level to stimulate greater usage of Information and Communication Technologies (ICTs) and build the EU into an economic entity with vitality and competitive advantage. *The eEurope Action Plans 2002 and 2005* aimed to extensively stimulate the application of ICTs in all industries and exploit the opportunities offered by the Internet [48]. Ireland joined the *eEurope Action Plans* in January 2003. The Department of the Taoiseach served in an ICT-related branch organized by the cabinet as Director General of IJC and assistant controlling the power of appointing the secretary-general of IJC. The Department of Enterprise,

Trade and Employment was responsible for those aspects of the EU and national strategies related to e-commerce and for the transformation of e-government as well. Since 1999, the Irish government has contributed in total 16 million EUR to construct organizations of the IJC so as to help enterprises seize opportunities brought by ICTs.

(2) Perfecting the legislation of e-commerce to ensure the interests of all parties

The Irish government strives to build a European EHUB in Ireland. In order to make sure that consumers and enterprises are able to engage in e-commerce activities easily and safely, the government enacted the *E-Commerce Act, 2000*, which is one of the most influential laws in the international IT industry. As a milepost for supervising business activities in a flexible way, it gave an explicit definition of Electronic Signature for the first time and made it possible to conclude a legally binding contract online. Considerably less legalistic and more business-friendly than the UK's bill, it enabled electronic signatures, dealt with contract issues, and proposed a new regime for domain name registration. It also protects the rights of businesses and individuals to use software programs that encode and decode electronic documents. This move creatively established the legitimate equality between documents, contracts, signatures and seals in electronic form and those in traditional form.

Ireland's e-commerce new regulations came into force on Monday 24th February, 2003 which provided for the free movement of Information Society services within the European Economic Area [49]. In November 2003, Ireland's Minister for Communications, Dermot Ahern, signed new regulations dealing with spam, cookies, and other privacy issues relating to electronic communication. The release, update, transmission, collection and alteration of data and individual privacy information were all specified subject to this new law that strengthens the confidence of e-commerce terminal users. For the sake of regulating and coordinating the healthy development of the IT industry, the government successively promulgated the *Copyright Law*, *Patent Law* and *Trade Marks Law* to make IT industry standards. What's more, the Department of Enterprise, Trade and Innovation formulated the Irish legal framework and the reference of e-commerce through Forfás, and then issued detailed rules and regulations through a subdivision of the department. From then on all e-commerce transactions could find related laws to obey.

(3) Strengthening the construction of infrastructure

The Government's May 2001 package of e-commerce measures included extensions to international connectivity, and also provided improvements to regional broadband infrastructure. As a result of the first proposals under the E-Commerce Infrastructure Measure of the National Development Plan, approximately IR£200 million worth of infrastructural investment had been implemented by the end of 2002.

The government spent $3.5 billion to build the world's most advanced and mature telecommunications network and a broadband network covering both urban and rural areas to lessen the digital gap between the two areas. A one-time

procurement was invested to realize information sharing among enterprises; meanwhile benign competition amongst telecom companies was encouraged to further attract infrastructural investment so as to build the best telecommunication facilities with minimized cost. The government aimed to construct a global network export of e-commerce in Ireland.

(4) Executing long-term tax preference

The Irish government made the success of the e-commerce center by means of comprehensive utilization of imaginative legislation, an infrastructure of high quality and preferential taxation. The correctness and completeness of this view will not be discussed in this book, but the Tax Preferential Policy it referred to is an important component of long-term Irish e-commerce strategy. Successive Irish governments always give the matter of attracting foreign capital investment a top-priority. As a result the tax concessions, government subsidy and the protection of investors never stop. Details about the Tax Preferential Policy include: manufacturing companies registered in Ireland before July 31, 1998 only needed to pay no more than 10% income tax before 2010, up to 12.5% by 2011; international service enterprises such as finance, wholesale and consultation registered locally on July 31, 1998 should pay at most 10% of income tax before 2005 and up to 12.5% in 2006. The income tax level is much more preferential compared to the rate of 30 to 40% in most countries of the EU. In developed countries the tax rate is so extremely low as to make Ireland a globally famous low-tax and favorite channel for exporting to Europe, resulting in great appeal for multinational companies.

(5) Providing advanced and independent technology support of ICTs

In order to further assist the development of e-commerce, the Irish government enacted a series of measures specific to indispensable technology support of ICTs, including: the establishment of ICT development projects based on networks, the founding of professional ICT consultation institutions, setting up ICT and e-commerce development institutions to track and promote enterprises' development, setting up relevant statistics organizations according to the usage of ICTs to follow and investigate in due time and provide reports to the EU, and to coordinate with international and European laws about ICTs.

(6) To satisfy the demand of e-commerce talents through two channels of recruiting and training

The government sets policies to recruit overseas talents of high quality to work in Ireland, especially welcoming Irish youth who have once studied or worked in the USA and European continent to return home and create their own careers. To foster e-commerce talents, investments in Irish universities are increasing. To improve electronic management skills and the applications, necessary ICT data management training courses and professional management training lessons are offered with related degree certificates or post graduate certificates.

(7) Encourage enterprises to take exports as the center, strive to develop e-commerce and make Ireland the world's e-commerce center

Since Ireland is a country with a small market and a small population, limited chances would exist to carry out the Irish grand plan of a global e-commerce

center if taking the domestic market as primary market. Learning from software development experience, the Irish government has formulated the e-commerce strategy focusing on exports and international markets. In practical work the Irish government matches its words with deeds by applying e-procurement, which means to design and manage software and systems used for management, transmission and exchange for the purpose of simplifying procedures and reducing standards, so as to facilitate SMEs' efficiency and service. This not only improves the demands of IT technologies, strengthens the price and service competitiveness, but also increases export opportunities.

2.8.5   Implementation Achievement of E-Commerce Strategy

Evolving from the software strategy, the long-term effect of Irish e-commerce strategy still needs to be further observed. It is hard to predict at present whether e-commerce can win a continual competitive advantage and bring economic recovery to Ireland after suffering the financial crises. So far, Irish e-commerce strategy has made some satisfactory achievements that indicate subsequent success in the future.

Apart from having invested the transportation and telecom infrastructural fund valued at billions of dollars to support the development of e-commerce, the states have also gradually completed the transformation of a traditional state-run monopolized telecom industry into current liberalized privatization for the sake of improving the service level of e-commerce. Connecting with main cities in Europe and North America, nowadays Ireland is ranked fourth in the list of broadband network nations. In Ireland, the broadband network covers the whole nation. The number of netizens expands day by day, and Internet penetration climbed from 20% in 2000 to 60% in 2009. The postal department can easily provide e-payment transactions and e-commerce certifications.

Among all the fruits gained from Irish e-commerce strategy, the call center is a very successful one. The main function of the call center is telemarketing, technology and client support of computer software and hardware, reservations and customer services of airlines, hotels and other accommodation, etc. Lots of international companies build their remote sales base and remote support center in Ireland making use of advanced telecommunication technology and locally manufactured software. Ireland has now become an undisputed leader within the calling field of Europe. Over 60 telecommunication operators choose Ireland as a new European calling base. In order to provide multi-language service to European and worldwide customers, 24 hours a day, 365 days a year, these global operators hired more than 7,000 people to handle business ranging from customer consultation, orders receipt and technical support to the commercial activities in European areas.

At present Ireland leads Europe in the development of e-commerce. According to Eurostat statistics published in the most recent issue of State of the Net report in

March 2010, turnover of e-commerce outlets accounts for 26% of enterprise turnover in Ireland. It is the highest percentage in all 27 countries of the EU, followed by Finland and Sweden (both 18%), Czech Republic, Britain and Germany (15%). The overall EU average is 12%. Within the first quarter of 2010, 29% of Irish online shoppers bought or ordered goods and services from the Internet. It is worthwhile to note that the majority of the transactions were made with companies from outside Ireland; 62% of the e-commerce turnover was received abroad (39% in another EU state, 23% outside the Union) [50].

2.9 Singapore

2.9.1 Overview of Singapore

Singapore is an island country, consisting of 63 islands including the mainland of Singapore occupying 88.5% of the whole land area and 62 islands nearby [51]. The territory of Singapore is very small so that there are not so many resources for Singapore to develop resource-intensive industries. But Singapore is adjacent to the Straits of Malacca. Meanwhile, it is separated from Malaysia by the Straits of Johor to its north and from Indonesia's Riau Islands by the Singapore Strait to its south. Singapore has great geographic advantages and Singapore is very open and diversified. There is little limitation in finance, international trade and so on. The traditional economy of Singapore mainly depended on business including entrepot trade, export processing, shipping and so on. After independence in 1963, the Singapore government insisted on free economic policy to attract foreign direct investment and create a diversified economy. In the early 1980s, Singapore initiated a state-led drive for industrialization focused on capital-intensive and high value-added fledgling industries, and meanwhile spent a lot of money on infrastructure construction to perfect the domestic business environment. In the 1990s, particular attention was paid to the information industry which was marked by the announcement of *Singapore ONE* in June 1996. In order to further stimulate economic growth, Singapore vigorously carried out the "Regional Economic Development Strategy" and actively developed foreign economic activities. Singapore, known as one of the Four Asian Tigers along with Hong Kong and Taiwan of China, and Republic of Korea, has a highly developed market-based economy since independence. Now Singapore's economy mainly relies on five industries including commerce, manufacturing, construction, finance, transportation and communications. Meanwhile, due to geographic advantages and well developed transport infrastructure, Singapore has the world's second busiest free port, second to Hong Kong of China and is the world's fourth largest foreign exchange trading center after London, New York and Tokyo.

Singapore was the third wealthiest country in the world in terms of GDP (PPP) per capita (established by IMF, 2010) [51], and the 39th wealthiest in terms of GDP

(nominal) reaching $222,699 million (established by IMF, 2010) [52]. The total foreign trade volume was $747,417 million, over three times GDP (nominal). The European Union, Malaysia, China and America are the major trade partners.

2.9.2   *Strategic Background*

Singapore has a high level of informatization and was one of the world's earliest countries to develop e-commerce. Because Singapore is very small and lacking resources, the people in Singapore are very active and sensitive to the changing environment. In addition, Singapore is very open and the people there are all willing to change. Meanwhile, the trend of Global Economic Integration also initiates a vigorous driving force for the development of e-commerce. Prior planning, legislative lawmaking and government-led promotion can be summed up as the main characteristics of Singapore's developing process.

While formulating national strategic planning, the Singapore government, with extreme foresight, announced a national trade network project in 1986. As a part of national info-highway construction, the Singapore Trade Development Board (renamed as International Enterprise Singapore in April 2002) made great efforts to develop the Electronic Data Interchange (EDI) System and launched the world's first nation-wide EDI network named "TradeNet" in 1989 which was used for comprehensive processing of business files. The TradeNet was composed of various sub-systems like trade network, manufacturing network, retail network, transportation network and financial network system. 95% of import and export trade in Singapore is dealt with by EDI. It is reasonable to say that TradeNet was the beginning of Singapore's e-commerce based on the Internet. Then the Singapore government launched "MediNet" for medical affairs and "LawNet" for legal issues, which made important contributions to guarantee security during e-commerce development.

At the beginning of the 21st century, the Singapore government recognized that the foundation of economic principal sectors would change; a broadband digital communication network and advanced information technology would become the new impetus to economic growth. From the 1980s Singapore successively established a series of national strategies to promote the information industry and began to lay a high-speed communication network throughout the country from the late 1980s for the purpose of popularizing computer applications. The construction of information and communications infrastructure was regarded as a vital aspect of national economic strategy, and was the key to success in informatization as well.

For more than 20 years, with the government's support, Singapore has been focusing on the development of the information industry and actively building an information infrastructure. Singapore has constructed as an e-commerce center in the Asia-Pacific region, known as a miracle of informatization. Founded in 1980, the National Computer Board put forward the first five-year plan entitled *Civil*

Service Computerization Program (1981) which hoped that through the implementation of the plan, paperless transaction and automation of government and enterprises would be realized so as to improve the work efficiency and service quality of government departments when handling public administrative affairs. Based on a prior plan, *the National IT Plan (1986)* for the second five-year plan emphasized the usage of network technologies; it encouraged using data fusion and data interchange to deepen the computerization of public administrative affairs, and encouraged private enterprises to participate in this work. After that, *IT2000 (1992)* was implemented to build a high-speed multimedia network within 10 years, to popularize information technologies and to build a widely connected electronic society in regional and global areas, which would create the vision of a "wired island". In June 1998, the Singapore government launched *Singapore ONE* throughout the island which would provide 200 interactive services including multimedia format, connect the island to the Internet by optical fiber, and provide a high-speed access to over 80 countries by three international digital telephone networks, three satellite transmission stations and seabed cables and pipelines. In order to encourage all the industries to set up online agencies, Singapore established *e-Business Industry Development Scheme* in September 1999 derived from *Local Enterprise Electronic Commerce Program*. In 2000, five agencies of the Singapore government took the lead, two of which merged to form the Infocomm Development Authority that expressed *Infocomm21* [52] aiming at becoming "the first-class economy" by 2005 in the network era. In June 2006, the government announced *the Intelligent Nation (iN2015) Masterplan* with the vision of being An Intelligent Nation, A Global City, powered by Infocomm [53] with the objective to strengthen Singapore's global economic competitiveness in the next ten years through a series of activities beneficial to the public, enterprises and global society. After the *iN2015*, Singapore implemented the Next Generation National Broadband Network (NBN), which referred to a national FTTH network with the highest speed of 1Gbps. This plan expected that by 2012 the NBN coverage rate of families and offices would achieve 95%, and 100% by 2013. As the supplement of wired broadband, the Singapore government expressed *Wireless@SG* (2006).

According to the statistics report of Infocomm Development Authority of Singapore (IDA), Singapore's information industry revenue increase by 8.9% in 2005, 19.9% in 2006, 13.8% in 2007 and 12.4% in 2008. Its annual revenue reached 62.74 billion SGD in 2009, increasing by 66% compared with that in 2006 while the export earnings increased 83% to 40.4 billion SGD in 2009 from 22.1 billion SGD in 2005. At present, Singapore has over 7,500 national wireless network pots covering airports, shopping centers and business districts, and more than 1.3 million customers, of whom 0.42 million use the network more than three hours per month on average.

2.9.3   Strategic Orientation

The strategic orientation of Singapore's e-commerce strategy is to develop Singapore into a universal e-commerce central pivot, to build an e-commerce popularized new economy, and eventually to ensure the competitive power of Singapore in the new economic environment.

2.9.4   Detailed E-Commerce Strategy

When information technologies stepped into the e-commerce stage, the Singapore government formulated its e-commerce strategy as soon as possible according to the constantly changing strategic environment. In August 1996, the Singapore government launched *The Electronic Commerce Hotbed Program*, of which the purpose was to develop e-commerce laws, technology infrastructure and e-commerce services. Soon afterwards, the Singapore government took lots of measures including establishing the first authentication institution "Netrust" in Southeast Asia to provide the government agencies and suppliers with identity authentication and signal transmission Security Service; to found Electronic Commerce Policy Committee in 1997 in charge of discussing and planning all e-commerce relevant laws and policies [54].

In 1998, the Singapore government launched a more comprehensive *Electronic Commerce Master Plan* to solidify the e-commerce central position in the world based on the traditional advantage of international trade, global financial services, telecommunications and information. The program planned to increase the application proportion of e-commerce by up to 50% and the volume of e-commerce products and service business by up to 4,000 million SGD.

The strategic contents of *Electronic Commerce Master Plan* are to develop an e-commerce infrastructure consensus to the internationality standard, quickly build Singapore into an e-commerce center, encourage and support enterprises to strategically adopt e-commerce, to promote e-commerce activities in the public domain and business areas, and to make e-commerce laws and policies appropriate for transnational trade. In consideration of its own e-commerce development plan in multinational companies, the promoting policies are generally specific to local enterprises, SMEs in chief, with much attention on the credit, security and legislation of e-commerce.

To conclude all the above policies, the e-commerce strategy of Singapore could be described as follows:

(1) Distinguish content or application service providers from pure information publishers or web content creators

The latter were channels suppliers who enjoyed exemption from liability for customers' information. This strategy would boost the development of the data center in Singapore.

(2) Open the telecoms industry and its policy regulation in an all-round way to

build advanced e-commerce infrastructure in line with the world level

Multiple Broadband Wireless Access Technology (LMDS) and 3G licenses were issued, and then the policies and regulations were adjusted to accommodate to new economic development. The government changed the early auction regulations so that it was unnecessary for anyone who wanted to host an auction, no matter in the traditional form or online, to obtain the auctioneer qualified certification. Additionally, the government formulated laws and policies of security and privacy protection.

(3) Assist corporations to engage in e-commerce activities

All sorts of existing plans were utilized to extensively help SMEs foster e-commerce capabilities. The Singapore government provided multiform convenient financial assistance schemes such as *Local Enterprise Finance Scheme (LEFS)*, *Business Development Programme*, *Local Enterprise Technical Assistance Scheme (LETAS)*, *Workfare Training Scheme (WTS)* and *Research Incentive Scheme for Companies (RISC)*, and sharpened enterprises' awareness of the efficacy of e-commerce in improving competitiveness and productivity. The easy-to-use transaction platform and mode were provided specific to SMEs who were interested in online transactions to assist them to reduce risk and increase the investment efficiency in e-commerce strategic plans. Since another plan *Infocomm@SME* was promulgated, over 1,500 SMEs obtained 2,000 Singapore dollars when they exploited their first web site. At the same time, the government encouraged cooperation with SMEs and existing websites to develop online business. E-society is underway focusing on trade and transactions, manufacturing and logistics, finance and banking. Furthermore, Singapore, together with the dealers, will set up a comprehensive E-learning infrastructure, supported by the "E-learning Standard Committee".

(4) Improve confidentiality and security of the network and enhance the consumers' confidence in online shopping

To achieve this goal, both consumer education and business education were introduced, followed by the review of individual privacy and security policies and the implementation of a "trusted symbol" to retail sites. The government will also spread the concept of the new economy by publicity activities, workshops, training and so on to ensure the smooth implementation of the enterprise-level e-commerce strategy. From the technological point of view, because of the small size and population, Singapore has fewer advantages in the research of security and encryption technologies than western developed countries and Japan. As a result, Singapore mainly adopts the existing technologies in this aspect, attached to powerful legal protection.

(5) The government will set up commercial centers abroad to strengthen the e-commerce strategic cooperation with foreign countries and help local companies develop electronic business. What's more, the government will keep on striving to attract world-class e-commerce companies to establish network pivots in Singapore, so that they can align with local companies more easily.

(6) Cultivate IT talents as a human resource reserve for the development of e-commerce

The Singapore government realized the importance of talents in the process of realizing the prospect of being An Intelligent Nation. Therefore, under the guidance of *Infocomm21* and *iN2015*, Singapore endeavored to develop world-class colleges, to improve the curriculum system, to attract and to retain international talents, to cultivate the technological elite, to advocate lifelong learning and to increase the quantity and quality of human resources. According to the investigation and statistics by IDA, until June 2008, the number of Singapore's IT talents had reached 139,000, of whom 71% were under 39 years old and 82% were university graduates or above [55].

The Singapore government attaches great importance to its role in the development of e-commerce. The Singapore government recognizes that e-commerce could not develop so fast without official supervision to some degree, just like trade without rules is dangerous. In the future cyber world which is full of competition, the government should provide services at the soundest price rather than monopolized management to attract talents and investment, which will finally contribute to national economic growth. The government in cyber space is no longer a fixed entity, but a service supplier in the competition.

E-commerce activities in Singapore are all controlled by the government. A total funding of $2 billion has been invested to establish a system in which all students can accomplish most learning tasks. In recent years, the Singapore government has been emphasizing the importance of information technology, and has spent a large amount of money on the preparations for the coming Internet era, including carrying out *Infocomm21* at school and the launching of *Singapore ONE* mentioned above. One goal of *Singapore ONE* is exactly to promote the national e-commerce level and let Singapore citizens grasp related e-commerce knowledge in order to maintain its business competitiveness.

In implementing the *Intelligent Nation (iN2015) Masterplan*, three important programmes driven by IDA were highlighted as the nation continues to take advantage of buoyant regional growth to drive its infocomm technology (ICT) agenda forward. They are the National Authentication Framework (NAF) which will strengthen the infocomm infrastructure for next generation ICT users, trade and logistics and the Digital Concierge Programme which aims to catalyse the growth of the mobile services ecosystem in Singapore.

● From the perspective of e-commerce, IDA views NAF as a critical programme to increase popularity and pervasiveness of e-transactions including e-banking and e-commerce. It (NAF) will be set up to provide a nationwide strong authentication platform to enhance the security of online transactions for government, businesses and consumers.

● To transform the trade and logistics industry, IDA is working on integrating key trade and logistics business processes through TradeXchange® (Fig. 2.15). Four consortia involving 22 companies were awarded a Call-For- Collaboration (CFC) to integrate key processes in marine cargo insurance, freight management and trade financing through TradeXchange®. A total of $6.3 million will be co-invested by industry and government to implement these three integrated processes.

Integrating Business Processes through TradeXchange ®
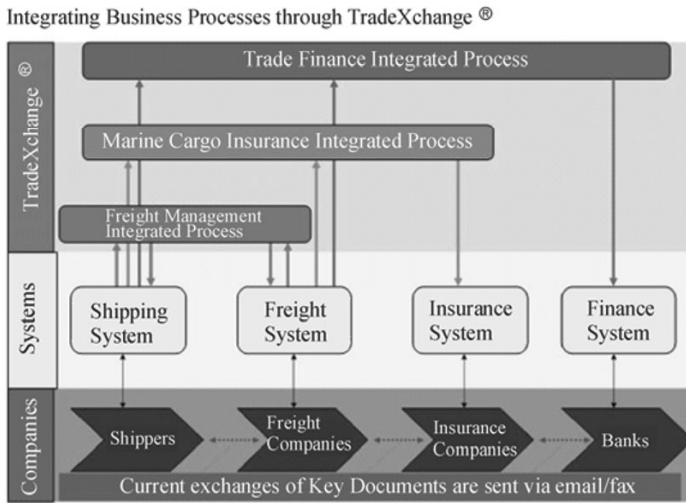
Fig. 2.15   Integrating Business Process through TradeXchange®
(Source: Infocomm Development Authority of Singapore, IDA)

"With the integration of key processes that bring about the timely exchange of information, companies will enjoy greater operational efficiencies, better visibility, and faster turnaround", said Mr. Loh, Siang Kiang, Assistant Director, Finance, Tourism, Trade and Manufacturing Cluster, IDA.

● The Digital Concierge programme encourages businesses to make use of the mobile channel to contact their customers more pervasively and to accelerate the development of transactional and innovative mobile services like ticketing, taxi booking, remote paying and virtual goods delivery. It will make a great contribution to the development of e-commerce, particularly M-commerce.

The Singapore government pays much attention to e-commerce legislation. Soon after the *UNCITRAL Model Law on Electronic Commerce* was issued in 1996, Singapore began its e-commerce relevant legislation research and drafting. On 10 July 1998 *Electronic Transactions Act (ETA)* was enacted to solve specific problems in e-commerce transactions, such as the accreditation and regulation of telegraph text and electronic signature, the responsibility of network service providers, the encryption and use of electronic contract and computer data. Because of the *1998ETA*, Singapore became one of the earliest nations which have formulated and adjusted e-commerce laws in civil law system, and was widely acknowledged as a world leader in laws relating to e-commerce. The *1998ETA* not only made electronic data legal valid and reliable for legal proceedings, but also stated that any trade data should be kept 11 years for future reference, which took the lead in the world.

In order to assure billions of dollars e-commerce market share, Singapore is trying to establish a more comprehensive e-commerce legal system. After the *ETA*, Singapore released *Legal Guide to the Electronic Transactions Act, Security*

Guidelines for Certification Authorities, *Electronic Transactions (Certifications Authority) Regulations 1999* and *Guidelines for Preparing Certification Practice Statement* implemented by relative organizations at the basic level to match the *ETA*. The official agency, Certificate Authentication, is responsible for issuing digital certificate to e-commerce customers as a faithful third party. Except for all documents about CAs, the Singapore government also enacted and ammended the *Computer Misuse Act* which provides heavier sentences for all forms of hackers and virus releasing actions. On May 19 2010, the *1998ETA* was repealed and re-enacted to provide for the security and use of electronic transactions.

In aligning with the *UN Convention on the Use of Electronic Communications in International Contracts (UN Convention)*, IDA together with the Attorney-General's Chambers (AGC), conducted a review of the *1998ETA*, culminating in the *2010ETA* [56] and the new framework for electronic transactions which was intended to adapt to the new international environment and science technology level. The new act eliminates the worries for Singapore domestic enterprises to develop global e-commerce, and modified the regulatory framework of CAs so that it is more compatible to new emerging and advanced techniques. In addition, in order to strengthen the convenience of e-government service, the *2010ETA* promised great strides in the design of electronic forms and the legitimacy of electronic materials.

2.9.5   Implementation Achievement of the Strategy

Singapore's e-commerce strategy has made preliminary results in the new economic era. In 2000 Singapore was ranked the first in Asia and fourth in the *World Competitiveness Yearbook 2000*, in terms of e-commerce infrastructures.

The infocomm infrastructure has made great progress in implementing the e-commerce strategy: the global first national broadband network *Singapore ONE* can provide practical interactive multimedia functions and services accessed by optical fiber and CATV network. Thanks to advanced infrastructure and policies, Singapore keeps ahead of many countries in the development of the Internet. Almost all Singapore citizens own the technical facilities and conditions to surf the Internet, and a high-speed broadband network spreads to almost all campus and research institutes. In 2009, about 83% of households in Singapore had at least one computer at home, up from the 74% in 2005. The proportion of households with Internet access increased to 81% in 2009, up from the 66% in 2005. The proportion of households having broadband access had also increased to 80% in 2009 from 54% in 2005 [57]. The Next Generation National Broadband Network had covered 35% of buildings in 2009 and will increase to 95% in 2012. From the aspect of enterprise informatization, the proportion of enterprises using computers was 76% in 2009, amongst which 99% in enterprises with 50 – 200 employees and 100% in enterprises having above 200 employees. About 36% of Singapore enterprises had their own websites, amongst which 78% of enterprises

with more than 50 employees, and 90% of enterprises with over 200 employees.

Driven by the *iN2015*, the development of the infocomm industry in Singapore continued to take the lead in Asia. Most recently, the World Economic Forum (WEF) ranked Singapore second in its *Global Information Technology Report 2009-2010* which measured the impact of ICT on the development process and the competitiveness of nations. In the *World Competitiveness Yearbook 2010* released by IMD, Singapore jumped two steps forward and was ranked first. In Singapore, ubiquitous information communication, high popularization of mobiles, broadband, computers and the enterprise network have ensured commercial trade security and attracted more and more multinational enterprises to establish an IT data hub there [58].

The Singapore government, who has been supplying positive demonstration and guidance from the beginning to the end of implementing e-commerce, strives to lead the world in e-government, and to realize the transformation of the government using information technologies. In all previous national informatization strategies, e-government was an important component, with the principle of upholding the will and requirements of the general public as the central task. The launching of myTax Portal, GeBIZ, Online Business Licensing Service and TradeXchange brought great convenience to people and enterprises, and also promoted the development of e-commerce and electronic community enormously [55]. So far, the main public services of the Singapore government have all been executed online. For the second year running, Singapore also topped the Waseda University World e-Government Ranking, which monitors and analyzes the development of e-government worldwide. The WEF ranked Singapore first in the ranking of e-government readiness index in the *Global Information Technology Report 2009-2010*.

Having been so successful, the Singapore government never slackens. The *iGov2010* vision is to be an Integrated Government that delights customers and connects citizens through the use of infocomm technology [59]. At the same time, the IDA is designing the *e-Government Masterplan* for the next stage to establish an electronic government which will adopt a new cooperation mode with private and public sectors based on new technologies so as to coordinate with the social development trend.

Since 1998, Singapore has launched a series of laws and regulations on network information and e-commerce, including the *Computer Misuse Act*, *Security Guidelines for Information Technology*, *Security Guidelines for Certification of Authorities*, *Electronic Transactions Act*, *Legal Guide to the Electronic Transactions Act*, *Electronic Transactions (Certification of Authorities) Regulations*, *Guidelines for Preparing Certification Practice Statement*, *Infocomm Development of Authority of Singapore Act 1999*, *Telecommunication Act l999*, *Intellectual Property Law*, *Copyright Act*, *Class License Scheme* and Code of Practice for every trade like *Internet Code of Practice*, *Code of Practice for Infocomm Facilities in Building (COPIF)* and so on. Inland Revenue Authority of Singapore issued the *Income Tax Guide on E-Commerce* and the *Goods and Services Tax Guide on E-Commerce*, which expressly set the tax bill currently in

effect as the basic principle of e-commerce transactions, so that enterprises and individuals engaged in e-commerce would understand and utilize the relevant tax regulations better.

As Singapore wants to be an e-commerce hub, an e-commerce dispute resolution infrastructure was necessary. The Singapore government constructed the Electronic Court (E-Court), Interactive Court (I-Court) and the Electronic Chamber (E-Chamber) in primary courts with the latest technologies to establish a comprehensive dispute resolution framework for e-commerce cases. E-justice lab@subcts, an experimental laboratory, was set up to allow judges, court staff, lawyers and leading infocomm technology vendors and developers of hardware and software to field-test cutting-edge technologies with potential for court-related uses, for the benefit of the justice system [60].

On Apr 14 in 2010, E-Commerce Association of Singapore (ECAS) has signed up as a Channel Partner of PayPal. With this development, local online merchants can add PayPal as a payment option to their shopping carts or online payment modules and enjoy special promotions. With e-commerce growing quickly in Asia, PayPal is committed to supporting the phenomenal rise of online payments in Singapore, as well as around the globe [61].

2.10   Republic of Korea

2.10.1   Basic Conditions

Republic of Korea (ROK) is a developed country in East Asia with a high standard of living [62]. It was Asia's fourth largest economy and the world's 15th (nominal) or 12th (purchasing power parity) largest economy with nominal GDP of $986.26 billion in 2010.

Republic of Korea lacks natural resources so that most of the materials and fuels have to be imported. As a result, Republic of Korea can not reach fast development just by traditional industries such as agriculture and extractive industries. The development of Republic of Korea has experienced various stages. In the 1950s, the ROK's economy recovered from the edge of economic depression. In the 1960s, Republic of Korea released an export-oriented economic development strategy and launched the first five-year economic development plan. After the successful implementation of the export-oriented economic development strategy, Republic of Korea joined newly-emerging nations in 1970s. Republic of Korea had been a competitive country in the international market in the 1980s and set being a developed country as the development goal in the 1990s. Now Republic of Korea has become one of the developed countries mostly dependent on exports, especially focusing on electronics, automobiles, ships, machinery, petrochemicals and robotics. Moreover, Republic of Korea has great advantages in the automobile and ship industries. The production capacity of the ROK's

automobile industry was 3.2 million units in 2002, ranking it 6th in the world, while the total tonnage of the ships that Republic of Korea manufactured was 7.59 million, ranking it first in the world. A highly developed transportation industry provides a good foundation for e-commerce, especially in logistics. Meanwhile, the electronics industry of Republic of Korea is one of the world's ten top electronics industries with fast development in semiconductor integrated circuits. The government has paid a lot of attention to the information technology industry and constantly increased the investment in the information technology industry. Now, household appliances, mobile phones, notebook computers, computer monitors and other electronic products produced by ROK's firms have a strong competitive edge in the international market. Republic of Korea is one of the most developed e-commerce countries in the world and its broadband coverage ranks in the top 3 in the world. This provides the infrastructure to develop e-commerce in Republic of Korea. Meanwhile, e-government in Republic of Korea has also developed well.

2.10.2   Background to ROK's E-Commerce Strategy

As a country lacking in natural resources, Republic of Korea has been trying to develop its economy in other ways. In the 1960s, through successful implementation of an export-oriented strategy, the economy of Republic of Korea achieved rapid development. Meanwhile, Republic of Korea is a nation good at self-study and self-improvement. During the "Third Revolution," as the innovation in IT was dubbed, Republic of Korea realized the development of information technology would be the trend in the future and invested a great amount of money and human resources in the information technology industry.

The Internet has been widely disseminated at a rapid pace in Korea thanks to a vastly increased distribution of computers and the growing number of PC communication subscribers since the late 1980s, which provides Republic of Korea with the requisite infrastructure to propel the growth of the Internet. In particular, broadband networks such as the cable Internet and satellite Internet are growing exponentially, which enables users to gain faster and easier Internet access to high-quality and huge quantity content. Based on this new economy-based Internet and knowledge infrastructure, industrial efficiency has been enhanced and various forms of e-commerce have been facilitated, which leads to the creation of new business, to strengthen global competitiveness and also raises living standards.

Meanwhile, some of the same traits that promoted ROK's manufacturing miracle during the 1960s and 1970s sparked this Internet boom. In Republic of Korea, business trends operated like a switch, which meant when the economy took a new direction the switch would happen immediately. There was no in-between setting. This aggressive "go-for-broke" mentality was a key feature of Korea's earlier manufacturing revolution. People in the Republic of Korea all

determined to keep up with their friends and neighbors, stimulating consumption of personal computers (PC) and Internet services [63].

In addition, the 1997 economic crisis was one of the most important factors that contributed to the Internet fervor in Republic of Korea. Because e-commerce could enhance the overall economic effectiveness, increase firms' competitiveness, increase the efficiency of resource allocation, and promote economic development in the long run, e-commerce was seen as one of the key elements in an industrial restructuring scheme to enhance the competitiveness of firms by the ROK's government. Although these positive impacts had not been verified completely, e-commerce made some enterprises survive in 1998 and 1999.

In the process of e-commerce development in Republic of Korea, the government has played an active role in promoting e-commerce in the public and private sectors. The government departments in charge of e-commerce are the Ministry of Information and Communication (MIC) and the Ministry of Commerce, Industry and Energy (MOCIE). The MIC has the power to grant or revoke telecom licenses. The ROK's Communications Commission (KCC) under the MIC is responsible for the following tasks: deliberating issues about fair competition and consumer protection in the telecoms industry, arbitrating disputes between telecoms service providers and users, and enforcing corrective measures and imposing fines on unfair competition practices. Because the responsibility between the MIC and the MOCIE sometimes overlap, there is a collision of interests over major policy issues. The Informatization Promotion Committee under the prime minister also provides policies in terms of setting broad policy directions and agendas. The ROK's Institute for e-commerce (KIEC), established in 1999, facilitates government-industry co-operation in developing local e-commerce infrastructure and sets internationally consistent standards. The KIEC also operates as a dispute-resolution organization and promotes e-commerce workforce-development programs. The central electronic-government website, www.egov.go.kr, offers many types of public services online. Government procurement, taxation, and fiscal and payroll management are also based on information technology. Government procurement is a driving force behind the growth of government-to-business (G2B) e-commerce. The government's central G2B platform (www.g2b.go.kr) offers extensive e-commerce opportunities to domestic and foreign businesses. The government also develops an Internet portal catering to the needs of foreigners in Republic of Korea, including foreign investors and expatriates [64].

2.10.3   Orientation of ROK's E-Commerce Strategy

Republic of Korea began the economic take-off in the 1970s, and created the world-renowned "Miracle on the Han River". Since the 1990s, electronics and appliances have always been the pillar industry in Republic of Korea. In the late 1990s, the main industry in Republic of Korea reached maturity. But ROK's

economy faced many problems, such as slower economic growth, severe challenges of weaker international competitiveness and the traditional ROK's economy suffered in the Asian financial crisis. All of the above prompted the ROK's government to realize that the 21st century was a knowledge and information era and they should vigorously develop the digital industry. The ROK's government grasped the developing opportunity in time, and devoted itself to the development and application of information technology. Meanwhile, developing e-commerce is the priority. Owing to low costs and efficient transactions of e-commerce, the government of ROK deemed e-commerce as an effective means for re-engineering the industrial structure and strengthening competitive advantages of ROK's companies to promote ROK's overall economic development.

2.10.4   ROK's E-Commerce Strategy

In order to compete in a unified global market, businesses all over the world are involved in life-or-death rivalry, and the EU and other nations such as the United States and Japan are engaged in a fierce contest to take the lead in e-commerce. Under these circumstances, the ROK's government is endeavoring to come up with industrial policies related to e-commerce.

The development of e-commerce in Republic of Korea formally started in the early 1990s. The government launched the *Basic Act on E-Commerce* in 1999, *Comprehensive Policies for E-Commerce Development* in 2000 and *E-Business Initiative in Korea* in 2001 respectively. In June 2002, President Kim Dae-jung hosted a national strategy meeting to promote e-commerce development, focusing on the present situation, the implementation of relevant research, and future direction of e-commerce development. Now let us just take a look in detail at the contents of ROK's e-commerce strategy.

(1) Enacting and revising the relevant legal system

Enacting and revising the relevant legal system such as the enactment of the *Basic Act on E-Commerce, Electronic Signature Law* and *Consumer Protection Law*, the revision of *Copyright Law* and *Contract Law*, the foundation of the national e-commerce credit system, the enactment of law on protection of the right of privacy on the Internet and intellectual property. In addition, it is necessary to establish the propulsion system of government informationization for promoting the development of informationization, and the framework of government informationization for instructing its development.

(2) Developing e-commerce infrastructure construction vigorously

Develop e-commerce infrastructure construction vigorously, renewing the national communication network, and enhancing the speed of the super high-speed backbone network. The Internet speed has reached over 400Gbps and the capacity of ATMs has been expanded. Meanwhile the government has increased the funding and policy support to standardized development of EB-XML, the

application and integration technology of e-commerce, e-commerce human resources development, logistics services and so on. The research in e-commerce technology should be strengthened to promote the standardization of e-commerce.

(3) Comprehensively promoting e-commerce in various industries

Build "e-government" to automate document processing, meetings, financial management, government procurement, tax, legislation, judicature and local public information. Build an agricultural e-business infrastructure by setting up farmer websites and a comprehensive online store of agricultural products. The government invested 19.25 billion ROK's won (KRW) to 28 industries for building a B2B basic trade platform. The government e-procurement system and electronic payment systems also should be opened up. Promote the informationization of small and medium-sized enterprises. It can be firstly conducted in four demonstration industries such as electronics, automobile, national defense procurement, construction industries, and then extended to the steel, shipbuilding, heavy industry, railway trains and other industries, then further extended to all industries.

(4) Promoting the ASEM e-commerce multilateral cooperation agreements

It includes the signing of an information agreement, the establishment of "the agreement of entry into overseas markets of e-commerce" and the "global e-commerce support center", etc. Encourage the use of electronic money, electronic signatures, and electronic transactions. Establish a series of supporting projects from the acceptance of orders, product delivery, to ensure supplies, financial payments, information exchange, quality assurance, safety insurance for fostering e-commerce market.

2.10.5   Measures

(1) Laws

➢ Revise the legal system that may restrict the development of the digital economy such as *Commercial Law* and *Securities and Exchange Act*.

➢ Increase the integration of relative e-commerce laws to electronic signature, electronic settlement and electronic documents.

➢ Enact and revise the fundamental laws to prompt the development of e-commerce such as copyright law.

➢ Strengthen the rewards and punishment mechanism of e-commerce to support the development of enterprises in tax, education, information and capital.

➢ Strengthen consumer protection and formulate relative laws.

➢ Establish an online intellectual property rights protection bill and revise the Trademark Law and the Anti-Unfair Competition Law, etc.

(2) The infrastructure

➢ Invest 155 billion KRW to establish the super-high speed communication network and extend the fiber communication network. The backbone network based on VSDL and Wireless LAN are planned to be popularized.

➢ Focus on the development of the basic technology of e-business and formulate the development plan of e-commerce.

➢ Standardize e-commerce by focusing on the specification of e-commerce and EBXML.

➢ Create a proper training environment to cultivate global senior e-commerce talents.

➢ Improve e-settlement, expand the support for e-commerce, guarantee and develop online bond transactions.

➢ Strengthen the construction of logistics facilities such as SP-IDC and the commodity base.

➢ Improve the development of e-learning.

(3) The industry

➢ Improve the infrastructure of e-commerce in all industries and strengthen the integration among industries.

➢ Support the informatization of SMEs and improve the popularization of ASP in all industries.

➢ Develop mobile e-commerce and establish a global mobile e-commerce center.

➢ Strengthen enterprises' competitiveness by improving the specification and focus on their main businesses.

➢ Promote the application of e-commerce in non-manufacturing industries such as pharmaceutics, agriculture and the construction industry.

➢ Strengthen the leading role of public sectors especially government procurement.

➢ Popularize e-commerce by prompting best practice in e-commerce.

(4) The globalization

➢ Establish an e-commerce network based on the Internet.

➢ Strengthen the cooperation under the multilateral mechanism of ASEM and OECD.

➢ Expand bilateral cooperation.

➢ Establish the supporting center for e-commerce solutions to support the development of services for exports, such as marketing, consultancy and testing.

Although there is still no mature operation mechanism for e-commerce in Republic of Korea, Republic of Korea has achieved great improvements. Compared with strategies of other countries, there are some obvious differences. The first is that the strategy is very concrete, which is easy to implement. The second is the government's high support. The president has conducted meetings to discuss e-commerce strategy and applications. The last is that the strategy has an obvious direction and has launched concrete solutions to key problems.

2.10.6   Current Situation and Prospects

● The infrastructure

Republic of Korea has the world's highest number of broadband services per capita. ROK's broadband market is represented by cable modem, DSL, Fibre-to-the-Home, WLAN, WiFi, Broadband Wireless Local Loop, broadband via satellite and anticipated WiBro. In addition, Republic of Korea has the cheapest, fastest broadband in the world. In 2009, most apartments and houses had the capacity to subscribe to 100 Mbps Internet connection for 33000 KRW ($30) or less, depending on the contract period. So far, there are no limits to these services. The high speed of Internet connection is mainly offered by three major companies—LG, KT and SK. Currently experiments with a speed of 1 Gigabit per second have been accomplished.

With widespread and fast speed of broadband in Republic of Korea, the Internet is widely used all over Republic of Korea. More than 92% of ROK's households have access to the Internet which makes Republic of Korea rank among the top countries in the world for Internet usage and broadband penetration. Meanwhile, with the growth of Korea's high speed infrastructure and the new government's initiatives to promote digital convergence, the demand for e-commerce transactions and broadband is increasing. In Republic of Korea, people are used to the Internet. Everyone from elementary school, children to grandmothers, are getting online, making Korea one of the world's fastest growing Internet markets. By early 2009, over 30% of the population and nearly 85% of households were broadband subscribers, and Internet penetration rate in the country was over 77%. This may be compared to the year 2000 when only about 40% of Internet users were connected, while it was over 66% of Internet users in 2006.

● E-commerce Laws

E-commerce laws and regulations are fundamental for the development of e-commerce. There are two basic e-commerce laws: 1) the *Basic Act on Electronic Transactions* and 2) the *Electronic Signature Act*. These laws were implemented in 1999, broadly defining how e-commerce is regulated and online market transactions should be handled legally in Republic of Korea. The *Basic Act on Electronic Transactions* is recommended for ROK's e-commerce regulations including consumer privacy protection. For example, online dealers are not allowed to use or give access to third-party personal information received through e-commerce unless they have obtained the consent from the customer. The purpose of the *Electronic Signature Act* is to achieve the security of electronic documents by placing a computerized signature on authorized documentation. It gives business people the opportunity to interact with a wide variety of clients in other countries and the convenience of authorizing documentation generated through electronic means. In 2002, the *Electronic Signature Act* was amended so that it could match different forms of electronic signatures that are now being accepted in Republic of Korea. Such digital forms include fingerprint, voice, and iris recognition.

In response to several privacy infringement cases in recent years, the ROK's government announced measures for increased privacy protection through implementing the "Comprehensive Information Protection Plan". Relevant previously established regulations under different ministries were integrated into

one new law called "*Personal Information Protection Act*" which restricted the use of personal information within the e-commerce market. In order to solve e-commerce disputes, the Electronic Commerce Meditation Committee was established under the Korea Institute for Electronic Commerce with the law on the promotion of Utilization of Information and Communication Networks and the Protection of Data.

● Statistical data

a. Number of high-speed internet service subscribers (September 2008) (Table 2.5)

b. E-commerce transaction revenues (Table 2.6);

c. Web site rankings by category (Table 2.7).

Table 2.5   The number of high-speed internet service subscribers   (Unit: persons)

Service providers	xDSL	HFC	Apartment LAN	FTTH	Satellite	Total	Share
KT	3,489,889	N/A	2,087,521	1,176,092	525	6,754,027	44.2%
SK Broadband	293,883	1,623,280	1,127,454	397,921	N/A	3,442,544	22.6%
Dreamline	6	250	215	N/A	N/A	471	0.0%
LG Dacom	763	9,714	27,631	N/A	N/A	38,108	0.2%
LG Powercomm	N/A	876,562	1,167,492	N/A	N/A	2,044,054	13.4%
Cable TV	55,206	2,505,985	213,390	67	N/A	2,774,648	18.2%
VAN Service& Resellers	24,967	39,328	146,660	110	N/A	211,065	1.3%
Total	3,864,720	5,055,119	4,770,363	1,574,190	525	15,264,917	100.0%
Share	25.3%	33.1%	31.3%	10.3%	0.0%	100.0%	

(Source: Korean Communications Committee (KCC), September 2008)

Table 2.6   E-commerce transaction revenues   (Unit: thousand USD)

Transaction category	2006		2007		Comparison 2006 vs 2007	
	Revenue	Rate	Revenue	Rate	Revenue	Rate
E-commerce total	413,584	100%	516,514	100%	102,930	24.9%
B2B	366,191	88.5%	464,456	89.9%	98,264	26.8%
B2G	34,435	8.3%	36,801	7.1%	2,366	6.9%
B2C	9,132	2.2%	10,226	2.0%	1,094	2.0%
C2C	3,826	0.9%	5,032	1.0%	1,206	31.5%

(Source: National Statistical Office, Statistics on E-Commerce Transactions, March 2008)

Table 2.7   Web site rankings by category

Rank	Portals	Entertainment	Shopping malls	News media	Gaming
1	Naver.com	Pandora.tv	Auction.co.kr	Joins.com	Hangame.com
2	Daum.net	Gomtv.com	Gmarket.co.kr	Moneytoday.co.kr	Netmarble.net
3	Cyworld.com	Mncast.com	Interpark.com	Chosun.com	Nexon.com
4	Nate.com	Newsen.com	11st.co.kr	Sbs.so.kr	Gameangel.com
5	Empas.com	Mgoon.com	Gseshop.co.lr	Hankooki.com	Migame.tv

(Source: ROK's Click, October 2008)

● Future tasks

a. International market

The domestic market may be too small to attain sufficient economies of scale for ROK's online suppliers to earn enough profit. This is in contrast to US suppliers, who already have a sufficiently large domestic market to achieve potential profits. To counter this problem, e-commerce companies have started to target potential markets not just in Republic of Korea but further overseas—in Asia and the industrially advanced countries. In order to achieve the goal, enterprises must overcome difficulties such as the language and cultural barriers, potential obstacles including efficient distribution mechanisms, multilingual and multi-tribal cultures, lack of efficient online payment systems, and inexperienced third-party logistics providers.

b. Common standards

Republic of Korea must adopt common standards used by other nations or be innovative enough to create standards that all other countries are willing to follow. In the era of globalization, a common standard is necessary. Without it, it may face a lot of obstacles and cause dispute when making an international deal for ROK's enterprises. Once adopting the common standard, both parties can follow the same regulation which would pave the way.

c. IT development

The development of information technology is essential for e-commerce development. Although Republic of Korea has competitive advantages in the infrastructure, it still needs to develop information technology continuously. Republic of Korea needs to quicken the establishment of IT industrial parks to allow IT related industries to develop. Compared with the Silicon Valley of US, the multimedia valley project in Republic of Korea is still only at the planning stage. To bring forward the completion of such industrial parks, it is critical to encourage the participation of private companies at every phase. In addition, the government should launch incentives and assistance measures to support the development of the information technology industry, not only for those chaebols (ROK's business conglomerates) but also the SMEs. In order to make companies obtain clear and simple answers to basic questions about these government programs, the government also should create a website with an easy to follow explanation of all the available strategies.

2.11   Features of Each Nation

2.11.1   Common Features

Different countries have different e-commerce strategies, because all countries need to formulate their own e-commerce strategy according to their economic, scientific and technical situation, resource allocation, advantages and

disadvantages in e-commerce activities, etc. However, there are some common points as follows:

- Government support

All the governments recognized the importance of e-commerce in the national development and international competition in the future. Every region or country has given attention to the development of e-commerce on different levels and put the development of e-commerce in the national construction schedule, particularly in developed countries. Countries all invest a lot in the e-commerce infrastructure, which is the fundamental of e-commerce development, such as the "information highway" of the United States, "E-Japan" of the Japanese etc.

- E-Government

All the governments developed e-government as a priority. For example, the United States firstly required that all government procurement should be paid online. The Chinese government carried out "Internet Engineering". The French government asked all the public sectors should take the lead in the development of e-commerce and accelerate the e-government process. Canada also developed E-government as a priority. Moreover, Japan carried out the "*e-Japan*" plan to establish an omnipotent and omnipresent e-government. Meanwhile, Republic of Korea wanted to provide on-line government electronic services in document processing, meetings, financial management, government procurement, taxation, legislation, judicial and so on. Hong Kong of China also planned to establish an e-government and a digital network, etc.

- Enterprises

Implement the "pull from front and push on back" strategy to encourage enterprises to develop e-commerce. The so-called "pull from the front" is to formulate some preferential policies to encourage enterprises to adopt e-commerce technology while the so-called "push on back" is to implement some sanctions or punitive policies to force those enterprises with little enthusiasm to adopt e-commerce technology. In the United States, the Government exempted the tax on e-commerce transactions and provided a priority for the declaration of goods transacted by e-commerce. Meanwhile, the goods sold in a traditional way are often delayed at customs or given some punitive treatment, in order to force enterprises to adopt e-commerce technology. The Ministry of Foreign Trade and Economic Co-operation of China (MOFTEC) also announced in 1998 that foreign trade enterprises would lose the bidding qualification of the export quota if they did not develop e-commerce from January, 2000. Through the implementation of these measures, many enterprises would adopt e-commerce in order to obtain competitive advantages.

- The environment

All the governments committed themselves to create proper environments for e-commerce development. First, clear legal barriers. E-commerce strategies of different countries all emphasized establishing proper legal systems about digital signature, online advertising, intellectual property protection, privacy protection, the protection of consumers' rights, etc. If these problems were not properly solved, it was very difficult to develop e-commerce. Second, establish a perfect

network. Only when the network is widely spread with fast speed, would it attract more and more people and enterprises to implement the network to carry out transactions. A perfect network was fundamental for e-commerce development. In e-commerce strategies of different countries, the governments all invested a great amount to establish a fast and stable network and tried their best to cover the whole country.

2.11.2   National Strategic Personalities

Differences among the e-commerce strategies of different countries are determined by economic strength, the development level of productivity, science and technology which can all be well reflected by GDP or GDP per capita. Here, all the data of the countries referred to above are summarized as follows (Table 2.8).

Table 2.8   GDP (nominal) and GDP per capita of ten countries in 2010 (USD)

	GDP (million)	Ranking	GDP per capita	Ranking
United States	14,657,800	1	47,284	9
EU	16,282,230	-	-	-
Japan	5,458,872	3	42,820	16
PRC	5,878,257	2	4,382	94
Australia	1,235,539	13	55,590	7
UAE	301,880	33	59,717	5
India	1,537,966	10	1,265	138
Ireland	204,261	43	45,689	12
Singapore	222,699	39	43,117	15
Republic of Korea	1,007,084	15	20,591	33

(Source: IMF database)

E-commerce has its own regularity and objective demands, so there are some common points when different countries develop their e-commerce. However, due to the difference in economic strength, technology, network infrastructure and legal system, different countries will not only have different advantages and disadvantages but also face different problems. Every country should maximize their advantages and avoid disadvantages, and overcome their problems. In addition, governments launched time formal e-commerce strategy at different times because governments realized the importance of information technology at different times. So there are different development situations of e-commerce in different countries. Here, we just made a brief comparison below.

(1) Different attitudes toward hard and soft environment

Many developing countries such as China and India have the heavy task of

network infrastructure construction in their e-commerce strategies. As far as the soft environment is concerned, almost all countries pay attention to the legislation, emphasizing integration with international regulations and customs. In fact, international regulations and customs almost all originated from those of the United States, which can also present the leading power of the United States in e-commerce. In national e-commerce strategies, many countries propose to reduce the Internet fees, especially those developing countries. The Internet fees in most of the developing countries are high, which further hinders the development of e-commerce. Take China as an example, the reasons why the Internet fee is the most expensive in the world lie in two aspects. One is the monopoly in the telecommunications industry and the other is an incomplete infrastructure. As far as India is concerned, its economic infrastructure construction is relatively backward, which has influenced the growth of logistics and ultimately affected the development of e-commerce. It is urgent for India to perfect e-commerce infrastructure construction including the constructions of railways, highways, airports and ports as well as information infrastructure.

(2) Different strategic objectives and strategy positions

The strategic objectives and strategy positions are determined by the economy and technology. The leading country wants to keep its leadership in politics, economics and technology. However, nations with comparative power want to challenge the leading position, or at least to match it. Whereas nations with less power just want to be in a more advantageous position, or be a regional leader. For example, the e-commerce strategy of the United States is to keep its leading position in IT while the e-commerce strategy of Japan is to overtake the United States and be a new master in e-commerce. The aim of Indian and ROK's e-commerce strategy is to be the leader in their region.

(3) Different establishment period of e-commerce strategies

It depends on the different positions of each country in the new economy. India and Ireland were the first two nations which made a long-term development strategy for IT. Consistent with this, India and Ireland have been great powers in the IT field and their status in the new economy has exceeded many developed countries such as Japan, Germany, Great Britain and France. Although the economic growth rate in India was slower than that in China in recent years, its quality of economic growth is better than China's. There are some characters in the economic growth of India. First, the service industry is the dominant industry in India instead of the manufacturing industry. Second, the gap between the wealthy and poor has not been enhanced. Last, its economic growth does not strongly depend on the international market. All of this shows that India has more sustainable development potential than China. In contrast, Japan realized the importance of IT only after its long-term economic recession and its IT development strategy was established during the middle and late 1990s. This is why Japan, as the third great economic power, should learn from India in the IT area. The establishment time of China's e-commerce strategy is generally the same as that of Japan's e-commerce strategy. For China has fell behind India in e-commerce for many years, China should not only pursue developed countries

such as the United States, Japan, France, Germany and Great Britain but also keep up with developing countries such as India and Ireland in IT and e-commerce areas.

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3

E-Commerce Strategy of Industries

With the fast development of information technology, the traditional economy is transferring to the information economy. Meanwhile, a worldwide trend to develop e-commerce is forming. In order not to be knocked out by this revolution, each nation has formulated its e-commerce strategy as referred to above. Through the implementation of national e-commerce strategy, the government has encouraged industries and enterprises to adopt e-commerce. However, there are so many kinds of industries in a nation with different characteristics. Due to these different characteristics, industries should formulate their own unique e-commerce strategy. Some industries adopted e-commerce first and achieved great achievements while others fell behind. For example, the construction industry is a highly fragmented industry. Many activities involved in construction activities are outsourced to other firms while the builder only focuses on the core business. As a result, managing those outsourcing firms is important for construction enterprises. Considering the efficiency of e-commerce, the construction industry has implemented e-commerce at an early stage. As far as the financial industry is concerned, it is the best cooperator of e-commerce. Imagine how e-commerce would work without financial support such as electronic payment and how a non-electronic financial industry would survive in modern society. From the win-win point of view, the financial industry had to formulate an e-commerce strategy first and focus on the establishment and safety of electronic payment. Meanwhile, the financial industry can develop new products to further promote the development of e-commerce and increase its profitability. It can be seen that industrial e-commerce strategy is really important.

As is well known, e-commerce can change the business model, while e-commerce can also change the structure of industries and the operating model. Only when the changes e-commerce brings are recognized, can industries understand how to optimize their industrial structure and adjust their strategies. Then enterprises can establish their own core competitiveness in the industrial value chain. One industry can make innovations to business models and expand to other emerging industries by making use of emerging information technology.

The level of industrial e-commerce strategies is between that of national e-commerce strategies and enterprise e-commerce strategies. Industrial

e-commerce strategies can be seen as details of national e-commerce strategies which are particular for one industry according to industrial characteristics. Meanwhile industrial e-commerce strategies can optimize industrial structure and guide enterprises to develop enterprise e-commerce strategies. Above all, industrial e-commerce strategies are also very important.

Through the implementation of proper industrial e-commerce strategies, many industries have achieved core competitiveness and made great achievements. The financial industry has developed many new kinds of products such as Internet banking, electronic money and electronic payment. E-commerce has helped the financial industry provide efficient financing services. As long as consumers can get access to the Internet, they can do nearly all their financial business via the Internet rather than going to the bank. The fact is that e-commerce develops new business models for the financial industry, and other industries also make use of e-commerce and achieve industrial advanced restructuring. This happens in more than just the financial industry.

However, how to formulate e-commerce strategies for each industry? How to properly implement those strategies? Details are shown in the following sections.

3.1   Construction Industry

With the advancement of related technology and fast development, e-commerce has transformed the way companies are doing business in all sectors. The construction industry is constantly becoming reliant on new electronic technology, including project-specific Web sites, online equipment procurement and negotiation. Although the construction industry was slow to warm to the technology, usage is developing every day.

3.1.1   Overview of the Construction Industry

In order to understand the influence e-commerce has brought to the construction industry, it is necessary to review the characteristics of the construction industry and industrial trends in recent years.

As a pillar industry of the national economy, the construction industry has a huge influence in socioeconomic development. From 1994 to 2000, 60% of fixed investments were achieved by the construction industry. Meanwhile, the construction industry is a mature, fragmented and labor intensive industry [1]. With a dynamic economy, there are some trends in the construction industry which are as follows:

● Construction activities are cyclical because construction is sensitive to fluctuations in interest rates. Meanwhile, the purchase of durable goods such as buildings is always postponed. The builder cannot get all the funds until the building is delivered to householders.

● Most of the non-core activities involved in construction activities are outsourced to other firms while the builder only focuses on the core business. These non-core activities include human resources, information technology and so on.

● With fierce competition in the design and construction industry, the convergence of architecture and construction activities becomes more and more frequent. Design-build (project delivery system) accounted for over 35% of the market in 2000, up from about 5% in 1985. In addition, the proportion is expected to increase [2].

Above all, the construction industry is in fierce competition with narrow profit margins. In addition, the main product of the construction industry is a building which is not sophisticated and easy to copy. The barrier to entry into the construction industry is not high. The most important success factor is the ability to control costs and increase revenues. In this situation, e-commerce can easily enter the industry and tap the potential.

3.1.2 Advantages of E-Commerce in the Construction Industry

Nowadays people always require better products with good customer service. For this, all the team players need to work jointly on the project using Internet tools. The Internet tools include CRM (Customer Relationship Management), ERP (Enterprise Resource Planning), Data Mining and so on. The relationship among them is shown in Fig. 3.1.

Through e-commerce, companies in the construction industry can find new markets, discover new sales channels and establish closer relationships with customers and business partners. Meanwhile, automatic business transactions and information exchange reduce the cost to a large extent.

Fig. 3.2 shows improvements e-commerce has made in the construction industry.

Considering activities in the construction industry involve a number of partners on each project, inventory management is necessary in order not to delay the project or to tie down space and money on excess inventory. Therefore, e-procurement is one important improvement that e-commerce brings to construction enterprises. Through e-procurement, builders can not only have access to suppliers at less cost but also can offer product standardization and quality assurance. For example, the builder would subcontract the project to other contractors. The contractor can input subcontractors choices and the owner can input contractors choices. In addition, e-procurement can help builders find more opportunities to manage material flows down the value chain. Moreover, e-procurement can find better vendors easily by searching for vendor databases and comparing the products based on the information recorded in the database such as technology, costs and standard documentation. Because all the process is based on information technology, all the internal requisitioning process becomes automatic, which largely reduces the requisitioning cost and personnel costs as

well as increasing time efficiency. Meanwhile, due to precise procurement, the extra-inventory is reduced and the inventory management cost is lowered. In addition, enterprises can maintain a long-term relationship with suppliers by creating a friendly environment. As a result, e-procurement can reduce administrative costs significantly by about 30%.
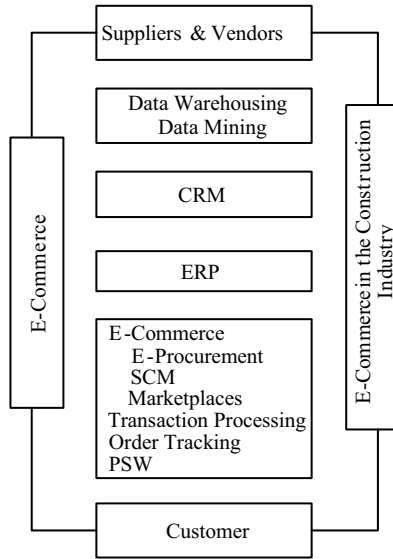
Fig. 3.1   E-commerce system diagram of the construction industry
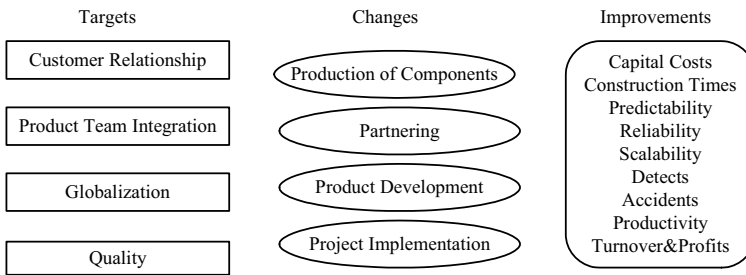
Fig. 3.2   Effects of e-commerce in the construction industry

Furthermore, the e-marketplace is also an important application of e-commerce in the construction industry. The e-marketplace, known as B2B, can make sure all the information and data is available to all the users anytime, anywhere. In an e-marketplace, the function of the commerce infrastructure and supply chain can both be achieved including planning, execution, negotiation, pricing and so on. In addition, the e-marketplace can increase revenues and decrease costs for enterprises as well as improve customer service so that the

competitiveness of enterprises will be improved. The e-marketplace in the construction industry integrates useful information and solutions in the industry and puts it on the Internet taking advantage of information technology to deliver more convenient and overall services. Meanwhile, the e-marketplace in the construction industry can help users connect anytime, anywhere, if it is necessary to contact each other. So they can negotiate and discuss with each other as soon as possible. Through the Internet the contractor can also understand the situation of other subcontractors anytime he wants, which can effectively solve the problem of the construction industry being highly fragmented.   In addition, the management costs can be effectively reduced. Moreover, the distribution channels will be further expanded and accessed by customers worldwide.

Above all, e-commerce can greatly improve management efficiency, not only in internal businesses like procurement and administration but also in external contractor management. Take Bechtel as an example. Bechtel is the largest engineering construction company in the United States with 49,000 employees and a profit of $30.8 billion in 2010 [3]. In the digital century, Bechtel recognized the opportunity of information technology and implemented e-commerce in its operation. Bechtel made use of information technology to streamline internal operations and communications within partners and clients as well as other organizations. The Internet also helped Bechtel access partners and clients all over the world as well as reduce the communication cost. In addition, Bechtel implemented e-commerce for procurement, collaboration, document management, engineering and design solutions. In 2010, Bechtel spent $16 billion in the marketplace. In addition, Bechtel has developed its own Bechtel Procurement System (BPS). The Bechtel Procurement System is an automated system used for acquisition strategy and planning. The BPS covers all procurement work processes, throughout the life of a project, for both office and site procurement of engineered equipment and construction materials. The multiple modules that compose BPS are: Acquisition Planning; Materials Planning; Supplier/Subcontractor Knowledge Base; Requisitioning; Purchasing; Subcontracting; Expediting; Inspection; Traffic & Logistics; Receiving; Inventory; Issuing. In addition, there is a function called electronic Request for Quotes (RFQ). During the bidding process, information such as payment terms, price and quality can be delivered at once by the Internet, which benefits both sides in negotiating with each other as soon as possible so that the cost can be further reduced. Moreover, through streamlining the sourcing, bidding and contract processes, the information and data can be organically connected with the processes. It can be seen that e-commerce really brings huge opportunities to construction enterprises.

3.1.3 *Implementations of E-Commerce in U.S. Construction Industry*

According to Bryce Harris Treffinger [4], the implementation of e-commerce in the U.S. construction industry has been highly developed. In particular, the wireless

implementation has developed fast. Let us take a look at the implementation of e-commerce in the U.S. construction industry in detail.

According to Table 3.1, the project management tool was one of the most popular applications adopted in the construction industry. In 2000 and 2005, about 70% of construction enterprises used e-commerce for project management in hopes of simplifying the business process, reducing the transaction cycle and costs. As is well known, the quality requirement of the construction industry was very high so that it was necessary to standardize documentation for automating the daily workflow to avoid rework and errors. The Extranet/Intranet was also one of the most popular applications adopted to speed up communication within the organization, partners and suppliers. In addition, the percentage increased by 10% from 2000 to 2005 (Fig. 3.3). Moreover, the implementation of wireless technology developed fast with the fast development of wireless technology and greater user familiarity. In 2000 there was no wireless implementation in the U.S. construction industry while 5% of construction enterprises then adopted this technology. The project collaboration tool was also developed to help construction enterprises organize the information about projects and make the information available to anyone on the project anytime and anywhere. As more and more information and data were stored in digital form, digital exchange made great developments and more digital exchange software was developed. In addition, the adoption of wireless technology made digital exchange more common. For e-procurement and supply chain management, this is used less in the construction industry. It was highly related to the characteristics of the construction industry where product prices in the construction industry did not fluctuate as much as those in other industries.

Table 3.1 Adopted e-commerce application adoption in the construction industry

E-commerce initiatives	Percentage in 2000 (%)	Percentage in 2005 (%)
E-procurement	40	25
Customer relationship management	30	50
Workflow	40	40
Supply chain management	25	15
Extranet/Intranet	65	75
Knowledge management/data warehousing	45	45
Enterprise resource planning	25	35
Accounting/finance	55	65
Project collaboration	50	55
Project management	70	70
Digital exchange/auction	5	45
Wireless	0	45

As for communication tools, Fig. 3.4 shows the general situation of the U.S. construction industry in 2000 and 2005. The phone was widely used in the construction industry in 2005 compared with 2000. The wide use of e-mail also

showed that the Internet played an important role in daily business operations in the construction industry. An obvious and important trend of communication tool applications in the construction industry was the fast development of wireless technology, increasing from 5% in 2000 to 35% in 2005. In addition, the trend was expected to continue in the future. Because the construction industry highly depended on personal relationships, the public market place developed slowly. Although those electronic communication tools made communication easier and more effective, face-to-face communication was also important. Over 80% of the respondents used e-mail for communication with their partners and suppliers.
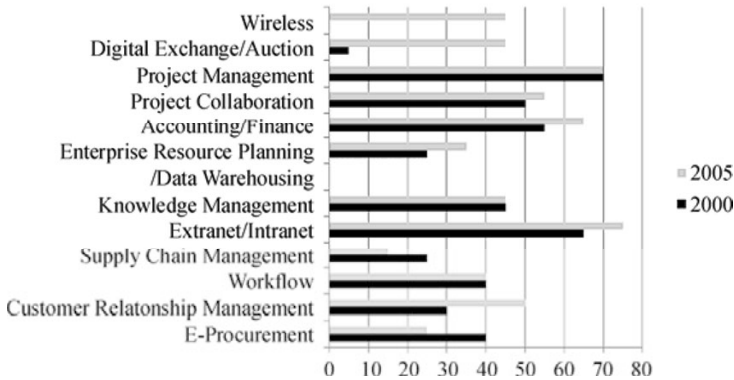

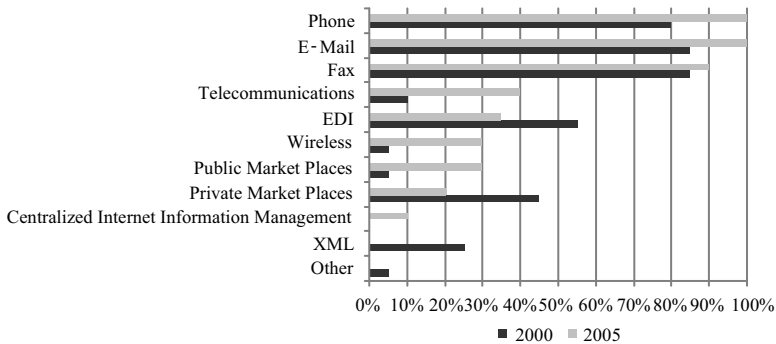**Fig. 3.3**   Distribution of adopted e-commerce application in 2000 and 2005

Fig. 3.4   Communication tools with suppliers, partners and customers

As for the e-business initiatives in construction enterprises, the Intranet/ Extranet and project management were the two most popular initiatives. Communication fell behind, decreasing from 60% in 2000 to 50% in 2005 (Fig. 3.5) because enterprises paid more attention to other fields. E-procurement would be the next key adoption of the construction industry in the future.

But there were still some kinds of obstacles for construction enterprises in the United States. Many enterprises hesitated to adopt e-commerce because of a lack of successful real time examples and expertise in e-commerce. Meanwhile, there

were not enough industry standards which further obstructed the development. In addition, the problem of security and high cost of network construction made many enterprises hesitate to adopt e-commerce.
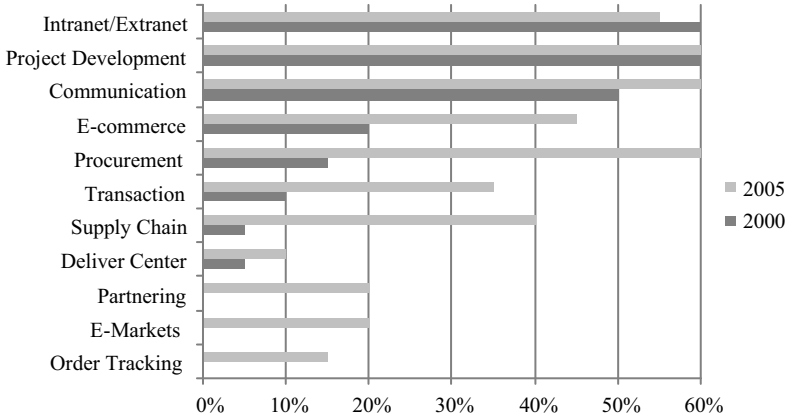

Fig. 3.5   Electronic business initiatives in the construction industry

3.1.4   Construction Industry in China Needs E-Commerce

Since the establishment of the People's Republic of China, the construction industry has been developing fast, especially after the reform and opening up. During the eleventh five-year plan of China, the construction industry has achieved much. Annual output of the construction industry in China in 2010 reached 9.52 trillion RMB with a growth rate of 24%. It could be seen the growth rate of the construction industry was more than twice that of GDP [5]. However, compared with the construction industry in the United States, the implementation of e-commerce in China is still in the early stages.

On the government side, all levels of administrative construction departments actively promoted office automation and administrative informationization. For example, the information center of the Ministry of Construction established the website www.cin.gov.cn to drive the informationization process of the government administration and industrial services. In addition, the Beijing Project Construction Committee developed a network information management system to achieve information management and qualification approval, including online application, approval, annual review and querying of enterprise qualifications as well as the handling of enterprise qualifications. All these functions were automatically fulfilled by the workflow when the system started up, to avoid artificial interference. Because the construction industry was highly fragmented among different contractors, subcontractors, architects, engineers, laborers and developers, all the information about the contracting situation, project quality and construction safety could be obtained by the system through exchanging the data

with other internal departments in the Ministry of Construction. Meanwhile, enterprise business licenses of contractors and tax registration information could be obtained by connecting the system with other external administrative departments. However, it took a long time for the government to establish an online project system ordered by the government construction administrative departments. The e-Government of China's construction industry was only in the initial stages, just for government affairs and industry dynamics.

On the enterprises' side, there were many domestic construction enterprises which made great achievements in the construction of information infrastructure and implementation in special fields. According to incomplete statistics, there were over 1.5 million computers in domestic construction enterprises. Some building enterprises established an internal network with most of their first-level contractors, which greatly strengthened their competitive advantages and management efficiency. Meanwhile, some corporations tried to acquire new opportunities to develop new business by means of their technical advantages. The eBuilds Technology Limited (www.ebuilds.net) was one of them. The eBuilds took its advantages in the construction industry and technology to expand the implementation of e-commerce in the construction industry. The ASP of eBuilds was composed of an industrial information database, project management and procurement, online building material marketing, e-commerce platform, data analysis and customer services, which would offer a comprehensive B2B solution for customers in the construction industry.

Above all, the development of e-commerce in China's construction industry is still in the early stage. There are some obvious limitations. First, most enterprises in China's construction industry are based on stand-alone software without forming a network. Second, most enterprises have established their own websites with splendid content but without really implementing e-commerce. The website is usually used as a platform to release the news or present the business performance without enough interaction. In addition, software development lacks overall planning and the development funding is not enough. Therefore, there is a long way to go for China's construction industry in developing e-commerce.

3.2 Transportation Industry

Transportation, which leads other industries, is a basic element in social and economic development. From a long-term perspective, the transportation industry has a bright future. According to the German authorities, transport will continue to flourish in e-commerce over the next 10 years. Road transport in particular will continue to play an important role in social and economic development.

Traditional transport is now standing at a crucial crossroads in building up the transport system network. The transportation industry, which is in a fast-forward development phase, has emerged as a major force in online B2B e-commerce. Transport operators exchange information and communicate with customers on B2B Websites. Many network operators are rapidly providing related services, so

as to set up a new transport system in the e-commerce environment.

IDC (International Data Corporation) has even studied the e-commerce market and then issued a research report which provided important guidance to the market. The report said that transportation e-commerce web sites offered excellent opportunities to service providers and transport operators to build their transportation management systems with efficient services. Many network operators constructed their transport communication environment on their own web sites and e-commerce systems, but most of these systems were in the testing phase. Transport service providers were generally available for on-site contracts to conduct transactions and some providers already established solid customer bases.

3.2.1 Impacts of E-Commerce on Transportation

As one of the fastest growing marketing channels for products and services, e-commerce has greatly changed the transportation industry. With information and communication technology, people can easily get the information they need. Each part of the supply chain can communicate directly and share the information. E-commerce has changed the traditional supply chain and further influenced transport demands. In addition, e-commerce has influenced distribution and given new opportunities to intermodal transport and international transport.

● Transport demand

The impact of e-commerce on transport demand can be divided into two parts: the decrease in demand for customer journeys and the increase in demand for freight journeys. With the development of e-commerce, more and more people prefer online shopping to traditional commerce. In traditional commerce, people have to take public transport or drive cars to shops and select proper products. But since online shopping came about, people can buy what they want without going out. Moreover, many products become paperless such as newspapers, e-books, music and software which all can be downloaded from the Internet. As a result, the demand on passenger transport has decreased. On the other hand, the delivery of products and services is still based on transport. In the process of e-commerce, delivery is one of the most important parts. In traditional commerce, the customer can take products home after they select and buy them. But products bought online have to be delivered by a third-party instead. In addition, customers do not see the real product. It often happens that customers return the product, which further increases the demand for freight. To some degree, e-commerce promotes the development of the transport industry.

● Distribution

Transportation is the distribution end of the e-commerce process. In traditional commerce, the distribution of products is usually packaged in units. But in e-commerce, especially B2C, people often order a great deal of different products for one neighborhood which leads to more small-size deliveries. It may result in higher operating costs and low efficiency. So setting up solutions to reduce delivery failures and delivery time are necessary.

● Intermodal

With the development of e-commerce, intermodal transport will become more and more popular. Compared with unimodal transport, intermodal transport will deal with thousands of loads with hundreds of operators, achieving consolidation and optimizing capacity utilization and total distances. Meanwhile, intermodal transport requires better cooperation and consolidation between shippers. Transport in the future will integrate warehousing and delivery to provide an integrated logistics service.

● Efficiency

With e-commerce, transportation enterprises can propagandize enterprises themselves and publish the information on the Internet so that travelers and shippers can understand in good time the situation of the goods. Travelers and shippers can query the transport information and send suggestions back to transportation enterprises to help transportation enterprises improve services and satisfy customers needs. In addition, e-commerce will benefit transportation enterprises, especially small and medium sized transportation enterprises in collecting useful information and expanding new fields of operation. Moreover, informationization reduces the consumption of material and energy, shortens the load distance and improves efficiency. The cost is also highly reduced with e-commerce.

Above all, e-commerce has changed the transport industry. E-commerce has decreased the demand on passenger transport and increased the demand for freight trips. In addition, e-commerce has impacted distribution, leading to more small-size delivery. Moreover, it gives more opportunities for the development of intermodal transport. With e-commerce, the efficiency of the transport industry is highly improved at low cost, which further improves the competitiveness of transportation enterprises.

On the other hand, the transport industry also influences the development of e-commerce. E-commerce cannot develop well without logistics. But the logistics cannot develop well without the support of transport. The transport infrastructure is the foundation for the development of e-commerce.

3.2.2 Emergence and Development of Transportation E-Commerce

● The emergence of transportation e-commerce

As is well known, buyers and sellers can communicate with each other directly through the Internet. In consumer-oriented industries, services and information play important roles in commercial activities. In particular, the impact on the transport industry is obvious. Opportunities and challenges of transportation e-commerce turn out to be more and more important. A major advantage of e-commerce is that the transaction costs are highly reduced. Thus, e-commerce has become the main trading entity to provide low-cost goods and services in the transportation industry. As the key part of the supply chain, e-commerce has not

changed the traditional supply chain, but provided new opportunities for global transport and intermodal transport.

● The current development of transportation e-commerce

Transport, as one of the national economic "bottleneck" industries in the coming years, will maintain a rapid and stable growth. Information, networks and automation are considered the main e-commerce features of transport in the coming years. The development of transportation e-commerce is aimed at meeting the three following requirements. (1) To break boundaries between transport and all other sub-sectors, such as production, and control the whole process including planning, offerings, production and marketing using the concept of the supply chain. (2) To put customers' satisfaction as a priority instead of traffic capacity. (3) To focus on transport process management and high-tech information technologies.

● The development status of transportation e-commerce in China

The development environment for China's transportation industry is getting better and better. The policy environment and investment environment has greatly improved; the proportion of foreign capital and private capital in the transport industry has been greatly enhanced. Driven by rapid economic growth, various modes of transport have been well developed and have shown their own characteristics and advantages during the developing phase. Road transport has achieved substantial growth and the highways have developed by leaps and bounds. In the field of air transport, its development ranks the first in China. Meanwhile, the competition in this industry is getting fiercer and a competitive landscape has gradually formed. As for the "bottleneck" problem in railway transport, an obvious contradiction between supply and demand needs to be solved fundamentally. To compete with foreign transport companies and create a new economic growth point, transport companies in China should improve their business structure. In the rapid development of air transport, pricing strategy is the primary means of competition within the industry. Due to the involvement of international capital in the pipeline transportation market, more and more companies have started businesses in this field and pipeline transportation has becomes the future trend.

China's transportation industry continues to maintain an appropriate rapid growth and the investment environment for transportation gradually gets better and better. In other words, fast economic development in China has brought great investment opportunities in transport. In 2003, the investment in fixed assets of the transport sector totaled 400 billion RMB, which greatly contributed to the construction of 1,164 km of railways and 36,444 km of highways and undoubtedly created the material foundation for the rapid development of the transport sector. In recent years, China's economy has maintained a rapid growth by continuous development of several industries such as electricity, coal and petrochemicals. On the one hand, this economic growth has expanded the transportation demands and brought more opportunities to the transport industry. On the other hand, rapid development of transport has significantly improved the whole performance at the industrial level. For all these reasons, the investment value of transport companies has been further enhanced.

Both road and rail transportation have been common modes of ground transportation especially in urban areas. The development of road transport was stimulated by three major positive factors: (1) The Ministry of Construction issued "*Opinions on Urban Public Transport Priority Development*" on September 23rd, 2005, which made it clear that China would construct a basic network of public transportation in urban areas and turn it into a dominant position within 5 years or so. (2) To meet the Beijing Olympic Games and Shanghai World Expo, the regional transport sector has obtained strong support from the government. As a result, the infrastructure and transportation capacity were rapidly increased. (3) Accelerating the merger of assets and the competitiveness of companies was put on the agenda.

China's accession to the WTO greatly improved China's foreign trade environment. A gradual reduction of trade barriers at home and abroad attracted a great deal of foreign investment and greatly increased the import and export trade volume. The key point was that foreign trade would be a direct benefit to the transport industry. Textile exports and the automotive trade have grown exponentially. At the same time, industrial output illustrated the widening margin at home and abroad. The forecast showed that maritime transport would increase with the growth in imports and exports. China's accession to the WTO would intensify the competition in the domestic market and improve China's international competitiveness at the same time.

After joining the WTO, foreign transport enterprises emerged one after another. They competed with domestic enterprises in the field of shipping agencies, freight forwarding, and logistics services and so on. External competitive pressures encouraged domestic enterprises to improve their internal management mechanism, by reforming the distribution and employment system and making efforts to develop external markets. A number of outstanding enterprises like Sinotrans[1] emerged. At the same time, the WTO provided state-owned transport enterprises in foreign countries with national protection, changed the current situation of some unfair international discrimination and the status of sanctions, and disputed the settlement mechanism to safeguard merited interests. Transport enterprises in China could occupy a space in the international transportation market with the advantage of low cost. Due to the introduction of foreign competition, re-differentiation was encouraged in domestic transport companies to form a much larger transportation group, or cooperation among several smaller transport enterprises to form a transport cartel alliance. Within the group, members could share the labor force, capital and information resources.

As mentioned above, economies of scale in transport services would appear. The cost of production and the competitiveness of enterprises would become important questions. At the same time, the involvement of foreign capital would intensify the competition in the domestic market, which also meant new communication chances with rivals. The process of competition is a process of mutual learning. By competing, companies can learn advanced management experience, science and technology and the construction of a large supply chain

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[1] Sinotrans (HK) Shipping Limited (commonly referred to as Sinotrans) is one of the largest shipping companies in Asia. It is headquartered in Hong Kong, People's Republic of China.

from each other. From the perspective of microeconomics, as the production in transport services is increasing, the unit cost of learning is decreasing. China's accession to the WTO has promoted China's opening up and made China mature more quickly to establish a foreign trade transport market for all types of enterprises and create a favorable market environment for competition. Joining the WTO, the Chinese market rules and international rules are more transparent so that more efficient transport enterprises are allowed to speed up the processes of the market. To this end, government departments would strengthen the legal system, accelerate the formulation or modification of international goods transport regulations and policies, speed up transport system reform, and promote fair competition among enterprises in China for the formation of a foreign trade transport market.

The WTO has brought China's transport sector development opportunities as well as challenges. Many foreign transport companies have set up branches and offices in China, directly involved in China's transportation market. China's accession to the WTO would further expand the momentum of this competition and escalate the existing tensions. The Chinese transportation service industry was committed to opening up the market. For the convenience of foreign trade transport services, China promised to unconditionally engage in cross-border transportation, allowing foreign investors to enter the transport industry in China.

It could be seen that foreign carriers would rely on their scale of operation, management quality, advanced technology and equipment, efficient multimodal management tools and rich experience of the Chinese transport market. A full range of all support services such as warehousing, customs clearance, shipping and freight forwarding in the domestic market would cause huge competitive pressure on domestic companies. As more and more foreign transport companies such as UPS and DHL entered the Chinese market, fierce competition would finally cause the transportation price to fall and further reduce profits. In this condition, e-commerce can help local transport companies properly control the costs and earn competitive advantages.

3.2.3   China: The Development of Transportation Informatization

Information intelligence has become a symbol of transportation system development in the modern 21st century. By accelerating the developing pace of information technology, transportation in China can achieve sustainable development. Moreover, the gap between China and developed countries is expected to be narrowed[3,6]. Because the transportation industry contains a wide range of sectors and businesses, the content of transportation e-commerce is very rich including inquiries, information exchange, online trading, real-time tracking, online claims and additional services.

From the types of transportation e-commerce websites, there are two categories of transport websites: commercial sites and non-commercial sites. Commercial sites are always founded by logistics companies and related software

companies for earning profits. Such sites are a major component of China's logistics. Comprehensive transportation e-commerce sites include functions such as online yards, online freight yards, online tracking, online orders, online services, industry information and business marketing. Comprehensive transportation e-commerce sites not only provide logistics information and transport knowledge, but also provide the trading platform, thus integrating social transportation resources. Non-commercial sites introduced relevant laws and regulations, logistics and transport policies, industry information and business consulting. Non-commercial sites are mainly operated by government agencies, logistics associations and institutions of higher learning without earning profits. Take www.clb.org.cn for an example. It provides logistics information, business promotion, system building, product promotion, logistics solutions and other services.

Transportation e-commerce applications can be embodied in three categories from the viewpoint of the business scope: freight transport e-commerce, passenger transport e-commerce and other additional services.

Freight transport e-commerce means that transport enterprises distribute freight information through the Internet and develop electronic transactions, including contents of freight information services and online transactions. Freight information services can provide transport enterprises with the functions of browsing and querying freight information, publishing and managing supply and demand information. Online transaction functions can realize quotes and inquiries of trading prices, transaction negotiations and contract management. CSIC (China State Information Center) and China Communications & Transportation Association jointly established www.hzyzq.net to provide freight information services. The opening of these freight services websites greatly improved transport efficiency in reducing unloaded rates.

Passenger transport e-commerce basically means online booking and ticketing systems. It adopts a uniform host structure and concentrated processing method to achieve selling tickets through ticket agencies. Customers can find the ticket information, car information and travel guide services through the passenger transport e-commerce site. To enhance industrial management and service levels, these sites provide the public with dynamic and comprehensive traffic information to facilitate people's outings. In February 2005, the Ministry of Transportation officially launched the traffic information demonstration projects. Since April, 2006, citizens of Nanjing, Jiangsu Province, could easily book a bus ticket just by moving a finger to send a message on the website.

Moreover, transportation e-commerce websites offer additional services including distributing electronic maps to travelers, introducing nearby natural conditions, hotels and restaurants, and even delivering the travel and accommodation business. In addition, transport e-commerce websites provide supply and demand information, and deliver many kinds of businesses such as packaging, storage, logistics, transportation insurance, and escorting goods in transportation.

Generally speaking, China's transportation e-commerce lags behind the financial industry, retail business, manufacturing and other industries. Most

transportation e-commerce websites are used to distribute industrial information. E-commerce has hardly penetrated into daily operation of transport enterprises. Transport enterprises just use e-commerce for simple management such as financial management without connecting the whole business flow with e-commerce. There is a long way to go for transport enterprises to combine e-commerce with enhancing the competitiveness of enterprises.

3.2.4   Prospects for the Transport Industry

Transportation, which leads the other industries, is a basic element in social and economic development. From a long-term perspective, the transport industry has a bright future. In particular, road transport will continue to play an important role in social and economic development. With the development of economic globalization, especially after China's accession to the WTO, it is necessary to develop road transport in China that is synchronized to the world.

In the past 20 years, great changes have taken place in the form of road freight transport, from a single container transport in the past to a variety of transport forms including vehicle transport, LTL freight, refrigerated cargo, dangerous goods transport and other specialized cargo transportation. These changes have enriched the service system of the road freight transport market and improved the effectiveness of goods transportation. In particular, container transport shows strong vitality. With rapid development of the market in commodities and the increase in foreign trade in recent years, logistics services, cargo transportation and other new services are rising fast in China, which creates new economic growth points for road freight transport. The competition between China's existing transport enterprises and other service enterprises in this field is getting fiercer and fiercer.

As a result, how to adapt the current freight structure to new transport trends has become an urgent task in accelerating the development of road transport. Firstly, it is necessary to lead road freight transport in a professional direction. Secondly, the road transport of goods should gradually be turned into multimodal transport by cooperating with other modes of transport so that both the geographical scope and spatial distance will be expanded to improve the efficiency and quality of transport. Thirdly, the whole process of the logistics of road cargo transportation services must meet the needs of economic and social development. Fourthly, to improve the road freight transport market, large enterprises are necessary to promote the diversification of development modes in the transport industry and to facilitate the formation of large-scale transport services. Moreover, transportation organizations with advanced technologies are also needed to improve transport efficiency.

Science and technology comprehensively promote the process of road transport informatization, and gradually build intelligent road transport systems for passenger transport and freight transport to meet the development trends of global transport. It can be seen that the most fundamental transport development is

to improve transport efficiency and the management level. For this sake, it is suggested we strengthen various elements of road transport itself and enhance cooperation with other modes of transport. Modern communications, electronic commerce, electronic data interchange, global positioning systems, geographic information systems and other advanced information technology in the field of road transport are all used for increasing the informatization level. Foreign road transport development trends and successful experiences have proved that the application of electronic information technologies and intelligent road transport are the precondition for improving traditional management in road transportation and the only way to develop the transportation industry.

3.3 Financial Sector

Finance means funds management, often including saving money and lending money. It deals with concepts of time, money, risk and the interrelationship between them. Meanwhile, it deals with how to spend and budget money. Finance refers to businesses, individuals, governments and financial intermediaries. The financial industry or financial services industry means a wide range of companies and institutions such as banks and security companies involved with money, offering businesses money management, lending, investing, insurance, securities and trading services. Banks, credit card issuers, insurance companies, investment bankers, securities traders, financial planners and security exchanges are the main parts of the financial industry.

3.3.1 Financial Industry

The financial industry is one of the most important industries in the global economy. According to the Global 2000, there were seven financial companies in the world's top 10 companies, namely Citigroup, Bank of America, HSBC Holdings and JPMorgan Chase and so on. As of 2004, the financial industry accounted for 20% of the market capitalization of the S&P 500 in the United States. In 2006, financial services generated $257 billion in profits, a third of the total Fortune 500 profits according to the Fortune 500 rankings. In addition, the financial industry is closely related to other industries. Other industries all need financial support from the financial industry. As far as the financial industry is concerned, the demand for financial products driven by risk assessment should take potential yield, risk rating, liquidity, availability of information, access to alternatives into consideration. In addition, the money supply, interest rates, inflation, economic conditions and government regulations will influence the financial situation.

With the utilization of information technology, the financial industry is undergoing massive change. Due to fierce competition in the financial industry

and great advantages, more and more financial institutions have adopted information technology to innovate their own services. The traditional financial business process is gradually disappearing. It can be said the financial industry consists of industries firstly seeking opportunities in e-commerce. The financial industry began to utilize the information and communication technologies in the 1960s. The utilization of e-commerce is one of the important perspectives for implementing information and communication technologies. E-commerce in the financial industry often refers to the utilization of the 'Net' and the services for additional communication, marketing and sales channels. In addition, the financial industry brings us several kinds of new businesses with the development of e-commerce.

3.3.2   Impact of E-Commerce in the Financial Industry

Information technology can offer the financial industry a much more competitive environment for its development. There is no limitation in time or space; the financial institutions can compete with national and multinational institutions as well. In addition, the Internet will bring a revolution in terms of marketing, business processes and communication. There are four kinds of impact e-commerce has in the financial industry.

● Marketing products to customers

With information technology, electronic banking can provide convenient services and new marketing channels for customers. Internet banking is one of the most important parts of electronic banking. The beauty of Internet banking lies in its low cost, convenience and availability. It enables banks and financial companies to offer services with the following qualities: 24-hour, seven days a-week availability, convenience, fast delivery, customer focus and personal service. With e-commerce, banks can reduce the time taken to approve mortgage applications from weeks to hours. In addition, financial institutions can make use of the Internet to provide financial information services and grasp financial news fast. Moreover, financial institutions can use the Internet to market their own products instead of using traditional media and print ads.

● New products and services

E-commerce represents business opportunities for banks to offer new products and services to serve the needs of e-commerce. E-commerce has created a demand for a low cost facility for micro payments. With credit cards, banks have developed electronic money and many online payment services such as online shopping, electronic payments, payroll agency services, and withholding public utilities to meet multi-layered customers' financial needs. Meanwhile, IC cards allow financial institutions to penetrate into various other fields of social life including medical insurance, taxes, vehicle refueling, road pricing and parking. Advanced network communication technologies link all kinds of financial networks into a unified network so that most intermediary businesses can be carried out by financial networks including securities trading, securities transfer,

bond trading, foreign exchange trading and foreign exchange settlement. Customers can use personal financial services and corporate finance advice with information processing technology and database technology. In addition, banks can provide customers with a variety of personalized consulting services and portfolio programs by analyzing customers' information. E-commerce allows financial institutions from single loan enterprises to comprehensive financial enterprises to offer a variety of financial products and services.

● Positive business environment for innovation in banking and finance

The new business environment associated with e-commerce represents an opportunity for re-structuring the banking and financial systems. As the capital market is assuming more and more the role of financing business ventures, banks have become less crucial as an intermediary between savers and investors. Together with the dangers associated with moral hazard, this forms a good reason for governments to withdraw the safety net from banks and set up an independent agency to operate on a totally secure basis the payment and transaction systems. Another potential impact is that central banks may find it more difficult to set interest rates, thereby giving up their important function in monetary policy.

● Strengthening financial supervision for government and financial institutions

In the background of e-commerce, all the capital flow is transferred in digital form. Different banks may use their own electronic money and support system. But all the systems are connected with each other. For example, all the banking system should connect with the UnionPay system for information exchange. In this way, all the bank's business credentials, instruments, management information are recorded and stored in digital form, which is hard to be lost on the network. Once the risk appears, banks can quickly find out the sources of the risk and control the risk. Due to the timeliness of the network, the system can in real-time monitor the capital flow to build a forewarning mechanism.

3.3.3 Finance Services in E-Commerce

● Internet banking

Internet banking consists of two models in concept. One is the agency concept which means the financial institution carrying out business on the Internet. The other is the business concept, meaning the financial services that financial institutions offer on the Internet. In general, we refer to the second concept. Banks provide account opening, account queries, account transfer, credit, online securities, investment banking and other traditional services, allowing customers to safely and easily manage their financial situation without going out. In a sense, Internet finance is also called a "virtual bank".

On Oct. 18, 1995, the first Internet bank was set up in America with only ten staff members at its website. In 1979, its bank savings totaled $400 million. In 2005, its Internet banking businesses accounted for nearly 50% of total banking businesses. In Europe, Internet bankers represented 37% of Internet users and online banking services attracted 18% of all European adults. The fast growth of

Internet banking is mostly because of its low cost. The operating cost of Internet banking is only 15% – 20% of operating revenue compared with 60% in traditional banking. In addition, the operating cost of Internet banking is far lower than the traditional bank. Meanwhile, the vocational department can find more potential consumers by utilizing the feedback messages and designing new financial goods according to the consumer's needs.

● Internet securities

Internet Securities mean that security companies offer customers new business services with the Internet as a medium. With the development of the market economy, people's investment perception has changed. More and more people are aware of investing money in the stock market. So many people trade in securities that lots of securities transactions cannot be well achieved. Also, many individual investors are on business trips so that they have difficult access to market information and the ability to trade stocks in a timely manner. Then investors suffer great economic losses. Therefore, with the further development of the Internet and e-commerce, an online security trading system is built. An online security trading system provides customers with an actual online stock trading environment, making trading easy. They can inquire and manage their accounts online through the Internet. The online securities trading system covers functions including stock trading, market information, security transfer, account balances, password changes and so on. The online securities trading system is composed of several different modules with the main task of collecting, collating and publishing market information and transaction details.

In America, the stock market is one of the transaction fields in which the application of e-commerce is the most popular. About 20% of orders are transferred via the Internet on the American stock market. At present, the Internet exchange is the most active stock sales department in China. Since 1994, China's stock exchange net has covered the whole country. Approximately 2600 sales departments of more than 300 stock companies are connected to each other. Its highest volume of transactions per day was more than 300 billion RMB.

● Internet insurance

Internet insurance is a new emerging insurance marketing model using the Internet as a medium. Different from traditional insurance agent marketing models, Internet insurance makes insurance enterprises and online insurance intermediaries available to support insurance management activities with Internet and e-commerce technology as a tool. Internet Insurance can cover the whole process, including insurance information consulting, insurance plan design, payment, underwriting, renewal of payments, claims and so on. For insured people, Internet insurance shortens the distance between insurance companies and customers. By the "help yourself" model of the Internet insurance service system, customers can acquire services they want conveniently and quickly. Meanwhile, the Internet insurance service system integrates a variety of insurance products so that customers can view detailed profiles of different products and find out the most suitable one. For insurance companies, Internet insurance can greatly reduce the operation costs by directly selling products and services online without intermediary agents such as brokers. Compared to traditional marketing methods,

selling insurance products online can save 58% – 71% of the cost.

With the coming of the information society, e-commerce has developed well in the United States, Western Europe and other developed countries. According to statistics, the American online insurance premium reached $390 million as early as 1997. In 2001, about $1.1 billion of insurance premium was earned through the online insurance system. In 2005, about 20% of insurance products in Britain were sold on the Internet. Japan already has the first online insurance company which completely conducts business via the Internet. As the world's biggest insurance and asset management group, AXA Group developed online insurance marketing as early as 1996. It can be seen that Internet insurance will be the development trend in insurance marketing.

Insurance websites in China appeared as early as 1997, but their main function is just limited to insurance consulting, products browsing, online complaints, online market investigation and customer portfolio management. Now there are three kinds of insurance websites in China, one for self-built websites to sell their own products such as Ping'an Insurance's[1] PAI8 and Taikang Life Insurance's[2] Taikang online; one for independent online insurance websites such as those which provide insurance products and services, without belonging to any insurance companies; the remaining one is for providing industry information without selling products. For most Chinese insurance websites, the understanding of Internet insurance is still at the trial stage. Just a few insurance companies have developed network marketing. The main functions of the Internet insurance system are just limited to insurance consulting, products browsing, online complaints, online market investigation and customer portfolio management. In addition, the variety of insurance products and Internet insurance business is lacking online interaction. The awareness of online insurance has not fostered customers. The safety of the Internet insurance system is also a big concern.

3.3.4   E-Commerce Application in the Financial Industry in China

The financial industry in China is in a transition period from electronization or semi- electronization to informationization. E-commerce has pushed the financial industry to develop Internet finance. More and more financial institutions have developed more and more financial products in the e-commerce field including the payment gateway, e-banking, information sharing, certificates of participation, fund trusteeship and trade financing. Those products greatly enlarged financial businesses and brought huge incomes to financial institutions. Meanwhile, those products further improve the development of e-commerce. They make

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[1] Ping'an Insurance, full name of Ping An Insurance (Group) Company of China Ltd., is a holding company whose subsidiaries mainly deal with insurance and financial services. The company was founded in 1988 and has its headquarters in Shenzhen.
[2] Taikang Life Insurance, full name of Taikang Life Insurance Corp., Ltd. sells life, annuity and health policies to consumers through 120 branch offices throughout China and has a network of over 150,000 independent agents. Taikang Life Insurance was founded in 1996 and is based in Beijing, China.

e-commerce change from a single information platform to integration of information flow, capital flow and material flow.

Electronic payment is one of the most mature businesses of financial institutions. In the beginning of e-commerce, all e-commerce platforms were used as the information release platform. As some e-commerce websites began to achieve online transactions, online payment became necessary. Without the support of online payment, the two parties to the transaction had to complete fund settlement at the bank counter, which resulted in the disjunction between the information flow and capital flow. So some commercial banks began to launch electronic payment products. Now, nearly all commercial banks in China have developed their own electronic payment products including C2C or B2C electronic payment products suitable for personal customers and corporate customers. These products connect with e-commerce websites through the gateway to provide online payment services. Now people can not only achieve online payment but also review the total process of online transactions. In addition, the central bank of China, the People's Bank of China, focuses on the establishment of the China National Advanced Payment System (CNAPS) which will achieve the inter-bank payments and settlement services. The establishment of CNAPS will further promote the development of electronic payment in China and narrow the gap between China and developed countries. In addition, some financial institutions cooperate with e-commerce websites to provide fund custody services. Many banks have developed special custody platforms for e-commerce trading capital to achieve the payment, settlement and custody of e-commerce capital.

For e-banking in China, a lot of banks have launched their own e-banking services, especially online banking. Online banking at China Merchant's Bank was established at the end of 1999 with the main subsystems of a personal banking system, online payment system, online securities system, online shopping system, etc. Up until June 2000, the number of clients of China Merchant's Bank's online banking had reached 10,078, and the total transaction amount had reached 170 billion RMB. In August 2000, China Merchant's Bank had its online banking system updated, adding new functions such as online financing, instant transfer and online letters of credit. China Construction Bank also developed an online banking system which would process 1.3 million dealings every day, and allow 50 thousand customers to visit it simultaneously. Bank of China's online banking system combined with 1 million "Great Wall Card" for a series of online services including online payment. The Industrial and Commercial Bank of China opened online banking services in 31 cities including Beijing, Tianjin, Shanghai and Guangzhou, providing 24-hour services [7]. Current services provided by domestic online banks are mainly B2C pattern. The B2C service pattern would serve as a basis for implementing the B2B and B2G pattern. B2B financial support services are also developing fast. Shanghai Pudong Development Bank has cooperated with Alibaba to develop the B2B business. Meanwhile, the government has implemented a series of projects such as the Golden Tax System, Golden Bridge System and Golden Gate Project. Now these projects have formed a certain network scale.

Although the stock market in China started late, the development is very fast. Now the transactions in the stock market are paperless and invisible. The settlement has become electronic and there are many kinds of entrustment measures. The modern network has connected banks, securities firms and the stock exchange as an organic whole to provide customers with multi-functional and comprehensive three-dimensional services. More than 200 securities firms have offered online transactions, especially in those developed regions such as the Yangtze River Delta area and Pearl River Delta area.

3.4 Manufacturing

The fast development of the Internet and e-commerce is affecting every industry, including the manufacturing industry. Besides online sales, the manufacturing industry makes use of e-commerce to expand businesses and offer friendly services to customers.

3.4.1 Manufacturing Industry and E-Commerce

The manufacturing industry is the leading industry of the national economy. E-commerce in the manufacturing industry adopts information technology in all aspects of business processes and forms an electronic business flow. Through e-commerce, the manufacturing industry can form a complete electronic business chain among suppliers, manufacturers, wholesalers, retailers and consumers. The problems of low efficiency and slow response to the market can be effectively solved as well as streamlining the productive process and reducing unnecessary procedures so that the manufacturing costs can be reduced and operational efficiency can be improved. As a result, enterprises in the manufacturing industry can earn more profit with better customer services as well as better competitive capabilities.

Most countries have discovered the benefits of e-commerce in the manufacturing industry and are promoting the development of e-commerce in that industry. The adopting of the Internet has expanded from online marketing to all the aspects of business processes including material purchases, product design, production, brand promotion, sales, after-sales services, financial management and customer relationship management.

From the perspective of the marketing environment of the manufacturing industry, the competition is transferring from product quality to competition in distribution capacity; from competition in the product alone to the brand, added value and marketing models; from competition in the investment scale to competition in human capital; and from competition among enterprises to competition among the supply chain alliances. The manufacturing industry remains in keen competition. Strengthening the implementation of e-commerce in

the manufacturing industry will play an important role in improving the competitiveness of manufacturing enterprises.

The main implementations of e-commerce in the manufacturing industry are as follows:

- E-procurement

Procurement is the starting point of all the production and operation activities. The quality, price, quantity and arrival schedule of materials purchased are directly related to all the aspects of business operations such as production, inventory and sales. The efficiency of procurement will have a direct impact on fund procurement and profitability. The specific role of e-procurement in the manufacturing industry is to publish the products, components, raw materials or services needed on the Internet at first, for suppliers to choose, and then to select the most proper supplier according to the information suppliers provide, and finally to place orders through electronic channels. In the entire process of e-procurement, there is less artificial intervention. The information transfer and contract signing both basically depend on the Internet to ensure fairness and efficiency.

- Digital design

Digital design in the manufacturing industry refers to designing the product via the Internet by cooperating with customers and allied enterprises based on traditional product design. There are two concepts of digital design. One is the participation of customers in the design process.

Digital design will allow customers to participate, which makes it easy for customers and designers to communicate with each other so that the product can better meet customer demands. The other is to strengthen cooperation with allied enterprises in the design process. Allied enterprises with core advantages cooperate and share information with each other to realize a win-win situation.

- Mass customization

With greater and greater implementation of the Internet in the manufacturing industry, traditional production on a big scale is gradually replaced by mass customized production. Mass customization refers to combining standardized components to form the product which can meet customer demands to the maximum degree based on information technology. It is different to traditional customization because mass customization is based on the scale of production. Digital mass customization will not offer enterprises unlimited choices but an acceptable number of compound modes. Through e-commerce, manufacturing enterprises combine thousands of standardized components and systematically manage complicated manufacturing processes at the same time. As e-commerce becomes more and more popular, digital mass customization becomes simpler and more feasible. Enterprises can build a database to record all kinds of data and make real-time communication with customers on the Internet. After getting the customer's request, the information can effectively be transferred to other aspects of the business processes so that other departments can respond to the customer demand in a timely fashion.

3.4.2 Necessity of Adopting E-Commerce in the Manufacturing Industry in China

The financial crisis which started in 2007 swept the world and China, called the world's factory, was inevitably affected. Many Chinese manufacturers were hard hit by the financial crisis with less orders and more inventory, which led to losses, even bankruptcy. Since the financial crisis has passed, the economy is gradually recovering. However, the market in the manufacturing industry has greatly changed. The appreciation of the RMB, the change in the exchange rate, the increasing labor costs, expensive raw materials, the requirements of a low carbon economy and so on, all result in cost inflation and the decline in competitiveness.

Since 2009, China has adjusted the industrial policy and reduced the export tax rebates as well as other adjustments in the import and export tariffs, import and export trade management and so on. China is gradually transferring from focusing on exports to a balance between exports and imports. For most manufacturers, the long-term low price policy makes the export tax rebate an important source of profits. The change in industrial policy will improve the earning ability of manufacturing enterprises. Meanwhile, with the implementation of the *Labor Contract Law*, the labor costs have increased. Because most manufacturers in China do not have access to independent technological development and research, the added-value content of products is low. Once the labor cost increases, there is little competitiveness for manufacturers in China. Moreover, the appreciation of the RMB will increase the RMB-denominated product costs and reduce the profits. However, foreign manufacturers can adjust the product price according to the cost advantages of high-level technology and the exchange rate. In addition, the change in the environmental policy makes manufacturing enterprises change their business model to improve profitability.

In a word, it is necessary to reduce costs. Formerly, enterprises reduced costs through reducing the material costs and labor costs. However, these methods cannot work well now. In addition, there are always a number of negative impacts such as low product quality and employee dissatisfaction. So reducing the costs should focus on the management of the logistics, circulation and inventory by advanced management and technological innovation to improve the profitability. Moreover, producing to demand is the development trend of manufacturing enterprises. If enterprises can produce according to the demand, there will be little inventory so that the costs can be reduced. However, producing to demand requires that enterprises can quickly respond to the market and improve business channels.

Above all, manufacturers in China cannot use the traditional operational model but should pay more attention to the scientific method. Producing to demand should be the target for enterprises as well as meeting individual requirements. E-commerce can help manufacturers achieve the transformation of the business model. Compared with the traditional business model, e-commerce has great advantages. First of all, e-commerce can enhance traditional linkages between supply chain participants. Taking e-procurement as an example, it replaces traditional procurement processes. Most of the procurement processes can be

conducted in an electronic form which is faster and more convenient. In addition, e-commerce can streamline internal processes to reduce costs and improve productivity. Through proper management, e-commerce can even achieve forecasting ability and decision analysis. E-commerce can help enterprises decide what, where or how many materials to purchase, so that enterprises will realize production according to demand. Moreover, e-commerce co-ordinates internal systems with the external electronic environment by increasing the availability of information, potentially reshaping the market.

3.4.3   E-Commerce Strategy of China's Manufacturing Industry

With a lot of advantages, e-commerce has a great impact on manufacturing industry. When e-commerce surged, some countries discovered the advantages of e-commerce and took the lead in adopting e-commerce in the manufacturing industry. Three automakers in the United States all have joined the implementation of e-commerce. The General Electric Company has set up a general information service company to provide various kinds of services related to e-commerce. Its manufacturing departments have adopted e-commerce to reduce the cost of buying and selling so as to achieve timely business processes, reduce inventory and provide higher quality services. But the implementation of e-commerce in China's manufacturing industry is still at an early stage. There is a great gap between China and other advanced countries. There are a series of problems in the process of implementing e-commerce in the manufacturing industry as follows:

(1) The governance structure of most manufacturers in China is irrational. Most managers do not care about strategy and do not realize the importance of e-commerce. So it is necessary to reform the structure, especially for those state-owned enterprises. We must educate these managers so as to realize the advantages of e-commerce.

(2) Low level management system. In the previous market environment there was little competitive pressure and most employees did not have a strong market sense. In addition, the pyramid management system of traditional manufacturing enterprises makes internal information transfer slow which cannot meet the real-time response of e-commerce. Moreover, traditional manufacturing enterprises prefer on-the-spot investigation and communication face to face which results in a situation of high sales but low profit. All of this will prevent the development of e-commerce in China's manufacturing enterprises.

(3) Lack of management and technical talents. Although China has implemented the policy of reform and opening up for more than thirty years and established a socialist market economy system, there is still a huge gap between the supply of competent human resources and economic development. Cultivating qualified managers and technical staff related to e-commerce is necessary.

(4) Backward manufacturing technology. The coverage of CAD technology in China's manufacturing industry is very low. Without advanced design technology, the manufacturing industry in China will remain at an early stage of automation.

(5) Backward information technology. The manufacturing enterprises in developed countries have widely adopted computer networking technology to improve internal communication and operational efficiency since the 1980s. But most manufacturers in China do not invest enough in information technology. The investment in information technology in China's manufacturing industry accounted for less than 2% of the total annual investment in 2005.

Above all, there are still a number of problems that should be solved to promote the development of e-commerce in China's manufacturing industry. Therefore, China has formulated the following e-commerce strategy to quicken the development of e-commerce in China's manufacturing industry.

(6) Comprehensively promote informationization: The manufacturing enterprises should rethink their own organizational structure and management model, and conduct reform to adapt to the development of e-commerce. In addition, the manufacturing enterprises should pay more attention to enhancing internal production process and management processes by information technology.

(7) Strengthen the development of human resources: When manufacturing enterprises bring in advanced technology, they should also pay more attention on the development of human resources. Staff training should earn widespread respect, to establish a good incentive and restraint mechanism to keep strictly to the rules for reward and punishment. In addition, enterprises can make use of the information systems to assist the supervision and help employees do creative work.

(8) Promote the combination of e-commerce and a modern manufacturing model which is the effective measure to stay competitive in the contemporary market: First, optimize the supply chain. Manufacturing enterprises should optimize their internal business process and strengthen electronic management of the supply chain. For this, manufacturing enterprises should establish a proper supply chain management system to connect all the processes such as human resources management, inventory management, delivery management and sales management together. Moreover a modern logistics system should be established to achieve informationization and automation.

(9) Get more support from the government: The government will develop pilot projects for e-commerce in the manufacturing industry and support representative enterprises to develop e-commerce. In addition, the government should play a leading role in higher education. For example, colleges and universities should offer courses related to e-commerce and cultivate a number of e-commerce talents to support the development of e-commerce in the manufacturing industry.

Informationization is the development trend in China's manufacturing industry. China should insist on its e-commerce strategy in the manufacturing industry and pay more attention to personnel training, government support and informatization construction. As a mainstay in the industrial structure of China, it is the duty of manufacturing industry to step forward in the national industrial reform process. Manufacturing enterprises should show initiative to optimize the business process and quicken the implementation of e-commerce to enhance the core competitiveness of China's manufacturing industry.

3.4.4   Snapshot and Foresight of E-Commerce in China's Manufacturing Industry

Since the reform and opening-up, China has made remarkable achievements in the manufacturing industry. After fifty years of development, China's manufacturing industry has become an important part of the national economy, which has created more than 1/3 of state revenue. China's total manufacturing output covers over 1/3 of GDP and about 4/5 of total industrial output value[8]. In 2008, China's industrial added-value reached 12.91 trillion RMB, with an increase of 9.5% over 2007. The annual industrial added-value in 2009 was 13.5 trillion RMB with an annual growth rate of 8.3%. The growth of China's industrial value-added output was up 13.4% in July year-on-year, with all 39 industries year-on-year growing. For manufacturing industry, general equipment manufacturing climbed 21.0%, transportation equipment manufacturing climbed 15.9%, electrical machinery and equipment manufacturing climbed 18.9% and electronic equipment manufacturing climbed 13.8% [9].

After China's accession to the WTO, especially after the new round of international industrial restructuring, many multinational corporations from developed countries transferred their manufacturing projects and production lines to China, which has brought a lot of opportunities and challenges to China's manufacturing industry at the same time. China is endeavoring to step from a manufacturing country to a manufacturing power. Manufacturing industry needs to drive forward China's economy as a great force. Therefore, in order to improve the adaptability and competitiveness of the market, manufacturers have made various efforts. Thanks to the favorable relevant policy, economic, social and technological environments, Chinese manufacturing enterprises have built up a strong awareness of e-commerce's advantages, like low-cost and high efficiency. Manufacturing enterprises have increased the degree of concern and invested more in e-commerce than before. Accelerating the development and application of e-commerce has become an important way to develop manufacturing industry in recent years.

At present, manufacturing e-commerce in China is proceeding in an orderly manner. In 2004, the National Informatization Evaluation Center (NIEC) published the *iPower500 (2004)*. There are over 400 manufacturing enterprises among these top 500 informatization powers. This ratio declares manufacturing informatization to be the main theme of China's enterprise informatization construction. The 400 enterprises cover iron and steel, automobiles, petrochemicals, electronic appliances, food and drink, apparel, pharmaceuticals, tobacco and other industries, which are mainly super-large-scale or large-scale manufacturing enterprises. In *iPower500 (2008)*, the proportion of manufacturing enterprises is still as high as 58.7%. The overall informatization level of enterprises selected in 2008 was remarkably improved and the average level was obviously better than that of 2007, with 34.5% reaching the level of moderately developed countries and 6.4% leading the whole world [10]. In the "Eleventh Five-Year" period, a total amount of over 10 billion RMB has been invested in informatization projects from the central government, local governments and

manufacturing enterprises [11].

Baosteel, First Auto Works Group (FAW) and SAIC Group, as the representatives of large-scale manufacturing enterprises, have already used third-party e-commerce platforms to conduct online transactions, built their own e-commerce sites and set up e-commerce companies specializing in e-commerce transactions. These efforts have played a positive role in the overall promotion of China's manufacturing e-commerce industry [12]. In the appliance industry, Haier Group, Chunlan Group, Konka Group, TCL Group and other companies have also opened online sales for some products.

China's manufacturing industry has made considerable progress in informatization construction through government support, marketing guidance, as well as enterprises' own efforts. The vast majority of manufacturing companies have implemented the informatization projects in varying degrees, laying a good foundation for the further application of e-commerce. In 2007, China's manufacturing e-commerce market reached 949.6 billion RMB, with a year-on-year increase of 34.9%[12]. The performance of manufacturing e-commerce can be considered as a model in the practice of integrating industry with information technology. In addition, China has established the Made in China Association (MICA) to help manufacturing enterprises develop e-commerce, especially for those small and medium sized enterprises. The MICA has built up goodwill with other international organizations in the United States, Germany, Russia, Canada, India and Qatar. Now the MICA has helped 40 million enterprises go abroad and transform from products made in China to products created in China.

In general, China's manufacturing industry still uses a relatively low degree of information technology: only a minority of companies have implemented ERP, or just use the Internet to carry out business information interaction. Manufacturing industry stands at an early stage of e-commerce applications. The e-commerce application level is still waiting to be improved. In the next 20 years, it will be difficult to push China forwards to become a manufacturing power if China continues taking the traditional low-end development model based on low-cost expansion and simple value-added labor. China must speed up the upgrading, adjustment and transformation of the industrial structure and the elimination of a backward production capacity. This adjustment process not only depends on the survival orientation of enterprises, but also is often accompanied by incoming enterprises' relocation, product changes and transformation, involving several issues including the development, innovation, transfer and grafting of new technologies, the introduction of innovative talents, the transfer of remaining labor, the output and placement of redundant employees. All the above issues need the lead and support of information technologies and e-commerce [13].

The industrial market shows that the relatively isolation of manufacturing and e-commerce will soon be significantly changed. Both central and local governments have formulated related policies and planning to practice e-commerce in manufacturing industry. Additionally, many manufacturers have also developed ambitious plans to turn e-commerce into their primary trading platform.
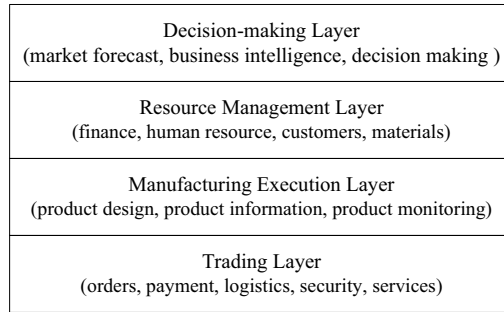
It is reported that in the "Twelfth Five-Year Plan" period, manufacturing

informatization will be carried out around the strategic mission that was expressed in the Fifth Plenum of the 17th Central Committee of the Communist Party of China: to transform and upgrade manufacturing industry, to cultivate and develop strategic new industries and to accelerate the development of service industries. Manufacturing informatization is aimed at promoting the deep integration of information technology and industrialization, taking "service" as a symbol, "synergism" as a starting point. Specifically, there are five focused points: to foster central government-led manufacturing enterprises, local key manufacturers and key manufacturers in specialty industries into becoming digital, service-oriented, high-end manufacturers; build service platforms for the SME market; train information technology service providers for software companies and system integrators; break through core technologies in manufacturing services and establish a long-term mechanism [11].

On December 17, 2010, Shanghai Municipal Party Committee determined the seven highlighted areas of e-commerce development during the "Twelfth Five-Year Plan" period, namely manufacturing, commerce and trade, international trade, tourism, finance, logistics and agriculture. In future, manufacturing industry will focus on driving the optimization and upgrading of traditional manufacturing industry and producer services by the application of e-commerce, improving the overall level of e-commerce applications based on the industrial chain [14].

3.4.5   A Technical Perspective: E-Commerce Solution for Manufacturing Industry

For enterprises, e-commerce involves all aspects of the business process and the overall industrial chain. It has made manufacturers, suppliers and customers establish closer partnerships. In general, e-commerce takes control of three kinds of flows: information flow, capital flow and material flow. The information flow refers to specific information related to business activities, including marketing information, commodity information, production information and services information. The capital flow refers to the money movements between the enterprise itself and its suppliers, customers and other partners. The money here does not mean commodity money but electronic money. The material flow refers to the physical transfer of materials. According to management responsibility, the e-commerce system of a manufacturing enterprise can be divided into four layers: decision-making layer, resource management layer, manufacturing execution layer and trading layer (Fig. 3.6). The decision-making layer can be achieved by technologies such as data mining, data warehousing and online analysis. The resource management layer can get support from Enterprise Resource Planning (ERP). All kinds of control systems can support the manufacturing process. Meanwhile, Customer Relationship Management (CRM) and Supply Chain Management (SCM) can manage the relationship with customers and suppliers to improve the trading process. Each level can be further subdivided into different parts according to different manufacturing enterprises.

Decision-making Layer
(market forecast, business intelligence, decision making)
Resource Management Layer
(finance, human resource, customers, materials)
Manufacturing Execution Layer
(product design, product information, product monitoring)
Trading Layer
(orders, payment, logistics, security, services)

Fig. 3.6   Four layers of the e-commerce system

There are some important parts of the e-commerce solution (Fig. 3.7) which should be paid more attention to:

● E-commerce and Business Information System (BIS)

The Business Information System (BIS) is the carrier of business activities. E-commerce makes all business processes electronic so that a powerful information system is necessary in the development of e-commerce. According to business activities, the BIS can be divided into different kinds of subsystems such as the Electronic Order System (EOS), CRM, SCM, BIS and so on. All the subsystems are connected by the EDI system. Through the portal, customers can place an order online and review the situation of the order anytime he/she wants. Meanwhile, the CRM can help manufacturers keep a good relationship with customers to maintain a stable development for manufacturers. As for suppliers, enterprises can achieve e-procurement through the portal to choose proper suppliers, purchase materials and keep a good relationship with suppliers making use of SCM. It can be seen that BIS goes through the supply chain. In addition, executives can make decisions by analyzing the data and information with the help of the Business Intelligent System.

● E-commerce and logistics platform

Logistics is one of the most important parts of e-commerce. The whole transaction will not finish until the goods are transported to customers. This part should be completed by the logistics system. Better and quicker logistics services can increase customer loyalty and reduce the inventory so that the cost can be further reduced and revenues will be increased because more and more customers prefer purchasing the goods of this brand. It can be seen that logistics is not only about transferring goods but also has great impact on commodity management.

In the logistics, the warehousing and delivery are the two indispensable parts. The delivery requires fast and professional services. Meanwhile zero inventory is the goal of modern warehousing management. Both of them can be achieved by the implementation of e-commerce. Through e-commerce, manufacturers can understand the situation of the sales, inventory, orders and settlement in real time so that manufacturers can make proper production quantities to reduce the inventory. Meanwhile, manufacturers can well understand the inventory situation of each warehouse so that they can make effective scheduling even if the inventory cannot meet the demand.
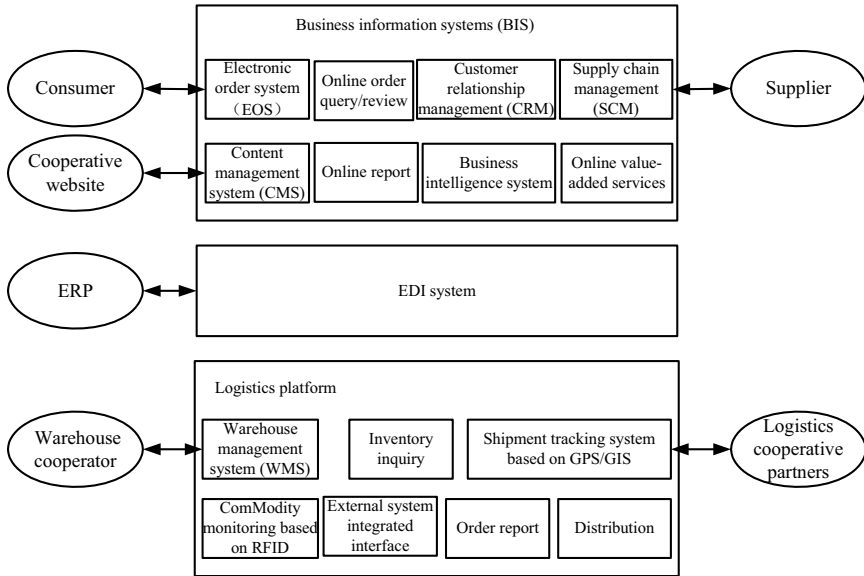
Fig. 3.7   E-commerce solution for the manufacturing enterprise

Besides the construction of an e-commerce system, it is worthwhile for manufacturers to pay more attention to reforming the business flow. Many actions that were carried out by employees can be automatically conducted by the e-commerce system. In this way, e-commerce makes the organizational structure flat. So it is necessary for manufacturers to use the Business Process Re-Engineering (BPR), including staff restructuring, business process re-engineering, corporate culture reform and so on. Manufacturers should carefully distinguish the responsibility of each employee to make him/her respond in time to the market change.

3.5   Textiles and Apparel

The textile industry (known colloquially in the United Kingdom and Australia as the rag trade) is a term used for industries primarily concerned with the design or manufacture of clothing as well as the distribution and use of textiles [15].

3.5.1   Textiles in China

The textile industry, playing a pivotal role both in China's national economy and world trade, is an important traditional industry, highly labor-intensive and with

great dependence on foreign trade. China is the world's largest producer and exporter of textiles and garments. Exports of cotton yarn, cotton cloth, woollen cloth, silk, chemical fibers, clothing and apparel all rank first in world production. The continued and steady growth of textiles and apparel for export is important for the guarantee of our foreign exchange reserves, balance of payments, the stability of the RMB exchange rate, the solution of employment and the sustainable development of the textile industry. Research into the structure of Chinese GDP shows that domestic clothing consumption accounts for about 49% of GDP, among which urban and rural areas account for 10.77% and 5.9%, respectively. The country's trade surplus accounted for 29% of GDP, of which the textile trade surplus accounted for 60%. From 2001 to 2008, 83% of the country's trade surplus of goods was created by the textile industry.

For people's livelihood, the textile industry is related to tens of millions of jobs. As a labor-intensive industry, the textile industry has a very long industrial chain, from cotton to clothing, home textiles to industrial textiles. This chain absorbs 20 million jobs and 80% of them are migrant workers. The raw materials required for the textile industry like cotton, wool, silk and hemp all belong to agricultural products, which are related to 100 million farmers' livelihoods.

In respect of exports, China's textile exports increased sharply from 4% in 1980, to 30% in 2009. As for trade methods, the Chinese brands are beginning to be influential after years of effort, with the proportion of the processing trade getting smaller and that of the general trade increasing. In the industry exhibition held in March 2009, there were 777 domestic brands against 224 foreign ones among a total of 1001, out of which 29% were China's homemade brands. By 2009, 40% of the population in developed countries bought Chinese brands, which marked an important progress in China's textile industry, and also showed the international competitiveness of China in this industry.

At present, China's textile industry has entered a new stage of development. It is a significant task in the current textile industry's development to make strategic adjustments to the product structure, to accelerate fundamental change in the industrial growth method, and to improve international competitiveness. To achieve this strategy, it is very necessary to promote e-commerce in the textile industry.

Early in the "China International Textile and Apparel Logistics and E-Commerce Summit 2005" (September 20th, 2005, Wuxi, China), Song Ling, Chairman of China Electronic Commerce Association, said in her speech, "For a long time, the textile industry was regarded as a labor-intensive traditional industry, relying on resources and labor advantages to attract international attention. Since the start of the 21st century and WTO membership, the original superiority alone cannot meet the demands of cutting costs and maximizing profit in the modern business. It becomes not only an objective requirement that we implement the Scientific Outlook on Development to promote e-commerce, but also an inevitable choice to cope with the challenges of economic globalization, to seize the initiative in development and to improve international competitiveness".

3.5.2   E-Commerce in Textiles

From the development point of view, electronic commerce services have undergone a total of four stages. The first point to point connected network EDI was not able to provide community-based interactive communication, and EDI standards are very complex and expensive to build and run. The second stage is named a basic e-commerce system. Corporate-self-built e-commerce sites are mainly used for releasing information and a few of them may have transaction capabilities. The third stage is the e-commerce community. At this stage all trading partners are gathered in a public community through a third party, in which buyers and sellers will make transactions once supply and demand matches each other. The fourth stage is the stage of cooperative business. Based on the third stage, it adds support to other business processes before, during and after the whole transaction period.

Textile E-Commerce is the general term for all textile business on the Internet [16]. Supported by the network, Textile E-Commerce realizes information exchange, commodities trading and services, payments and fund transfers and other business behavior through digital communication. This triggers a far-reaching revolution in the textile industry. With the popularity of e-commerce, there are more and more e-commerce sites in the domestic and international textile and apparel industry. Currently there are many relatively successful professional websites like *apparel-key.com*, *etexx.com*, *textilesolmion.com* of Sweden etc., and large-scale comprehensive sites such as the world's first textile trading site *itextile.com*.

To promote the textile industry's e-commerce process, certain principles should be followed.

(1) Principle of systematization: E-commerce is an integral part of the textile enterprise information system. So in the process of promoting e-commerce, the principle of systematization should be implemented while determining the objectives, content, methods, plans and progress.

(2) Principle of coordination: Textile enterprises should coordinate all kinds of technical work while promoting e-commerce, especially making full use of information technology resources such as ERP, MIS, CAD, CAPP, CAM systems. Only in this way can corporate information systems play the overall advantage.

(3) Principle of sharing: The purpose of promoting e-commerce is to help an enterprise improve the overall profitability, shorten the time for business decisions and enhance the competitiveness. All of these depend on the coordinated use of information resources that is sharing of information resources.

Limited by the industrial characteristics, geography, race, culture and other factors, information in the traditional textile industry cannot be shared completely. Information on production and sales were separated from each other. It is difficult for inflexible sales methods to adapt to rapid changes in market situation; at the same time, fixed marketing channels impose restrictions on the involvement in strange and new product areas, limiting the ability of retailers to open a broader market. The implementation of textile e-commerce can solve the above shortcomings. It will drive the rapid development of the textile industry, form a new technical growth point, change the traditional management model, improve

the operational efficiency and strain rate, increase the market share, and enhance the core competitiveness of enterprises.

Members on the textile supply chain include: raw material suppliers, product manufacturers, product distributors and enterprises. The running situation of the supply chain determines the interests of all enterprises in the chain. Wang Yue, a Chinese scholar, believes that e-commerce works throughout supply chain management, and brought changes into the supply chain that enables enterprises to reduce transaction costs, shorten order cycles and improve information management and decision-making. Due to enhancement of quality, cost and speed of response, both businesses and competitiveness are improved. Therefore, promoting e-commerce in the textile industry develops an e-commerce supply chain management model that can help enterprises create a smooth information flow among customers, enterprises themselves and suppliers. Compared to traditional business activities, textile e-commerce has the following advantages:

(1) Produces a more effective organizational management mode for enterprises

The traditional management in textile enterprises is level-style management mode, namely the superior take charge of the subordinate, and the subordinate takes charge of the workers. Under this pyramid-style management mode, information transmits very slowly and inefficiently. In addition, once the original information goes wrong, the cost to correct it will be very high. Moreover, the level-style management mode involved too many human factors, which is harmful for staff's motivation and creativity. All these problems in management can be avoided through e-commerce.

(2) Decreases transaction costs

Through network marketing activities, textile enterprises can improve their marketing efficiency and reduce marketing costs. According to statistics, advertising on the Internet can increase sales volume 10 times, with a cost of only 1/10 of traditional advertising. At the same time, e-commerce can reduce procurement costs, since enterprises can look for the best price in the global market through the Internet and, through the sharing of information with suppliers, enterprises can reduce losses in intermediate links. Some data indicate that enterprises which are using EDI can save procurement generally by 5% – 10%.

(3) Reduces inventory

Textile fabrics are highly limited by season and trends. Whether enterprises can keep up with trends in the textile market is the most important aspect of textile marketing. It is inevitable for textile enterprises to produce a certain amount of inventory through the whole production cycle from raw materials to finished products. The root cause of inventory is blocked information. IT-based e-commerce can change the situation caused by information inaccuracy and untimely delivery in textile business decisions. It shortens the response time for requirements and market changes and quickens the feedback. Through the Internet we can quickly understand the trends of the international market, pass the market demand to the enterprise for decision-making production as soon as possible and meanwhile send the demand from enterprises to the supplier for real-time implementation and zero inventory, to improve operational quality and efficiency.

(4) Shortens the production cycle

A textile production cycle is often of long duration and slow growth. A textile business results from mutual cooperation, so the design, development, production and marketing of textiles involve many affiliate enterprises. But in the past, enterprises had no convenient way of transmitting information to each other. They had to work in a multistage cooperation mode although they never wanted that. E-commerce transforms the old mode by sharing information in a parallel manner, thereby reducing the waiting time caused by the delayed information.

(5) Facilitates information dissemination and increases business opportunities

The traditional textile trade is limited by time and space constraints, while Internet-based textile e-commerce is without any restrictions such as borders, time and place. The textile business can be conducted online in areas in which traditional marketing and advertising promotions seldom reach. Much information can be spread online at low cost and can be easily updated. Enterprises publish corporate image videos, new product introductions, supply and demand information, recruitment information and technology transfer information, etc. through the e-commerce web, which overcome the drawback of traditional information exchange to a large degree, and create better trade efficiency.

(6) Reducing the dependence on materials and intermediate links and activity leads to greatly improved economic benefits for the textile business

The traditional textile industry operates based on certain materials like shop decoration, shop assistant training, and so on. But for online virtual enterprises, such as establishing a web textile city, little physical infrastructure is needed. Transactions run from business to business or from a merchant directly to the customer, eliminating a lot of intermediate links and saving many intermediate costs. Once these costs are invested in consumers, both the credibility and visibility of an enterprise will be enhanced.

(7) Improving the quality of customer management

There are still some environmental constraints on the textile industry to fully implement e-commerce, such as legal security of e-commerce, network security, online credit problems, professional problems, etc. But it is truly possible to improve the quality of customer relationship management through e-commerce systems. In e-commerce systems, you can easily check the demands for service, shorten the response time for customer service, so as to improve the relationship with customers and attract more customers into the supply chain.

(8) Improving the efficiency of logistics and distribution

Logistics is an essential part of purchase, manufacturing, distribution processes. An e-commerce solution for logistics will build a smooth networked logistics and distribution access, which fully co-ordinates distribution tasks, helps to achieve an efficient logistics management process, to effectively integrate and deal with logistics-related resources and data, and improve the timeliness and traceability of the logistics.

3.5.3 Current Situation of China's Textile E-Commerce

Generally speaking, China's textile e-commerce started late and developed at a low level. In most cases textile e-commerce is only used for discussing whether some technical means and standards are mature and reliable, rather than for practical applications. The development of textile e-commerce is only 0.23% that of the U.S. Taking into account the important position of the textile industry in China's national economy, it has been committed to reform and revitalize this industry.

In recent years, breakthroughs in state-owned enterprise reform have been basically completed in China's textile industry, with the focus turned to technical progress and industrial upgrading. The government proposed to speed up the information technology construction of textile enterprises, and to improve international competitiveness and the e-commerce level. Up to now, there have been tens of thousands of textile enterprises involved in e-commerce, which marks the entrance to a new phase of China's textile e-commerce. The Ministry of Information Industry has officially decided to use the textile industry as a pilot for improving traditional industrial automation and network level. Additionally, the following preliminary achievements were mentioned simultaneously as the goal: ERP (Enterprise Resources Planning) management systems were promoted and applied in 200 key companies around the country; textile e-commerce construction was accelerated to lay the foundation for a uniform industrial information system; the sum total of textile e-commerce trade reached 40 billion RMB in 3 years; more capital was invested in China's textile information net.

In order to analyze the current situation of e-commerce in China's textile industry, we explain it from the aspects of quantity, category and total trade.

(1) Number of e-commerce websites in the textile industry

According to an online survey, *textile.com.cn* had collected the business directories of over 100,000 domestic and foreign textile and related enterprises by the end of 2010. By entering "textile", 1,403,873 textile sites can be retrieved. Classified by categories, there are 61,564 cotton-textile sites, 1,267,306 apparel ones, 85,819 non-woven ones, 284,735 chemical fiber sites, 220,959 textile printing sites, as well as a collection of textile colleges, research institute sites and leather sites. The amount of domestic textile news by searching on www.sina.com.cn reached 303,698; the total number of domestic textile e-commerce websites and related web pages were up to 324,928 and 11,007,327 on *www.sohu.com* and 13,200,076 and 39,004,637 on Yahoo! China respectively. The statistics provided by Google were 1,450,000 sites for China's textile industry, and 35,900,000 pages (Table 3.2).

Table 3.2 Statistics of textile websites and webpages (2010.12)

Key words	Searching platform		
	Sohu	Yahoo! China	Google
Related textile websites	324,928	13,200,076	1,450,000
Related textile webpages	11,007,327	39,004,637	35,900,000

At the international textile exhibition held in 2000, in Shanghai, 95% of foreign enterprises introduced their own websites and e-mail addresses. In contrast, only a minority of domestic companies did this. It is easy to conclude from the comparison between the year 2000 and 2010 that benefiting from the rapid development of the Internet, along with all types of textile e-commerce websites, China's textile e-commerce has rapidly developed.

(2) Classification of textile e-commerce websites

There are many classification methods for textile e-commerce sites. According to its content, business model, purpose of establishment and focus, these sites can be divided into two categories: transactional sites and non-transactional ones.

Transactional websites' main objective is to promote a deal between suppliers and wholesalers, and thus to achieve business marketing. These kinds of sites, including comprehensive portal, textile industry sites and textile enterprise sites, become the platform of information exchange between suppliers and wholesalers, whose clients are enterprises. By May 17th, 2002, the transactional websites' profitability was *efiber.cn* 300 million, *texnet.com.cn* 100 million, and *efu.com.cn* 60 million RMB respectively. These sites have already been the main driving force of the textile industry to e-commerce, and are still developing fast.

As mentioned above, transactional websites can be further divided into comprehensive portal, textile industry sites and textile enterprise sites.

● Most of the comprehensive portals were founded by domestic authoritative organizations, adopting paid or unpaid membership systems. The main focus of these sites include e-commerce, professional search engines, online enterprise communities and dynamic industrial news channels, to provide a far-reaching capability for information retrieval, information exchange and information transmission. The sites develop a B2B business model to collect the enterprise's registration, and provide online presentation services, whose main purpose is business marketing. Currently, such sites are most active on the Internet and are very popular. One example is China Textile Information Center (*ctic.org.cn*), which is one of the domestic organizations with advanced technology.

● Textile industry websites are divided into cotton, wool textiles, hemp textiles, silk textiles, chemical fiber, knitting, textile raw materials, textile fabrics, household textiles, textile machinery, and other industry sites. Typical sites include *www.cncotton.com*, *www.cblfta.org.cn*, *www.chinafashion.com* and *dye.onchin-mnet*. Each of such sites is generally related to a specific industry, and distributes information in a special area, or provides service for enterprises in such an area, with a significant service industry connotation.

● Most websites of textile companies mainly focus on displaying enterprise images, without online transactions except for a few individual enterprises. For reasons of consciousness, personnel or cost, the sites are usually cooperatively established by both textile enterprises and IT companies, while maintained and updated by IT companies, with very low frequency.

Non-transactional websites include Science & Technology ones, textile colleges, and some other sites were established by individuals. Such sites are aimed at communicating textile technologies and promoting textile culture, with much attention from professionals.

● Science & Technology sites are such as *bbs.texindex.com.cn* and *texleader.com.cn*. Most of them were established by former textile research institutes and literature collection agencies, and rely on some leading journal in the industry. A wealth of information is provided by the sites, which provide an effective approach to industry news.

● Textile college websites, such as Donghua University (*www.dhu.edu.cn*), Wuhan Textile University (*www.wist.edu.cn*) and Tianjin Polytechnic University (*www.tjpu.edu.cn*), provide one of the infrastructures constructed and developed by colleges, and make up the main support environment for promoting teaching and research in China. With the development of informatization, textile college sites draw extensive attention not only from educators but all areas of the textile industry. The college sites often lead research trends, and thus have strong vitality.

(3) Distribution and e-commerce transactions of the textile and apparel industry

In August 19, 2009, "*Blue Book of Information: Information Analysis and Forecasts in China (2010)*" released in Beijing. The Blue Book noted that the Chinese e-commerce transactions in 2009 amounted to 3.85 trillion RMB, with those of the textile and apparel industry at the top. The top 10 industries were textiles and apparel, digital household appliances, steel and mechanical industry, chemicals and pharmaceuticals, building materials, agriculture and forestry, hardware, packaging and printing, the food industry, gifts and jewelry. Among them, the textile and apparel industry and digital household appliances account for the largest share, respectively up to 14.3% and 10.4%. On August 5, 2010, China Electronic Commerce Research Center released the "*2010 (I) Chinese E-Commerce Market Data Monitoring Report*", which supported detailed data monitoring of domestic industry dynamics for the first half of 2010, and did a more systematic   inventory and looked at future trends in all e-commerce areas. According to the China Electronic Commerce Research Center's data, the top ten industries in e-commerce areas were textiles and clothing (12.20%), digital household appliances (10.30%), steel and machinery industry (7.25%), building materials (7.00%), farming, forestry and husbandry (6.38%), hardware tools (5.89%), chemicals and pharmaceuticals (5.30%), packaging and printing (4.89%), food (4.38%), gifts and jewelry (3.56%).

According to the "*Research Report on 2009-2010 China Garment B2C Online Shopping Market*" issued by *iResearch*, in 2009 the scale of China's online shopping transactions reached 30.87 billion RMB, an increase of 81.5%. Among them, B2C transactions for clothing reached 2.4 billion RMB, which accounted for 7.8% of the transaction size for online clothes shopping, increasing by 99.8%. And it grew faster than overall online clothes shopping. *iResearch* predicted that in the next three years B2C would continue to maintain high growth and was expected to exceed 18.0 billion RMB in 2012.

In the first half of 2009, China's online shoppers for apparel reached 80 million, while the number of Internet users in China reached 338 million. Apparel is one of the daily consumer necessities, and is ranked in the forefront of required commercial goods. So the potential for online apparel purchase is huge. According to a report, the proportion of online apparel shopping in the retail market would be

close to 17% by 2012.

The above analysis enables us to realize China's potential for e-commerce development in the textile industry, but at the same time problems still remain in developing e-commerce in China's textile industry.

(1) Lack of awareness of e-commerce and backward concepts: Some of the domestic business decision-makers do not fully recognize the necessity and urgency of seizing the virtual market in the era of a knowledge economy, and some even misunderstand e-commerce thoroughly, and consider e-commerce equal to electronic trading. These misconceptions have seriously affected the development of e-commerce in the textile industry.

(2) Inefficient management: one important prerequisite of applying e-commerce in textile enterprises is the appropriate management level of these enterprises. Currently, most domestic textile enterprises suffer from low informatization, in which the distribution of enterprise resources is most subjective and arbitrary. There exists no scientific management system, which has been an obstruction in the development of e-commerce.

(3) Insufficient e-commerce personnel and investment: on the one hand, professionals in e-commerce and Internet marketing can guarantee implementation by enterprises; on the other hand, a large amount of capital must be invested to meet the demands of human resources and hardware. These problems have also become the main constraints of e-commerce development in the textile industry.

(4) Irregularity of the external environment: at present, the promotion of e-commerce in China's textile industry does not have a sound external environment, mainly in the following aspects:

● Infrastructure: for reasons of economic strength and the technology level, the network's infrastructure lags behind, and commercial informatization infrastructures are in need of improvement and do not meet the requirements of e-commerce.

● Logistics and financial services: e-commerce is an integral business operating system based on the chain of information, logistics and capital flows. At present, China's services for online payments and logistics need to be completed, and some security problems may exist, which affects the development of e-commerce.

● Network security: safety and security of consumer equity is an important part of e-commerce. For technical and human reasons, the domestic network system suffers from relatively poor security; it is usually very difficult to protect consumers' privacy from viruses, fake sites, hacker attacks occurring frequently. Therefore, network security issues restrict seriously the normal operation and development of e-commerce.

● Legal system: at present, the regularity and construction of laws for e-commerce seriously lag behind. There exists no unified legal system of e-commerce, and an effective legal environment has not yet been formed, to meet the legal needs of the development of e-commerce.

● Government action: the rapid expansion of China's textile industry scale makes it difficult to get technological transformation funds from each level of the government. Sometimes the investment loans of textile enterprises are confronted

by constraints of monetary policy, and textile enterprises have to rely only on their own accumulated investment.

3.5.4 E-Commerce Strategy in China's Textile Industry

Textile e-commerce will inevitably become the main driving force of the development of the textile trade in the 21st century. With the Internet, e-commerce can bring huge and far-reaching business opportunities. Not only at the micro level will the operating behavior of enterprises and spending behavior of consumers be affected, but also at the macro level e-commerce will have a huge impact on international trade relations and national economic competitiveness in the future. Against the problems existing in the development of e-commerce in China's textile industry, and in reference to the international and domestic situation, the main development strategies are to improve the information infrastructure and to establish textile enterprises' international websites; to accelerate the enterprises' informatization construction; to improve the management level with information technology; to make rules for e-commerce in the textile industry by combining adaptation and innovation; to reform state-owned textile enterprises by taking advantage of policies.

(1) Improving information infrastructure and establishing textile enterprises' international websites

The following set of data provides a comparison between information construction in China and seven western countries (Western-7). The possession rate of computers in the 'Western-7' is 32 – 90 times that of China per capita, with Internet penetration 143 – 1761 times higher, and phone penetration 11 – 15 times higher. All of these are part of the external environment of e-commerce, without which it is impossible to create a network. According to the data, there is a large gap between China's enterprises' Internet occupation and foreign peers'. The penetration of online business computers in domestic textile enterprises is poor, and visits to domestic textile websites are quite few. Problems brought about by this mainly include lack of experts who know both the Internet and business, as well as large telephone and information expenses, lack of Internet business rules and know-how used by enterprises. This situation in China makes it necessary to speed up the development process of the information industry so as to keep up with Internet development. Both the quality and quantity of e-commerce textile websites are in urgent need of improvement.

(2) Accelerating enterprises' informatization construction

There is a need for internal informatization construction to develop enterprise e-commerce and to fully realize the functions of e-commerce. There is a large gap between common informatization in textile enterprises and business technology modernization. The current informatization level is no longer adapted to, even hinders, the development of e-commerce in the textile industry. Acceleration of informatization construction should be performed in respect of personnel training (especially the middle and senior management personnel), technical construction

and management support.

Textile enterprises should vigorously promote and build a computer network system in the future, and strive to make a breakthrough in the establishment of an ERP system as soon as possible. In the next five years, efforts will be made to promote and implement ERP systems in 200 domestic key enterprises, which may provide the basis of a uniform industry information system. Additionally, further capital should be invested in the *China Cotton Textile Information Centre* and an enterprise LAN, transforming the website into a comprehensive site for the industry, making it a most effective international website in the domain of China's textile industry.

(3) Improving the management level with information technology

In the U.S., many textile companies have established their own supply and distribution chains with information technology and networks, including management of internal processes and product sourcing and marketing. The enterprises can make better use of internal resources and obtain better products and lower prices by network management. What's more, the companies can distribute purchasing information on the network platform, and adopt bids in light of lower raw material costs and thus increase profits. Last but not least, the companies can learn of the changes in the customer market, so as to make adjustments accordingly.

The applications of e-commerce management software in textile companies in Italy, U.S.A. and Korea have exceeded greatly those of China. The influence brought by e-commerce is revolutionary. The processes of marketing, sourcing, and internal management are all implemented through the network in the majority of enterprises. This action has greatly promoted the anti-risk capability and rapid response to the market. It is of great significance for Chinese enterprises to establish their own systems, to facilitate communication with clients in the future.

(4) Making rules of e-commerce in the textile industry by combining adaptation and innovation

The first step is "adaptation", which means the electronic schema must adapt to the business requirement of Chinese enterprises at the current level. It must also combine business requirements and technical means, make an overall plan, identify feasible business models and design practical and effective technical solutions, in order to promote the management level and business profit under current conditions.

The second step is "innovation", which means creating the e-commerce system in the textile industry with the development of the management and informatization levels. The main purpose is to meet the development demands in the future and further improve market competitiveness and the management level, making the best of e-commerce's characteristics.

(5) Making use of national policies and industrial advantages

The State Economic and Trade Commission, Ministry of Information Industry and Ministry of Science and Technology held the "Enterprise Information Promotion Conference" in 2001 and arranged six major tasks, of which two were: to select some key national enterprises to carry out e-commerce exploration of material procurement, product marketing, technology transactions, personnel

training and other aspects; to establish "Chinese enterprise information sites", and then finally to establish a platform with the key national enterprises as demonstrations.

The textile industry is a key state industry, which should seize the opportunity to make full use of national development policies for e-commerce, and make use of information technology to improve the automation, intellectualization and network level of traditional industries. The textile industry should serve as a model, and take advantage of its industrial superiority to collect relevant industry information resources, such as policies, tendering, supply and demand information, inventory information, product quality, price and technology. High-profile websites with abundant information, frequently updated information, high business reputation and authority should be established to draw companies from home and abroad to inquire, browse, distribute information, advertise, and trade online. The income from trading and advertising should be used for rolling development, so that e-commerce becomes the development direction of innovation for textile enterprises.

(6) Continue to reform state-owned textile enterprises

The knowledge content of industrial products has been increasing in the information age. As personalized consumption has reduced the repetitive production of one product, quantity no longer means advantage in the market. Less quantity but more categories may become the main focus of competition among new-style textile enterprises in the new century. What textile enterprises are faced with is quota production, and flexibility to make changes will be the main feature of the market. In the Internet economy, textile enterprises should have the capability of manufacturing diverse products and making use of various techniques. Any enterprise, as an independent economic entity, should control all the situations from production to marketing.

The reaction speed of a textile enterprise to information determines its existence and development in the environment of e-commerce. To handle information well, the internal organization structure of an enterprise must be convenient enough for information's scientific transmission, facilitating rapid business decisions. There should be as few intermediate links as possible. Therefore, a flat organizational structure is preferred, which means relatively equality for all departments, making each person one node of the net. In this way, each work group in the enterprise deals with one series of tasks and all groups can handle a wide variety of tasks. Then the leader in the enterprise may just need to coordinate and fully organize to develop personal initiative and creativity.

E-commerce has changed the production and consumption activities, but this change does not necessarily mean that the original industry will loose its significance. To a great extent, what e-commerce has done was only to graft information technology to the industrial economy. The traditional economy needs the network as a promotion tool. The characteristics of traditional economic activities like durability, standardization, timeliness and thoughtfulness are still applicable in e-commerce.

3.6   Telecommunications Industry

Telecommunication is the transmission of information, over significant distances, for the purpose of communication [17]. Traditional telecommunication refers to the use of visual signals like beacons, smoke, semaphore telegraphs, signal flags etc. When we came to the age of electricity and electronics, telecommunication produced a significant breakthrough. Due to this telecommunication revolution, e-commerce gained the chance to exist. Since then, there has been an interaction between the modern telecommunication industry and e-commerce. In general, an industry with the following five major characteristics is more suitable for an integration of marketing: network, scale, production, service and consumption. Obviously, these five characteristics match the telecommunications industry to a high degree. The telecommunication industry and e-commerce have also made great progress together.

3.6.1   Telecommunications Industry in China

China's telecommunications market took shape through the restructuring of the competitive pattern. The telecommunications industry in China is a monopoly market. There are only three magnates running the telecommunications business in China — China Telecom, China Mobile and China Unicom. They all provide similar products and constitute a typical market structure. In such a market, the best strategy for guiding telecom vendors' behavior is to maximize their market share and profits. China's telecom enterprises should actively utilize foreign capital and technology to develop the whole telecoms industry and achieve the optimal allocation of telecommunications resources.

Since the establishment of a market economy system, China's telecommunications industry has undergone great changes. The Ministry of Information Industry of China set up the Telecommunications Regulatory Authority in order to strengthen the government's industry regulatory functions, to allow companies to build their own communications networks for operating different basic telecommunications services and value-added telecommunications services.

In the "Eleventh Five-Year Plan" period, China has been the largest communication power in the world on the scale of Internet users. According to the report published by China Internet Network Information Center, the overall size of Internet users in 2010 reached 457.3 million, 73.3 million more than that in 2009. The Internet penetration rose to 34.8% in 2010, up 5.4% compared with that in 2009 (Fig. 3.8) [18]. The number of Internet users could not expand without a good development environment. In recent years, governments at all levels in China issued a series of policies and regulations to strength the infrastructure construction of the Internet and to actively cultivate the backbone of the Internet service market. As a result, the external development environment of the Internet industry is becoming better and better. Since 2010, as Internet policies have been

positive and stable, more and more new network technologies have been put into practice, which promote the growth in the number of Internet users.
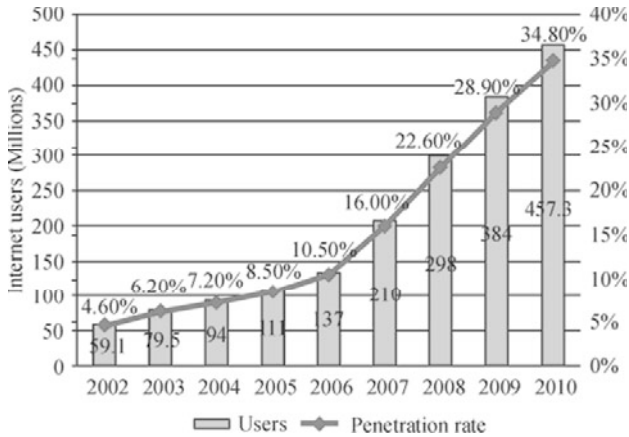
Fig. 3.8   The scale of Chinese Internet users and penetration rate
(Source: CNNIC, 2010)

National telecom business volume totaled RMB 2.8 billion in 2010, increasing 20.6% over 2009. Since pilot projects of Three Network Convergence and Cloud Computing were launched in 2010, 3G technology has made a major breakthrough. The industrialization process of next-generation Internet speeded up, which led to the transformation and upgrading of the Internet.

Meanwhile, China's mobile Internet users continued to grow in recent years. Up to December 2010, the number of mobile Internet users reached 302.73 million, 69.3 million more than that at the end of 2009 (Fig. 3.9). The proportion of mobile Internet users as a percentage of Internet users increased from 60.8% in 2009 to 66.2% in 2010 [18].
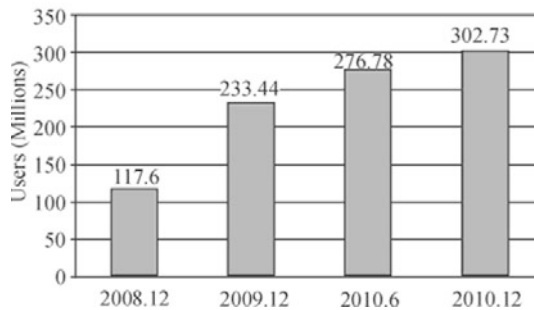
Fig. 3.9   Comparison of number of mobile Internet users
(Source: CNNIC, 2010)

The fast growth of mobile Internet users is ascribable to the following:
(1) Concerted efforts of the government and telecom operators. The State

Council issued 3G licenses in 2009, which offered operators broader development space and strengthened the concept of a mobile Internet. Afterwards, China Mobile reduced tariffs on GPRS data throughput; China Telecom lowered the fee for the wireless access package; China Unicom introduced diversified GPRS packages, etc. Major telecom operators successively took actions to attract more users to promote the development of the mobile Internet market.

(2) Integration of Internet access and the fashion concept. With the penetration of mobile phones, the mobile phone was not only the most portable tool for Internet access but also a symbol of fashion. The fashion for mobile access attracted young users, thus boosting the number of mobile Internet users.

(3) Enrichment of Internet content and applications. The amount and quality of mobile access increased gradually, with mobile blogs, mobile video and mobile TV growing rapidly to offer users richer choices and to promote the expansion of mobile Internet users.

3.6.2   E-Commerce: The Driving Force of China's Telecommunications Industry

(1) E-commerce: the new business model of value-added telecommunication services

In China, the three telecom operators are always attempting to attract new customer groups by putting forward distinctive value-added services. During the cycle from design, advertising, promotion, marketing to pricing for any new kind of service, some new business modes may exist. Considering the no-distribution characteristics and the network carrier of telecommunication products, these new business models are very likely to turn into mainstream e-commerce models in the future. In this sense, e-commerce could be considered as one inalienable part of telecommunication services.

(2) E-commerce: the right choice for the management of companies

Since the new competition pattern was formed through restructuring, telecom operators tended to place emphasis on their own core competencies. Many telecommunications companies gradually shifted their focus to differentiate products, diversify business, personalize marketing, and deliver high-quality services. Telecommunications enterprises were in need of the overall operation and information exchange. This situation presented new challenges to the management and services of telecoms operators. As well known, e-commerce was good at processing information flow, which made multi-sectoral cooperation possible and services convenient as well.

(3) E-commerce: the promoter for market expansion of the telecommunications industry

Since e-commerce required all parties to communicate through the web, the demand for a leased network would be directly stimulated. In a complete payment-type e-commerce transaction, both public network access for business entities or administrative bodies and a dedicated connection with a number of banks were needed. Additionally, with the further development of e-commerce,

operators would increasingly focus on a particular area to provide personalized services. From the perspective of multimedia communication services, as e-commerce would absorb various social sectors such as governments, banks and merchants into the telecommunications network. It would also bring users of these sectors into the Public Switched Telephone Network (PSTN) and Public Multimedia Communication Network, which potentially increased the network revenue. Meanwhile, e-commerce applications would enrich the services of involved sectors, improve standards of service and the efficiency of operations, and further strengthen market competitiveness. Traditional methods of competition could not match the rapidly expanding telecom market any longer. Using e-commerce would improve efficiency in customer relations management, cost control and services innovation [19].

(4) Telecom operators: the best integrator in the mobile industrial chain

Mobile commerce (m-commerce) has flourished in many developed countries, but in China it has just started. Compared to a traditional telecommunications value chain from consumers to operators then to manufacturers, the industry chain of m-commerce was fully inverted. Mobile operators, banks and service providers gradually formed a perfect business model for mobile value-added services, and finally got through to consumers, which fundamentally changes the original consumption patterns [20]. From the perspective of marginal benefit, telecommunications companies possessed unique advantages in the network infrastructure, so it was the most cost-saving approach if telecommunications companies played the integrator of the m-commerce industrial chain [20]. Therefore, m-commerce was the best way forward for China's telecom operators to develop value-added services.

3.6.3   E-Commerce Strategy of China's Telecommunications Industry

In July 2007, the National Development and Reform Commission and the State Council Informatization Office jointly issued the *Eleventh Five-Year Plan of E-Commerce*. This plan reflected the basic content and requirements of national strategic thinking: to realize the integration of a network economy and real economy, to optimize industrial structure, to promote the transformation of the economic growth pattern, and to improve the efficiency and quality of the national economic operation. At the same time, the plan proposed a series of innovative measures to develop e-commerce with Chinese characteristics.

With regard to the telecommunication industry, there were three highlights in the plan. First, the plan identified that e-commerce was a new type of network economic activity with the telecommunication network as an important supporting platform. Second, China would be committed to developing e-commerce services. Telecom operators should take major responsibilities and accurate positioning. Third, mobile commerce was listed in national crucial construction projects. This project was quite likely to become a breakthrough into e-commerce for the

telecommunications industry [20].

E-commerce strategies in the telecommunications industry were as follows:

(1) Strengthening the construction of the network infrastructure

For the first time, the *Eleventh Five-Year Plan of E-Commerce* declared e-commerce as a new type of network economic activity, which was a kind of production, circulation and consumption activity based on electronic information networks including the Internet, broadcast television networks and telecommunications networks rather than just a new Internet-based way of trading or circulation. Telecoms companies had a large user base, a perfect network platform and a market and service system covering the whole country. Therefore, they played an important role in promoting e-commerce applications. China's telecommunications industry should adhere to the construction of a network infrastructure to establish a perfect network support environment and to provide efficient network access platforms in various forms. In January, 2010, according to the executive meeting presided by Chinese Premier Wen Jiabao, the State Council decided to speed up the integration of the three networks convergence of the telecommunications network, broadcast television network and the Internet [21]. As the network infrastructure was the foundation of substantial integration, the Chinese telecoms industry was duty-bound to act.

(2) Developing third-party e-commerce service platforms and constructing public e-commerce service platforms

The *Eleventh Five-Year Plan of E-Commerce* for the first time put forward strategic tasks for developing e-commerce services, stating that we should base this on guiding various types of enterprises to actively carry out service outsourcing, promote the transformation of telecom operators, develop new services and expand the range of services. There was a huge space for the development of telecommunication enterprises in three major market areas of e-commerce services. Taking ICT services as an important transition direction, telecommunication enterprises launched a lot of web-based outsourcing businesses in succession which created several famous brands such as "BizNavigator" and "CU Connected". The telecommunication enterprises also looked at mobile payments especially micro-payments. From the point of view of pilot projects established by the nation in the plan, to develop third-party e-commerce services and public e-commerce service platforms should be regarded as a basic orientation of China's telecommunications industry in the field of e-commerce. The plan put forward clear policies to solve problems facing the development environment of e-commerce such as electronic authentication, credit services and national standards. In addition, the plan proposed new measures for online payment issues, of high concern to telecoms companies.

(3) Promoting the development of m-commerce

In the *Eleventh Five-Year Plan of E-commerce*, m-commerce pilot projects were subsumed into the national Eleventh Five-Year Crucial Pilot Projects. The government encouraged developing new consumer-oriented services at different levels with an emphasis on m-commerce. To spread and deepen e-commerce applications, m-commerce should be taken as an important task for telecommunications enterprises.

Mobile Internet applications and wireless data communications technology provided a solid foundation for the development of m-commerce. They mainly included: wireless application protocol (WAP), mobile IP technology, Bluetooth technology, General Packet Radio Service (GPRS), Mobile Positioning System (MPS) and 3G technology. Currently, factors restricting the development of m-commerce are high mobile Internet rates, weakness of m-commerce applications and an imperfect industrial chain. The problems are continually easing with the commercial usage of 3G; moreover, all the constraints will eventually be resolved with the development of m-commerce and the telecoms industry. As the mobile communications network has a huge individual consumer base and enterprise user group, telecoms companies possess huge advantages in enhancing the penetrability of e-commerce applications. In 2009, the three telecoms operators in China (China Telecom, China Mobile and China Unicom) invested more than 400 billion RMB directly on 3G. As a result, the demand of enterprises and consumers for mobile commercial applications will be greater than ever before. The "migration" of modern business to the 3G mobile Internet platform represents an irresistible trend [21].

(4) Establishing electronic services and electronic marketing channels for the telecommunications industry

Through the establishment of online business halls, SMS business offices and telephone business offices, China's telecom industry provided telecommunication products and services which enabled consumers to order products on their own and to obtain services with the aid of terminal devices including online business, online bill payments, online customizable phone card sales, online querying, statistics and consulting etc. All these businesses could be dealt with without time and geographical constraints. Within telecommunications enterprises, CRM and ERP were established and attached importance to network marketing, network services and product innovations.

(5) Carrying out value-added telecom services to improve the value chain of B2C e-commerce

E-commerce created a huge and open competition space between the network level and end-user level. There were three application forms of B2C e-commerce modes in the telecommunications industry: the online telecoms business operation hall, telecoms value-added service platform and infoport. Online telecom business operation halls were well operated by three operators. The appearance of professional web portals greatly restricted the development of infoports in telecommunication enterprises. As a result, only the value-added service platform had a huge development space. The future competition in the telecoms market will be for value-added services rather than bandwidth. To carry out value-added telecoms services through a comprehensive alliance of service providers, a stable chain of Internet applications will eventually arise. In recent years, the major domestic telecoms operators in China have introduced several value-added service platforms combining with e-commerce, among which are many brands like ChinaVnet, Monternet, 169Online and 116.com etc.

3.6.4   E-Commerce Practice in China Telecom

China Telecom (China Telecom Corporation Limited) is the domestic pioneer in China's telecommunications industry. As one of the three main China telecom operators, China Telecom not only actively explores the electronization and networking of their own businesses, but also provides e-commerce infrastructure services, system integration and technical support services with the aid of its own network resources advantage and technological advantages. The general strategic objective of China Telecom's e-commerce is to establish an e-commerce service system taking China Telecom safety certification system "CTCA" as the core and to cooperate with government, banks and enterprises to develop e-commerce services and applications using a variety of secure access methods.

Looking back on the reform process of China's telecommunications industry, the industry has experienced a series of reforms: from complete monopoly to monopolistic competition, from the unity between governments and enterprises to joint-equity enterprises, and from two entities to multiple competition entities. During the reform process, China Telecom has experienced repeated split reorganization. Especially in 1998, after China Mobile was separated, the income of China Telecom sharply declined. Since China joined the WTO in 2001, foreign telecommunication companies have tried to enter the Chinese market. At the same time, other telecommunication giants in China such as China Unicom, China Mobile, China Netcom and China Tietong began to seize market share in new business fields. With this background, it was impossible for China Telecom to maintain sustained high growth without developing e-commerce.

As the biggest telecommunication enterprise in China, China Telecom has the world's largest fixed telephone networks. However, the growth rate of fixed telephone in China as well as in the world begun to slow down before 2000. On the other hand, the mobile communication market developed rapidly with a growth rate far higher than that of the fixed-line. China Telecom realized that future profit growth lay in information services and there was a huge potential market for information services.

To confront the rapid decline of fixed-line businesses and a large number of non-performing assets, China Telecom started to establish a public e-commerce platform and develop information communication services in 1998. Based on the company's own understanding of e-commerce and its own characteristics, China Telecom established its market positioning in the e-commerce field which was to become a provider of e-commerce infrastructure, e-commerce solutions and e-commerce applications.

According to the market positioning and strategic objective above, China Telecom made great efforts in e-commerce infrastructure construction and application promotion.

(1) To establish a CTCA safety certification system and improve e-commerce infrastructure

● To perfect an e-commerce security authentication system and promote the development of the digital certificate business

In order to solve the security problem of e-commerce activities and provide a

safe and reliable business environment for users, China Telecom began to study safe authentication in 1996. In August, 1999, China Telecom's CA safety certification system - CTCA passed the joint appraisal of the Chinese Cipher Codes Administration Committee and the Ministry of Information Industry, and the certification of China Information Security Certification Center (ISCCC). CTCA was the first CA safety certification system. Then China Telecom established the R&D center of CA technology to perfect the function and upgrade the core technology of CTCA and several CA regional technical support centers to provide technical support. Moreover, China Telecom selected key industries for promoting the development of the digital certificate businesses.

● To accelerate the construction of a payment system and provide one-stop payment services

China Telecom developed a micro payment system and unified payment platform. Then each provincial branch established a local payment gateway according to local conditions and the whole payment system was formed. Meanwhile, China Telecom adopted corresponding cooperative strategies according to characteristics of different banks, and signed e-commerce cooperation agreements with the Agricultural Bank of China, Bank of China, China Merchants Bank, Industrial and Commercial Bank of China, and China Construction Bank etc. Together with these local banks, China Telecom launched payment gateways in Beijing, Shandong, Hunan, Shanxi, Zhejiang, etc. and built up a unified electronic payment platform. Moreover, China Telecom formulated and perfected the interface standards and technical standard of payment gateway with many banks.

In March 2011, a payment subsidiary company of China Telecom officially named "E-Surfing Electronic Commerce Limited" was established with main businesses covering mobile payment, fixed payment, bonus payments and other fields to provide users with payment services on the Internet, mobile phones, fixed telephones, IVR self-service voice, IPTV, public telephone kiosks, self-service machines and other types of terminal channels [22].

● To increase the investment in network construction and provide a variety of safe and fast access methods

To meet growing domestic demand for Internet and e-commerce, China Telecom continuously improved the communication network infrastructure. The company built a nationwide, multi-service-oriented and multi-rate data communication network and 163/169 networks, and spread the construction of a broadband and wireless broadband network throughout the country. In addition, China Telecom set up Internet Data Centers (IDC) in most capital cities to further improve the access capabilities and network throughput of a data communication network on a national scale.

(2) Vigorously promoting e-commerce applications throughout the whole country by flexible market mechanisms and business models

● To implement e-commerce in China Telecom by reducing operating costs and improving service quality

China Telecom has established an online business hall covering all the businesses of China Telecom such as installed application, complaints, telephone

charge queries, telephone charge payment, IP phone cards, network card purchase, and network card recharge. With the implementation of ERP and CRM, electronic management has enhanced China Telecom's service levels, thereby reducing operating costs and improving service quality.

● To build a number of e-commerce applications based on e-commerce infrastructure cooperating with government departments, banks, brokerages, enterprises and other units

In order to promote e-commerce applications quickly, China Telecom carried out e-commerce applications through cooperation with third parties. Main businesses include electronic negotiable securities, electronic banking, electronic filing, an online mall, online room reservation, online ticket booking, B2B electronic transactions and e-lottery etc. As early as the beginning of 1999, China Telecom cooperated with the General Administration of Customs of the People's Republic of China to promote the use of an "Import and Export Declarations Online Verification System". The system applied the approach of "electronic account + online verification", which essentially eliminated the use of false declarations, simplified procedures of customs and foreign exchange management departments, achieved great results in fighting against foreign exchange fraud and smuggling. The system cut down foreign exchange loss of over $20 billion and increased customs revenue by 71.1 billion RMB.

● To cooperate with e-commerce application developers

Cooperating with e-commerce application developers, China Telecom developed the e-commerce application system in a sharing-copyright, joint-promotion and sharing-revenue model, to provide users with complete e-commerce solutions containing resources at the network layer, a security system, payment system and application system.

Based on enterprises' characteristics, China Telecom launched the first e-commerce project in the domestic telecommunications industry in 2004. Wuhan Telecom was selected as the pilot unit. The project planned to build an e-commerce information and transaction platform integrating enterprises and personal services, and uniting facilitating agencies [23]. In April 2005, the largest e-commerce platform of China Telecom at that time "Central China Business Network" was completed, which was mainly related to five areas: corporate information release, online purchases, online stores, personal transactions and personal information distribution [24]. So far China Telecom has offered a variety of software products and solutions like secure e-mail, secure government systems and electronic filing and tax systems by cooperating with international and domestically well-known e-commerce application developers.

On the basis of applications in practice, China Telecom put forward a set of e-commerce architecture suited to national conditions as shown in Fig. 3.10. Summing up practical experiences in technology research and applications, China Telecom formulated the "Administration Measures of e-commerce business in China Telecom", "the Overall Technical Specifications of e-commerce in China Telecom", "Interface Standards of China Telecom CTCA Security Authentication Technology", "Interface Standards of China Telecom CNEC Payment System" and many other business management regulations and technical specifications, and

thus gradually established a sound and rational e-commerce operation control system and technical standard system.

Policy Framework & Laws and Regulations	E-commerce Application Services		Technical Standard & Regulation
	Payment System (SET, un-SET)	Logistics Distribution System	
	Security Infrastructure (Network Security, CA Safety Certificate, etc)		
	Network Infrastructure (Internet, PSTN, cable TV, Wireless Network)		
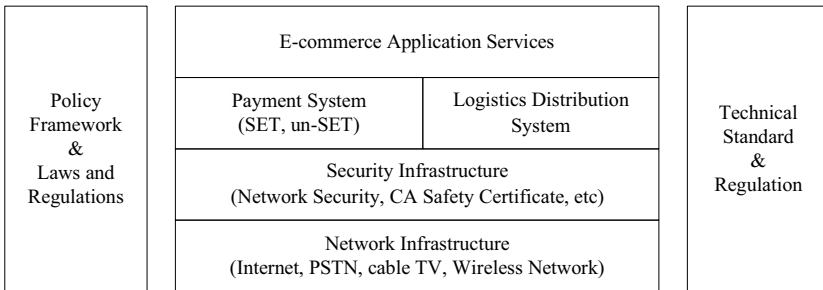
Fig. 3.10   E-commerce architecture of China Telecom

As China's telecommunications reform deepens and various reform measures are gradually implemented, China Telecom has turned into a main competitor in the market. Meanwhile, China Telecom vigorously develops comprehensive information services represented by e-commerce services, strengthens the management and optimizes the allocation of resources. Encountering worldwide negative growth of fixed-line telecommunications businesses, China Telecom successfully maintains sustained growth. After years of practice, e-commerce has been a new impetus for China Telecom's development.

In May 2008, the Ministry of Industry and Information Technology (MIIT), National Development and Reform Commission (NDRC) and the Ministry of Finance promulgated the *Announcement on Deepening Telecom System's Reform* which encouraged China Telecom to take over China Unicom's CDMA network (including assets and users) [25]. In early 2009, a third-generation (3G) license was issued to China Telecom, which transferred China Telecom from a fixed-line business operator to a full-business operator. In addition, China Telecom has obtained competitiveness by developing m-commerce. At present, China Telecom has completed a strategic plan for mobile payment, and developed relevant businesses relying on m-commerce. Two kinds of intelligent payment terminals named "e payment" and "e Jitong" were launched. The former was oriented towards urban public users, enterprises and phone users (mobile phone and fixed phone), which could be subdivided into a public version, industrial version and phone edition. The latter was oriented to the student campus, which integrated the meal card, student card, library card and entrance card to provide a convenient environment for students and to improve the informatization level of universities [26].

3.7   Comparisons

The prosperity of the Internet culture has set off a business "bloodbath" in the United States. *Amazon.com* rewrote the rules of the book sales industry using e-commerce, which generated a great threat to Barnes & Noble; Expedia

overturned the tourism industry rules and defeated so many traditional travel agencies. The Internet and e-commerce force traditional market competitors to bring prices down, squeeze their own profits, and even kick some of the opponents out. New technologies, new management methods and new approaches to eliminate middlemen mean that the traditional pricing rules in many industries have collapsed. Surviving leaders are compelled to look for new revenue streams. No one wants to be the next "Amazon occupation". As early as 1980 Michael E. Porter discussed "How the Internet Influences Industry Structure". In his conclusion, the efforts that the Internet has brought are mostly negative. Bloch *et al*. (1996) drew up a model to sum up the impact of e-commerce on organizations from a value-added point of view (Fig. 3.11). This model divides the impact of e-commerce into three classifications: improving direct marketing, transforming organizations and redefining organizations. Although the impact of the Internet on strategic competitiveness and long-term profitability will differ from industry to industry [27], e-commerce strategies of any industry have a certain relationship with these three classifications.
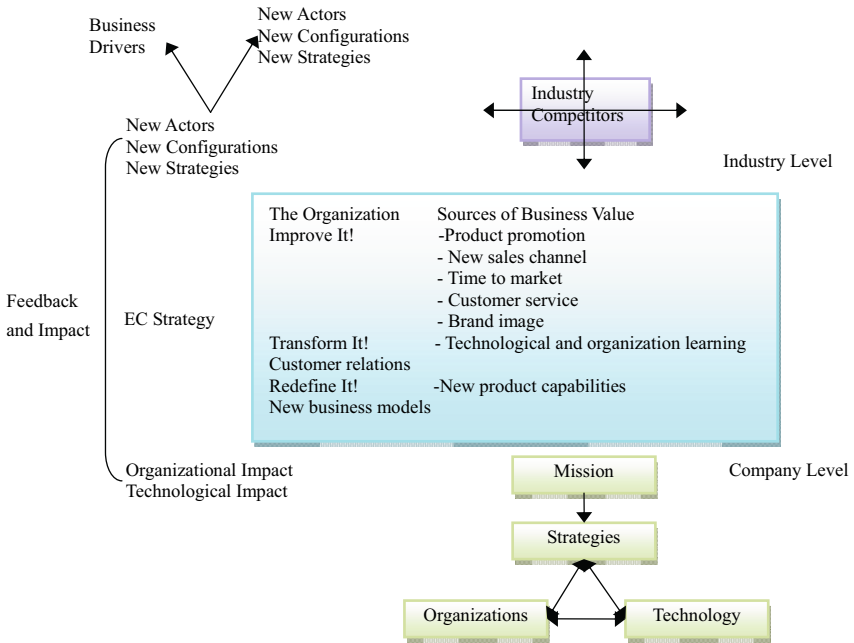
Fig. 3.11   The Analysis-of-Impacts framework

Comparing e-commerce strategies of various industries, there are some subtle common points between them.

(1) Comprehensively promoting industrial informatization construction

Having faced the new challenges, all organizations within the industry should rethink their organizational structure and management styles, and consciously reform them if necessary to catch up with e-commerce development, so that the whole enterprise will be able to respond quickly to changes, making the industry

structure adaptive to the network environment. In this process, strengthening the internal informatization construction and taking advantage of information technology to enhance the transformation of production, management and the sales process should be the common strategic focus in each industry and all enterprises within one industry.

(2) Strengthening the supervision, guidance and support of governments

To practice e-commerce in industries, governments bear the brunt of enhancing the research and development of e-commerce laws and regulations. Governments should establish laws and regulations related to e-commerce activities in various industries as early as possible, including the legal effect of electronic contracts, an e-commerce regulatory system, e-commerce tax policy etc., so as to provide significant guarantees to the orderly development of e-commerce in all industries. At the same time, governments should carry out e-commerce pilot projects in all industries and support representative enterprises to develop e-commerce to set up good examples for other enterprises. In this way, experience of promoting e-commerce can be promoted throughout the whole industry.

(3) Developing e-commerce in stages

As a new business model, practicing e-commerce is a gradual process and would never be accomplished in one action. In order to find a comprehensive e-commerce operating model for an industry, a study of different aspects should be started and worked on so that e-commerce strategies in the industry will be steadily implemented.

Developing e-commerce is a gradual process. Enterprises should formulate their own e-commerce strategy according to their business development needs based on the principle of gradualness. They can set specific e-commerce development goals and planning and choose proper business models with reference to the experiences of advanced countries.

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4

E-Commerce Strategy in Enterprises

Enterprises are the main body of economic activities. By this analogy, enterprises are the main body of e-commerce for certain. Without the participation of enterprises, a national e-commerce strategy would only be discarded even if it is the best.

As one kind of business activity through electronic communication, e-commerce has brought many kinds of advantages to the development of enterprises. From a transaction perspective, it not only improves the efficiency of business activities but also reduces the cost. From a management perspective, e-commerce strengthens the cooperation with enterprises as well as providing new business models and opportunities. E-commerce is a trend now. In the new market environment, enterprises are facing new opportunities and challenges. If enterprises fail to adapt to change, it is impossible for them to survive. "Many have argued that the Internet renders strategy obsolete. In reality, the opposite is true. Because the Internet tends to weaken industrial profitability without providing proprietary operational advantages, it is more important than ever for companies to distinguish themselves through strategy. The winners will be those that view the Internet as a complement to, not a cannibal of, traditional ways of competing." Michael E. Porter (2010) emphasized[1].

In e-commerce times, traditional enterprises should restructure themselves and adopt proper e-commerce strategies or else be knocked out. In this respect, there are some typical examples such as GE, IBM, and Haier, etc. Besides, e-commerce has prompted enterprises with new business models, represented by Google and Taobao. No matter the former or the latter, all of them have make a good use of the Internet, make positive innovations to improve efficiency and have strengthened worldwide cooperation with efficient management mechanisms.

Since the Internet and e-commerce have a great impact on business practices and tend to change several industrial structures, enterprises and companies have no more choice. How to formulate an excellent e-commerce strategy and how to practice the strategy becomes the highlight of every company.

E-commerce aims at improving competitiveness, management power and technological innovation. When enterprises formulate e-commerce strategy, they should pay much attention to the product and the market. Firstly, the core of

business activities is the product, including real products and the virtual ones, like services. Owning efficient and advanced product policies contributes a lot. Especially in an age of fast information spread and advanced logistics, products can be distributed to segments in a short time. If the analysis of the product is not correct, it is possible to cause a disaster through the chain effect. Secondly, analyzing the market is also important. E-commerce has expanded the scope for sales and renewal, but also has increased the competition and the uncertainty of one product. Once a product comes out, people will rapidly become familiar with it through e-commerce and copy it. Due to the homogeneity of the network environment, the similarity among products obviously increases. Only with proper market analysis, can enterprises make a difference.

When it comes to the implementation of e-commerce strategy, enterprises should make a maximum utilization of various high-quality resources including finance, technology, equipment and humans, to highlight the strategic core. During this process, how to optimize the resource allocation and how to apply e-commerce technically are all determined by the recognition of the resources. So enterprises should cultivate a great number of e-commerce professionals. But we should remember that any technology is just a tool. Only when it is tightly connected with the business and operation will the advantages of e-commerce be represented.

Although the above common points exist, e-commerce strategy still differs according to industrial properties and enterprises' characteristics. Details of typical enterprises adopting e-commerce well will be presented in the following sections.

4.1   IBM: Are You Ready for E-Commerce?

International Business Machines (IBM), nicknamed "Big Blue", is a multinational computer, technology and IT consulting corporation headquartered in Armonk, New York, United States[2]. IBM manufactures and sells computer hardware and software, and offers IT services, application services, outsourcing services, consulting services and training services in areas ranging from mainframe computers to nanotechnology. With over 426,000 employees worldwide, IBM is the largest (by market capitalization)[3] and the most profitable[4] software & services company around the world according to *The Forbes 2000* with sales of more than 109 billion US dollars. To take social responsibility, IBM's Corporate Service Corps (CSC) has sent over 1,400 IBMers from 50 countries to more than 20 emerging markets[5] delivering high quality problem solving for communities and organizations since its launch in 2008.

4.1.1 History of IBM

IBM is one of the few information technology companies with a continuous history dating back to the late 1880s, decades before the development of electronic computers. The company, which later became IBM, was founded in 1896 as the Tabulating Machine Company in Broome County, New York. On June 16, 1911, Computing Tabulating Recording (CTR) Corporation, the precursor to IBM, was incorporated through a merger of the Tabulating Machine Company (with origins in Washington, D.C. in the 1880s) and two other companies: the International Time Recording Company (founded 1900 in Endicott), and the Computing Scale Corporation (founded 1901 in Dayton, Ohio, USA). In 1914, Thomas J. Watson Sr. joined CTR, which then had 1,346 employees and $9 million in revenues. Over the next two decades, Thomas J. transformed CTR into a growing leader of innovation and technology and a prototype for the newly emergent multinational corporation. This shift was signaled in 1924, when the company's name finally changed to International Business Machines Corporation (IBM)[6].

During World War II, IBM took the first step towards computing. In 1944, IBM introduced to Harvard University the world's first large-scale calculating computer, the Automatic Sequence Control Calculator (ASCC), also known as the Mark I, which used electromechanical relays to solve addition problems in less than 1 s, multiplication in 6 s, and division in 12 s[7]. But since the computers had just been built, company leaders did not realize the good prospects, even stating that: "I think there is a world market for maybe five computers". With lack of enough foresight, IBM missed a good opportunity to enter the computer field. By the late 1940 s had IBM recognized the significance of the technology, had taken effective measures and caught up fast to squeeze into the computer market. In 1951, IBM decided to develop commercial computers and invited Von Neumann as the scientific advisor. In December 1952, IBM introduced the 701, its first stored program computer and its first large-scale electronic computer to be manufactured in quantity, which carried IBMers into the electronics business[8]. Till 1967 IBM controlled 76% of the computer market. The Apollo 11 astronauts made the first manned landing on the Moon with the help of IBM computers. In 1971 IBM computers helped guide the Apollo 14 and Apollo 15 Moon landings. One year later, Apollo 16 and Apollo 17, the final missions in the Moon-landing series, were also supported by IBM personnel and products [9], which demonstrated the great power of IBM computers. In 1981, IBM successfully developed the world's first Personal Computer (PC), which helped IBM gain the "Person of the Year" award in TIME Magazine a year later. From 1986 to 1987, four fellows of the IBM Zurich Research Laboratory won the Nobel Prize. In 1980 – 1984 IBM spent $28 million in total on electronic computer development and infrastructure construction, equivalent to 14 times the total cost of the Manhattan Project. IBM was never absent from any major inventions in information technology. The Data Encryption Standard (DES) in America was a representative achievement. In the research into superconducting materials, IBM research personnel also created exciting and outstanding achievements.

Since the foundation of IBM, the company has always led the development direction of the global information industry with advanced technologies, excellent management and unique products. In the development process of over 100 years, IBM has created lots of "firsts" in the computer industry: IBM was the first to manufacture hardware and software separately and thus gave birth to the software and hardware industry; IBM produced the famous Deep Blue Supercomputer; IBM firstly put forward the concept of E-business; IBM built the world's first prototype of the quantum computer. As the biggest multinational company in the information industry, IBM is worthy of "Big Blue". Depending on continuous innovation, IBM is now taking the leading position in the information industry, and has many splendid accomplishments. But the process is not easy at all. IBM has survived in a life-and-death struggle. The key events in the history of IBM are listed below.

• 1896: Herman Hollerith established the Tabulating Machine Company, what was later merged into IBM.

• 1911: The combined Computing Tabulating Recording Company (CTR), the precursor to IBM was founded.

• 1914: The young salesman Thomas J. Watson Sr. was hired by CTR. Ten years later he founded the "Big Blue" IBM.

• 1924: CTR's name was formally changed to International Business Machines Corporation (IBM).

• 1928: A punch card named "IBM CARD" was developed.

• 1944: The world's first large-scale calculating computer, the Automatic Sequence Control Calculator (ASCC), was introduced by IBM.

• 1948: IBM's first large-scale digital calculating machine, the Selective Sequence Electronic Calculator (SSEC), was announced.

• 1956: IBM introduces the world's first magnetic hard disk for data storage: Random Access Method of Accounting and Control (RAMAC).

• 1964: In the most important product announcement in company history to date, IBM introduces the IBM System/360.

• 1968: The Customer Information Control System (CICS) transaction monitor was developed by IBM.

• 1976: IBM built flight computers and special hardware for the first vehicle in the U.S. Space Shuttle program.

• 1981: The IBM Personal Computer went to mass market.

• 1983: IBM announced PC-DOS2.0.

• 1986: IBM put forward its first memory chip with storage of 1 MB.

• 1989: IBM introduced the System/390 family, which was its most comprehensive product announcement in 25 years.

• 1989: IBM and Microsoft announced joint support for the competitive operating system OS/2 and Windows.

• 1991: IBM introduced the notebook computer with the function of wireless communication.

• 1992: IBM introduced a new line of notebook computers with the innovative TrackPoint nestled in the middle of the keyboard. In the same year, IBM

announced another new product: Personal Digital Assistant (PDA).

• 1993: IBM declared its first losses of a billion dollars.

• 1995: IBM announced plans on the Internet to strengthen the force of Internet access.

• 1997: The 32-node IBM RS/6000 SP supercomputer, Deep Blue, defeated World Chess Champion Garry Kasparov.

• 1997: IBM defined a new industry by using the Internet as a medium for real business and institutional transformation: E-business.

• 2002: eServer i890 was launched.

• 2005: The PC division (including Thinkpads) was sold to Chinese manufacturer, Lenovo.

• 2009: IBM announced its watershed project: Smarter Planet.

• 2010: At the end of May 2010, IBM bought the Sterling Commerce Unit from AT&T for about $1.4 billion. This is the second largest acquisition by IBM.

Each IBM success has pushed forward the development of the global information industry. At the same time, each setback has caused the whole information industry to think deeply. The most severe test for IBM occurred in the 1990s. With the danger of financial collapse in the background, IBM's e-commerce strategy was formulated.

4.1.2 Background of IBM's E-Commerce Strategy

As mentioned above, in the 1970s IBM took the lead to separate software from hardware, which brought us today's Microsoft and Intel. In 1981 IBM introduced the world's first PC that raised the curtain on the age of "Ubiquitous Computing". It may be said that the IBM PC was a golden egg for the information industry, but for IBM itself the PC nearly became a grave digger. Before the PC was introduced, IBM had been dominating the mainframe market for a long time. The development and production of the mainframe had always been the core of IBM's business. As a result, although IBM developed PCs, the company did not pay enough attention to them. Hewlett-Packard (HP) exploited this weak point and produced PCs in quantity. With the development of microelectronics technology, the performance of PCs was constantly improved and formed a serious challenge to the mainframe computer, leading to the decline of both relative demand and absolute demand for the mainframe by a wide margin. As an overstaffed organization with rigid and centralized management at that time, IBM did not realize this problem in time. Therefore the company failed to adapt to the great changes in market demand and the technical issues and still focused on research, development and production of mainframes. Meanwhile, after spending a lot of money on buying IBM's mainframes, many enterprises found that those mainframes did not work as expected, due to various reasons. Hence enterprises hoped that IBM would use its own advantage to help them solve the various problems encountered in the use of their mainframes. Since the quality of IBM's

products has been acknowledged by the world, IBM were opinionated and ignored the needs of those enterprises. IBM thought that the quality problem of mainframes belonged to IBM, while whether enterprises could well use the mainframes or not was the enterprises' own problems. This led to the overall nervous relationship between customers and IBM. In the rapid development of the mainframe market in the 1960s, the market was then dominated by sellers. The relationship with customers did not affect the sales of IBM's mainframes. When it came to the 1980s, the situation was completely different: except for the nervous relations, the sales of mainframes showed overall atrophy. What's more, IBM was unresponsive to the rapidly expanding demand in the PC market. By the time that IBM recognized the problem, it had lost the game and fell from being a pioneer in the market and technology to be just a follower, with the global computer market share declining from 36% to 23%. To reverse the tide, IBM began mass production of PCs following HP. But the present cannot compare with the past. In the software industry Microsoft was booming; as to the PC hardware, HP pushed IBM into a corner by price superiority. From 1990 to 1993, IBM was hit by its fourth straight year of billion dollar losses. In 1993 IBM lost $8.1 billion, which hit the bottom line hard, and its stock also hit the lowest level of $12.09. From 1986 to 1993, in just seven years, IBM's stock value reduced by $75 billion and almost all investors lost confidence in IBM. Some media described IBM as a man with one foot stepping into the grave. To bring IBM back from the brink of insolvency into the forefront of the computer business, IBM's then chairman tried to greatly increase the PC output and reduce the production of mainframes, meanwhile dividing IBM into 13 divisions. Each division enjoyed decision-making autonomy, to solve the overstaffing problems and bureaucracy in IBM. But unfortunately the entire endeavor did not turn back IBM's declining tendency. To leave IBM's dying, or to help IBM rise from its ashes like a phoenix? In this life and death choice, indomitable IBMers have chosen the latter. It was with such a macro background that IBM's e-commerce strategy was put forward.

4.1.3   Contents of IBM's E-Commerce Strategy

In April 1993, when the gargantuan company was near collapse, Louis V. Gerstner, Jr. became IBM's chairman and CEO. He analyzed carefully the competitive environment to be confronted by IBM and the growing trend of information technology. Gerstner realized that IBM could not compete with Microsoft in software production; moreover IBM was greatly behind HP in hardware. From the perspective of the developing trend of information technology, Gerstner recognized that the Internet, which integrated hardware and software together, would become an infrastructure of human society in the future. What's more, there were no rivals at this point. Gerstner had previously spent 11 years (1977 – 1989) as a top executive at American Express Co. This experience had given Gerstner a lot. He had learnt the power of e-commerce at least 20 years ahead of

most people. Millions of people could go shopping and enjoy a variety of services just with the American Express Card. Each time a customer paid with the credit card, one electronic transaction was done. It was the global data processing center that makes "a card travels the world", and it was IBM that provided the technical support to this magical transaction model. So once the Internet was introduced, Mr. Gerstner immediately recognized that the mode of transactions applied by American Express Co. would become common, from which IBM could obtain enormous business opportunities. It was a godsend for IBM to lead the information industry once again. Having been the IBM's customer for 11 years, Gerstner profoundly tasted the sweetness and bitterness of being an IBM customer. He was aware of customer requirements more than any IBMer and knew how to make IBM's products and services better.

Based on the analysis of customer demand, competitive environment, the developing trend of technology and their own advantages, IBMers formulated e-commerce strategy for themselves.

(1) Changing from providing products to providing services to society

For a long time, the equipment suppliers and software vendors were only responsible for providing customers with needed equipment and software, but totally lacked concern for how to use them and whether they could be used by enterprises. A large number of enterprises spared no effort to invest in equipment and unrelated software programs, which caused lots of remaining problems calling for urgent settlement. IBM's indifferent attitude to these problems resulted in a nervous customer relationship and also a reduced need for equipment together with a growing demand for service. After recalling the painful experience, IBMers decided to transfer the strategic target to services, so as to promote sales, to promote the improvement of the relationship with customers, and to further stabilize customers and extend the market.

(2) Embracing the Internet overall

Mr. Gerstner noticed that young people were highly keen on the Internet, which indicated its vast potential for future development. The Internet could not only provide convenience for sharing information and communication, but also should be developed into a platform on which to deal with many things in the future. The most important and far-sighted opinion of Mr. Gerstner was that future business activities would be done on the Internet, which would have a far-reaching influence on human society. So he made a wise decision to embrace the Internet overall. In 1996 IBM decided that in the following years IBM would focus on applications of the Internet to make the users capable of managing companies and even conducting transactions on the Internet. That was the initial concept of e-commerce.

(3) Vigorously developing e-commerce infrastructure

Mr. Gerstner thought it impossible that e-commerce could be created out of nothing, or fall down from the sky. In order to develop the real e-commerce, it was necessary to develop the e-commerce infrastructures, including the reform and informationization of business processes, the informationization of Enterprise Resource Planning (ERP), the modernization of Customer Relationship

Management (CRM), the modernization of Supply Chain Management (SCM) and the construction of enterprises' internal networks. All of the above belonged to IBM's strong points, and therefore the company decided to develop e-commerce infrastructure vigorously.

(4) Developing middleware applied in e-commerce

When the enterprise informatization developed to a certain extent, lots of problems like incompatible software and mis-mated hardware would appear, leading to systems that could not continue their normal work or operated with difficulty. IBM hoped to develop some new software systems acting as the connector or interpreter for communications between all the other different software systems. As soon as users become familiar with the skills of communicating with IBM new software systems, they can use all the other bottom-layer software lucidly. The new software systems nowadays are named software middleware. As a strategic decision, IBM decided to develop software middleware which would be applied in e-commerce.

4.1.4   Measures

How to help customers effectively use the already purchased hardware devices became the breakthrough when IBM chose to provide services. Because of this choice, IBM needed to additionally supply software for controlling devices to customers who had purchased devices already, and meanwhile provide new customers with both devices and controlling software. From then on IBM was no longer just an equipment manufacturer, but also a software producer exploring the functions of devices for users. For the implementation of the strategy to transform from providing products to providing services, IBM Software Group was formed by the merger of once three independent departments: software solutions, individual software products and network software. With the market analysis and their own experience, IBM recognized that their devices can be used in many fields. To coordinate with the hardware, CRM was necessary to help enterprises establish and maintain a good customer relationship; ERP was needed to help enterprises to improve business flows and realize the enterprise resource reorganization to get the greatest benefit; SCM was required to assist enterprises to improve the supply and sales process. IBM proposed to provide users not only with the best equipment, but also with the best software. If IBMers could not produce one kind of software, they would purchase such products, even from the competitors; then if possible, just takeover these manufacturers. Under this guidance, IBM successfully completed some acquisitions of SCM, ERP and CRM software manufacturers, which ensured the high-quality software and services.

In 2003, soon after retiring from IBM, Mr. Gerstner delivered a speech in Harvard University, in which he denied his contribution to save IBM. He insisted that it was the Internet that took IBM away from the brink of death, and if there were no new business opportunities created by the Internet, IBM would

unavoidably collapse. Actually Mr. Gerstner only said half the truth. The Internet, which is like a double-edged sword, has double effects. It does provide good opportunities to IBM, but it also pushes companies that make bad use of the Internet to a faster death. Fortunately IBM caught this chance and therefore realized its rebirth.

Embracing the Internet from all sides was the core of IBM's e-commerce strategy. The specific methods are: initiatively making use of the Internet, supplying hardware and software support to customers on the Internet; developing various Internet software applications to help customers manage their companies and do business on the Internet. IBM emphasizes the importance of developing e-commerce by utilizing the Internet. As a result IBM can offer complete e-commerce solutions integrating both hardware and software systems. This business model, different from neither the price competition between hardware franchised stores, nor the upgrade to the latest version of software systems, is aimed at helping customers establish the infrastructure adapted to the development of the information society, so as to offer facilities to enterprises for carrying out more business activities on the Internet faster, better and cheaper.

It is actually a premise for online business to vigorously develop an e-commerce infrastructure. If there is no corresponding infrastructure, what is called e-commerce is nothing but another version of EDI, at most adding some information sharing function. Based on the ideological understanding, IBM concentrates on developing basic software facilities for e-commerce. These basic software systems include:

● CRM. CRM helps enterprises to establish and optimize the business process, to accelerate the response speed of customer service and support and to enhance customers' satisfaction and loyalty.

● ERP. ERP helps enterprises to realize the integration of logistics and the fund flow and to eliminate the unreasonable part of resources utilization, which makes the resource utilization more reasonable, management more scientific.

● SCM. SCM helps customers improve their supply, production, inventory and sales and make a more rapid and precise electronic communication with suppliers and dealers. In this way SCM makes information sharing and decision support come true to guarantee the efficient operation of the entire supply chain.

● TRS. As a database retrieval system of good performance, TRS can be applied to many fields and plays an important role in data management.

● Firewall is the first step in realizing information security, like an entrance guard for the information community, is one of the infrastructures for keeping information safe.

● Office Automation (OA). OA is a software system developed especially for office automation which ensures high efficiency and quality.

● Web Hosting. It breaks through the limits of time and space, and then provides customers with interactive and personalized services.

● E-mail. The robust email management system offered by IBM is a foundational tool to guarantee the smooth information flow and exchange.

In addition, IBM also provides traditional basic hardware devices like the IBM

memory system, IBM PC, IBM mainframes, etc.

Middleware is a bridge that connects operating systems, databases and network applications. In a network environment, middleware sits in the "middle" between network applications and operating systems. In process of informatization construction, enterprises spent a lot of money on buying various hardware devices and software products, especially on operating systems. Due to the differences in the time of informatization construction and the hardware or software vendors, one software system differed from another in enterprises. When these different systems operated independently, enterprises could still cope with them. Once the information systems got access to the Internet, serious defects were exposed. Differing in thousands of ways, network applications were all developed on the corresponding platform in different operating systems. They can work very well on but only on the development platforms, which means that in the other operating systems they may not work at all. Purchasing and installing new operating systems and database would cause not only huge economic waste, but also great difficulties in management. Numbers of enterprises fell into deep trouble. Caught at this very point, IBM decided to develop middleware to coordinate different applications, operating systems and database platforms so that all software systems could work together. IBM hoped its middleware would become the lubricant layer between different operating systems and hardware devices, so as to solve the problems most enterprises were facing. Under the guidance of this principle, IBM strove to develop relevant middleware software. Within ten years IBM has grown into the biggest middleware manufacturer. Since 2003, IBM Software Group has totally completed more than 70 acquisitions[10] that has expanded its scale to become the world's second largest software company only second to Microsoft, making about 45% of the $185 Trefis price estimate for IBM [11]. Foundational middleware products of IBM include:

● WebSphere software

WebSphere is a software system working for the reshuffle and integration of enterprises. Specifically speaking, it is software for SOA environments that enables dynamic, interconnected business processes, and delivers highly effective application infrastructures for all business situations[12]. As the basic platform of IBM's middleware software, WebSphere is the needed IT architecture. Based on WebSphere customers can conduct electronic business affairs. E-commerce, Business Intelligence (BI), CRM and SCM all belong to this platform. In the USA, 90% of top-level commercial banks, 15 stocks and securities brokerages in Wall Street, 87.5% of the biggest domestic telecom companies and 80% of the top insurance companies are using WebSphere. By the third quarter of 2011, WebSphere had created three consecutive quarterly growths of more than 50%, leading all product lines of IBM. Featured WebSphere products are WebSphere ILOG JRules, WebSphere Application Server, WebSphere Portal Server, WebSphere Process Server, WebSphere Studio, WebSphere MQSeries, VisualAge, CICS and so on.

● DB2 software

As a main database software product of IBM, DB2 offers leading industry

performance, scale and reliability on your choice of platform from Linux to z/OS[13]. About 70% of global data are managed by IBM software installed in IBM servers. Data management will still be an area of high-speed growth in IBM. The company has become the fastest growing database provider in the industry, twice as fast as the average. The core products of DB2 include DB2 Universal Database, IBM Content Manager, DB2 OLAP (Online Analytical Processing) Server, DB2 Everyplace, IBM DB2 Date Warehouse Center, IBM Enterprise Information Portal and HotMedia.

- Lotus software

IBM Lotus Software delivers robust collaboration software that empowers people to connect, collaborate and innovate while optimizing the way they work[14]. With Lotus people can drive better business outcomes through smarter collaboration with business partners, suppliers, employees and customers on the web, taking full advantage of e-commerce. Cataloged as knowledge utilization software, the main function of Lotus software is to mobilize the collective wisdom for improving the speed of response and boosting innovations. Among these products, the software series of the cooperation and network application server Lotus Notes/Domino achieves a compound growth rate of 12%. In the field of e-mail and messages, Lotus Notes possesses over 90 million users. The software products in the Lotus series are Domino, Notes, Knowledge Management, Learning Space Same Time, Quick Place, SmartSuite etc.

- Tivoli software

Along with the expansion of technical resources and the gradual development progress of e-commerce, systems in companies turn out to be more and more complex. While the multiplicity of platforms and the diversity of systems are increasing, enterprises are having an increased number of users as well as decreasing IT staff. Therefore the management for companies' systems is more important day by day. Tivoli software, IBM Integrated Service Management, provides smarter solutions and the expertise customers need to design, build and manage dynamic infrastructures that enables them to improve service, reduce cost and manage risk [15]. With the assistance of Tivoli software system, CIOs can exercise centralized management of all technical resources, thus improve the efficiency of IT staff and leave them more time for other jobs. The key products of this series include IBM Tivoli Business Service Manager, IBM Tivoli e-Marketplace Manager, IBM Tivoli Point-of-Sale Manager, IBM Tivoli Security Information, Tivoli SANergy, Tivoli NetView, IBM Tivoli Netcool/OMNIbus, Tivoli Network Manager, Tivoli Internet Services Manager, IBM Tivoli Storage Manager and so on.

On the basis of IBM middleware software, IBM also introduces several packaged solutions orienting 12 industries including financial, banking, insurance, retail, medical treatment and public health, life science, telecommunications, electronics, automobile, consumption goods, energy and public utilities and government agencies. These solutions have effectively sustained the development of industrial e-commerce, meanwhile helping IBM firmly occupy the e-commerce market and become the undisputed overlord in the field of e-commerce.

It must be pointed out that although the IBM e-commerce strategy is foresighted and complete, the implementation and propaganda of the strategy are divided into several steps. In its move to provide services, IBM did not let any competitor smell the flavor of e-commerce. At the beginning, IBM was constructing e-commerce needed infrastructures for users in a down-to-earth manner. Then many enterprises introduced these infrastructures after e-commerce infrastructures were built. At the same time, the Internet was already well equipped for the development of e-commerce. Since everything was ready, IBM raised its hand and issued a rousing call in 1988 with a resounding advertisement "Are you ready for e-business". As soon as the advertisement came out, an industrial revolution represented by e-business got a positive response from governments, enterprises and individuals around the world, which all rely on IBM e-commerce infrastructures. From then on, IBM began to enjoy the infinite interest that e-commerce brought for it.

4.1.5   *Strategic Positioning and Implementation*

In the early 1990s, nearly all people felt IBM was no longer a viable player in the industry. The formulation of IBM e-commerce strategy is exactly for the revitalization of IBM. IBMers plan to use e-commerce to regain the leading position in the information industry and turn into the IT pioneer once again, which insures IBM will be back at number one in the Internet era. From such a strategic positioning, the manner, courage and insight of this Big Blue can be seen distinctly.

The facts speak for themselves: IBMers have made it. In 2004 the operating revenue of IBM reached $96.5 billion USD and the operating profit came to about $8 billion. What's more important was that IBM found the way forward for itself. IBM established a close alliance with large enterprises around the world, which laid a solid foundation for further development.

The only pity is that IBM had bad dealings with individual customers. The PC, the permanent pain for IBM, almost put an end to IBM in the 1980s – 1990s. From the late 1990s to the beginning of the 21st century, the PC, which never brought good luck to IBM, became a heavy financial burden once again. To coordinate with the strategic transformation from providing products to providing services, IBM recombined all its business through various means like mergers, division and divestment, so as to highlight the core business adapting to the global competitive environment. In the field of software and consultancy, IBM launched large-scale acquisitions to step into new domains in the shortest time. For example, in the field of software, IBM mainly focused on enterprises with core technical innovations, especially those influential enterprises in the middleware and database market. On December 6th, 2002, IBM took over Rational, a software company supplying test, design and management products for $2.1 billion, and formed a strategic alliance with Edwards, which specially provided commercial

application software to SMEs. With regard to the non-core business, hardware which caused a heavy economic burden, IBM adopted active pruning measures. IBM negotiated with Hitachi about transferring hard disk business departments to Hitachi for $2.05 billion in 2002. In December 2004, IBM sold its PC business to Lenovo at a price of $1.25 billion.

The transaction of the IBM PC department is of great significance, no matter to IBM or to Lenovo. Via this acquisition, Lenovo has soared to third largest worldwide PC manufacturer next to DELL and HP. At the same time, this transfer of possession means IBM has taken a key step towards the final strategic transformation through 6 years of effort. It can even be said that the victory of IBM strategic transformation is in sight.

According to the fourth quarter and the entire fiscal year of 2008 announced on January 20th, 2009 in the USA, the gross sales of IBM during 2008 (fiscal year) reached $103.6 billion USD, 5% more than 2007, 2% more excluding rate of exchange. The net profit was $12.3 billion with a comparative growth rate of 18%. So far, no matter in terms of business operation or corporate image, IBM has successful transformed from a hardware manufacturer to an information technology services company that solves problems for customers. On May 18th 2010 Gartner, Inc. released a core research note that proposed Magic Quadrant for e-commerce[16] (Fig. 4.1). Compared with many well-known congeneric products, IBM Websphere Commerce was located in the "leaders" quadrant, superior to almost all competitors.

It is expected that the new IBM without the PC burden will travel to a more brilliant future. Meanwhile, Lenovo, the company starting out in sales of PC's, will make full use of its own superiority in the hardware market and the brand advantage of IBM to build up another global information giant.

IBM's e-commerce strategy enlightens everyone: innovation is the soul of an enterprise, especially an enterprise leading the industry. Any enterprise that wants to develop cannot live without continuous innovation. In other words, once the innovation stops, an enterprise will travel towards a standstill, even death. As a result, taking innovation as the soul of an enterprise should be kept in mind and the formulation of strategies must conform to the developing trends of society. That is why IBM's strategy has met with success. It accords with the developing direction of the Internet and related technologies, as well as the developing trend of society. What's more important, the correct strategy has been executed unhesitatingly and persistently. To formulate a correct strategy is not easy, while the implementation of a strategy has proved to be more difficult because of underlying resistance. It is necessary to capture the breakthrough point, and then carry out those established strategies drastically. Sound strategies including e-commerce strategy have created a huge stage for the elephant named IBM to dance.
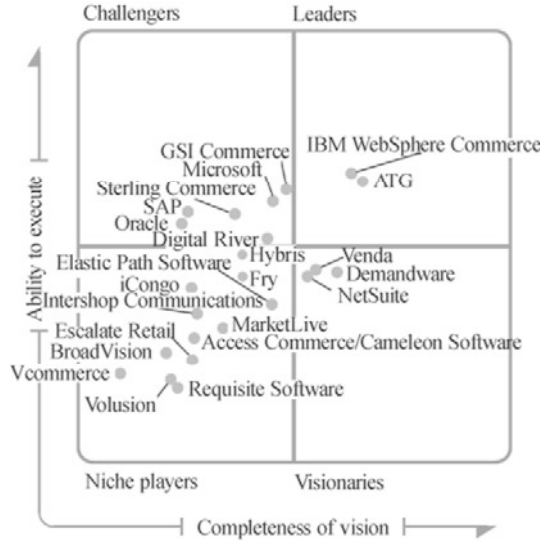
Fig. 4.1   Magic Quadrant for e-commerce
(Source: Gartner; May 2010)

4.2   GE: Revolution in Traditional Industry

As the giant in the IT industry, IBM's e-commerce strategy serves as a reference for enterprises in the information industry. How about traditional enterprises? How should they formulate their own e-commerce strategies? Now let us take a look at GE's e-commerce strategy. From IBM, we have found that an enterprise must adapt to market change, otherwise it would soon be eliminated. GE actively takes actions to meet the needs of the market and develop itself into the world's second biggest manufacturer. Although GE and IBM are totally different enterprises, there are some similarities which can bring us much inspiration.

4.2.1   GE: the Giant in Traditional Industry

GE is an American multinational corporation headquartered in Fairfield. GE was established by Thomas Edison in 1880s. At the beginning, there were only dozens of employees and a few hundred thousand dollars. Now GE has developed a multinational corporation with 304,000 employees and $782 billion total assets. In 2010, the revenue of GE was $150 billion with a net income of $12.6 billion. GE's divisions include GE Capital, GE Energy, GE Technology Infrastructure, NBC Universal and GE Home & Business Solutions. Through these businesses, GE participates in a wide variety of markets including the generation, transmission

and distribution of electricity, lighting, industrial automation, medical imaging equipment, motors, railway locomotives, aircraft jet engines, and aviation services [17].

Different from IBM, GE has been developing very smoothly although it also went through many historical turning points. GE has been constantly taking action to adapt to changes in the market and realize development unceasingly.

As far as GE, we have to talk about "six Sigma", the management guideline of GE. "Sigma" is a statistical term used to measure the deviation. The "six Sigma" seeks to improve the quality of process outputs by identifying and removing causes of defects, and minimizing the variability in manufacturing and business processes. A set of quality management methods including statistical methods are used in the process to create a special infrastructure[18]. Although the "six Sigma" was originally developed by Motorola, GE is the best to make use of "six Sigma". Now GE uses the "six Sigma" throughout everything the staff do and every product GE designs. The "six Sigma" has become GE's operation mode. Because a six-sigma process is one in which 99.99966% of the products manufactured are statistically expected to be free of defects, the "six-Sigma" effectively guarantees the stability of the product quality.

Culture is one of the key factors to success. GE's culture is well worth all business personnel learning about. GE's culture mainly includes: adhere to honesty, pay attention to the performance, be eager to change, measure the success by customers' success, insist on "six Sigma" quality standards and keep innovating. Meanwhile the culture helps GE quickly adapt to e-commerce trends faced with the shock of e-commerce.

In the 1980s, with more and more fierce competition, enterprises could not earn profits just by grabbing market share. Welch, GE's chairman, was keenly aware that in such a market environment, the potential of value growth had transferred from the market share to customer services and the profit had transferred from the product itself to the process after products were sold. So Welch launched the timely idea of providing the total solution for customers and put it into practice, which was ten years earlier than IBM. The so-called solution was to provide services besides products. With regard to IBM, the service was to solve actual problems by making use of IBM's mainframes and PCs. For GE, the service was to solve actual problems when using GE's products, especially financial services. GE was able to provide consumers, producers and middlemen with a wide variety of financial services such as all kinds of insurance for enterprises and individuals, provide credit operations for retailers holding credit cards, automobile leasing and renting for dealers and saving business for consumers.

When people were all attracted by IBM, Microsoft, Intel, Yahoo, Amazon, Google, Cisco and other Internet enterprises, GE shocked those who worshiped the new economy again. In 2000, GE was named as "E-Business of The Year" by Internet Weekly Magazine, America's most famous Internet and information technology magazine. The chief editor said "the main cause of GE's success was that GE had transferred its sales and investment of billions of dollars to the Internet at the fastest speed". In addition, GE has high corporate recognition. In

2004, GE was named as No.1 Company for employers and employees on the Forbes 500 Global Player list. In Fortune Magazine's 2005 "Global Most Admired Companies" list, GE ranked first overall. In 2006 and 2007, GE ranked No.1 in Fortune Magazine's "America's Most Admired Companies" list again[19,20].

4.2.2   Background of GE's E-Commerce Strategy

Implementing e-commerce is GE's another active action of adapting to social development and market reform. Different from IBM's background of passively taking actions, GE is totally active. Welch was called the greatest manager in the 20th century. One of his important guiding principles is to change before you have to.

At first, Welch did not recognize the importance of e-commerce. At that time, many people doubted whether e-commerce could make money. Even some people were afraid of computers and the Internet. One member of Daimler Chrysler Board, Jurgen Hubbert had even said "Why jump into this business when nobody makes money?" Jack Welch even said "I was afraid of it because I could not type". Many companies feared e-commerce would become a burden. By adding the click-element to business strategies, huge additional costs on web sites and technology would appear. Besides, the cost of fulfillment (picking, packing and delivery) would be a major killer. Many doubts prevented GE from joining the bandwagon of e-commerce. But this did not influence the development of e-commerce. In June 1998, Schwab's web site handled about 600,000 secure transactions a day. However, the site handled well over 7 million secure transactions a day in November 1999, just less than one and half a year later. Schwab conducted two-thirds of its trades over the Web taking in 4.7 million dollars a day. Gradually, Jack Welch realized what GE had missed. Jack Welch said "If we do not embrace it and make it as engrained as breathing – we may be taking our last breath", in January 1999. In addition, Jack Welch addressed his annual speech to shareholders in which he stated the importance of e-commerce again on April 26, 2000. In the speech, Jack Welch said, "the 'new economy' and 'old economy' are just popular terms. However there is only a global economy no matter at present or in the future. Any company, whether old or new, could be on its last breath, if it does not see the technology of e-commerce as important as breathing. But for those of us including GE, who can capture it, the rewards of e-commerce would be greater than we can imagine".

In this background, GE realized the importance of e-commerce and began to implement e-commerce. As we knew, GE was always committed to achieving the leadership. If the business was no longer No. 1 or No. 2 in its industry, the department would be rectified, sold, or closed. It made GE become the world's most powerful conglomerate company. To reach and maintain the leadership position, GE's ongoing growth and strategy was focused on four key initiatives: Workout, Globalization, Six Sigma and Services (Fig. 4.2). But in 1999, e-commerce was taken as one of the key initiatives.

Fig. 4.2   Five initiatives of GE

● Workout

Workout was the oldest initiative at GE, which could go back to the early 1980's. It has become GE's operational way, deeply ingrained in GE's culture.

● Globalization

Globalization was taken as the key initiative in 1985. GE tried to find new markets for products and services and the most competitive sources of finished products, components, and raw materials by globalization.

● Services

What's more, GE aimed at transforming from an engineering company into a service firm and took "product services" as its key initiatives in 1995. In order to achieve the goal, GE was committed to creating service platforms to support high-tech products and equipment.

● Six Sigma

The "Six Sigma", referred to before, was used to eliminate the variability in the process and optimize the quality and taken as its key initiatives in 1996. In addition, GE used Six Sigma to help distinguish between work which was absolutely necessary to the quality. Through this methodology, GE has developed and delivered much-improved products and services. It is estimated that GE has trained more than 100,000 people in Six Sigma and completed 500,000 projects [21].

● E-commerce

E-commerce was taken as one of the key initiatives in 1999. Its goal was to utilize Internet-based workflows wherever possible to eliminate process friction and streamline the process of GE. GE had invested $10 billion in IT since 1998 to make digitization a vital part of the company. GE expected to make use of e-commerce in all aspects of the business — from the "make" side of internal process digitization, to the "buy" side of sourcing and procurement, and finally to the "sell" side of customer transactions and services.

In addition, workout, globalization, Six Sigma and product services were the foundation for the development of e-commerce. Only when all the four initiatives were shaping a leaner conglomerate, could e-commerce be well developed.

4.2.3   GE's E-Commerce Strategy

Through its e-commerce initiatives, GE expected major improvements in both the buy side and the sell side of the business. On the buy side, e-commerce strategy aimed at carrying out the whole negotiation process on the web and performing transactions electronically with GE's suppliers. The strategy also planned to achieve complete automation of the selling process, including customer services and order taking. We could just subdivide the goal into seven themes as follows [22]:

● Make it easy to do business with a unified face to the customer.

● Develop a process enterprise which was intenerated around the customer.

● Focus on outside-in services instead of just manufacturing products inside.

● Use flexible business process outsourcing to integrate virtually.

● Make the business agile which means to respond to uncertain economic events quickly.

● Make use of digital cockpits to monitor, act and control events.

However, how to convert these themes into business processes was critical in the practical implementation. In order to translate these strategic themes into processes and applications, strategic contents and guidelines in details were needed. The details of GE's e-commerce strategy had been stated in Welch's speech.

(1) Accepting the existence of e-commerce

Accepting the existence of e-commerce means to actively take actions to utilize e-commerce. There should no excuses such as channel conflict, immature market, and immature customer base to prevent the enterprise from developing e-commerce. E-commerce was the new thing at that time. Due to lack of enough experience, there must be some doubt about e-commerce itself and concrete implementation. But do not let these fears hinder the pace. GE should encourage employees and customers to actively adapt to the environment by training, educating and so on. Meanwhile, with the introduction of new e-commerce strategy, GE should balance interests of different sectors and persuade all of them to utilize e-commerce. For example, the sales force may feel threatened that after customers learnt how to use GE's websites to directly place orders, they might end up losing their jobs. So GE should encourage the sales force to accept the existence of e-commerce in some ways. For example, GE should offer a bonus to salespeople who helped customers use GE's website. In addition, members of the sales force were also educated as to how the Internet would benefit them as well as customers.

(2) Seizing the opportunity by making use of e-commerce technology

In the period when the market changes relatively slowly, the market opportunities may continue for a few of years. However, the opportunity seldom appears twice in the age of the Internet. The information could quickly spread to anyone, anywhere, at any time in a short time through the Internet. An opportunity a company lost may become the one that another company could make use of. Any company which did not seize the opportunity by making use of e-commerce technology may fall behind and face a survival crisis. So GE should well utilize

e-commerce to reduce the cost, integrate diverse businesses, and provide qualified services. Meanwhile, GE should undertake strategic investment in Internet companies making use of GE's advantages.

(3) Taking the advantage of the fast speed of the Internet

Introduce the principle of fast speed to accelerate the development of each business. In the age of the Internet, the opportunity was fleeting. If the company could not respond quickly, the opportunity may disappear. So the company should improve the management efficiency. Meanwhile, GE could take advantage of the fast speed of the Internet. Once e-commerce was carried out, the customer could get the service in a fast and efficient way anywhere and at any time. In addition, the company could immediately get the response from customers. With the fast response, GE could provide quality services and products to the customer, which further improved the development of GE.

(4) Establishing the KMPI to be compatible with e-commerce environment

On the buy side, online bidding and the balance between total online purchasing amount and the amount saved through e-commerce should be measured. On the product side, the delivery speed, information collection and so on should be taken into account. As far as the selling side, the visit record, online revenue, new customers, market share and so on should be measured too.

4.2.4   Implementation of GE's E-Commerce Strategy

GE was typically a fast follower in consideration of its falling behind at the beginning. In order to get the momentum of e-commerce, GE had to quickly muster support. Meanwhile, GE shifted the paradigm, from old economy comparisons such as Lockheed Aircraft, Maytag Washers, Sony Televisions and BASF Plastics to new economy comparisons such as Yahoo, Amazon and AOL. In addition, GE focused on practical applications such as industry-specific systems in order to provide better products and services. Meanwhile, GE planned to operate all the businesses through the Internet including selling, buying and designing products. GE's e-commerce platform was based on B2B architecture, which could be divided into three parts: a buyer's market – GE and vendor trading platform; the seller marketplace – GE and its customer trade market; and self-party platform – GE operational platform among departments. Meanwhile, GE also provided various e-commerce solutions to others according to its experiences. Under its e-commerce strategy, GE had also introduced a series of measures (Fig. 4.3) [23].

● e-Buy

The e-Buy was meant to purchase materials online. The e-Auctions allowed suppliers to prepare and submit online bids for request for proposals (RFQs). In the e-Auction, the time of the price negotiation cycle was significantly reduced and the supplier approval process was simplified by quickly eliminating non-competitive suppliers. Meanwhile, the RFQ process was standardized and streamlined which reduced a great amount of transaction cost. In 1999, the

e-Auctions saved about 20% transaction costs. In addition, the supplier could directly connect with the GE systems. Take GEPS as an example (Fig. 4.4). The supplier could connect the database servers through some portals such as Yahoo.com, GE.com and gepower.com. With secure access to GEPS Intranet via Internet, the suppliers could connect internal GEPS database servers and get the internal data. Moreover, GE provided a lot of applications such as on-line auctions, electronic invoicing, supplier scorecards, milestone tracking, e-Logistics, e-Marketplace and e-Packing list. Take the electronic invoicing as an example. Through electronic invoicing, suppliers could view invoice information and payment status online without waiting for mailing time to arrive at accounts payable. In addition, there would be less possibility of error because of no manual data entry at accounts payable. All these Internet operations replaced paper-based processes.
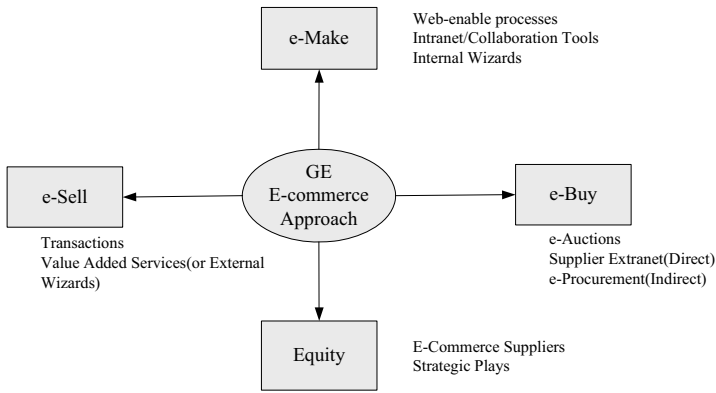
Fig. 4.3   GE e-commerce approach
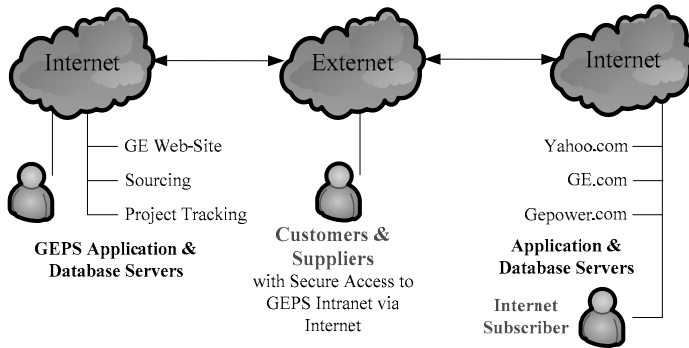
Fig. 4.4   Suppliers example of GEPS

● e-Sell

The e-Sell generated revenue for GE through three aspects: online transactions, adding value to what currently offers customers and forcing GE to change its behavior and become more competitive based on customer use of the Internet. The Internet became a critical source of real-time customer/GE interaction and relationship management. Through the Internet, GE built on its image of "provider-friendly, stable partner, 24*7". Customers could also get access to GE's internal database in a similar way to GEPS referred to above. Take GE Polymerland as an example. It served as an online sales& data portal with strong design, research and order status capabilities. People could buy things online and the portal could also provide the information to help customers find out the potential goods. In addition, GE could make use of the data to understand the customer demands, design the products and do the proper research. There were about $1 billion online sales in 1999 and $7 billion in 2000.

● e-Make

The e-Make was meant to eliminate manual activities to improve and simplify the workflow process. GE tried to create a paperless work environment. GE used the electronics devices to automate the manufacturing and collect the necessary information. The information and data could spread and be shared in the whole company through the Internet for analysis. The e-Make could provide better and faster information and reduce support resources. Above all, digitize everything. GE almost saved 40% to 50% of the cost of the manufacturing process during 2000.

● Equity

The equity included two aspects, e-commerce suppliers and strategic plays. GE tried to reach a strategic cooperation agreement with suppliers. Meanwhile GE made especially a lot of strategic equity investments in e-commerce, including relevant technologies.

It is seen that GE implemented its e-commerce strategy in all the aspects of the organization to eliminate paperwork and run operations a lot more efficiently. During the process, it's necessary to provide the employees with e-commerce training and help them adapt to the changes in the business environment. To successfully implement its e-business strategy, GE had to deal with some cultural issues too. It had to ensure smooth operations and build good relationships with customers. GE paid a lot of attention to cultivating the habit of shopping online.

4.2.5   Benefits to GE's E-Commerce Strategy

GE is not an IT enterprise but a representative of traditional enterprises. Different from IT enterprises, GE's e-commerce positioning is to improve production efficiency and reduce the cost in order to become the leader in the era of e-commerce. It mainly focuses on production, which is very suitable for GE. In the development of e-commerce in GE, Welch actively asked all business sectors

to work out a complete set of practical e-commerce strategies, implementing programs and work plans. Now all of GE's businesses can be available through the Internet.

The e-Buy trading platform means all of GE's suppliers can bid online, which greatly reduces the supplier's price and further reduces the costs of GE. Now GE online purchase value has reached more than $15 billion, including various types of office equipment and materials such as office furniture, fax machines, copiers, etc. In 2000, each GE transaction cost was about $50 – $100 and the transaction costs as a whole were about $200 million to $400 million. But each transaction cost online was just $5. If all the transactions were done online, GE could save almost $ 20 million.

As far as the e-Sell, consumers can shop online and order anything they want anywhere they have the Internet. All of GE's products can be found in GE's e-Sell trade platform. In the first year of implementing e-commerce, the sales online had reached nearly $1 billion, which increased to $7 billion in 2000. E-commerce reduced a great deal of the transaction cost, almost $1.6 billion. After putting the order services online, customers did not need to call GE any more. The inquiry cost online was only 20 cents per treatment while that of a consulting telephone call was up to $5. GE had to handle more than 2000 million telephone calls each year. By implementing e-commerce, it could reduce transaction costs by $96 million.

In addition, GE's overall organizational structure has been restructured and reorganized. With the implementation of e-commerce strategy, all of GE's business processes have been automated based on the Internet. All the business information such as manufacturing information can be quickly collected and shared in the whole company through the Internet. Moreover, GE has provided a series of e-commerce services such as Commercial Distribution Finance (CDF) and Customer Online Management System (COMS).

Now GE's aircraft engine department has achieved annual sales of over $10.6 billion by implementing e-commerce. Meanwhile, the department put the list of all kinds of components onto the Internet so that customers could inquire about the price and delivery situation of the product ordered anytime they wanted. In addition, the supplier could directly arrange the delivery time and deal with the orders on the Internet. Moreover GE's medical equipment department could provide for the cooling device application services online. For example, the salesmen could install the magnetic imager with the technical personnel on the user side through the Internet.

Above all, e-commerce brought fast development for GE. Its revenue in 2004 was $15.24 billion with more than $150 million profit. The expenditure on sales and administrative management was reduced by about 20%–50% by implementing e-commerce. The benefits of advanced productivity brought by e-commerce could not be accurately calculated, which was estimated at least $20 million. During the financial crisis, GE still earned about $30 billion and generated $36 billion of cash in 2009[24]. After experiencing the financial crisis, GE still earned $3.9 billion in the fourth quarter of 2010, up 33% from the fourth

quarter of 2009 [25].

Although GE was not the first enterprise to make use of e-commerce, it was one of the best enterprises to implement it. GE has become the paradigm of implementing e-commerce right now. Meanwhile, GE is committed to provide the e-commerce solutions, selling tens of thousands of e-commerce software applications. From the entire history of the development of GE, we can see that enterprises should pay attention to their own characteristics when formulating and implementing e-commerce strategy. Considering GE is a manufacturing enterprise in essence, GE positions its e-commerce strategy on improving the production efficiency, which is an important reason for GE's success.

Exhibit 0.1 Jack Welch's speech presented at the GE's 2000 annual meeting
"Reality in the Internet world means moving at a fanatical, maniacal pace everywhere in GE!"
Presented at the General Electric Company 2000 Annual Meeting, Richmond, Virginia, April 26, 2000

Once again I would like to welcome all of you to our Annual Meeting. Thanks for coming, and thanks in particular to our Richmond share owners for their gracious hospitality to our Board of Directors.

We've always been warmly received in the different GE cities we visit every year for this annual meeting, and one of the reasons is because of the things GE employees do in their hometowns all year round.

GE Financial Assurance, or GEFA as we call it, located here in Richmond and led by CEO Mike Fraizer, is the eleventh largest net income business in the Company. It is only five years old, yet in those five years GEFA employees; many of them new to GE, have warmly embraced the GE tradition of volunteerism in the community and have worked to improve life for people here in the city of Richmond.

In the schools, GE mentors from the Elfun Society, a company-wide organization of GE volunteers, working with a five-year $1 million grant from the GE Fund, are aiming to double the college-bound rate of the students at John F. Kennedy High School. I visited the high school yesterday and met with its students and principal Frank Butts, a great guy and an education zealot who is with us here today. This mentoring program at JFK is a best practice learned from Elfun chapters in several other GE cities. Nationally, this program has enabled more than 5,500 kids who probably would never have gone to college to do so.

The Richmond chapter of Elfun works with younger students as well. GE employees run a hands-on after-school science program with its partners at the Science Museum of Virginia. And 350 GE employees from Richmond took busses to North Carolina last summer to do volunteer work at the Special Olympics World Summer Games in North Carolina.

Again, nationally, Elfuns in every GE town do more of the same, and each year deliver more than a million hours in volunteer service. They certainly are one reason why, just two months ago, Fortune Magazine named GE "America's Most Admired Company" for the third year in a row.

A technology change, massive as it is, doesn't mean abandoning traditional management concepts. What it does mean is adapting those business principles to the transformational world of the Internet.

Every year 340,000 GE employees around the world send me to this meeting armed with terrific numbers, and this year is no exception. In 1999 GE

• Revenues were up 11% to $112 billion — a record.
• Earnings increased 15% and broke the $10 billion level for the first time.

The total return on a share of GE in 1999 was 54%. Over the past 5 years, this return has averaged 46%, more than 60% better than the S&P 500 for the same period.

In the first quarter of 2000, results from operations were even better: Revenues were up 24% and earnings were up 20%.

Finally, on numbers, this is my twentieth annual meeting and the fifth time I will ask for a stock split, this time three for one.

We employees have always considered a split a celebration, and we hope you do as well.

I closed the annual meeting last year in Cleveland by saying to our share owners: "The next time we gather again in April of 2000, as GE begins operations in its third century, you can be certain that your Company will never have been newer, fresher or more energized."

I had a lot of confidence then, but I didn't know that this would turn out to be a massive understatement. I didn't realize that in less than a year a phenomenon that was rumbling across the operations of our Company would erupt with a transformational energy that is changing the very kind of company GE is.

You have undoubtedly read about the ongoing debate about "new economy" companies versus "old economy" companies and the advantages, or penalties, for being one or the other.

The fact is the old economy – new economy scenarios are just trendy buzzwords. There is now and will be in the future only one global economy. Commerce hasn't changed.

There is, however, a new Internet technology that is fundamentally changing how business operates.

But a technology change, massive as it is, doesn't mean abandoning traditional management concepts. What it does mean is adapting those business principles to the transformational world of the Internet.

This morning I want to explain what adapting these traditional management principles means to all of us in GE.

Let's start with the decades-old GE principle of reality, seeing the world the way it is, not the way we hope it will be or wish it to be.

Seeing reality for GE in the '80s meant a hard look at a century-old portfolio of business, insisting that every business in GE be #1 or #2 in their global markets or that they must be fixed, sold or closed. Taking action on this #1 or #2 reality brought us to where we are today: the owners of the most exciting and powerful array of global businesses in the world.

Seeing reality today means accepting the fact that e-commerce is here. It's not coming. It's not the thing of the future. It's here. Reality today means "go on offense." One cannot be tentative about this. Excuses like channel conflict, or "marketing and sales aren't ready," or "the customers aren't prepared" cannot be allowed to divert or paralyze the offensive. Moving aggressively raises some thorny issues with no clear and immediate solutions, but the challenge is to resolve these issues on the fly in the context of the new Internet reality. Tentativeness in action can mean being cut out of markets, perhaps not by traditional competitors but by companies never heard of 24 months ago.

Reality in the Internet world means moving at a fanatical, maniacal pace everywhere in GE!

The second management concept that has guided us for the better part of two decades is a belief that an organization's ability to learn, to transfer that learning across its components, and to act on it quickly is its ultimate, sustainable competitive advantage. That belief drove us to create a boundaryless company by delayering and destroying organizational silos.

Selflessly sharing good ideas while endlessly searching for better ideas became a natural act. We purged NIH — not invented here — from our system, creating a company with an insatiable desire for information. All this was done the hard way, before the arrival of the Internet. Today, with the Internet, information is available everywhere to everyone, and a company that isn't searching for the best idea, isn't open to ideas from anywhere, will find itself left behind with its survival at stake.

Another management concept that served us very well over two decades was the belief that an organization that was not only comfortable with change but relished it – saw it always as opportunity, not as a threat – had a distinct advantage in a world where the pace of change was always accelerating.

We became such a Company, but we had the luxury of learning to become one when the pace of change was comparatively glacial and the windows of opportunity often hung wide open for years.

In the late 1970s and early 1980s, we experienced the Japanese inroads on many of our traditional businesses, realized that our future was no longer in many of them, and moved into businesses that were immune to this assault while we restructured the Company. We did this, but we had almost a decade to get it done.

When Europe experienced doldrums and dislocations in the early 1990s, we moved quickly to partner with European firms whose future we believed in. The best opportunities this time were around for only two or three years.

Then Asia in the late 1990s experienced again economic dislocation and again sudden opportunities to partner with great companies with great futures from Japan to Thailand. The very best of these opportunities were gone in a year.

You see the pattern.

Today, in the midst of this Internet revolution, the opportunities presented by change open and close on a weekly, even daily, basis, which brings us to another management tenet — speed.

Relishing change in itself is not enough if we aren't institutionally fast enough to capitalize on it. The need for speed and more speed has been driving this management team for two decades, for the competitive advantage it always brings and for the sheer excitement and fun it imparts to every aspect of business. Our endless assault on bureaucracy, hierarchy, layers, boundaries and every other manifestation of corporate nonsense has made us much faster than we ever thought a big company could be, but that qualifier — a "big company" — was always there. The most daring true boast we could make about GE's speed was that we had become "the fastest elephant at the dance." Today, with the digitization of every process, every operation, every customer touch of every GE business around the globe, we are in the process of taking this Company to levels of speed, agility and performance we could only dream of just a few years ago. There is no time for lengthy evaluations of Internet opportunities. We have to pounce — every day.

We have the hard part, hundreds of factories and warehouses, world-leading products and technology. We have a century-old brand identity and a reputation known and admired around the globe, all attributes that new e-commerce entrants are desperate to get.

And we have one other enormous advantage — Six Sigma Quality — the greatest fulfillment engine ever devised.

Six Sigma is a quality process methodology that more than 100,000 GE people have been trained in and have been working at with great success for five years. Six Sigma fits like a glove with e-commerce because it allows us to produce and deliver just what customers need when they want it. Six Sigma Quality defines the ultimate in customer fulfillment and satisfaction, just what e-commerce requires.

The final and most basic management tenet is measuring progress. GE has for years, like every other company and business school, measured revenues, net income, cash flow

and the like and will continue to do so.

In the Internet world, we measure new things, in some cases things we never even heard of a couple of years ago and we measure most of them daily. We group these measures in what we call buckets... 4 buckets: buy, make, sell and strategic.

On our "buy" side, we now measure the number of auctions on line, the percentage of the total buy on line and the dollars saved.

On the "make" portion, the Internet is all about getting information from its source to the user without intermediaries. The new measurement is how fast information gets from its origin to users and how much unproductive data gathering, expediting, tracking orders and the like can be eliminated. This tedious work in a typical big company is the last bastion — the Alamo — of functionalism and bureaucracy. Taking it out improves both productivity and employee morale.

On the "sell" side, the new measurements are number of visitors, sales on line, percentage of sales on line, new customers, share, span and the like.

Strategically, the breadth of our business portfolio exposes us to a very wide range of emerging companies, many of them Internet based. This intimate knowledge has enabled us to make successful strategic investments in over 250 companies.

We are convinced that if we get these new buy, make, sell and strategic measurements going in the right direction, the traditional sales, net and cash flow measurements will follow, as will our relative stock market performance.

In the end, all of this going on at GE is about using this transformational new technology to better serve customers and to be so good and so fast we become the global supplier of choice.

So, to conclude, I'd like to remind you once more that there is very little, if anything, new in management today and that this "new economy" and "old economy" which we hear about incessantly are just labels invented by pundits.

There is, however, something new and something very real that is changing the pace and scope of business as it has never been changed before. Any company — old or new — that does not see this technology as literally as important as breathing could be on its last breath.

But for those of us, including GE, who are capturing it, are energized by it and see it as the greatest opportunity in our history, the excitement is like nothing we've ever experienced and the rewards promise to be greater than we can imagine.

The Internet truly makes the old young and the slow fast, and what could be a better tonic than that?

This is a wonderful time to be part of GE. I've never been more confident that our most exciting days lie ahead.

Thanks for listening.

4.3   Googlism

Different from IBM and GE, Google is a totally Internet company. After its establishment by Larry Page and Sergey Brin in 1997, Google has been the world-renowned search engine. With fast and accurate search results, Google has occupied 80% of market share in the United States. Now Google can not only provide web searches but also offer many kinds of content searching such as pictures, news, videos and maps. In addition, Google has expanded its businesses

to Gmail, Android, Ads, chrome and so on. But all the businesses are related to Google's main business-search engineer. Google's e-commerce strategy also aims at taking advantages in search engineering to find more useful information for enterprises and consumers.

4.3.1 Google: A Rising Star in the Internet Age

Google is a multinational public cloud computing, Internet search and advertising technologies corporation, which hosts and develops a number of Internet-based services and products. Google was established in January 1996 when its founders, Larry Page and Sergey Brin carried out a research project as PhD students at Stanford University. They were committed to creating a new technology 'PageRank' to analyze the relationship between websites by determining a website's relevance with the number of pages.

Since its establishment, Google has had fast development. Google became the search engine of "Yahoo" instead of "Inktomi" in 2000. In September, 2000, Google became the search engine of Netease (China) too. Now Google has become the best search engine in the world. According to a marker search published by comScorce in November 2009, Google was the dominant search engine in the United States market, with a market share of 65.6%[26]. Google has indexed trillions of web pages, so that users can search for the information they desire through keywords. The quantity of queries reaches over 1.5 million every day and the user would on average login on Google 13 million times a month which makes Yahoo fall far behind. But these simple "searches" have huge business opportunities behind them. To connect the search engine with the advertisement can accurately deliver the product advertising to target consumers. When viewing the search result, people would accept some advertisement unconsciously. Therefore, selling search technology, keyword advertisements and bidding rank become the universal pattern of the search engine. According to Google's annual report in 2008, 99% of Google's revenue was derived from its advertising programs. In the 2006 fiscal year, Google reported $10.5 billion in total advertising revenues and only $112 million in licensing and other revenue [27].

Google is not a traditional IT enterprise but an Internet enterprise entirely dependent on the Internet. Google is almost considered as the pronoun of search engines. But in terms of business flow, Google is also the most successful and effective e-commerce company. According to Associated Press, Google had about 1.5 million advertisers in the United States in 2010. Meanwhile, its number of global employees had reached 21,805 in 2010 and the number will increase as the business expands[28]. The revenue in 2011 reached $37.9 billion with a year-to-year growth rate of 24%. Total advertising revenues in 2011 reached $36.5 billion, accounting for over 96% of the total revenue [29].

But these figures are not the sufficient conditions for Google's being a successful e-commerce enterprise. The key factor of Google's success is its

unceasing innovation in the business mode and fast developing technology. Although Google develops e-commerce successfully, there is no obvious e-commerce strategy for Google. We tried to analyze and summarize different aspects which would have an important reference value for Internet enterprises.

4.3.2   E-Commerce Strategy of Google

Google is a complete and thorough Internet corporation with no other business besides Internet business. Google realizes innovation in the profit pattern, behavior pattern and enterprise culture has a far-reaching impact on Internet users.

● The innovation in profit pattern

Google's revenue is almost all from its advertising programs. But its advertising is not as simple as what we see in the streets or on the TV. Google creates the pay-per-click (PPC) model with strong ability to organize and search information. Once the user clicks the webpage, the website owner would pay Google $0.05. But if the user does not click, the enterprise needs pay nothing. The advertising fee is so little that most enterprises can afford it, especially those medium-sized and small enterprises (SMEs). The pay-per-click model is very flexible and of low cost. Google has no customer-service representatives because any question can be solved by the online support system. In addition, the customer can set the search condition by himself to obtain the information he wants more quickly and conveniently. Meanwhile, the customer can alter the keyword or search condition at any time which is very flexible. Moreover, Google has implemented various innovations in advertising methods. In order to find the user interest and target advertisement more accurately, Google acquired the DoubleClick Company for its publishers and advertising agencies. Google also launched a series of products such as Google Analytics, Google AdWords and Google AdSense. Among these products, Google Analytics allows the website owner to track where and how people use their website and do in-depth research to make users get what they want easily. Google also allows third-party websites to embed its search engineer.

● The innovation in search pattern

In the past, people thought the more frequently a keyword appeared in a document, the more significant the document was. Instead, Larry Page and Sergey Brin, Google's founders, think that a document's search ranking should be determined by the frequency of the document appearing on other websites and the credibility of these websites. Whether a website is important or not should be evaluated by craft brothers, which is more objective.

● The innovation in the software and hardware

Why people favor Google is because of Google's fast speed. To realize the quick retrieval, an effective search algorithm is necessary. In addition, high performance computers are also essential. But if you think computers Google is using are the most advanced supercomputers in the world, you are wrong.

Google's search system is composed of tens of thousands of second-hand computers which are connected together to form the server. But its performance is three times better than the world's fastest supercomputers. Google processes over one billion search requests every day.

● The innovation of search functions

Google's keyword can be the phrase or the sentence which brings in more convenience for the search. But the sentence as the keyword should be within quotation marks. In addition, the "site" mark can limit the search result in a website or website channel. The "link" mark can limit the search result in the website linked with all the websites the users has given. The "inurl" mark can limit the search result which includes the first keyword. The "related" mark can search relative content besides the keyword. The "cache" mark can search the cache file in the Google server. And the "info" mark can show a series of search result including those of the "cache" ,"link" and "related" mark. Besides these, Google has designed other senior search functions.

Directory service: if you don't want to search the webpage, but still want to find some special website, you can just visit the classified catalogue whose URL is http://directory.google.com/directory.

Toolbar: Google provides the toolbar integrated in the browser to facilitate the users. People do not need to go to Google's homepage but can still search by entering the keyword in the toolbar.

USENET search: there is a great deal of valuable news in the USENET. Google can not search in the USENET but can support browsing and releasing the news through the USENET Web version.

Translation: Google can translate the search result if you are familiar with its language.

SafeSearch Filtering: Google provides the SafeSearch Filtering placed in the URL (http://www.google.com/preferences for the adults). People can filter out those contents only suitable for adults which can create a healthy Internet environment for children.

● The innovation of search contents

Google provides several types of search content. Besides simple text search, Google provides PDF document search and image search. People only need enter "inurl: pdf" and the keyword in the search box. As for the image search, people can just visit "images.google.com" and enter the keyword describing the image. Besides that Google provides all kinds of digital searching services. On December 11th, 2003, Google added several new features: people can enter UPS and FedEx, patent, airplane and FCC equipment ID/tracking number to track what they want [30]. Moreover, Google has been involved in a new field of search engine advertising called "Click to Call" service which is connecting the advertiser with potential customers through the telephone. The service mainly targets small enterprises. Because these enterprises have no self-owned website, they can not use Google's original online advertising services. So Google tries to connect advertisers of this kind with online users through voice call.

● The innovation of other products

In addition to its standard web search services, Google has released a number of online products. Google formally launched a free webmail service Gmail which could offer over 7400 MB of free storage with additional paid storage ranging from 20 GB to 16 TB on February 7, 2007. In addition, Google launched the Google Docs which allowed users to create and edit documents online while collaborating in real-time with other users by combining two separate products, Writely[1] and Google Spreadsheets together. The Google Docs along with other Google Apps was taken out of beta on July 6, 2009. In order to simplify the process of paying for online purchase, Google launched Google Checkout similar to eBay (owned by PayPal) on June 28, 2006. Google Checkout also offered fraud protection, as well as a unified page for tracking purchases and the status. Google's products also launched desktop products such as Google Desktop and Google Talk. Moreover, Google has acquired many companies for diversification of products. Google acquired Keyhole for its product called Earth Viewer which gave a 3-D view of the Earth and developed it into Google Earth.

● The cooperation with other organizations

Google has partnered with other organizations for everything from research to advertising besides the innovation itself. In 2005, Google partnered with NASA Ames Research Center on large-scale data management, nanotechnology, distributed computing, and the entrepreneurial space industry. Moreover Google cooperated with Sun Microsystems to share and develop search technology together. Google also partnered with AOL of Time Warner to enhance the video search services. In addition, Google announced cooperation with Harvard and Oxford at the end of 2004. Google planned to invest 200 million to digitize the library collections in ten years. But the plan was objected to by the Association of American Publishers and other European national libraries in fears of the infringement of book copyrights which forced Google to abandon the plan.

4.3.3   Technologies Behind Google's Great Results

The success of Google is mostly because of its continuous technology development. Google has innovated in technologies to provide users with fast and accurate search results. Considering mass data on the Internet, Google proposed the distributed cluster infrastructure. Google's fundamental technology framework is described in Fig. 4.5. On the left of the picture are fundamental technologies that enable Google to gather and process mass data. Google cluster is based on the three core technologies including Google File System, Bigtable and MapReduce. On the right of the picture are many applications supported by fundamental technologies, including Google's famous search algorithm—PageRank, Google's repository of data and other infrastructure.

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[1]   A kind of word processing software launched by Google
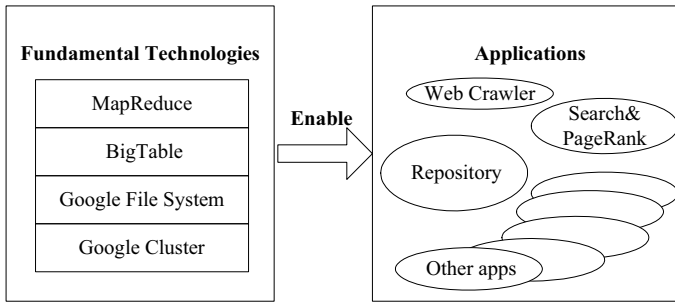
Fig. 4.5   Fundamental technologies of Google

● Google file system

Google File System (GFS) is a simple way of accessing enormous amounts of data spread across a large cluster of machines. Google File System acts as a virtual file system that makes the cluster look to developers more like a single machine, and eliminates the need for developers to think about details like what happens when a machine fails.

There are two kinds of nodes in Google File System: Master node and Chunk node. The Master node is used for storing the metadata relative to data files instead of a data block. The metadata contains the 64-bit tag mapping the data block's position. The metadata would be periodically updated according to the update of the Chunk node. The Chunk node is stored for the data block. The data file is split up into many 64 MB data blocks with sole 64-bit tags.

Fig. 4.6 presents the Google File System architecture. A GFS cluster is composed of a master server and several chunk servers. The GFS cluster can be accessed by several clients. When each block is created, the server would assign it to a constant and sole 64-bit chunk handle. The chunk server would store the chunk on a local hard disk as a Linux file. The data block can be read and written according to a specified chunk handle and byte range. In order to ensure the reliability, each block would be copied to multiple blocks on the server with three default back-up copies. The master server manages all the metadata including namespace, access control information, mapping information and block location. The clients interact with the master server for metadata manipulation while all the data communication is directly carried out by the chunk server. Through the joint design of the server and clients, Google File System is able to get the maximum performance.

● MapReduce

MapReduce is a powerful programming model for processing and generating very large data sets on large clusters. MapReduce enables developers to code and run simple but large parallel jobs in minutes.

MapReduce mainly processes mass data through the two steps called "map" and "reduce". The map is a highly parallel operation. It would carry out specified operation on each element in a logical list composed of independent elements and create multiple new lists to store the mapping result. When the map step is

completed, the system would shuffle and sort the new generated lists. Then the reduce operation would be carried out on these new lists, which means to merge elements in a list according to a typical key.
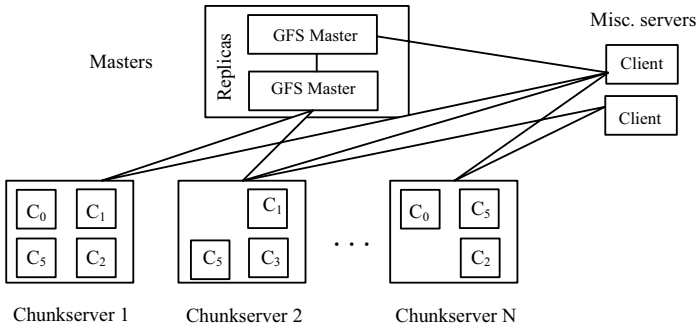
Fig. 4.6   Technical architecture of Google File System

Fig. 4.7 presents the operation mechanism of MapReduce. It can not only process large-scale data but also hide many tedious details including automatic parallelization, load balancing and downtime disposal. The MapReduce can be used in distributed sorting, log analysis, reverse index construction, document clustering and machine learning.
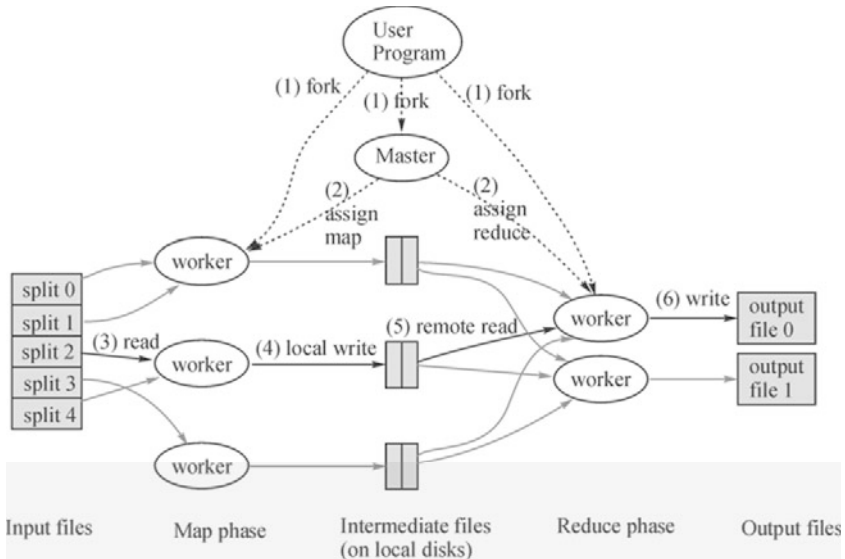
Fig. 4.7   Operating mechanism of MapReduce

● BigTable

BigTable is a simple database system that builds on the Google File System, allowing developers to ignore many of the underlying details of the cluster, and just concentrate on getting things done.

BigTable is not a relational database and it does not support join operation or any other advanced SQL operation. Instead, it is a multiple-level mapping data structure. BigTable can use structured files to store the data and process millions of reading and writing operations per second. What is a multiple-level mapping data structure? It is a sparse, three-dimensional and sorting cell. Every cell is composed of line keyword, column keyword and time stamp. The line keyword generally means reverse URL address such as com.cnn.www. The column stores detailed contents of the web page. Each content object has a time stamp.

BigTable can be divided into master node and tablet node (Fig. 4.8). The master node is used to process metadata-related operations for load balancing. The tablet node is used to store a sharding tablet to support corresponding data access. Now BigTable has provided structured data support for over 60 kinds of products including Google Print, Google Maps, Google Earth and Gmail. Now Google has operated over 500 BigTable clusters.
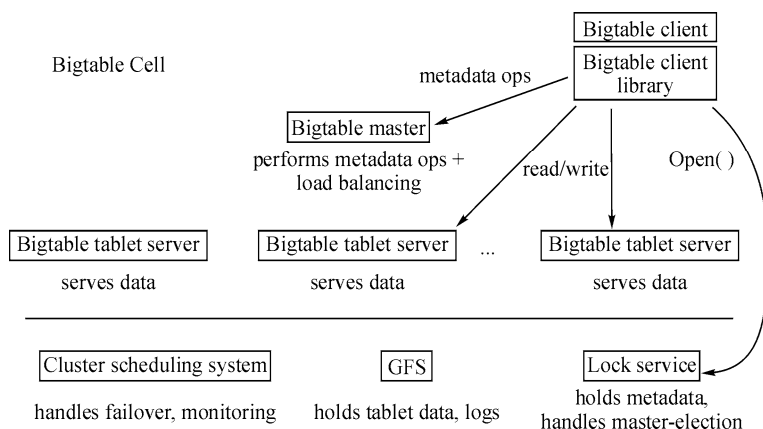
Fig. 4.8   Technology architecture of BigTable

● PageRank

PageRank was one key innovation when Google was just founded. Now Google is still closely associated with its PageRank algorithm. PageRank is a voting algorithm weighted for a Web page's importance by looking at what other pages link to it. Then another factor which voted for the importance of a Web page was added into the PageRank algorithm. This idea was the number of people who click on a Web page. The more clicks on a Web page, the more weight that Web page was given. Over time, still other factors have been added to the PageRank algorithm; for example, the frequency with which content on a page is changed.

In this algorithm, all the results are calculated by the actual situation without human interference, which makes people trust Google's search results more than

other search engines. In addition, the PageRank algorithm fully considers the association among different pages, which makes Google's search result more accurate.

4.3.4   Google's Achievements

Google's e-commerce strategy has an astonishing effect. Google runs over one million servers in data centers around the world and processes over one billion search requests and twenty petabytes of user-generated data every day [31].

Meanwhile its number of global employees has reached 21,805 in 2010 and the number will increase with expansion[28]. The revenue in 2011 reached $37.9 billion with a year-to-year growth rate of 24%. Total advertising revenues in 2011 reached $36.5 billion, accounting for over 96% of the total revenue.

In 2011, Google achieved revenue of $37.9 billion of which over 96% of the revenue is from advertisements. Now Google is the dominant search engine in the United States with over 80% market share. According to the AdGooroo, the market share of Google in the US and international market was the most from March 2009 to March 2010, about three times of that of Yahoo and eight times that of Bing (Fig. 4.9).
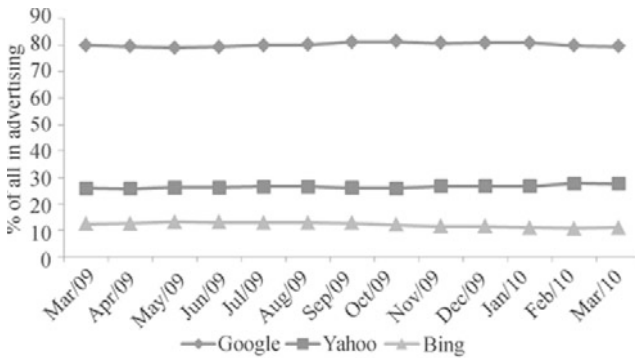
Fig. 4.9   Market share in advertising of search engines (US and International)

Meanwhile, Google's e-commerce is popular with the public. Since Google extended its customer satisfaction over Yahoo in 2007, Google has been always the top in the American Customer Satisfaction Index (ACSI) E-Business Report launched by the University of Michigan. The ACSI model measured how well an e-business performed against customers' expectations through categories including search engines, portal, online news and information sites. Google was at the top with a score of 86 in 2008 and 2009, up 10% from that in 2007. Thus it can be seen Google's e-commerce strategy has already obtained favorable results.

From Google's success, we can see that innovation is the source for enterprises' development. As long as the enterprise insists on innovation, it can

obtain fast development. Those enterprises without enough innovation would fall behind. Meanwhile, innovation will never stop. Before Google, people thought the development of the Internet was very mature and there would be no innovation anymore. But the rise of Google changed people's ideas and brought a new wave of Internet innovations. Each Google innovation is customer-oriented. For example, Google chooses simple websites in order to make customers pay more attention to useful information they are looking for. It can be seen that enterprises should focus on customer-oriented innovations when enterprises formulate and implement e-commerce strategy.

4.3.5   Effects on People's Daily Life

Google has huge effects on people's life. With the goal of organizing the world's information and making it universally accessible and useful, Google has innovated in the search engine many times. Now people can easily find what they want with the help of Google. In the world of the Internet, Google has been the god for a great number of people. In order to show their respect to Google, a new word "Googlism" has been created.

However, with Google's super capability for searching information, people began to worry about their privacy. The "Boston Global" has even described a story that an ordinary person named Eric broke up with his girlfriend because his girlfriend found his experience of being imprisoned for larceny eight years before through Google's search engine. Besides, there is a lot of private information on the Internet such as telephone numbers, email addresses, interests and education which can be searched through Google. Google's success has brought serious challenges to information security and privacy protection [32].

In addition, more and more people begin to worry about the fairness. The Google Watch, a website launched by the non-profit group Public Information Research has even criticized Google's PageRank algorithms, saying that they discriminate against new websites and favor existing sites, and has made allegations about connections between Google and NASA and the CIA [33]. Even some company has sued Google for its drop in Google's search results.

Now that Google has so much information, how about Google's self-control? Google stores lots of search information and puts cookies on users' computers so that Google can track those search results to individuals. In addition, Gmail, launched by Google, has brought a lot of privacy criticism. Google can automatically scan e-mails and add context-sensitive advertisements to them. Until now, Google has not confirmed how long such information would be kept and how it would be used. There are several cases where Google has even "accidentally" downloaded personal information.

Google also brings a huge potential threat to web service providers. Because Google can provide the most popular search result, it is becoming a web service middleman. For example, people used to search the goods they wanted on the

eBay website before. But now people only need to enter "eBay" and the name of the goods they want in the search box, Google can lead users to the corresponding link. Gradually Google becomes the middleman of eBay.

Above all, Google has changed the way people use the Internet which not only makes the search simple and convenient but also brings in a lot of potential threats.

4.4   Haier's Legend

Haier is one of the most successful companies in China with main businesses in the household appliances field. In order to obtain competitiveness, Haier is committed to innovation and reform. When most enterprises in China cut prices to earn profits in the early 21st century, Haier was devoted to improving product quality and expanded businesses abroad. When e-commerce came out in developed countries, Haier found potential opportunities in e-commerce although there were still barriers of poor technical infrastructure, payment systems and consumer acceptance. When developing e-commerce, Haier not only invested in the network construction but also focused on establishing its own logistics system and optimizing internal business flow.

4.4.1   Introduction of Haier

Restructured in 1985 as a small manufacture of refrigerators burdened by a debt of RMB 1.47 million, Haier has survived a series of radical reforms and become one of the most successful companies in China. Now Haier is primarily a producer of household appliances, including not only refrigerators as before but also air conditioners, washing machines and so on. Besides the domestic market, Haier moved into the international market as well. Haier has its own plants in many countries such as Indonesia, Philippines, Malaysia, the United States, Pakistan, Jordan, Egypt, South Africa and so on. There are about 30,000 employees in the world. Haier has maintained a healthy and fast growth since 1985. The products has developed from the single refrigerator to home appliances with over 15100 different specifications in 96 categories, including white goods, home appliances in black, beige and so on. The products are sold in more than 160 countries and regions. In 2009 Haier reached a revenue of 33 billion RMB, up 8.46% year-on-year while the net profit reached 1.74 billion RMB, up 49.64% year-on-year [34]. Several cases of Haier's development have become classic cases at Harvard Business School and the International Institute for Management Development (IMD). Now Haier has been awarded the First Brand in Global White Appliances Markets issued by Euromonitor [35].

Haier's fast development mostly relies on its innovative culture. Haier's

branding process combines the best eastern and western management thinking to create a foundation for further innovation. Its innovation culture can be divided into five parts: concept innovation, strategic innovation, organization innovation, technological innovation and market innovation.

Concept innovation: Concept innovation is the prerequisite of all innovations. Sometimes though the fact itself doesn't change, a series of innovations will happen once the concept has changed. For example, one person went to India finding that there were no people wearing shoes, so he thought there would not be any market for shoes. On the other side, another person went to the same place, thinking India was a huge potential market because no one there had a pair of shoes. Concept innovation can bring in innovation in the market, technology and so on. Therefore Haier places concept innovation as a source of fundamental innovation.

Strategy innovation: Haier put forward different strategies in different stages: from brand building strategy to diversification strategy, then from globalization strategy to global brand building strategy. These strategies all pointed out the direction of Haier's development.

Technology innovation: Haier has gone through three stages of technology innovation. In the 1980s, Haier mainly did the OEM production through introducing foreign advanced technology. In the second stage, Haier mainly absorbed foreign advanced technology and improved it to establish its own brand with high added value. In the third stage, Haier completely mastered the core technology and carried on the self-innovation constantly. Now Haier has obtained about ten thousands patents, being the top in Chinese enterprises.

Organization innovation: Organization innovation means changes in the organization structure to adapt to the market change. Haier advocated organization innovation from a straight-line functional structure to matrix structure. Now Haier adopts the re-moulding of the market chain, which can fill the enterprise with vitality. This organizational structure can internalize the external market competition, transferring the internal employee relationship into a market relationship and delivering the external market pressure into internal pressure which makes every employee take the initiative to face the market and take actions as soon as possible so that the customer satisfaction degree will be improved.

4.4.2   Haier's Development Phases

The development of Haier can be divided into four phases [36] as shown in Fig. 4.10.
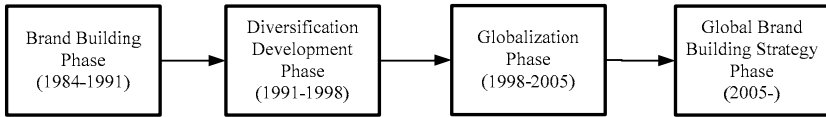
Fig. 4.10   Development phases of Haier

● Brand building phase

Haier launched the brand building strategy in early days of China's reform and opening up. At that time, the market was relatively controlled in China. People could buy a refrigerator only when they had a 'refrigerator coupon'. The demand in the market was not enough so that the demand was unrelated to product competitiveness. But Haier still insist in providing high quality to tap an enormous potential market. Therefore Haier launched the 'Zero Defect' quality standard. In 1998, Haier earned the first ever National Gold Medal awarded in China's refrigerator industry. Because of the high quality of Haier's products, Haier survived in the market reform. When most refrigerators cut prices because refrigerators' supply exceeded demand by the late 1980, Haier could still increase its prices by 12%. Through the implementation of the brand building strategy, Haier had transformed from being a small factory operating at an annual loss of nearly 1.47 million RMB into the number one refrigerator brand in China.

(1) Diversification development phase

Haier launched the diversification strategy by the early 1990s. At that time, many home appliance manufacturers chose to reduce the price due to fierce competition. But Haier still remained its market position with a stable price because of its good quality, which gave Haier opportunities to carefully think about future development. Haier observed that future marketing competitiveness would be more likely to come from satisfying customers' demands instead of beating annual sales quotas. Therefore Haier established its diversification strategy to expand its product line. At that time, Haier developed new products including washing machines, air conditioners, and other items. Meanwhile, Haier put emphasis on customer services, which further strengthened customer loyalty to the Haier brand. Through the implement of its diversification strategy, Haier had transferred from a single-product company to a manufacturer with multiple product lines.

(2) Globalization phase

In the 21st century, many Chinese companies acted as original equipment manufacturers (OEMs) that produced products for multinational corporations. But as the labor cost gradually increased, many multinational corporations shifted their production facilities to other countries with cheaper labor costs. In this situation, Haier realized that Haier had to earn their own proprietary intellectual property and strong brand identities to obtain market competitiveness in the age of globalization. Therefore Haier began to enter the international market and utilize main sales channels to deepen market penetration. Haier established a design/production/marketing operational framework in six key regional markets including North America, Europe, Middle East/Africa, Asia-Pacific, ASEAN and South

Asia.

(3) Global brand building phase

After Haier expanded its business to foreign markets, Haier began to build global brand identity. In the global brand building phase, Haier set a target of building a local Haier brand in each geographic area all around the world. Now Haier has established design centers, manufacturing bases, and trading companies in over 30 countries for sharing global resources through a single information platform.

4.4.3 Contents of Haier's E-Commerce Strategy

Haier has laid a solid foundation for e-commerce with the implementation of Enterprise Resource Planning (ERP) and Business Process Re-engineering (BPR). The ERP is to build the technical infrastructure for information collecting and processing so that all parties can share all the business information. The BPR is to readjust the traditional business processes in order to meet the requirements of e-commerce. After the two critical programs, Haier has been ready for e-commerce. First, Haier achieved e-Management, e-Marketing, e-Service, e-Purchasing, e-Production and e-Distribution, which all made a solid foundation for Haier's e-commerce practice together with Haier's traditional distribution channels. As for the organization and managerial process, Haier shifted from a traditional function structure to a flat market-chain structure. Every employee is responsible to the market instead of only to their bosses, which is called the famous Haier's Market Chain Management [37]. According to Market Chain Management, Haier set the customer and the market as the focus of the company instead of profit in the past.

Haier's e-commerce strategy consists of its awareness, target and measures of e-commerce.

(1) E-commerce awareness

E-commerce is the product of high economic maturity. Developing e-commerce is the inevitable choice and objective requirement for Haier. Haier's leadership is fully aware of the imperatives of e-commerce in the new economy. Mr. Zhang Ruimin, CEO of Haier, has even pointed out that Haier's growth depends on effective e-commerce strategy. In addition, responsiveness is the core of e-commerce practice. So Haier should respond quickly to the dynamic changes in the global market and be committed to the development of e-commerce.

(2) E-commerce target

The primary strategic target for Haier's e-commerce is better customer service to meet the vision of a global brand. Haier pays much less attention to profit growth and profit margin than to better services. Haier hopes restructuring the traditional business through e-commerce would gain competitive advantages.

(3) E-commerce measures

In order to achieve its e-commerce target, Haier has implemented a lot of

measures as follows:

● Carrying out the existing business online to achieve individual service

First, Haier realized its traditional B2C business by selling products online to achieve its goal of electronic operation of traditional business. Then Haier integrated electronic businesses in different periods into a most reasonable enterprise e-commerce system. At last its e-commerce strategy could coordinate with the development of the company's overall strategy. Now Haier can provide individual service online to better meet the customer demand. For example, Mr. Xu is an artist in Qingdao who wants to buy a refrigerator looking like a work of art but still practical. Mr. Xu finds the custom module online and designs a refrigerator by himself. Then he quickly receives Haier's feedback in which Haier promises to deliver the goods within one week. Without e-commerce, such services would not be possible. Meanwhile, Haier has claimed that it would shift from a manufacturing-oriented enterprise to a service-oriented enterprise.

● Setting up the e-commerce unit and developing e-commerce software

Haier established an e-commerce unit, Haier E-Commerce Co., with a staff of 45 as early as 2001. The e-commerce unit is responsible for e-commerce plans and initiatives within the company. Now the unit is developing the B2B business for the suppliers and B2C business to meet individual demand. On Haier's e-commerce platform, Haier, suppliers and consumers can realize interactive communication to increase added value.

● Establishing a self-owned, well-developed logistics system

Why Haier wants to establish its own logistics system is because of two reasons. One is that the successful implementation of e-commerce must depend on a well-developed modern logistics system. But there is no standardized and developed modern logistics system and no good logistics company in China. However, to complete an order it must pass through a series of processes such as the procurement, transportation, storage, manufacturing and distribution. If Haier chooses a local logistics company to do this, it is impossible for Haier to respond to the market in time and develop individual services. Therefore Haier has to establish a well-developed logistics system of its own. In China, Haier has more than 30 call centers in major cities and more than 10 thousand distributors who reach more than 60 thousand rural areas.

● Establishing a virtual trading platform and improving customer relationship management

The eHaier.com and iHaier.com are the main parts of Haier's trading platform. Between them, eHaier.com (Fig. 4.11) is mainly responsible for taking online orders, serving as the B2C platform. Instead of taking eHaier.com as the simple platform to introduce the company, Haier establishes the interactive relationship with customers on the Internet. For this, Haier has built one of the best distributions in China referred to above. Moreover, Haier's B2C platform is able to process customized orders. In order to set up a close partner relationship with suppliers, Haier set up an international supply chain, the iHaier.com, which is fully open. It can be seen iHaier.com is a B2B platform. The B2B platform can provide a lot of services such as ordering, automated stock replenishment, payment

processing and production-related control and processes. With the platform, Haier can find the best suppliers quickly, keep a close partner relationship with the suppliers and reduce the purchasing cost while improving product quality.
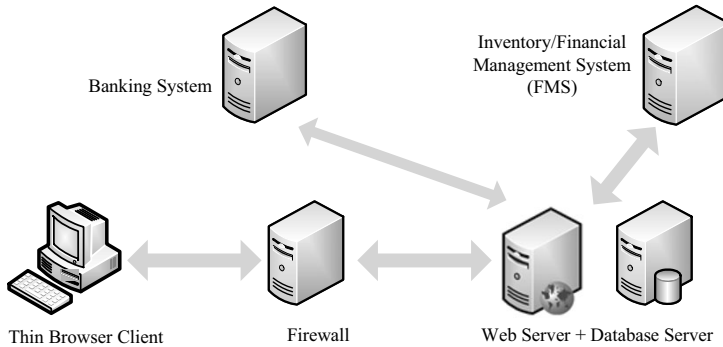
Fig. 4.11   Site configuration of eHaier.com

With the two websites, Haier has formed a preliminary e-commerce framework: one for order-oriented upstream manufacturers; the other for design-oriented downstream distributors and end customers. But "E of Haier" is more than this. Haier has to integrate organically different parts of e-commerce together, in which the internal management is the foundation of Haier's e-commerce platform. For this, Haier has improved an internal ERP as discussed before. In addition, Haier works with many IT partners such as SAP and Lucent, and some consulting firms such as McKinsey for technical and business advice.

4.4.4   Effects of Haier's E-Commerce Strategy

The overall effect of Haier's e-commerce strategy was generally positive. Haier had improved the mode of the new economy from two aspects, one for B2B, the other for B2C. In regard to B2B business, Haier promoted the external supply chain to replace some part of its own manufacturing operations. The distributor had been cut for B2C business, Haier's e-commerce promoted the interaction between the enterprise and the consumers which overall enhanced Haier's brand value. Through E-business, Haier's cycle time was largely reduced due to zero distance and fast speed. For example, the cycle time for developing new products was reduced from 4 – 6 months in 2000 to 2 – 3 months in 2002. The export delivery cycle time was reduced from more than 15 days in 2000 to less than seven days in 2002. Further, the procurement cycle was reduced from 10 days in 2000 to three days in 2002 [38].

In addition, Haier enhanced its customization. The consumer could design its own product with the help of Haier. Through e-commerce, Haier achieved zero

distance with the customer. In addition, Haier cultivated a lot of its own product designers. Currently there are 9,200 kinds of basic products including refrigerators, air-conditioners and washing machines. These basic products are similar to over 9,200 kinds of materials which form the basic functional modules along with thousands of accessories. Then consumers and distributors can freely choose the materials and functional modules on the platform that Haier provides to design their own products according to their own demand.

Moreover, Haier has formed a powerful logistics company, which not only provides modern logistics but also provides the perfect third-party logistics services for other enterprises.

Above all, through the implementation of e-commerce strategy, Haier has transferred its target from maximum profit to being customer-centered and market-focused. Further, Haier depends on increasing the B2B turnover and improving the innovation of B2C to raise the profit instead of increasing the service fee, which enhances Haier's competitive advantage. Moreover, Haier largely reduces the cost and improves the competitiveness of its products by purchasing directly from large international companies.

4.5   Taobao: The Largest Online Trading Platform in Asia

The improvement and the development of internet technologies have triggered rapid development of e-commerce applications since the beginning of the 21st century. Many enterprises are using e-commerce to work with partners and suppliers for procurement and other internal activities including automated office and product development. In general, e-commerce can be divided into Business-to-Business (B2B) and Business-to-Consumer (B2C). Besides, there is also another type of e-commerce called Consumer-to-Consumer (C2C). Taobao is the largest C2C platform in China. Taobao provides an open C2C platform so that anybody can buy and sell the goods on it. Since establishment in 2005, Taobao has defeated eBay and occupied over 80% of C2C market share in China.

4.5.1   What is Taobao?

Taobao, established by Alibaba Group in May 2005, is the largest online shopping and auction destination in China. It is committed to become the world's leading online retailer. It develops business-to-consumer (B2C) and consumer-to-consumer (C2C) business by providing a platform for businesses and individuals to open online retail stores which focuses on consumers across Greater China. Taobao processed transactions worth 20.83 billion RMB during 2009 and the transaction increased to 40 billion RMB in 2010 [39].

The term of 'Taobao' literally means "to search for the treasure" in Chinese.

Taobao advocates a faithful, dynamic and fast online trading culture. It is devoted to creating a more efficient and safer online retail platform. Meanwhile, Taobao is committed to creating a friendly trading environment. Everyone trading in Taobao can also make a lot of friends while achieving efficient and fast transactions. Now Taobao has a priority of doing pioneering work on the Internet and making friends for most Internet users. With fast penetration of the Internet in China, Taobao has achieved high growth in terms of quantity and trading volume even during the 2008 financial crisis.

Besides providing an online shopping platform, Taobao also provides a lot of tools such as an instant messenger tool called Aliwangwang. With Aliwangwang, people can instantly discuss transactions in detail with each other. Meanwhile consumers can rate and recommend vendors. People can also participate in a community called Taojiaohu in which they discuss favorite stores, goods, gossip and so on. Also, there are many other tools which will be discussed in detail below.

4.5.2   Background of Taobao's Establishment and Development

Taobao has developed very well since its establishment in 2003. It grew beyond eBay in 2005 and became the first Asian shopping website in 2006. It can be said that Taobao's establishment and development is a legendary arena.

In development of Taobao, Taobao's parent company-Alibaba plays an important role. Alibaba was founded in 1999 by Jack Ma and developed in the business-to-business (B2B) pattern. Jack Ma was the key person in the establishment and development of Alibaba. Almost every important decision of Alibaba was related to this legendary figure. When the Internet became more and more popular in 1999, Mr. Ma sensitively found an opportunity in e-commerce and determined to establish an online business information exchange platform for global businessmen. His crazy thought was appreciated by a lot of venture capitalists. The investor AB, Goldman, Fidelity Capital and Technology Development Fund of Singapore invested $5 million in Alibaba in September, 1999. With fast development, Alibaba began to earn profits from 2002.

With the success of Alibaba, Mr. Ma began to think about the opportunities and challenges the model of eBay would bring. In 2002, eBay announced investing $30 million to acquire a 33% interest in EachNet and the two companies formed a strategic partnership to further expand online trade in China. Through the alliance, EachNet would further extend its e-commerce leadership in China while eBay would enter the Chinese market, one of the world's fastest growing Internet markets. In 2003, eBay announced acquisition of the remaining 67% of EachNet's stock. Faced with such a strong competitor, Mr. Ma began to develop a consumer-to-consumer (C2C) pattern since he obtained an investment of $82 million from the Softbank. On May 10th, 2003, Taobao was officially launched.

It can be seen that the establishment and development of Taobao is related to

e-commerce. Taobao is committed to developing e-commerce in China, particularly in C2C and B2C businesses.

4.5.3   Taobao's E-Commerce Strategy

Taobao's success has been used as a model for developing e-commerce in China. Compared with other C2C websites, Taobao pays more attention to Chinese people's shopping habits and promotes service innovation based on Chinese characteristics. So what is Taobao's e-commerce strategy?

● No-fee strategy

In order to create the brand, Taobao decided not to charge any transaction fees and listing fees in the first three years. It believed that customers would be loyal only when they could get more benefits from online transactions than from other websites. The no-fee pricing strategy gave Taobao great advantages when it competed with its biggest competitor—eBay. Compared with Taobao, eBay charged many kinds of fees such as 'insertion fees', 'final value fees' and 'gallery feature fees' for listing. Although some kinds of fees were cancelled or lowered after 2008, they still could not compete with Taobao's no-fee strategy. Due to Taobao's no-fee strategy, there were 10 million listings on Taobao in September of 2005 while there were only 1 million listings on eBay China.

● Market positioning strategy

One of the most important factors in Taobao's success is Taobao's precise market positioning. Before its formal operation, Taobao analyzed China's C2C market thorough market investigation. At the end, Taobao decided to target the market on those Chinese customers between 20 and 30 years old with good education. It believed that those customers would be mainstream consumers in the future. In Chinese consumption custom, people preferred shopping in real stores. In addition, Chinese people were not all familiar with online consumption at that time. It was necessary to cultivate online consumption custom. Compared with those old consumers, younger consumers were more sensitive to trend changes and more likely to change their shopping habits. When those younger consumers grew up, they would influence the consumption habits of the whole country. Though Taobao and its competitor eBay both focused on young people, Taobao's target market was much more correct. Taobao was positioned on customers between 20 and 30 years old with good education including students and relatively low-income white-collars workers while eBay only targets professionals with salaries. Compared with professionals with long working experience, students and low-income people had more reasons to shop online because of the low cost of online transactions. In addition, those customers would become loyal customers of Taobao when they grew into the main stream of society. It can be seen Taobao's target market is much broader and more accurate. In fact, students are one of the most important participants, accounting for a quarter of all customers and 10% of online purchases.

● Promoting e-commerce instruments of payment

Chinese people always think online shopping is not as safe as traditional shopping because they cannot see the real goods and they cannot touch or try them anyway. Customers are usually afraid that they will be deceived by sellers when they conduct online transactions. So even if customers are attracted by online commodities, they will also hesitate to take a move. Customers prefer to pay when they receive the goods while sellers prefer to deliver goods when they receive the remittance. In order to solve the contradiction, Taobao launched an intermediary called Alipay to fulfill online transactions. In order to promote the development of Alipay, Taobao cooperated with Industrial and Commercial Bank of China (ICBC), Agriculture Bank of China (ABC), China Construction Bank (CCB) and many other domestic financial institutions. With Alipay, the buyer firstly transfers the money from a bank account into his Alipay account and then the seller can get the money from his Alipay account only when the buyer receive the goods and notifies Taobao about the receipt of the goods. Then the seller can transfer the money from his Alipay account into his bank account. If the buyer doesn't receive the goods or is not satisfied with the goods, he can request Taobao not to pay the seller and keep his money in his Alipay account. In addition, the buyer can comment on the goods received and the seller so that other buyers can get more useful suggestions when selecting the seller and the goods. If the buyer gives the seller an evaluation of "difference is judged", it will have a great impact on the seller's sales because other buyers will be skeptical of the goods' quality and service. Meanwhile, if the seller does send out the exact goods but the buyer is unfaithful, the seller has the right to complain the buyer to Taobao with proper evidence. With sufficient evidence, the seller can request Taobao to pay for the goods he has sent out. In addition, the seller can comment on the buyer's honesty. If the buyer has a low honesty score, many sellers will like not to deal with him. With this mechanism, the requirements of both sides will be satisfied and it is beneficial to create an honest environment for online transactions.

● Providing an online instant message tool for communication and convenience

In traditional shopping, people would like to bargain till both sides agree on a satisfied price. But during online shopping people cannot meet each other, it is impossible to bargain face to face. In order to solve the problem, Taobao developed an online instant message tool called Aliwangwang to help immediate communication between sellers and buyers. Aliwangwang, which meant 'prosperity' in Chinese is similar to MSN [40]. The buyer could communicate with the seller on a one-to-one basis through Aliwangwang just by clicking the Aliwangwang icon of a seller on the website if both sides are online. The buyer could ask anything about characteristics of the goods or the service through Aliwangwang while the seller could find out more information to provide better services to the buyer. If both sides have a different opinion on the price or the goods, they could also coordinate with each other by communicating through Aliwangwang. In addition, all the chat logs of Aliwangwang would be regarded as the evidence in case there was a transaction dispute. For example, if the seller

ensures the goods he would send are green in the chat logs but the goods the buyer actually receives are red, the buyer has the right to request the seller to resend the goods or give a refund. With this mechanism, Aliwangwang makes virtual trading real. In addition, Aliwangwang provides video and screen capture functions and mobile phone integration, which is much more convenient.

● Establishing a credit evaluation system to ensure online shopping's reliability

Credit evaluation is most important when shopping online. People may find it difficult to choose a proper seller online when facing lots of similar sellers. Although the price could be the primary criteria for people to select a seller, other characteristics such as the quality, after-sale service and timeliness are also very important. But these characteristics are not easy to distinguish because faking in a virtual environment is so easy but it is hard to find the faker with no real shops. Therefore Taobao has offered a credit evaluation system which is divided into two subsystems: appraisal for a buyer and appraisal for a seller. The appraisal is based on the past transaction history. As referred above, the seller and buyer should evaluate the other side after the transaction and the appraisal is not altered unless the other side agrees too. For example, if a deal is successfully completed, the buyer should give the seller a GOOD appraisal while the seller should give the buyer a GOOD appraisal. But both sides may give the other a BAD appraisal if the transaction fails. If the goods the buyer receives does not meet the quality assurance or his requirement, the buyer could comment on the buyer and give him a BAD appraisal. Even the buyer could ask the seller for return of goods. From these comments, both the buyer and the seller could make the first judgment about the other side. Taobao's credit rating is composed of three levels: flower, diamond and crown. Each level is divided into five sublevels. Among them, a one-flower rating is the lowest while five crowns is the highest. When the seller or the buyer gets enough GOOD appraisals, he would be prompted to a higher credit rating. In addition, Taobao allows buyers and sellers to track the rating in detail. The buyer and the seller could check the number of GOOD appraisals and reasons why GOOD appraisal is given so as to make a decision whether it is good or not.

● Strengthening the cooperation with other enterprises

Since its establishment in 2003, Taobao has aligned with many enterprises. As for the Internet portal, Taobao cooperated with 21CN and launched a big shopping site to give consumers more services over the channel, E-mail, messaging and market activities together in April, 2004. In 2005, Taobao cooperated with Sohu as strategic partners to share active user groups and to promote the progress of e-commerce in China [41]. Besides the Internet portal, the relationship with the banks is also very important. Online payment is one of the necessary parts in online transactions. But online payment could not be successfully fulfilled without support from banks. Therefore Taobao is committed to developing and keeping a stable strategic partnership with banks. During the establishment of Taobao, Taobao has obtained support from the Industrial and Commercial Bank of China (ICBC), Agriculture Bank of China (ABC), China Construction Bank (CCB) and many other domestic financial institutions. As a

third-party online payment platform, keeping a stable partnership with banks is necessary in the business process of Alipay. In general, banks charge customers remittance fees when transferring funds from one account to another. So Taobao has aligned with banks to reduce the remittance fee. Besides, Taobao has cooperated with other Internet companies. For example, Taobao signed a strategic agreement with Baidu, the biggest search engine in China. In addition, Taobao put lots of promotion information in other Internet portals to attract widespread attention.

Above all, we could summarize the business model of Taobao in Fig. 4.12. With the business model and e-commerce strategy, Taobao has developed well since its establishment. However, Mr. Jack Ma, CEO of Taobao, thought it was not enough for many rivals who were eager to take market share away from Taobao. In October 2008, Taobao announced a five-year 'Big Taobao' strategy with an investment of 5 billion RMB ($731 million) at the aim of developing Taobao.com into the core of an e-commerce ecosystem that could influence the entire economic chain of e-commerce companies while maintaining its business model. Meanwhile Taobao planned to pay more attention to offer more services to existing users rather than acquire more new users. Taobao wanted to transfer itself from an online shopping platform to an e-commerce infrastructure platform. With the help of Taobao's e-commerce solution, medium-sized and small enterprises could establish e-commerce platforms of their own and enter the e-commerce field with low cost and high efficiency.
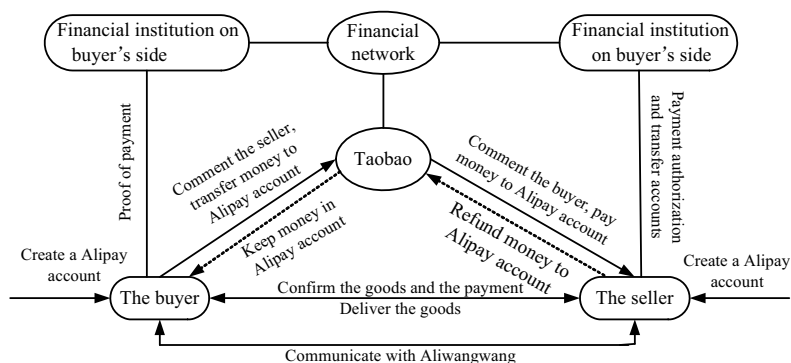
Fig. 4.12 The business model of Taobao

Therefore the 'Big Taobao' strategy has integrated most services owned by Alibaba[1]. At first, Taobao formed a B2B2C commercial chain by integrating Taobao and Alibaba with the aim of attracting e-commerce outsourcing providers to provide customers and SMEs with individual products and services. In September, 2008, Taobao integrated Taobao.com and its online advertisements marketplace Alimama together aiming at building up the largest e-commerce platform around the world. Through the integration, Alimama would provide

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[1] Alibaba is the parent company of Taobao.

Taobao sellers with the most accurate, simplest and most efficient online marketing services. In addition, Alibaba strengthened the leadership of Alipay for improving China's online trusted secure system in order to coordinate with 'Big Taobao' strategy. Moreover, Taobao launched a B2C ecosystem named Taobao Mall to elevate online shopping infrastructure. According to Daniel Zhang, CFO of Taobao, Taobao Mall aimed at setting up the standard of online retail experience for Chinese consumers and formed a framework for merchants and service providers that would allow each other to optimize their own competitive advantages. Taobao Mall established a set of standards specific to each product vertically to guide merchants and service providers in their practice. All the merchants and service providers in Taobao Mall had to adhere to these standards which covered all aspects of the online retail chain including brand building, product management, customer services and logistics. In addition, the merchants and service providers in Taobao Mall were all carefully selected by Taobao with good quality and high credit rating. Through the mechanism, Taobao Mall would elevate customer satisfaction.

In addition, the 'Big Taobao' strategy meant to be more open. Taobao launched the Taobao Open Platform (TOP) in 2008 which allowed third parties to build applications that could have access to the data from Taobao such as product details, the seller information, etc. With the TOP, developers could develop proper applications to help buyers or sellers make transactions on Taobao. Then developers could earn revenues after Taobao users purchased the application. As a result, shopping or selling in Taobao would be more interesting and convenient which further helped Taobao form a perfect e-commerce ecosystem.

As far as the logistics, Taobao started a big logistics plan. The logistics was one of the most important parts of e-commerce. Over 90% of the process of e-commerce was used in the logistics. Now Taobao's logistics mostly depended on third-party logistics service providers. Therefore Taobao officially launched the big logistics plan including the logistics system, logistics service partners and content standards to provide better logistics service and reduce costs in June, 2010.

Besides the e-commerce business, Taobao has taken part in other kinds of businesses in order to build up an excellent ecosystem. Taobao has stepped into online search business with cooperation with Sogou. Moreover Taobao has expanded to mobile terminals, print media and wired networks. Taobao cooperated with Leveno to launch a mobile handset in order to increase the demand for mobile shopping.

4.5.4   Effects of Taobao's E-Commerce Strategy

We discuss the effects of Taobao's e-commerce strategy as follows.

● Market situation

Online shopping in China has developed rapidly recently. The online transaction volume reached 523.1 billion RMB in 2010, up 109.2% compared with

that in 2009 (Fig. 4.13). More and more consumers chose online shopping. Online transaction volume accounted for 3.3% of the total social consumable turnover in 2010, 1.3% higher than that in 2009 and 2.2 higher than that in 2008. The frequency of online shopping also increased from 6 times semi-annually in 2009 to 10 times semi-annually in 2010. Online retail sales have been one of the important parts in the retail market.
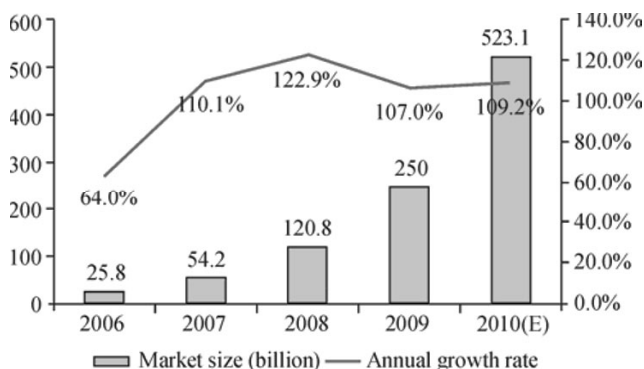
Fig. 4.13   Online shopping market size and annual growth rate in China from 2006 to 2010 (Source: CNNIC, 2010)

● B2C businesses

Since establishment in 2008, Taobao Mall has been the leading platform in the B2C market. Taobao Mall accounted for 40.8% of the total B2C turnover, followed by 360buy.com[1] with 17.6%, Dangdang.com[2] with 4.3%, Amazon.cn with 4.1% and Newegg.cn with 3.8% (Fig. 4.14). Different from other B2C websites, Taobao Mall was a B2C platform instead of a self-operated B2C website. Therefore Taobao Mall did not sell the goods itself but integrated a great many qualified online shops together. In addition, Taobao Mall mostly targeted brand dealers. Therefore Taobao Mall has a strict verifying system and elimination criteria on vendors to guarantee consumer rights and interests. Now there are over 400 million registrants, 4000 vendors and 7000 brands. A lot of world-known brands have opened their own flagship stores in Taobao Mall such as Kappa, Levi's, Esprit, JackJones, UNIQLO, Lenovo, HP and Disney.

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[1]   360buy.com is a Chinese self-operated electronic commerce company in China. It was founded in 1998 and headquartered in Beijing. It sells almost 11 kinds of goods including home appliances, digital products, computers, home furnishing, clothes, maternal and child supplies, books and food. 360buy mostly focuses on digital products.

[2]   Dangdang.com, is a Chinese self-operated electronic commerce company, founded by Peggy Yu and Li Guoqing in 1999. It is headquartered in Beijing and sells a wide range of items, especially books.
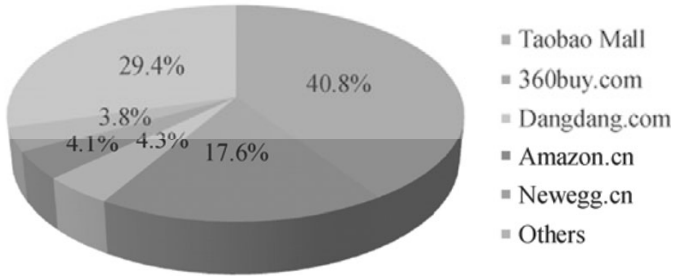
Fig. 4.14   B2C market share in 2010, China
(Source: CNNIC, 2010)

● C2C businesses

According to CNNIC's analysis, Taobao led the C2C business in China, accounting for 95.6% in 2010, up from 81.5% in 2009. The other big C2C websites all lost their market share. The market share of Tencent's Paipai[1] fell from 10.5% in 2009 to 4.2% in 2010 while that of Baidu Youa[2] fell from 2% in 2009 to 0.1% in 2010 (Fig. 4.15). International C2C giant Eachnet, Taobao's long-term rival, launched by eBay in 2002 did not develop well in China, only accounting for 0.1% in 2010, down 6.9% compared with that in June, 2008. There were over 190 million registered memberships in Taobao and the number of independent IP's visiting Taobao per day reached more than 40 million in 2010. According to the world's leading monitoring company Alexa, Taobao's share of users has reached 4.1% of global Internet users, surpassing Amazon and eBay[42].
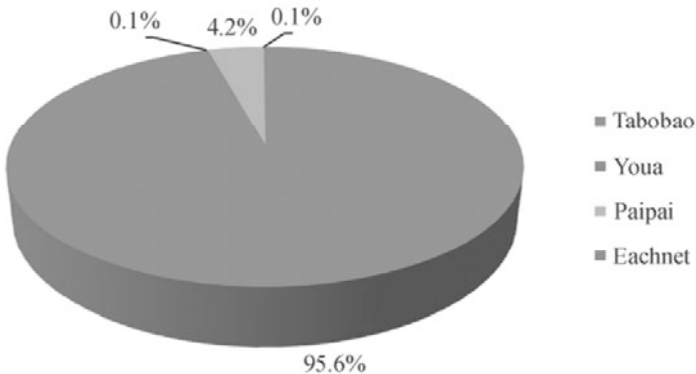
Fig. 4.15   C2C market share in 2010, China
(Source: CNNIC, 2010)

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[1] PaiPai.com is a C2C auction site launched by Tencent in March 13, 2006. Tencent Holdings Limited is a publicly owned holding company whose subsidiaries provide Internet and mobile phone value-added services and operate online advertising services in China.
[2] Baidu Youa is an C2C platform through which businesses can sell their products and services at Baidu-registered stores. Baidu, a Chinese web services company headquartered in Beijing, offers many services, including a Chinese language search engine for websites, audio files, and images.

As far as brand awareness, Taobao is the highest in the e-commerce websites, reaching 93.9% in 2009. It primarily results from its good promotion. But its major competitors are all lower than 50%. In addition, the utilization rate and conversion rate of Taobao is also the highest. Taobao's utilization rate was 81.5% with the conversion rate of 86.8%. Although Paipai's brand cognitive was the second highest, reaching 40%, its conversion rate was much lower only with 26.3%. Due to bad presentation in China, EachNet conversion rate was the lowest with 10.4% (Fig. 4.16). Although Eachnet was the biggest competitor of Taobao before, it has been totally replaced by Taobao.
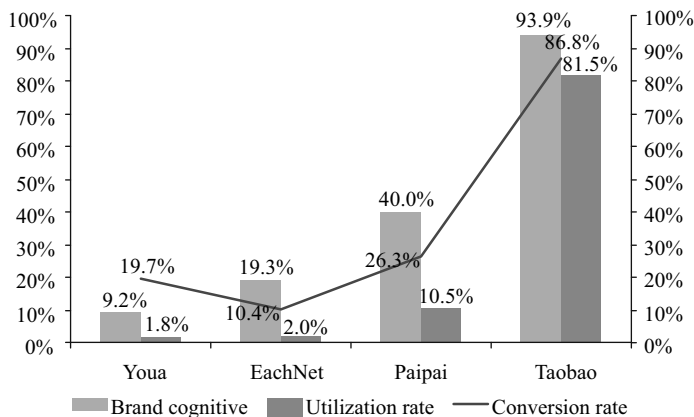
Fig. 4.16   Brand cognitive and conversion rate of C2C websites
(Source: CNNIC, 2009-11)

By means of convenient services, Taobao attracted more and more users. Meanwhile, Taobao's users were all loyal and the wastage rate was the lowest. About 94% of users who used Taobao half a year ago still continued to use it in 2009. Most of Taobao's users are satisfied with Taobao's services. A buyer called Veronica has even said "I am quite keen on online shopping in Taobao. For college students, especially girls, shopping in Taobao, or just online is more popular than you imagine." A Taobao seller also praised "Taobao is so nice, so powerful. As a businessman, as a Chinese, I really adore it. It has the strength other companies don't, that is Taobao—create online consumption, guide new market; seize consumption, seize new market and the future!" Compared with Taobao, EachNet lost about 59.7% of users within just half a year. Only 40.3% of users who used EachNet half a year ago still chose to continue using EachNet in 2009 (Fig. 4.17). It can be seen Taobao has defeated EachNet with its excellent e-commerce strategy.

● About Alipay

As the most popular and extensively used online payment tool for e-commerce in China, Alipay has developed very fast since its launch in 2004. Now Alipay is not only used in the transactions in Taobao, but also used in other websites. About 460,000 external merchants such as Lenovo, CCTV and New Oriental use Alipay

as their preferred online payment platform. There were over 300 million users in March, 2010 and daily transaction volume exceeding 1.4 billion RMB in July, 2010. Meanwhile Alipay has received the endorsement of financial institutions including Bank of China, China Construction Bank, Agricultural Bank of China, the Industrial and Commercial Bank of China and Visa because of its advanced e-commerce payment technology and sophisticated risk management system. Since its launch, Alipay has received many honors and awards [43]. In 2005, Alipay was awarded as the "No.1 e-commerce Payment Service" and "Most Innovated Company" by Internet Society of China. In 2006, Alipay was awarded the "Most Trusted Online Payment System" and "No.1 e-commerce Payment Service" by China Association for Quality and CCW Research. In 2007 Alipay was awarded the "People's Choice Awards in Electronic Payment" by E-Business magazine and "China's Excellent E-Payment Enterprise" by China Electronic Commerce Association.
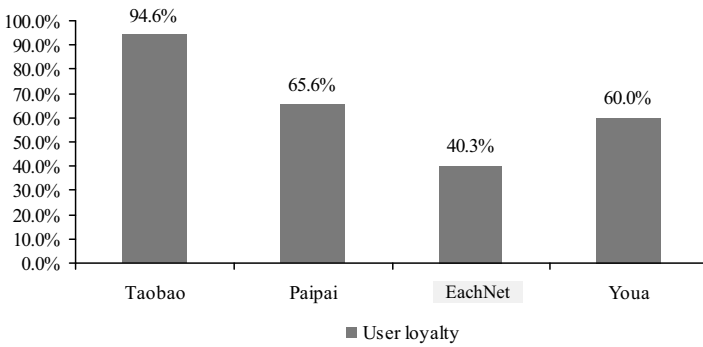
Fig. 4.17   User loyalty of C2C websites
(Source: CNNIC, 2009-11)

● Effect of the 'Big Taobao' Strategy

Based on the 'Big Taobao' strategy, the big Taobao ecosystem has gradually formed. Alibaba, the parent company of Taobao forecast Taobao's gross turnover in 2009 to exceed 200 billion RMB ($29.3 billion) and to double the turnover in 2010 to 400 billion RMB ($58.6 billion). Taobao has established an executive committee to push for the success of the 'Big Taobao' strategy.

In addition, Taobao has diversified its businesses. As a new B2C platform launched by Taobao, Taobao Mall has been the leading B2C platform for retailers in China with over 30,000 major multinational and Chinese brands. Most famous international brands such as Uniqlo, Addidas, L'Oreal Paris, and Revlon have all launched their official online retail storefronts on Taobao Mall. Meanwhile some famous local brands advertised on CCTV also have their own official online retail storefronts on Taobao Mall such as Lenovo and Li Ning.

As for Taobao Open Platform, there are all kinds of applications including sellers marketing platform, visual presentations, items management, inventory management, CRM, analytics tools, mobile applications, overseas market, logistic

services, financial and loan services, buyers' browsing tools, auction and pricing system etc., which gives great convenience to the sellers and buyers. Take a look at a good application named SoTuGou. With the applications, the buyer can upload the picture of the product he wants and the application would analyze the picture and find where to get the product. If the buyer clicks one of the results, the webpage would be directly linked to the Taobao shop selling the product which sounds very perfect and efficient.

Taobao is not only expected to provide an entire set of Internet retail solutions but also create a more comprehensive and extensive service platform to Chinese consumers. Taobao has merged Yahoo Koubei, a lifestyle website focusing on developing lifestyle-related e-commerce, community and communication services to provide better lifestyle services [44]. In the online search business, Taobao launched a search engine website named "YiTaoWang" to solve the problems before and after consumer purchase. With the search engine, Taobao's customers can find appropriate goods faster. Moreover, Taobao accelerated to the mobile terminal, print media terminal, cable network terminals, television terminals. Taobao launched the "Taobao world" lifestyle magazine and "the more fun the more Amoy" television program. Taobao integrated online and offline resources to further expand the market. In addition Taobao plans to establish its own bank called "Alibaba Zhejiang Commercial Bank" to provide small loans to online shopping sellers.

From the aspect of logistics, Taobao established a logistics company named "BaiShi logistics" with Guo Taiming in April, 2008. Meanwhile Taobao has signed cooperation agreements with other third-party logistics providers such as XingChengJiBian, WuZhouZaiXian, ShenZhenHuaQiang to provide logistics service in Chengdu, Shanghai and Shenzhen.

Above all, the "Big Taobao" strategy is becoming more open and diversified. Taobao is trying to build up a good e-commerce ecosystem in all fields of B2B, B2C, C2C, online search, financial support, logistics and terminal support, etc.

4.6 Growth of Industrial and Commercial Bank of China

E-commerce integrates the information flow, logistics system and capital flow. E-commerce cannot develop without support in electronic payment and settlement. In this financial field, banks play the most important role. As the settlement system of commercial banks is gradually improved, the financial support platform of e-commerce has been formed. Electronic money has developed fast and most banks have launched their own electronic banking services. The Industrial and Commercial Bank of China (ICBC) is the largest commercial bank in China with total assets of 12.78 trillion RMB. ICBC has developed Internet banking well and been awarded the "Best Personal Internet Banking of China" by international finance magazine-the Asian Banker.

4.6.1   Basic Condition of ICBC

The Industrial and Commercial Bank of China (ICBC), established in 1984, is one of China's 'Big Four' state-owned commercial banks (the other three being the Bank of China, Agricultural Bank of China and China Construction Bank).

In 2005, ICBC completed the joint stock reform and officially changed its name to "Industrial and Commercial Bank of China Co., Ltd." In 2006, ICBC was successfully listed on the Shanghai Stock Exchange and Hong Kong Stock Exchange at the same time, which was the world's largest IPO at that time valued at $21.9 billion [45]. Now ICBC is China's largest state-owned commercial bank, with assets of more than 4 trillion RMB. And the level of ICBC's e-financial services is at the leading position in the industry, with its e-network coverage of more than 98%. Its annual settlement volume accounts for more than 50% of the total volume of China's financial industry. ICBC offers a wide variety of financial products and services to 3.61 million corporate customers and 216 million personal customers through 16,232 domestic branches, 162 overseas branches and more than 1,504 agents worldwide and other distribution channels such as an online bank, telephone bank, and self-service bank.

ICBC was awarded by the Global Finance Magazine the "Best Bank of China", the "Best Consumer Internet Bank of Asia" and the "Best Corporate/Institutional Internet Bank of Asia" in 2008. The magazine "The Banker" also awarded ICBC the "Bank of the Year in Asia" and "Bank of the Year in China" [46].

ICBC has strong earnings capacity. In 2010, ICBC achieved annual income of 381 billion RMB. The net profit reached 166 billion RMB, up 28.4% year-on-year. In order to enhance the sustainability of the development, ICBC leveraged the growth of all kinds of loans to optimize the credit structure. Meanwhile ICBC improved the investment structure and expanded financial market businesses to increase the operating income. Moreover, ICBC strived to develop intermediary businesses to encourage the diversification. In 2010, ICBC achieved a fee and commission income of 72.8 billion RMB, accounting for 19.13% of the total revenue compared with14.21% in 2008 [47].

ICBC is also committed to improving diversification and inter-market competitive ability, expanding the business from home to abroad, from a traditional commercial bank to an integrated financial services provider. In 2009, ICBC seized the opportunities to enter the market in Canada, Thailand, Vietnam, Malaysia, Abu Dhabi and other countries. ICBC also cooperated with South Africa Standard Bank in a series of businesses. By the end of 2009, the overseas assets of ICBC reached US$ 49.182 billion, up 22.89% year-on-year.

4.6.2   E-Commerce Development Background of ICBC

We discuss the e-commerce development background of ICBC as follows.
- Policy

Chinese government and relevant competent departments are committed to supporting the development of e-commerce. At the end of the 20th century, the Chinese government launched a two-step development strategy planning for ten years to catch up with developed countries in the field of e-commerce. Details of the strategy planning were to develop necessary national e-commerce development policies and regulations; and to build electronic trading systems, payment systems, and monitor security systems as well as training enough e-commerce specialized persons and piloting e-commerce in some industries in the first three or five years; and then to realize the alignment with developed countries in the field of e-commerce and make e-commerce an important component of international commerce in the remaining three or five years. In 2004, China officially launched the "*Electronic Signature Law of the People's Republic of China*" and relevant departments launched the "*Management Regulations for E-banking Services*" and "*Security Evaluating Guidelines of E-Bank*", which played a positive part in the development of e-commerce. The support of national policies provides a strong guarantee for ICBC to fully participate in the development of e-commerce.

● Technology

ICBC set up a software development center in 1996 and its development team began to take shape, which provided a sufficient talent pool for ICBC to develop e-commerce. At the same time, ICBC also actively carried out information technology infrastructure. In 2000, ICBC self-developed a fully functional banking system and a fund remittance and transfer settlement system, realizing the integration of core applications and ensuring that business application systems can continuously run for 24 hours. Meanwhile, ICBC established two major data centers in Beijing and Shanghai and set up the off-site backup system to achieve professional operation and management of the test and production. ICBC's electronic infrastructure has provided technical support for its full participation in e-commerce.

● Market

With everlasting improvement in the technology, there are more and more Internet users in China. In 2006, the number of Chinese Internet users reached nearly 137 million while more than 30 million of them shopped online. It showed that the pattern of e-commerce was gradually been accepted by Chinese people. Especially after the emergence of third-party payments, the bottleneck of traditional e-commerce payment was broken. According to iResearch statistics, there were 31.52 million SMEs in China and the B2B transactions amounted to 480.9 billion RMB in 2006. About 70% of state-owned enterprises were connected with the Internet. General acceptance and participation in e-commerce forms the market on a certain scale.

● Business requirement

After successful listing on the stock market, the customer-focused and benefit-oriented business philosophy is continually enhanced in ICBC. With full liberalization of the financial industry in China, ICBC has participated in the global competition. From the view of large global commercial banks, a large part

of bank earnings are from intermediary businesses. E-commerce can help ICBC develop intermediate and capital services, such as electronic banking, investment banking, bank cards, asset custody and so on. Meanwhile e-commerce will help companies reduce the costs and enhance core competitiveness and market influence which helps ICBC to provide services to customers around the world at low cost.

4.6.3   E-Commerce Strategy and Implementation

The main businesses of ICBC include corporate business, interbank business, treasury business and retail business with the strategic goal of being the leader in the banking industry as well as being a global top financial institution. In order to achieve the goal, ICBC sustainably innovates its business pattern. ICBC leads the investment in data concentration making use of information technology and introduces new products and services, as well as developing a comprehensive risk management system and electronic banking network. ICBC's e-commerce strategy can be summarized as follows:

a) To further develop non-credit businesses in order to achieve the diversification of the asset structure.

b) To develop the credit business and improve the credit structure.

c) To intensify the propaganda of e-commerce and cultivate consumption habits.

d) To enhance the distribution network and strengthen the electronic banking business.

e) To make full use of partnerships with strategic partners.

f) To enhance the training and pay attention to personnel training.

According to ICBC's e-commerce strategy, ICBC mainly focused on five aspects to further develop e-commerce.

● Infrastructure

ICBC knows that an efficient information system is essential for the development of e-commerce. Therefore, ICBC carried out three major projects including data center consolidation, a full-function banking system and data warehouse, in order to set up an advanced international financial information platform. In October 2002, ICBC completed its information infrastructure— "Data Center Consolidation", and set up two data processing centers respectively in Shanghai and Beijing to achieve unified and real-time processing of national operational data. In 2004, the system was integrated, which made Shanghai data center an operation center and Beijing a disaster back-up center. The total processing capacity of the data center reached 17,000 MIPS (millions instruction per second) with 480 million accounts and 20 million transactions per day. Meanwhile, businesses of ICBC's branches in Macau, Singapore, Tokyo, Seoul, and Hong Kong were all gradually connected with the overseas data center for processing. The integrated business system was a super software system, including

23 subsystems such as a fund transfer settlement subsystem, personal finance business subsystem, electronic banking system, credit subsystem, supervising system, accounting subsystem and international business system. During the "Tenth Five-Year Plan" Period, ICBC also launched a full-function banking system named NOVA. NOVA included 19 sub-systems and over 150 application platforms, covering businesses from processing to management, which achieved the transformation from product-oriented businesses to customer-oriented businesses and established a leading position in the domestic financial industry.

● Development system and personnel training

ICBC established a collaboration development mechanism in which Beijing, Shanghai and Hangzhou development departments are responsible for software fundamental development according to joint requirements while tier-one branches are responsible for the system expansion and improvement according to their specific demands. Meanwhile, ICBC established a product test system to ensure software quality. In addition, a software testing environment corresponding to different scales and different responsibilities was established. Moreover, through rich experiences in ICBC's project implementation, ICBC formed an effective technology team during practical development. ICBC also provided regular training for the staff. Now more and more talents are brought into ICBC.

● Product innovation

Relying on information technology platforms, ICBC invested in an updated version of an integrated management system, securities and fund business systems, Internet banking system, mobile and telephone banking system, and a series of financial information products. With advanced technology, ICBC launched a large number of innovational financial products in the domestic market, and also formed new business advantages in electronic banking, investment banking, asset trusteeship, gold business and small business credit. The Internet banking system consisted of three parts, personal Internet banking, business Internet banking and internal management. The personal Internet banking could provide services in 10 categories such as registering individual customers, account processing, customer service, foreign exchange, B-share stock inquiries, a bank-securities link, personal remittances, financial consultancy and B2C services. The corporate Internet banking could provide 7 categories for enterprise customers, such as group financial management, payment instructions, online shopping, credit inquiries, customer service and certificate management services.

● Cooperation with other enterprises

In order to promote the development of e-commerce, ICBC cooperated with a number of strategic partners. In May 2006, ICBC and Alibaba signed an overall cooperation framework in Hangzhou, which was a comprehensive cooperation between China's largest commercial bank and the largest e-commerce enterprise. Under the framework, the two sides would cooperate in the following fields such as e-commerce, related security certification, fund management, marketing and product innovation. In addition, ICBC launched strategic cooperation on online payment, co-branded cards, corporate Internet banking, customer resource sharing and joint promotion with Sohu, Hainan Airlines, Sina and another 12 famous

e-commerce enterprises, which not only marked the beginning of ICBC's involving in network financial services, but also meant the interaction and cooperation between commercial banks and e-commerce industry chain had reached a new stage. Moreover, electronic payment would be well solved through the cooperation.

● Clients

Clients are always ICBC's focus of attention. ICBC has even launched a series of distinctive marketing activities with Tencent, Shanda, Lianzhong, Air China, and China Southern. Through all kinds of incentives and activities, ICBC provides clients with comprehensive and multi-level financial services, prompting customers to form the habit of using online financial products such as Internet banking and electronic banking.

4.6.4   Benefits of ICBC E-Commerce Strategy

As for e-commerce, ICBC plays the role of online payment service provider. Since 2004, ICBC has been the largest online payment service provider in China [48]. When developing e-commerce, ICBC is very keen. When the dot com bubble occurred and e-commerce in China was immature, ICBC found huge potential in e-commerce, which helped ICBC occupy the initiative. Meanwhile, ICBC focuses on its own businesses and actively develops online payment services. In order to develop electronic services, ICBC is committed to developing a solid information infrastructure. In addition, ICBC actively integrates existing resources and develops new businesses such as Internet banking, telephone banking and mobile banking. Moreover ICBC cooperates with other famous e-commerce websites and provides online payment services for them, which further improves the development of ICBC's e-commerce.

● Infrastructure

In infrastructure, ICBC's information infrastructure has been increasingly excellent, which forms efficient e-business services, internal management and office information systems. The network and business data of all 20,073 outlets has been connected and synthetically processed. In addition, ICBC has established a three-level backbone network. The network can be flexibly restructured and expanded according to technology development and business requirements. The bank also promotes the use of mails, document processing and other kinds of office automation systems. Currently, there are over 1.4 million ATM and more than 70,000 POS units in ICBC.

ICBC is also committed to training personnel in science and technology. ICBC now has more than 11,000 scientists and technicians, about 1,600 people among whom are managed directly by the head office.

● Electronic banking

ICBC is committed to creating an integrated business platform including e-banking transactions (Table 4.1), marketing and services. With the platform,

ICBC can accelerate product innovation and take functional optimization according to customer demands to consolidate its leadership in the industry. ICBC introduced a total of 48 new products in 2009, optimized and improved 82 original product features, and its customer services were improved further. ICBC also launched e-commerce, mobile banking (WAP) and other marketing promotion activities to enhance the e-banking brand awareness, driving the growth of customer size and business volume. In 2010, e-banking transactions reached 249 trillion RMB, up 37.3%. The count of the entire electronic banking operations accounts for 59.1%, increased by 9%. The service pattern coordinating traditional physical channels with electronic channels was further formed.

Table 4.1 The amount of e-banking transactions of ICBC from 2000 to 2010

Year	Transaction volume of e-banking (trillion)	Growth rate year-on-year	The proportion in the total business volume
2000	1.93		3%
2001	3.61	87%	5%
2002	8.77	143%	8%
2003	22.3	154%	18%[49]
2004	38.4	72%	20.2%
2005	46.7	22%	26%[50]
2006	45.2	-3.2%	30.1%[51]
2007	102.9	127%	37.2%[52]
2008	145.3	41.2%	46.2 %[53]
2009	181.31	24.8%	50.1%[54]
2010	249	37.3%	59.1%

● Internet banking

ICBC sticks to customer-orientation, and gradually launched kinds of specials products such as the VIP version of personal Internet banking, small purchase of foreign exchange, mobile banking (WAP) with functions of payment, installment, funds, gold trading and other financial management. All of these things effectively meet customers diversified and individual needs. Meanwhile, ICBC also launched an inter-bank online management system for large enterprises and online accounting software for small and medium size business customers to enhance the capability online of corporate banking services. ICBC also introduced an online financial supermarket and remittance to overseas VISA products, which provided more convenient online banking services for individual customers.

In addition, ICBC's internet banking was well accepted by the public. ICBC's internet banking was awarded the "Best Integrated Corporate Banking Global Website" and "Best Personal Internet Banking" by "Global Finance" magazine. And when people chose Internet banking, most people preferred ICBC. In Enfodesk's market survey of Chinese online banking statistics in 2009, 34% of Internet banking users set ICBC as their preferred bank, ranking it first (Fig. 4.18) [55].

In iResearch's survey data on Internet users behavior, ICBC's monthly number of covered people was ahead of others, up to 3,313 million in September 2009 (Fig. 4.19)[55].
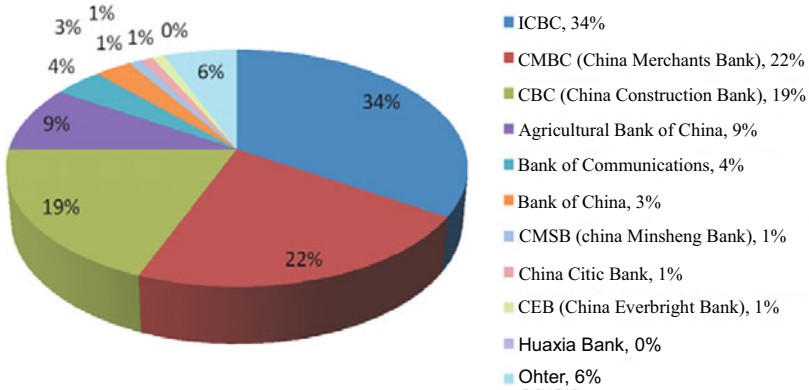
Fig. 4.18   Distribution of preferred Internet Banking in Q1, 2009 (Source: iResearch)
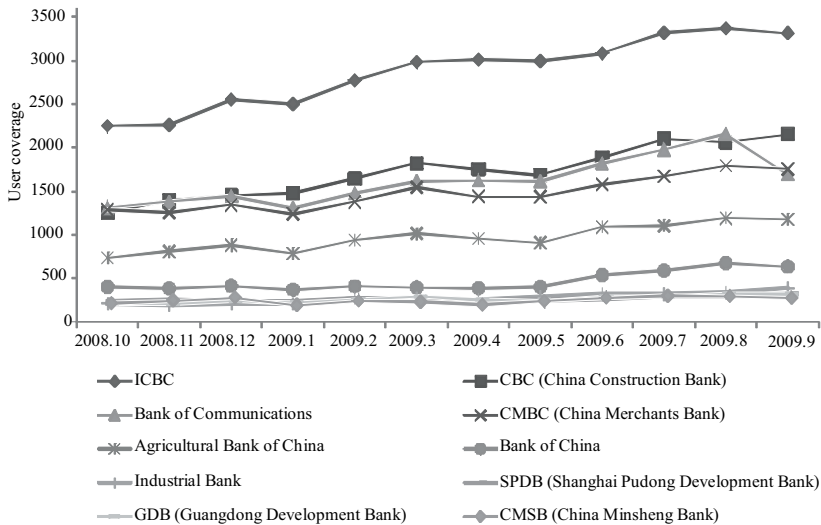
Fig. 4.19   Top 10 monthly user coverage of Internet Banking in China from October, 2008 to September, 2009 (Source: iUserTracker 2009.10)

With ICBC's continuous innovations and people's approval of ICBC's Internet banking, its online banking business is developing smoothly. By the end of 2010, online business banking customers had reached 2.39 million, 500,000 more than that in 2009 (Table 4.2); personal online banking customers had reached 9,623

million, 2,087 million more than that in 2009 (Table 4.3). Corporate Internet banking achieved a turnover of 198.4 trillion RMB, up 46.6% (Table 4.2); personal online banking achieved a turnover of 28.5 trillion RMB, up 60.1% (Table 4.3).

Table 4.2   ICBC's customer numbers and turnover of corporate Internet banking

Corporate Internet banking	Amount of customers (million)	Transaction volume (trillion RMB)	Growth rate of transactions (%)
2007	0.98	85.74	133.8
2008	1.44	110.5	28.9
2009	1.89	135.4	22.5
2010	2.39	198.4	46.6

Table 4.3   ICBC's customer numbers and turnover of personal Internet banking

Personal Internet banking	Amount of customers (million)	Transaction volume (trillion RMB)	Growth rate of transactions (%)
2007	39.08	4.2	205.1
2008	56.72	9.8	135.4
2009	75.36	17.8	82.3
2010	96.23	28.5	60.1

● Telephone banking

ICBC completed the integration of telephone banking reconstruction, and launched special services such as the one-number unified payments services and VIP hotline. The voice menu of telephone banking was also optimized in order to provide more friendly services.

● Mobile banking

ICBC launched a 3G version of mobile Banking (WAP), providing customers with more convenient and efficient inquiry, transfer, payment and other banking services. The number of mobile phone banking customers and the transaction amount grow rapidly, occupying a leading position within the industry. ICBC was awarded "Best Mobile Banking" by the China Electronic Commerce Association.

● Self-banks

ICBC continued to increase the investment in self-service terminals and optimized the layout of self-service equipment. ICBC improved self-terminal functions and optimized its operational processes to enhance self-services' efficiency and reduce the pressure at bank counters. At the end of 2010, ICBC had 11,414 self-service terminals, up 30.8% from 2009. The number of ATMs was increased to 42,868, up 25.8%. The ATM transaction volume reached 33,753 billion RMB, up 64.9%.

4.7   Rise of Lenovo

Lenovo Group Limited is a Chinese-based multinational computer technology corporation that develops, manufactures and markets desktops and notebook personal computers, workstations, servers, storage drives, mobile handsets, IT management software, and related services[56]. As mentioned above, Lenovo acquired the former IBM PC Company Division, which marketed the ThinkPad line of notebook PCs in 2005. Within less than five years, Lenovo has grown into a top PC vender in the world. Compared with IBM's strategic transformation, Lenovo's principal operations are in the hardware industry. It is interesting to find out how Lenovo takes advantage of e-commerce to vitalize the enterprise.

4.7.1   Introduction to Lenovo

In 1981 IBM PCD introduced its first personal computer, the IBM PC. The annual marketing turnover of IBM PCs reached US$5 billion in 1984 and accounted for 50% of the world's PC production. In the same year, with an initial capital outlay of only RMB 200,000 (US$25,000), Lenovo's founding chairman Liu Chuanzhi, together with 10 like-minded colleagues, launched the New Technology Developer Inc. (the predecessor of the Legend Group) funded by the Chinese Academy of Sciences[57] in a rented gate house, HaiDian District, Beijing, China. The main business was selling calculators and assembling compatible computers. After over 20 years of development since the foundation, the company has developed into a multinational corporation with nearly 24,000 employees around the world. According to the press release by IDC in Oct, 2011, Lenovo has unseated Dell as the No. 2 PC manufacturer worldwide[58]. The company reported its revenue of $21.6 billion for the FY 2010'11, increasing from $16.6 billion. The net profit increased to $217 million, over double the previous year. With the integration of IBM's PCD on track in 2005, Lenovo Group Limited Board of Directors appointed William J. Amelio as President and Chief Executive Officer to accelerate Lenovo's planning for its next phase of growth. Lenovo Headquarters are located in Beijing, China and Raleigh, the capital city of the state of North Carolina. The manufacturing and logistics bases are mainly located in China, Mexico, the United States, India, Malaysia, Japan and Australia. With nearly 2,000 top-ranking R&D personnel including world-class technical experts, Lenovo has mastered core technologies of independent intellectual property which take the DeepComp 1800 as a representative. The DeepComp 1800 is China's first computer with 1,000 GFLOP (floating point operations per second) and China's fastest computer for civilian use [57].

   In the development process, Lenovo is bold in making innovations and has realized a lot of major technical breakthroughs successfully, including the Legend Chinese-character card in 1987 which can translate English operating systems into Chinese ones, the Internet PC in 1999 with the "one-touch-to-the-net" feature

which enables millions of Chinese PC users to easily access the Internet and the Collaborative Computing technology in 2003 which established Lenovo's important position in the era of 3C. With advanced personal computers, Lenovo reached the summit of China's IT industry. At the end of 2011 Lenovo became the fifteenth consecutive annual market share leader in China.

Company history is concluded below [57]:

1984: The New Technology Developer Inc. (the predecessor of the Legend Group) was launched.

1987: Legend successfully rolled out the Legend Chinese-Character Card.

1988: Legend's Chinese-Character Card received the highest National Science-Technology Progress Award in China.

1989: Legend Group was established in Beijing.

1990: The very first Legend PC was launched in the market.

1993: Legend enters the Pentium era, producing China's first "586" PC.

1994: Legend was listed on the Hong Kong Stock Exchange. The Legend PC business division was formally established.

1995: Legend introduced the first Legend-brand server.

1996: Legend became the market share leader in China for the first time.

1997: Legend launched the first multi-function laser printer.

1998: The millionth Legend PC came off the production line. The first Legend Shop was established.

1999: Legend became the top PC vendor in the Asia-Pacific region and headed the Chinese national Top 100 Electronic Enterprises ranking. Legend began to promote the first generation of networked PC's titled "Conet" or "Tianxi." Plan.

2000: Legend became a constituent stock of the Hang Seng Index - HK. Legend ranked in top 10 of world's best managed PC venders.

2001: Legend successfully spinned off Digital China Co. Ltd., which was separately listed on the Hong Kong Stock Exchange. Legend appointed Yuanqing Yang President and CEO.

2002: Legend introduced the supercomputer DeepComp 1800. It was China's first computer with 1,000 GFLOP (floating point operations per second) and China's fastest computer for civilian use, ranked 43rd in the Top 500 list of the world's fastest computers.

2003: Legend announced the birth of its new "Lenovo" logo to prepare for its expansion into the overseas market. The DeepComp 6800, which ranked 14th on the global list, was successfully developed.

2004: Lenovo became an Olympic worldwide partner. It is the first Chinese company to become a computer technology equipment partner of the IOC.

2005: Lenovo completed the acquisition of IBM's PCD, making it a new international IT competitor and the third-largest personal computer company in the world. After that, Lenovo established a new Innovation Center in Research Triangle Park, N.C., to enable customers, business partners, solution providers and independent software vendors to collaborate on new personal computing solutions.

2006: Lenovo introduced the first dual-core ThinkPad notebook PCs,

improving productivity and extending battery life for up to 11 hours. In the same year, the first Lenovo-branded products outside of China debuted worldwide. Lenovo technology flawlessly supported the 2006 Olympic Winter Games in Torino, Italy, supplying 5,000 desktop PCs, 350 servers and 1,000 notebook computers.

2007: Lenovo's strategy orienting the 2008 Olympics Games was put into the comprehensive implementation phase.

2008: Lenovo technology and products flawlessly supported the 2008 Olympic Games in Beijing, China.

2010: Lenovo achieved its highest ever worldwide market share and becomes the world's fastest growing major PC manufacturer.

4.7.2   E-Commerce History of Lenovo

In Lenovo, the development history of E-commerce can be divided into four phrases [59].

(1) 1994 – 1995: Manual operation

In 1994, Lenovo's agents contacted sales representatives by telephone and all sales data needed artificial input to the financial system (Fig. 4.20). In 1995 the Board of Trade was established to replace the former functions of sales representatives. Faxes were introduced to improve the work efficiency. But generally speaking, these kinds of manual operations brought Lenovo a lot of problems.
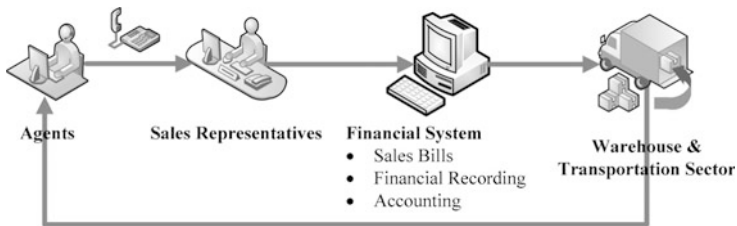
Fig. 4.20   Transaction flow diagram in 1994

(2) 1996 – 1998: Electronization—static information release

Order Management System, Sales Bills Processing System and Rebates Management System were built up to control the intern transaction flow diagram in 1996. Voice Mailbox was used to release quotations, bank statements and other kinds of policies. But all the cancellations of bills after verification were still done by hand. In 1997, Lenovo began to design the e-commerce solution to replace the former Voice Mailbox. Detailed implementation steps were established too. The Bills Management System was released to deal with the cancellations in turn automatically (Fig. 4.21).
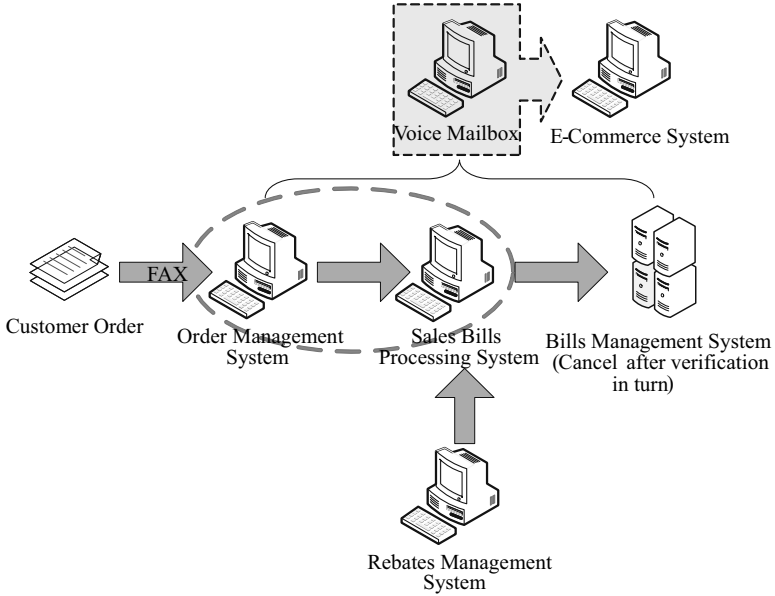
Fig. 4.21 Transaction flow diagram in 1997

The first generation of Lenovo's e-commerce system (Fig. 4.22) made its debut in 1998. Although it was a website which only released static information, it laid the foundation for the full implementation of e-commerce. With the system, policy-making departments could easily deliver the latest policies to each division in Beijing, Sales Representatives among the major regions and Lenovo agents.
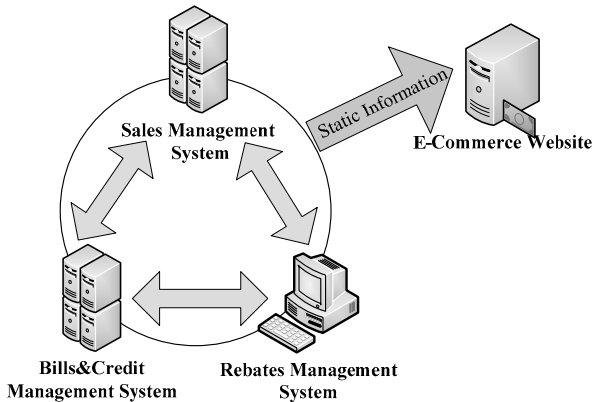
Fig. 4.22 The first generation of e-commerce system

(3) 1999 – 2000: Dynamic interaction

A great leap has taken place from the first generation of e-commerce systems to the second generation introduced in 1999. The new system (Fig. 4.23),

integrated with the Transportation Management System and MRPII (Materials and Resource Planning System), improved the whole business process, realized the smooth link with the Financial System and unified the SQL Data Platform. Customers could submit orders online and enjoy dynamic information inquiry from then on. Lenovo's relevant staff could finish the collection and confirmation of new orders in the system running on the internal LAN.
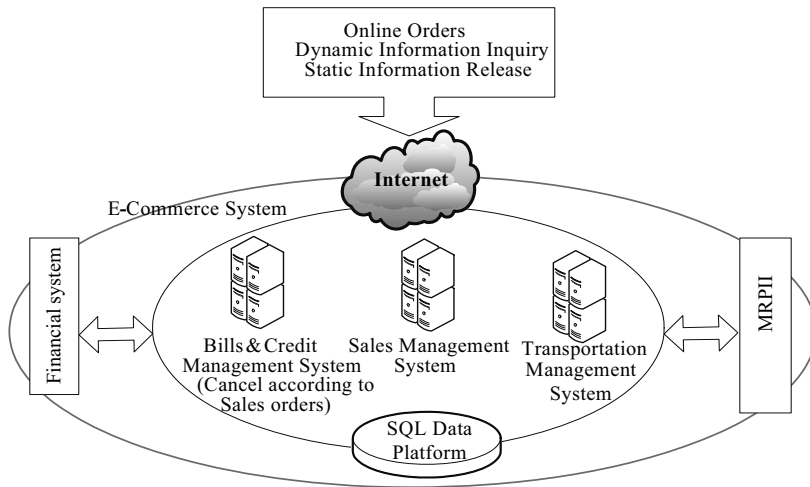
Fig. 4.23   The second generation of e-commerce system

In January 2000, just several months later, Lenovo put forward the ERP system based on e-commerce.

(4) 2001 – present: System integration

From 2001 Lenovo made great efforts to expand the sales channels as well as to realize the integration of them. To extend the traditional supply chain composed of purchase, manufacture, R&D, sales and inventory, the information systems of agents and suppliers were connected to the enterprise system. In addition, all Lenovo exclusive agencies could upload business data and download product details through the Internet. To solidify the development of e-commerce, the Partner Relationship Management system, CRM and SCM were put into operation successively during the following years. In order to improve the efficiency of the trading platform, electronic orders gained their legal effect; the information systems of banks provided an interface for online paying; carriers' websites supplied real-time logistics information for queries and tracking. An integrated system was built up to connect upstream and downstream enterprises, cooperative firms and Lenovo's system.

It can be clearly seen from the above four phases that the construction pace of e-commerce in Lenovo was accelerated with marked results. Benefiting from proper e-commerce strategy, Lenovo has made extraordinary progress almost each year in the developing history of e-commerce.

4.7.3 Strategic Background

At the initial stage, Lenovo confirmed the strategic objective of 2010: To rank among the world top 500 enterprises with a high-tech company image which involves production, sales and R&D as well. Together with this strategy, Lenovo made the three-step implementation plan: the first step was to 2000, to make an entrance into the top 60 in the worldwide computer industry with a turnover of $30 billion and profit of about $100 million; second, to realize the turnover of $10 billion and get closer to the entry criteria of the world's top 500 in 2005; the third step was to become a Fortune 500 entrant and get access to the chip R&D market before 2010. On July 8, 2008, FORTUNE published the 2008 annual Top 500 Global Corporations on its web site in which Lenovo ranked 499th. At China's reform and opening up 30th anniversary, Lenovo finally realized the strategic objective. In order to achieve the long-term development strategy, it is necessary for Lenovo to adjust its main direction and development policies according to its own development level, the change in the market and the development of technology. Lenovo's e-commerce strategy came into being with this background.

From 1984 to 1988, Lenovo developed into a large company with nearly 1,000 agents across the country. In this period, Lenovo contacted all agents by traditional telephone and fax. During the course of communication, a problem arose: it was such a tough job for agents to know a price adjustment quickly. First, Lenovo had to inform the Marketing Department in Beijing of the price changes, then the Marketing Dept. would notify major regions, and after that the information would be transferred to regional sales representatives. At last all agents got the message one by one through telephone or fax. Due to the slow method of delivery, the nearer to the core department agents were, the earlier they knew the changes, while the farther selling agents did not know the message until the customers who saw the advertisement somewhere else and who went to complain. Agents all complained about this method and hoped for relevant information in time, which made Lenovo very passive.

This made Lenovo determined to change the information release system so that all agents hopes could come true. This decision contributed to the construction of the static information release system.

In 1998, the capital of Lenovo was only turned over 1.7 times a year; the payoff period for Accounts Receivable lasted for several months; non-raw materials cost more than 20% and losses because of overstock accounted for 5%. That is to say, Lenovo would make profit only when it grossed over 25%. While at that time international manufacturers such as IBM, HP and Compaq only made a profit of 25% they spent much less on materials and turned over their revenues much quicker. What's more troublesome, adopting the traditional method, business accounting in Lenovo was neither accurate nor timely, which made the enterprise unable to provide timely cost control. A lot of arbitrariness occurred in administrative control. For example, if client had bought 100 hard disks, and then found two broken, they could just change the price at will rather than claim an indemnity. The requirements of improving management, strengthening supervision

and reducing the costs promoted Lenovo to build its own ERP system.

Until 1998 Lenovo was still using the traditional marketing mode. In this mode, the enterprise planned for production and appropriately adjusted it according to sales. Produced goods were put in storage. The sales staff sold products in accordance with stock. For the kind of products which was sold faster more would be produced to ensure inventory quantity. But there was a problem that computer products get upgraded and replaced too quickly. Sometimes the enterprise could not detect market changes in time. Even though Lenovo discovered the change, it was too late to adjust the production plan, which resulted in an immediate consequence of overstocks. Lenovo strongly hoped to meet the market demand speedily, to avoid large stocks and to make quick adjustments to changes. The requirement did urge Lenovo to construct the SCM system.

In market development and customer service, Lenovo also encountered the following problems. To serve larger quantities of customers, different business personnel in Lenovo were arranged to manage different clients. All the customer information and related data were stored only in the minds of business personnel but could not be fully utilized or effectively centralized. More seriously, once some business personnel quit, the customer information, even the customer base, would go with the employee. The urgent need to provide quality services, to improve customer satisfaction and to retain the user urged Lenovo to launch the CRM system.

According to the above, we can see that there is a certain degree of similarity between e-commerce strategies of Lenovo and IBM. Both of them are passive. But this does not mean everything. It is important that in the process of carrying out e-commerce, Lenovo has recognized that many enterprises were facing the same situation. The company fixed providing e-commerce solutions for other companies in an important position. Furthermore, after experiencing this kind of passive adaptation, Lenovo learned how to take the initiative to adapt and make self-adjustment, and soon after put forward a more forward looking e-commerce strategy, which proved Lenovo superior to others. Lenovo executives said: e-commerce is not to simply "electronize" business, but contains the informatization of the entire internal operation system and the business process re-engineering and optimization. E-commerce makes business more efficient, reduces costs and meanwhile increases customer satisfaction via convenient and personalized services. In the domain of enterprise informationization and Internet applications, Lenovo will act as a practitioner, a utilizer and an active contributor as well.

4.7.4   Details of Lenovo's E-commerce Strategy

To sum up, the essence of Lenovo's e-commerce strategy is to develop e-commerce step by step from passiveness to taking the initiative, from low level to high level, from local to the whole and from internal to external, so as to improve the overall e-commerce level of Chinese enterprises and serve China's

e-commerce. The strategy is aimed at becoming the promoter and the rule maker of China's e-commerce.

In early 1998, Lenovo launched the online static information release system, which was considered the first generation e-commerce system in Lenovo. Although the system was fairly simple, it met the urgent need at that time. With the system, agents could learn the latest product news, market policies, business regulations and supply information about Lenovo through the network. This was a one-way connection by which users could understand the situation of Lenovo while Lenovo could not learn about customers and the market.

The system in use brought great convenience to agents, but still left some extremely obvious problems. Based on the successful operation of the system above, Lenovo summarized the experience and introduced the second generation e-commerce system. In this system, websites were joined with Lenovo's internal business processing system. Agents could place orders through the network to Lenovo at any time. The orders were then automatically passed into the internal orders allocator to determine delivery time. Users could query real-time accurate information like the delivery time, delivery location and the tracking position of goods on the website. It made a great contribution to reasonable arrangements for the supply and service to end-users.

The second generation e-commerce system basically realized the electronization of foreground commercial activities, which meant e-commerce in the usual sense. But the performance of the system was incomplete without support from the background electronic system and the after-sales electronic system. To constitute a more complete and comprehensive e-commerce system, Lenovo established the SCM, ERP and CRM system that truly enhanced the core competitiveness of Lenovo. With the help of the CRM system, service personnel were able to grasp all information about one user including the preferred computer model, purchase date, pre-installed software, problems he\she had encountered before and the service history. Customers felt themselves at home. In addition, problems got solved successfully.

Having achieved great success, Lenovo made e-commerce strategies for the next phase: to positively conclude its own successful experience of e-commerce, put forward e-commerce systems and models appropriate for China's enterprises' situation according to the enterprise informatization level and development laws; taking advantage of its own technologies, to launch different e-commerce application solutions and e-commerce service solutions; making full use of Lenovo's influence and actively cooperating with government departments, to promote the application of related e-commerce firms as well as the development of e-commerce across the country. Lenovo is at this stage right now with feasible strategic measures.

(1) Founding the Digital China Holdings Limited (Digital China)

To brave the challenges of e-commerce and to seize the good opportunities, the Legend Group conducted a strategic split in April 2000. Digital China was founded by the mergers of the original Legend Technology, Legend Integration and Legend Network. On June 1st, 2001 Digital China was listed on the main

board of The Stock Exchange of Hong Kong Limited[60]. Digital China is committed to providing Chinese users with state-of-the-art e-commerce infrastructures, solutions and services with a sense of responsibility and continuous innovation. Nowadays Digital China is a leading integrated IT service distributor in China, and is also the largest professional system integrator as well as a well-known supplier of networking products across the board. It focuses on eight major business segments in the China market: IT Planning, Business Process Outsourcing, Application Development, System Integration, Hardware Infrastructure Services, Maintenance, Hardware Installation, Distribution and Retail. Main products contain the product line for the enterprise-level backbone network and Metropolitan Area Network and SME-oriented DSC series switchboards, which have been widely used in government, education, business, telecommunications, finance, military, medical and other industries. After several years of efforts, except for complete product lines, Digital China developed a wide range of personalized products for education and government, and presented a series of industrial solutions based on the wishes of customers. Moreover, Digital China took the lead into the high-end value-added services market. Through continuous exploration and efforts, value-added services achieved a rapid growth. Digital China has become No. 1 among value-added service providers. In the field of enterprise informationization, Digital China Management Systems Limited ranks first in domestic ERP software vendors. On the value-added services platform of Digital China are gathered more than 30 well-known international IT companies, 3,500 integrators, independent software developers, agents and other partners to provide customers with enterprise-level hardware and software products, backbone networks, basic network devices and comprehensive solutions. The company also has its own brand of networking products and solutions developed by the staff, which powerfully supports the Chinese e-commerce process. To the end of March 2010, the Group realized a total turnover of 50.178 billion Yuan, an annual growth of 18.55%, much higher than the growth rate of the same period in China's overall IT market.

(2) Striving for the strategic transfer to the Internet

Comparing with IBM's strategy "embracing the Internet overall", Lenovo's strategic transfer is similar to it in form but quite different from it in content. Lenovo focuses on how to help Chinese users realize the Internet dream. 1999 was the first year that Lenovo's strategy turned to the Internet. The operation of the e-commerce system "is a thing of great signification in Lenovo's history and will drive the implementation of Internet strategy" Yang Yuanqing, general manager of Lenovo, said. In March 1999, at the exhibition of COMDEX/China, Yang announced that Lenovo would start the full implementation of Internet strategy. It was the first time for Lenovo, and for China's IT companies to make a public, comprehensive and systematic strategic philosophy and framework orienting the Internet. Lenovo would strive to provide more, cheaper and better functions and applications, more useful means and tools for Internet users in China. The critical step Lenovo took to meet the waves of the Internet was to flourish "Internet Time Featured Computers" at first. For the purpose of the strategic transformation from

"a computer function integrator" to "a comprehensive Internet products and services provider", Lenovo decided to take the Internet as the core and build the company's own products and services around it.

Specifically, Lenovo starts off with three domains to achieve the national Internet dream. They are, respectively, access products, infrastructure products and information services. Access products include the reading room computers and living room computers for family users, mobile computers for business users etc. As to infrastructure products, Lenovo pays attention to servers. The company develops dedicated servers for the Internet application model which are called Application Servers, puts forward application projects based on Lenovo Tower Servers and optimizes the hardware performance of servers according to the requirements of the Internet. When it comes to information services, Lenovo published *Happy Home* for families, *My Office* for office workers, *Lenovo Full Mark School* for students and *Internet Farther* for the under aged. Access products, infrastructure products and information services together form the new three-terminal product architecture for Lenovo. The core of this structure is just the Internet. The function is to lead Chinese households, businesses and society into the Internet world more quickly. To coordinate with the Internet strategy, Digital China has been introducing routers, network management software, network security products, switches, hubs, network cards, etc., all of which belong to Lenovo's own brands. These endeavors sound the horn of Lenovo on the march to the Internet world.

(3) Developing e-commerce solutions adequate for China's actual conditions and serving China's enterprises

Lenovo proposed the enterprise e-commerce solutions "Web Shop". It is a front-end e-commerce platform for enterprises created on the basis of Lenovo's ERP solutions for manufacturing industry. It is seamlessly integrated with the back-end ERP system and allows users to log in to the ERP system through a browser. Users can place orders, check the implementation status of orders, cancel orders, choose different product accessories such as different colors and different materials, select the delivery date, select bulk delivery or partial delivery, grasp sales promotions, discounts, distributions and so on directly on the Internet. Later, Lenovo launched CTI II as the core technology of Lenovo Call Center. Compared with traditional CTI technology, it places emphasis on Information and the Internet. It is easy for CTI II to realize the IP phone, the IP fax based on CTI technology, and the call center and unified information processing combined with the Internet. At the same time, it is good at dealing with complex interactive problems, personal services, fuzzy response, flexible treatment, repeated inquiries, work assignment and tracking, recording for evidence and quality of service dialogue. The Call Center series solutions have proved to be superior to the past in improving the utilization rate of communication paths, increasing labor productivity and improving the quality of service with less manpower, which is applied to public service trades like finance, insurance, shipping, tourism and telecommunications.

4.7.5   What Lenovo Gets

The most wonderful benefit Lenovo gets from e-commerce is the internal cost savings. The inventory turnover time fell from 72 days in 1995 down to 22 days in 2000. Referring to 963 million RMB, the average balance of deposits in 2000, it meant saving 2.1 billion RMB. From the cost of the capital perspective, e-commerce reduced the cost by 126 million RMB. The total lost revenue caused by backlogs was pegged at 0.19% in 2000, much less than that of 2% in 1995. Compared to annual sales volume in 2000 at 20 billion RMB, the decrease equalled saving 362 million RMB a year totally, including a cost reduction of 47 million RMB. The turnover time of accounts receivable changed from 28 days in 1995 to 14 days in 2000. The ratio of accounts receivable and bad debt in gross revenue dropped from 0.3% in 1995 down to 0.05% in 2000. The cost of online resource booking, travel and office supplies reduced about 10%. The above all added up to an annual total cost of over 600 million RMB, which was enlarged approximately proportionally to the increase in business turnover and the decrease in cost. Thus, in terms of 2005 turnover at 80 billion RMB, Lenovo saved nearly 2.4 billion RMB within one year.

After establishing e-commerce systems, a large number of orders were delivered via the Internet. This change greatly reduced the error possibility of orders, saved the time and energy of counter parties to examine and verify orders. Moreover, the system also improved the information transmission efficiency. With the help of e-commerce systems, agents could track orders' execution states through the network at any time.

The implementation of ERP resulted in more accurate cost accounting to Lenovo that avoided delay and inaccurate data in time. Before ERP came out, in Lenovo there were 44 independent legal accounting entities, 15 independent accounting divisions, 179 profit centers, 32 functional departments and more than 1,400 cost centers, which produced more than 2 billion items monthly, over 40,000 orders, 1,000 purchases and more than 4,000 expenditures.

At the end of each month, at least 70 personnel from the financial sector were needed to work overtime for accounting. Even so, it took 30 days to get an inaccurate financial statement. After the implementation of ERP, monthly report forms from each independent legal accounting unit could be made out in only half a working day later than accounts, and financial statements from the headquarters took only five days even though Lenovo never stopped growing.

ERP also improved the financial control and supervision, which reduced the difficulty and arbitrariness of artificial operations, effectively minimized the vulnerability of financial management and put an end to corruption.

After implementing SCM, Lenovo was able to meet requirements of customer orders quickly, and avoided overstock as well. With the implementation of CRM, personnel changes would not lead to service disconnection which helped Lenovo serve customers more effectively. Network office, financial management, SCM and e-commerce saved 350 staff for Lenovo in 2000, which meant that labor productivity was increased by 7%.

To sum up, implementing ERP, CRM and SCM systems has optimized internal management, increased the resource utilization rate, accelerated the speed of response to market changes and improved customer relationships. All these obvious social benefits are essential to the healthy development of enterprises. The beneficial changes caused by the use of the above e-commerce systems ensured the smooth implementation of long term development strategy and laid a solid foundation for the realization of long term strategic goals. These effects of high importance will find their expression in many ways other than economic indicators.

4.8   Conclusions

In recent years there has been a dramatic increase in enterprises and companies practicing e-commerce. The emerging conventional wisdom suggests that e-commerce is different enough to warrant an in-depth examination of traditional organization design in the present global scenario; e-commerce has increasingly become a necessary component of business strategy [61].

In the strategy initiation phrase, an organization reviews the information about itself, like its vision and mission, strengths and weaknesses, analyzes its competitors and competitive position, and recognizes its strategic environment. Then, according to the outcome, the enterprise decides all detailed initiatives which make up the e-commerce strategy for the enterprise and the implementation order. Initiatives generally include a list of approval of e-commerce projects or applications, risk management plans, pricing strategies, and a business plan that will be implemented later [62].

From the very beginning of the e-commerce strategy cycle[62], different companies meet with diversified situations, so they formulate different strategies to solve their unique problems. E-commerce coupled with the appropriate strategy and policy has helped a large number of enterprises and companies. Some e-commerce strategies have become classic business issues. In this book, only seven companies are referred in which four are from China. Although strategies differ from each other, we can compare and distinguish all these e-commerce strategies by *Brick-and-Click* or *Brick-and-Mortar*.

During the practice of e-commerce, two basic modes of organizing companies have emerged. The first is creating a *brick-and-mortar* (also called *move-to-the-Internet*) company in which an e-commerce division may be installed. The second is founding a *brick-and-click* (also called *born-on-the-Internet*) company as an electronic commerce company, without previous organizational links to a traditional brick-and-mortar organization. Whether a company is a *brick-and-mortar* or a *brick-and-click* business is a key classification index of e-commerce strategies. Both modes of corporate practice of e-commerce require redesign, recalibration, and even restructuring of key organizational dimensions. IBM, GE, Haier, ICBC and Lenovo all belong to *brick-and-mortar* companies. No

matter whether they are active or passive in joining the e-commerce procession, they have to make great efforts to transform the existing value chain. Companies like Google, Taobao and many other well-known enterprises we have not analyzed, like Amazon, Yahoo and eBay etc., are called *brick-and-click* businesses which prefer building a brand new web based value chain. Table 4.4 describes the substantial assets and liabilities of the two modes of companies that influence their ability to formulate and implement an e-commerce strategy.

Table 4.4 An e-commerce strategy balance sheet for brick-and-click and brick-and-mortar companies[62]

	Assets	Liabilities
Brick-and-click company	• Executive management tends to be young and entrepreneurial and is willing to take risks and make commitments for the long-term. • Some funding is available to start the project. • The organizational structure is flat and flexible, with wide spans of control, so the organization can respond rapidly to change. • Information systems are new, allowing rapid implementation of fast, Web-based services that customers demand. • The company as a whole is agile, flexible, hungry for success, and looking to topple the market leader from its perch. • An innovative idea exists, possibly patented.	• Executive management tends to be focused on the short-term, looking after satisfactory next quarter results and going IPO rather than the long-term viability of the company. • Product knowledge, logistics channels, and value chain partnerships must be built from scratch. • The lack of a brand, reputation, and physical presence raises issues of quality uncertainty among customers. Assets such as brand and reputation must be built, at considerable cost. • The Brick-and-Click business must be built from scratch, using limited venture capital funds or bank loans. If results and revenues do not appear fast, the company will go under. • The initiators frequently lack managerial experience or capabilities; yet they hold the CEO position.
Brick-and-mortar Company	• A customer base and decades of knowledge about customers and their requirements are available. This knowledge base can be mined to anticipate customer needs and demands. • The company is willing and able to take risk. • The company has the knowledge and personnel to undertake (or outsource) the project. • Years of experience in the product marketplace are available to the company, which knows what its customers buy, how they buy, and why they buy. • An established brand, a marketplace reputation, and a physical presence give customers reassurance in terms of trust, long-term viability, and convenience. • The initiation of an E-commerce application or project can be funded from existing or redirected resources. A long-term commitment to funding an E-commerce application is possible.	• The customer base on day one is zero, and each new customer must be acquired from an existing firm within a competitive marketplace. Need to spend big money on customer acquisition. • The organizational infrastructure is old and lethargic, with layers of management that make responding to change difficult. • Legacy information systems make implementation of strategic E-commerce applications difficult. • The company as a whole is rigid, satisfied with the established way of doing things and, if it is an industry leader, complacent in its market prominence. • Resistance to change from the existing parts may slow down or even "kill" the move to the Internet.

Studies on the e-commerce strategy implementation phase have found that the implementation of e-commerce depends heavily on the application of information and communications technologies (ICTs). The integration of ICTs in business has greatly improved inter and intra organizational relationships. E-commerce also acts as a strong catalyst for economic development. Specifically, with the help of ICTs, many companies have improved productivity, encouraged greater customer participation, and enabled mass customization as well as reduced costs. Thanks to the developments in the Internet and Web-based technologies, differences between traditional markets and the global electronic marketplace are gradually being narrowed down[61]. Workable and practicable e-commerce strategy can bring companies direct economic benefits and defend their competitive positions as a result. Statistical data and analytical conclusions of the effect of e-commerce strategy implementation on all companies in this chapter have fully proved this point.

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5

E-Commerce Strategies in Specific Strategic Environments

In Chapter 1 we have said that "any strategy, no matter for a country, an industry or for an organization, will be restricted and influenced by the strategic environment". In this chapter, some special strategic environments like financial crises and earthquakes are discussed in detail to explain further the impact of strategic environments on e-commerce. Actually, there are great differences between these impacts and all the strategic environments need to be treated case by case. But there is one common point underlying these cases, namely that environmental factors should be taken into consideration seriously while making e-commerce strategies, no matter whether they are positive or negative.

5.1　How to Fight Against Financial Crises

The global financial crisis in 2008 was the worst financial crisis since the Great Depression in 1929. The crisis originated in the United States and quickly spread all over the world. The global economy has been badly affected. In the background to the financial crisis, what will e-commerce do? How to fight against a financial crisis with e-commerce?

5.1.1　Financial Crisis

A financial crisis is used to describe a situation in which some financial institutions suddenly lose a great deal of assets, including a currency crisis, a banking crisis, a stock market crisis and public debt crisis[1]. A financial crisis can affect the whole economy of the country where the financial crisis is initiated and also has a great effect on the global economy through the chain reaction. A financial crisis may trigger a global economic recession and many businesses may

fail, or employees get laid off.

In history, there were many kinds of financial crises which really damaged the global economy badly. The economic crisis of 1929 initiated in the United States led to bankruptcies and mass unemployment across all industrialized countries. In 2008, another financial crisis began in the United States as the consequence of uncontrolled consumption by U.S. households and other Europeans. The housing bubble and the stock market bubble grew up in the United States in the mid-90s. At that time, the stock market was bullish and stock prices increased all the time, which made a great deal of unexpected wealth for people. It led to the consumption boom and a fixed asset such as housing became one of the most important investments for households. In return, the housing bubble was triggered because of exceeding demand and fixed supply. But the housing bubble started to burst in 2007 when house prices drastically declined. Many large state-based financial firms went bankrupt or merged with others. Meanwhile the crisis expanded into other countries with a ripple effect. It caused a deep recession and many other industrialized economies were damaged by its outcome. Three of the most important socio-economic consequences are shown as follows:

● Increasing unemployment rate. Due to the financial crisis, the growth of the whole economy slowed down and nearly each industry's production was reduced with lower profit. As a result, companies tried to reduce expenses to maintain an ideal profit or reduce the loss. Downsizing was one of the most important solutions that most companies would take. Therefore the unemployment rate grew. To reduce costs, some giant companies such as Google, Yahoo and eBay all cut the number of employees[2].

● Inflation or deflation. The financial crisis would mean people would lack enough credit to finance their purchases so that demand would be decreased to some extent, resulting in deflation. On the other hand, the government would launch relevant policies and pour more money into the banking system in order to stimulate the economy. This would increase the inflation rate to some extent[3].

● Economic deceleration. Due to the financial crisis, many financial institutions were badly damaged so that the financing of other industries was badly influenced. Without enough financial support, it was impossible to expand business or investment. Meanwhile, an increasing unemployment rate led to less consumption. In return, this forced manufacturers to reduce production. In addition, inflation or deflation had a ripple effect on the economy. At the end, the economy decelerated.

In this situation, the performance of companies must be influenced. Due to the economic deceleration, all companies had to face problems such as high costs, few customers and little revenue. During the financial crisis, many companies went bankrupt or were acquired by other companies, especially medium-sized and small enterprises. Those enterprises with little capital highly depended on other large enterprises. Once the economic situation deteriorated, their orders were reduced to a large extent because consumption greatly shrunk and most of their customers had to reduce production. Meanwhile, costs were greatly increased because of high interest rates. Without enough capital, those medium-sized and small

enterprises quickly faced a shortage of liquidity because of less revenue and credit. Even some large enterprises with a long history did not survive the 2008 financial crisis. General Electric's and Textron's share price declined by 70% or more during the financial crisis[4].

Therefore, reducing costs and expanding new business are important parts of the solution to rescue those companies from the nightmare of the financial crisis. Compared with traditional commerce, e-commerce had great advantages in the financial crisis. First, e-commerce could bring great sales opportunities as a vital sales tool. With e-commerce, enterprises can not only quickly find new suppliers and trading partners, but also publish procurement information online. On the buyer side, enterprises can provide more convenient services for buyers using the Internet. In addition, e-commerce can help enterprises share information with customers and understand their actual needs so that enterprises can provide more satisfactory goods and services to boost market penetration. Moreover e-commerce can reduce the transaction costs. A well-run e-shopping mall is without the pressure of inventory, which will save costs to a great extent. E-commerce can also reduce the need to provide price quotations and other activities for companies selling products and processing orders. Moreover, with an e-commerce platform, people can directly bargain with each other and speed up the information exchange between themselves which will reduce transaction costs on both sides. Secondly, e-commerce can reduce costs. The whole process from signing the contract to the payment can be realized online anytime and anywhere. Due to the fast speed of the Internet, people can finish transactions online quickly and efficiently [5]. Moreover, e-commerce has great advantages for enterprises, especially small-sized and middle-sized enterprises. With low cost, SMEs can easily adopt e-commerce to develop businesses. In addition, people prefer shopping online owing to prices, which also brings a great many customers to SMEs. With high transaction efficiency and low transaction cost, enterprises can enhance their competitiveness and earn more profit compared with other enterprises.

5.1.2   Impact of Financial Crisis on B2C E-Commerce in U.S.

As referred to above, the financial crisis has had a great influence on the economy including the high unemployment rate and lack of financial resources for households, which influenced the buying power in the end. Over the whole economy, different industries would be affected by the financial crisis. Companies such as eBay, Google and Intel all tried to cut costs in order to face the problem of declining profit and revenue. Meanwhile, customers' confidence was affected by the declining economy. From Fig. 5.1, we can see the consumer confidence index (CCI)[1] fell to the lowest during the financial crisis. It could be seen that

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[1] Consumer confidence index (CCI) is defined as the degree of optimism on the state of the economy that consumers are expressing through their activities of saving and spending.

consumers were very pessimistic at that time so that they did not dare to spend too much instead of saving. Meanwhile, people did not have so much money to spend due to the downturn in salaries and revenue. In addition, loans from banks were reduced because banks tightened conditions for loans as a consequence of the financial crisis. As a result, consumer spending remained at a low level for an extended period. As a chain reaction, it would influence enterprises in different industries because the demand determined the supply. The demand declined so the supply would be reduced in return.

Current Reading: 54.1   Consumer Confidence Index

Change: 6.7
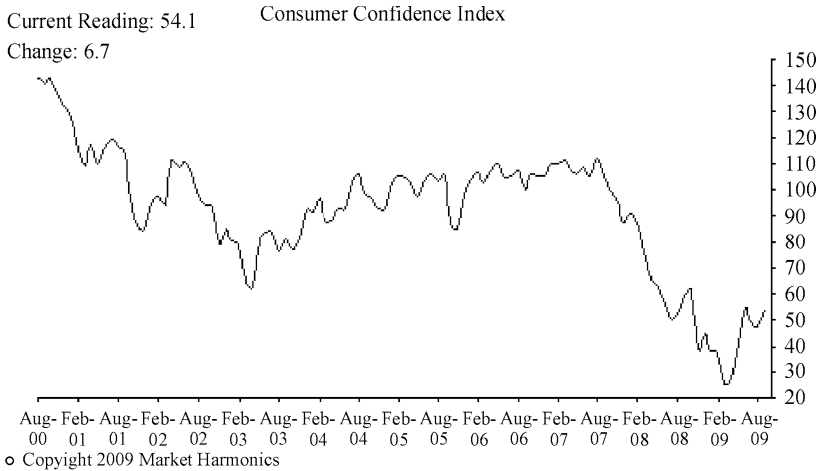
Fig. 5.1   Consumer confidence index (CCI) 2008 – 2009

Among different industries, the retail industry was the most closed related to consumer demand. The decline of consumer demand would definitely affect the retail industry and the influence was the strongest. Meanwhile, the retail industry was one kind of industry that implemented e-commerce the most. Consumers had been used to shop online, especially for inexpensive goods. So we chose the retail industry as an example.

In the first quarter of 2008, the financial crisis had not obviously emerged. The total retail sales grew respectably at 3.7% with a total volume of $32.4 billion (Table 5.1). Although compared with the prior quarter, online retail sales decreased by 16.9%, increasing sales in the holiday season of the fourth quarter should be considered. The total retail sales in the second and third quarter of 2008 experienced a decreasing growth respectively with a growth rate of 2.3% and 0.9%. Although increasing demand in the fourth quarter made online retail sales increase by 17.3% compared with the prior quarter, retail sales still declined severely compared with the same quarter a year before. When the year 2009 began, retail sales showed increasingly negative growth. In the first quarter of 2008, online retail sales declined by 5.7% compared with the same quarter a year before with a volume of $30.2 billion while total retail sales declined by 11.6%. With economic recovery, retail sales performed better than the prior quarter although

retail sales still declined compared with the same quarter a year before. Online retail sales and total retail sales respectively declined by 4.5% and 10.6% compared with the same quarter a year before.

Table 5.1 Retail and online retail sales in 2008 – 2009 in U.S.[6]

Quarter	Online retail sales (billion)	Percentage change from prior quarter	Online retail sales percent from same quarter a year before	Retail sales percentage change from same quarter a year before	Online retail as a percent of total
1st Q 2008	$32.4	−16.9%	13.4%	3.7%	3.4%
2nd Q 2008	$32.5	0.5%	8.9%	2.3%	3.1%
3rd Q 2008	$31.6	−2.8%	4.6%	0.9%	3.1%
4th Q 2008	$37.1	17.3%	-5.5%	−8.6%	3.8%
1st Q 2009	$30.2	−17.7%	-5.7%	−11.6%	3.6%
2nd Q 2009	$30.8	2.1%	-4.5%	−10.6%	3.3%

According to statistics above, it can be seen that retail sales went through a severe downturn in the financial crisis. The downturn in online retail sales was because of the following reasons[2]:

● Online buyers had less available credit to finance purchases as a consequence of the financial crisis. During the financial crisis, nearly all the financial institutions had been badly damaged so that they all reduced their available loans and tightened the conditions to obtain a loan. As a result, consumers had fewer opportunities to get credit to fund spending. Meanwhile, people had less money because of the increasing unemployment rate referred to above.

● People saved more. Because of the negative economic situation, people preferred saving money in the bank to excessive consumption. From the third quarter in 2008 and the second quarter in 2009, the savings rate showed significant growth while consumption expenditure showed negative growth (Table 5.2). At that time, the market remained severely strained. Nobody knew whether he would lose his job the next moment. So people tried to reserve a safe financial source for hard times. Furthermore, the retail industry and online retail sales were severely influenced because of reduced consumption expenditure.

Table 5.2 Consumption expenditure and savings rate 2008 – 2009[4]

Case	Percentage change from prior quarter					
	1st Q 2008	2nd Q 2008	3rd Q 2008	4th Q 2008	1st Q 2009	2nd Q 2009
Consumption expenditure	3.7%	3.9%	−4.7%	−5.0%	−1.5%	−1.3%
Savings rate	1.2%	3.4%	2.2%	3.8%	3.7%	5.0%

However, if we considered differences between the growth rate of retail sales and its online part, we could find that the development of online retail sales was better than the total. During the first quarter and the third quarter of 2008, online retail sales and total retail sales all showed positive growth. But online retail sales grew more than total retail sales. For example, online retail sales grew by 13.4% while total retail sales grew by 3.7% compared with the same quarter a year before. Although online retail sales and total retail sales all showed negative growth, online retail sales decreased less than the total retail sales. When the total retail sales decreased 11.6% in the first quarter of 2009, online retail sales just decreased by 5.7% compared with the same quarter of 2008. The decrease in the total was because the economy worsened, which resulted from the financial crisis. The situation was hard to change. However e-commerce showed a better performance because of its advantages, which proved e-commerce could play an active role in the financial crisis. In particular, in the fourth quarter of 2008, online retail sales accounted for 3.8% of the total, reaching the highest point. The fourth quarter was the holiday season with the strongest demand in the United States. The demand in the holiday season was rigid. There were lots of big occasions, especially Christmas. For these important holidays, people had to buy lots of goods for celebration. Although the financial crisis reduced people's purchasing power, necessary goods for the celebration were necessary. In addition, people preferred spending a brighter and beautiful Christmas to push aside what the financial crisis had brought. However, people had to find a more convenient and cheaper way to purchase goods because of the declining purchasing power. So e-commerce became the best choice. Online retailing, as one part of e-commerce, required less expenditure to buy and search online. People could easily find and buy what they wanted at any time anywhere they had access to the Internet. Moreover, there were many discounts and bonuses in online shops. Online retail sales as a percentage of the total in the fourth quarter of 2008 reached the highest point. Therefore the financial crisis really promoted the development of e-commerce.

Moreover, the economic situation was the most important factor in e-commerce development. Although online retail sales performed better than the total, online retail sales still showed negative growth. The financial crisis directly reduced the purchasing power through different mechanisms. Although the financial crisis made people more likely to choose e-commerce as the first choice, the decrease in total sales would inevitably bring a decrease in online retail sales as one part of e-commerce. As the economy began to get better, we could see online retail sales turned out a better performance. Online retail sales in the second quarter of 2009 performed better than the prior quarter, as shown in Table 5.1.

Above all, the financial crisis could bring great opportunities for the development of e-commerce. With the decline in purchasing power, people would like to choose e-commerce as the best choice instead of traditional shopping because e-commerce is more convenient, with reduced costs. However, a stable and healthy economy is the foundation of e-commerce. As long as people have enough purchasing power, e-commerce can maintain sustainable development.

5.1.3   Opportunities Brought about by the Financial Crisis to China's E-Commerce

E-commerce has great advantages in reducing costs, improving efficiency and expanding business opportunities to minimize the bad effects caused by the financial crisis. The financial crisis has also brought about great opportunities for the development of e-commerce in China. Nie Linghai, deputy director of the Information Technology Department in the Chinese Ministry of Commerce, said "The financial crisis provided a rare development opportunity for China's e-commerce industry".

China's e-commerce started much later than that of the West. China did not pay attention to e-commerce until 1997. Compared with the West, e-commerce in China is quite different. The emergence of e-commerce in the West, especially in the United States, was promoted by business demands. With fast and efficient business demands, IT vendors like IBM tried new technology to satisfy the demands and promoted the development of e-commerce. But when China began to develop e-commerce, the business model and technologies were relatively mature. China's e-commerce could be seen as "technology pulled" while US e-commerce was "business-driven". E-commerce in China had learnt a lot of previous experiences from the West and improved them according to China's actual conditions. Meanwhile, with the development of technologies, e-commerce in China can be improved to some extent, from the Internet to mobile e-commerce. In the development of China's e-commerce, Alibaba must be mentioned as it can be called the forerunner of China's e-commerce. Ten years ago, e-commerce did not arouse great attention among the public because Chinese people prefer purchasing in real shops for security reasons. Alibaba established public confidence in shopping online. Now there are a lot of e-commerce companies such as Alibaba, Dangdang and Zhuoyue in B2B, B2C and C2C markets. But there is still a huge gap between China and other developed countries. With regard to the advantages of e-commerce, the financial crisis has brought about great opportunities for e-commerce in China.

E-commerce makes traditional business electronic and digital which largely reduces the cost and breaks the limitations of time and space. As a result, e-commerce gives enterprises opportunities to develop new business models. In the financial crisis, both the sales costs and procurement costs have been greatly increased but both of them can be largely reduced by e-commerce. For example, e-commerce can reduce lots of unnecessary intermediate links to reduce procurement costs. In addition, e-commerce can largely reduce the management costs because lots of management tasks can be moved to the Internet. A lot of Chinese enterprises lack modern management, especially in small and medium enterprises. Those enterprises may be adversely affected by the financial crisis because of high costs without electronic processing. Therefore, the financial crisis will put great pressure on businesses to reduce costs and improve management. E-commerce would be a good choice. E-commerce can reduce 47% of channeling and marketing costs, leading to a 16% cost reduction in total[7].

In addition, the financial crisis has largely triggered people's enthusiasm for shopping online. Buying online is cheaper and more convenient. People can easily search what they want on the Internet. Meanwhile, online shops have inherent advantages of low cost compared with traditional shops. Now the amount of goods online is very plentiful and a lot of discount activities are provided, which attract people to shop online. During the financial crisis, people all suffer economic strain. There is no doubt that e-commerce will become the best choice for people. In the end, all of this will promote the development of e-commerce.

Moreover, developing e-commerce is the requirement of an innovative service. The financial crisis has exerted a negative impact on most enterprises. Industrial restructuring has become necessary. The Chinese economy is labor-intensive and this kind of economy is vulnerable, especially during economic decline. When other countries reduce the demand or other countries' labor costs are much cheaper than those in China, the Chinese economy will suffer heavy losses undoubtedly. Therefore, Chinese enterprises need to explore new business models and develop e-commerce through the Internet. With e-commerce, enterprises can make the best of information technology to increase value and competitiveness in the future. Through developing e-commerce services, the industrial structure can be optimized and the efficiency and quality of the national economy can be enhanced.

Meanwhile, government support in the financial crisis has brought a rare opportunity for the development of e-commerce in China. In order to reduce the negative impact the financial crisis may have on the economy, the government of China has taken a full range of effective measures. The government of China has launched an investment plan worth 4 trillion RMB to further expand domestic demand in order to promote economic growth. In particular, the State Council explicitly put forward the measure of supporting the modern service industry which takes e-commerce as representative of ten measures for expanding domestic demand. The government plans to move forward the process of industrialization by information technology and encourage most medium-sized and small enterprises to adopt e-commerce so that the modern service industry can be actively developed and domestic demand can be greatly expanded. In addition, as an effective way of restructuring industry, the government will unveil a series of measures and policies on finance, tax and industrial development to further promote the development of e-commerce.

In fact, e-commerce is really developing fast in China and the financial crisis really has had a positive impact on the development of e-commerce. In 2008, the total amount of e-commerce transactions in China exceeded 3 trillion RMB with a growth rate of 40% year-on-year, which is much higher than the GDP growth rate of 9.6%[7,8]. It can be seen that e-commerce develops faster than the national economy.

However, there are still many constraints on the development of e-commerce in China. Firstly, there is an imperfect credit system. The two parties in e-commerce find it difficult to trust each other due to lack of direct, face-to-face contact and deep understanding so that a perfect credit system is necessary. But

the establishment of a credit system in China just started not long ago. The credit system has not included all the population and the penalties for not acting in good faith have not been perfected. Secondly, there is bad e-commerce security. The "electronic document" was introduced in China not long ago and security technology is not perfect, which makes it easy for the hacker to decipher trade information and personal information. In the end, this will affect e-commerce transaction enthusiasm. Thirdly, there is a low level of e-commerce logistics and distribution system. China is a large country with great amount of land and people. But its logistics infrastructure is weak and can not fully meet the requirements of online transactions. Moreover, there is a lack of legal policy. There are not enough laws and regulations related to e-commerce to address online transactions, electronic money payments, goods distribution and quality assurance of goods, which further prevents the development of e-commerce in China. One of the most important laws relative to e-commerce, the *Electronic Signature Law of the People's Republic of China*, put into effect in 2005, still needs more improvement. Lastly, there are not enough e-commerce professionals. To cultivate e-commerce, professionals are important for developing e-commerce in China.

Above all, although the financial crisis has triggered a global economic recession, it is also a good opportunity to upgrade for China. China can make the best of e-commerce's advantages to make industrial restructuring and reduce the negative impact the financial crisis may bring. There are a number of constraints in the development of China's e-commerce, including an imperfect credit system, ineffective on-line transaction security, imperfect logistics and distribution system and legal policy lag. But the financial crisis has brought a great opportunity to resolve these constraints. Meanwhile, a series of measures and policies the government of China has launched would create a sound environment for developing e-commerce. China should make use of the opportunity to speed up the construction of the credit system, to establish a scientific system of e-commerce security, to improve logistics and the distribution system and establish a sound legal system related to e-commerce. Meanwhile, China can adopt innovative e-commerce services to develop emerging markets. Small and medium-sized enterprises can adopt e-commerce to change the operation model so as to provide value-added products.

5.1.4   China's B2B Websites in the Financial Crisis

The global financial crisis had a dual effect on the B2B industry in China. The financial crisis had great negative impact during the end of 2008 and the first half of 2009. New registrants and revenues obviously decreased. But most B2B websites quickly recovered from the financial crisis in the latter half of 2009 because a great many enterprises adopted e-commerce to face the crisis. Even some websites achieved accelerated development.

● Great increase in registrants

In the financial crisis, about 88.6% of B2B websites fluctuated in the number of registrants. Up to April 2009, the number of B2B websites whose registrants decreased accounted for 26.29% while the number of B2B websites whose registrants increased accounted for 62.29% (Fig. 5.2). It could be seen that the number of B2B websites' registrants still maintained a growing trend with an average growth rate of 12.65%.
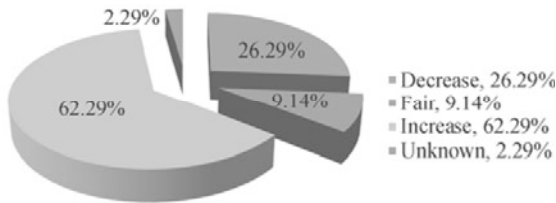
Fig. 5.2   Changes in registrants after the financial crisis (Source: www.ebrun.com[1])

In addition, the financial crisis had a greater effect on renewals than new registrants. Up to April 2009, only 7.43% of B2B websites showed no change in renewals. 34.29% of B2B websites decreased in renewals. The average growth rate of renewals was just 3.09%, much lower than that of registrants (Fig. 5.3).
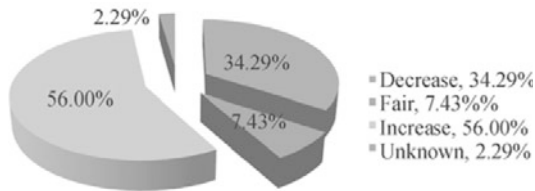
Fig. 5.3   Changes in renewals after the financial crisis (Source: www.ebrun.com)

● More services innovation

In order to effectively tackle the financial crisis, B2B websites actively developed services innovation. 55.93% of B2B websites focused on developing and improving domestic businesses. Besides, 48.02% of B2B websites innovated in the operation models, supply chain and revenue models while 37.29% of B2B websites were committed to assisting SMEs in forming industrial alliances. Providing B2C services is the fourth measure for B2B websites to deal with the financial crisis (Table 5.3).

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[1] www.ebrun.com, established in 2007, is the largest e-commerce sharing platform for SMEs in China. It is developed from a unique and largest e-commerce magazine 'e-commerce world'. Now there are about 200,000 high-quality members in www.ebrum.com.

Table 5.3   B2B websites' measures in services innovation (Source: http://www.ebrun.com/)

B2B websites' measures in services innovation	Percentage (%)
Keeping down operating costs (e.g. shutting down subsidiaries, layoffs)	18.64
Providing or improving foreign trade services	28.81
Providing or improving internal trade services	55.93
Providing B2C services to assist SMEs in taking more orders	31.07
Assisting SMEs in forming alliances to invest, produce and sell the same kind of products	37.29
Innovating in operation models and becoming the leader in the alliance	48.02
Providing new services to assist SMEs in financing	15.82
Others	26.55
No measures	2.82

However, the third-party B2B websites still face a great many challenges (Table 5.4). According to ebrun.com, B2B websites are facing three kinds of challenges: lack of capital, lack of innovation in profit models, lack of e-commerce awareness for customers. Meanwhile, the innovation model of B2B websites is easy to copy by others. In addition, lots of B2B websites have difficulty in employing qualified e-commerce employers. The government should pay more attention to the implementation and popularity of e-commerce.

Table 5.4   Challenges for B2B websites (Source: http://www.ebrun.com/)

Challenges for B2B websites	Percentage (%)
Lack of innovation in profit models	27.84
Lack of enough capital	27.84
Lack of e-commerce awareness for customers	20.45
Lack of qualified e-commerce talents	11.93
Vulnerability of innovation model that is easy to copy by other B2B websites	11.93

5.2   Unexpected Natural Disasters

Generally, a natural disaster refers to the effect of a natural hazard[9]. It leads to human, financial, environmental and social losses. On a worldwide scale, significant unexpected natural disasters include droughts, floods, typhoons, hurricanes, frost, hailstorms, tsunamis, earthquakes, volcanic eruptions, landslides, mud-rock flows, wildfires and epidemics etc. A natural disaster has usually fierce destructive power. No matter how long a natural disaster lasts, it always brings negative influences on normal life. E-commerce, as a new business model as well as a new technology, has played a key role in reducing the negative effects of disasters and reconstruction after disasters.

5.2.1   Serious Influences on Human Society

Natural disasters are abnormal phenomena which happen in the environment where human beings live. The startling influences can be mainly classified into the following aspects:

● Human losses

At 03:42:53.8, July 28, 1976, an earthquake with a Richter scale of 7.8 hit Tangshan, followed by several aftershocks. The Tangshan earthquake altogether killed an estimated more than 242,000 people and severely injured 164,000 people in Tangshan, Tianjin and Beijing. In 2008, the Wenchuan earthquake caused a tragedy in which 69,197 people died, 374,176 were injured and 18,209 people went missing. Except for geological, hydrological and meteorological disasters, another kind of disaster, a health disaster like the 2002-2003 SARS pandemic and the 2009-2010 H1N1 Influenza (Swine Flu) pandemic, has never stopped killing the human population for hundreds of years.

● Property losses

In natural disasters, lifeline engineering (e.g. communication systems, power supply systems etc.), grain crops, industrial output, mechanical devices, office supplies etc., transportation networks, harbors, roads etc. will suffer damage in varying degrees. These losses include direct economic losses (crops, domestic animals, forests, houses, roads, airports, ships, factories and mines, heritage attractions and so on) and indirect economic loss (production shuts down, transportation communication is interrupted and so on, to cause disruption to circulation of commodities, business finance, the social structure and cause management losses). In 2008, there were 17 earthquakes altogether and the direct economic losses have amounted to 859.496 billion RMB. The losses in the Wenchuan earthquake were very astonishing, among which the loss of houses was very important. In detail, the loss of private residences and urban housing accounted for 27.4% of the total loss; the loss of non-residential houses including schools, hospitals and others accounted for 20.4%; and the loss of roads, bridges and other city infrastructure accounted for 21.9%. In 2009 China encountered 418 unexpected environmental disasters altogether, leading to a direct economic loss of 433.544 million RMB. In the same year, 132 marine disasters occurred in China with a direct economic loss amounting to 10.02 billion RMB [10].

● Damage to natural resources and the environment

Differing from human and property loss, the damage from natural disasters on natural resources and the environment are hysteretic and invisible. Usually this damage would not be repaired until much later, covering a larger area and lasting a longer duration. For example, it will take 50 years at least to reconstruct the ecological environment after the 1987 Greater Hinggan Mountain forest fire. In the course of post-disaster reconstruction, the concept of "Emergency Logistics" is born and arouses the concern of the whole of society.

5.2.2 *Emergent Materials and Emergency Logistics*

As soon as a natural disaster takes place, the first thing we may think of is "Rescue"; the first thing we need is a large quantity of emergent materials. Emergent materials mean necessary indemnificatory and supporting materials for sudden public events such as serious natural disasters, unexpected public health incidents, public security events and military conflicts. Generally speaking, everything that is used during the process of dealing with sudden public incidents can be termed as emergency materials or emergency supplies[11].

Emergency logistics, as a special logistics activity pursuing maximal efficiency and minimum loss, denotes specific time critical modes of providing and transporting emergent materials for natural disasters, public health incidents, security events, military conflicts and so on[12,13]. While implementing emergency logistics, the management of emergent materials is the core part. Doing further research on methods of emergent materials purchase can sharpen the emergency response capability of the logistics system to minimize the negative influences that natural disasters bring, and to contribute to post-disaster reconstruction.

In general, emergent materials possess the following four characteristics: First, unpredictability; it is hard to forecast when emergent events will occur. It is difficult to detect the intensity, reasons and coverage. As a result, it is a tough job to predict quantities, size and mode of transport needed. Second, emergent materials cannot be substituted. Most emergent materials are for special use in the specific environment. For example, vaccines are needed after an epidemic and blood is needed on battlefields. Not all emergent materials can be replaced. Third, this is time-dependent. Emergent materials will never be of value unless they are delivered within the shortest time; otherwise even the best materials are meaningless. Last, there is a time lag between emergent events and materials. The emergent materials called for after a disaster depend on the reason, intensity and the scope of the disaster, which causes a lag in time.

Emergent materials are generally used for preventing disasters from spreading and for reconstruction, as well as for supplementing the basic necessities of citizens. The purchased quantities are considerable over a short period of time. Therefore most emergent materials' purchase has the following characteristics:

● The purchase period is short with a high demand for quality. Emergent materials procurement often relates to people's life and property. Therefore, the whole period of emergent materials procurement must be as short as possible and the purchasing process needs to be compact and simple. But it never means that the quality standards can be lowered. Just the opposite, owing to the purpose and importance of emergent materials procurement, the same attention as usual should be paid to the procurement of emergent materials. In some special cases, like drugs and blood products, even higher requirements are demanded.

● A large number of commodity suppliers are demanded. Due to the unique purpose and urgency of emergent materials purchase, no single manufacturer or vendor can fully satisfy the great demand for emergent materials in the short term. Usually these materials are provided by multiple suppliers, which makes it more

difficult to make the final choice and to control the quality.

● There are contradictions between procurement methods and codes of conduct for procurement. The procurement department should adopt proper purchasing methods with regards to the time limit for emergent materials procurement. In recent years several governments have amended laws and regulations on procurement. These laws have enabled procurement to be more standardized and transparent, while, on the other hand, they sometimes also make purchase patterns rigid, which delay the development of procurement. For example, it is obviously unsuitable to apply tendering procedures for emergent materials procurement.

In recent years natural disasters have frequently happened in many countries and regions around the world. Take China as an example: from the 1998 Yangtze River flood to the 2010 Chou Qu and Hainan's flooding, from the snowstorms in the south of China in 2008 to the Yushu earthquake in 2010. Those disasters have strongly challenged the efficiency of China's emergent materials purchase and assignment, as well as the distribution of commodities during reconstruction. In this process, the electronic natural disaster emergency system has emerged and has been put into practice immediately. At the same time the country has gained valuable experience in the consummation of emergent materials purchase and method of distribution.

As soon as the Wenchuan earthquake occurred in 2008, all provinces in China tried their best to help in the rescue. Many countries and international organizations have given their help to China. How to prepare and distribute the relief goods became a test of our country's emergency operations. Emergency logistics is not only about using helicopters to provide relief materials but also should be planned and optimized from purchase to allocation. If there is not a scientific and effective logistic support system, once a disaster occurs neither can information of the disaster situation be sent to the command center in time, nor can the massive disaster relief equipment and commodities be supplied, which causes a delay in the disaster relief. Usually there are no professionals to classify donated relief commodities. As a result, good and bad commodities are mixed together when they arrive at the disaster area, which consumes much precious time and causes a waste of resources [14].

Due to economic and technical development, the Internet is applied in more and more domains. E-commerce has emerged along with it. In common commercial trade activities all over the world, buyers and sellers can trade without meeting in the Internet network environment. Based on the Browser/Server application, online business activities, transactions and related comprehensive services like shopping, trade between users, payment etc. are easily realized [15]. E-commerce not only changes the original and traditional sales into online selling, but also breaks invisible barriers, which enables production enterprises to achieve globalization, individuality and integration. It also surpasses the traditional trade mode and promotes the reaction speed between demand and supply. Thus, e-commerce helps to optimize the resource assignment, raise the relief efficiency after natural disasters and quicken the disaster reconstruction process. Also,

e-commerce can transmit the demands quickly, and realize commodity exchange in a more widespread market.

5.2.3 E-Commerce in Emergency Logistics

Disasters always come without notice and bring serious destruction, so relief materials are often badly needed. If emergent materials are assigned in untimely fashion or unreasonably, the effect of disaster rescue will be seriously affected. If we make scientific use of e-commerce in natural disaster rescue, we can distribute the emergent materials accurately and fast. In the process of post-disaster reconstruction, e-commerce is also an effective method without doubt.

Owing to differences between emergent materials and conventional commodities, the procurement strategies can not be as diverse as those usual ones. In order to highlight "emergency", more attention should be paid to the time cost, the quality and quantity of emergent materials in procurement. By using e-commerce in emergency procurement, we can overcome these difficulties to a certain extent.

Emergent materials can be classified into the following four aspects according to their priorities: life rescue supplies, engineering support supplies, engineering construction supplies and post-disaster reconstruction supplies [16]. In the process of collecting these emergent materials, the procurement plan based on B2B/B2C e-commerce has great advantages over the traditional ones. Through real-time information transmission and exchange via the Internet, the new method can improve greatly the contact frequency and speed. What's more, e-commerce enables purchasing staff to set different weights for different indicators and analyze different figures from the supply time, quality, price, service and so on expediently, which provides data for comparisons and decisions regarding various materials.

Comprehensive supplier information management can raise the efficiency and accuracy of emergent materials procurement, and its superiority may be summarized as follows:

Firstly, it reduces the procurement cost of relief materials. If the e-commerce mode is implemented to search related worldwide relief materials suppliers, to make online comparisons of all suppliers' offers, to accumulate the data about various details like the quality of products and service, the date of delivery and the credit status, the best suppliers with the best quality and lowest price may be chosen much more quickly and easily. The cost of procurement will be sharply cut down, which enables funds for the procurement of relief materials to achieve the maximum effectiveness and this helps more victims obtain relief materials.

Secondly, it shortens the procurement duration of relief materials. Although tight procurement commonly results in unsatisfactory quantities, relief materials are always needed quickly and plentifully. There are too many steps in the traditional purchase to meet the special needs. But through on-line inquiry, offers

or online tender/bids, a great deal of feedback may arrive in a short period of time. Once e-commerce is fully applied, a lot of time spent searching and comparing relief materials suppliers will be saved. If rescuers can reduce the time for procurement, they can send relief materials to victims faster so as to raise the efficiency of the entire disaster relief.

Thirdly, it reduces corruption in relief materials procurement. Although we do not welcome anything similar to corruption, things often go against our will. In traditional procurement, it is quite possible to misuse the relief capital. But when purchasing relief supplies through the Internet, the procurement process is more transparent. Choices are made based on the dynamic historic data recording all transaction performances including purchase execution, commodity approval, distribution channels and ways of application. Comparing different suppliers based on these records, embezzlement and the sales commission during the traditional procurement may be greatly reduced [14].

E-commerce procurements are generally carried on through an e-commerce platform. Suppliers can learn the types and quantities of emergent materials, and purchasers can also obtain suppliers' basic information on the platform. Both sides may exchange real-time supply information about all emergent materials through the e-commerce platform which raises the communication speed of supply and demand information, reduces the procurement cost and shortens the procurement time.

5.2.4 Weakening Negative Influences of Natural Disasters Using E-Commerce

According to the present national disaster relief plan, when there is a serious disaster, the local government will immediately establish a Disaster Relief Control Center, and simultaneously set up Rescue Spots for the victims in the disaster area. In order to enhance the disaster relief benefit of relief materials and to enhance the systematic benefits between Rescue Spots and society donations, the government may set up the Relief Material Gathering Center in areas which are not affected and in areas where disaster relief donations are concentrated, based on the joint distribution and the mixed distribution theory of modern logistics management. All kinds of donations from the populace and social groups need to be classified and packed first, and then transported together on specific transport to improve efficiency and to control the cost of relief materials transportation.

The Relief Material Delivery Center should be established near the disaster area to realize the centralized management of relief materials, and to take charge of the distribution of relief materials. Moreover the Relief Material Delivery Center plays the central key role in collecting the demands of victims. It works by comparing types and quantities of subsistence materials with victims' demands, and then sending demand information to each donation site so as to get more targeted social contributions.

Through adding the Gathering Center and Delivery Center of relief materials to the disaster relief system, both material flow and information flow are integrated into the relief logistics system. The whole relief logistics system consists of the Relief Material Gathering Center, the Relief Material Delivery Center and the Rescue Center for victims, which forms the traditional relief materials supply chain. The main structure is shown in Fig. 5.4.
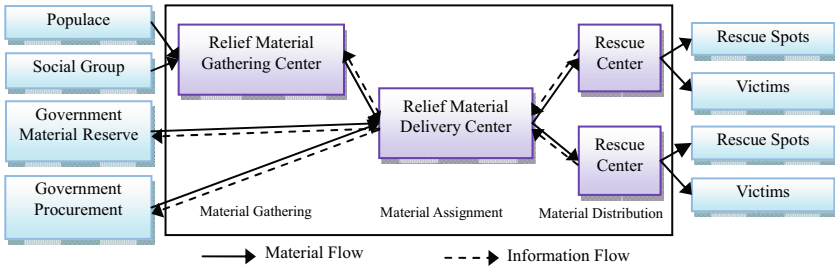
Fig. 5.4   Traditional relief materials supply chain

In the e-commerce environment, the network and information technology have demonstrated the incomparable reaction rate and superior effectiveness. When a serious disaster occurs, the information center for relief materials collection, procurement and delivery will be established rapidly to accurately control the flow of relief materials through real-time information transmission. The Relief Material Procurement and Delivery Center keeps contact with the Relief Material Gathering Center, the Government Material Reserve Center, and the Government Procurement Enterprises and takes charge of dispatching materials to the Rescue Center. The procurement of relief materials is executed conveniently through on-line trading platforms. Such e-commerce trading platforms can come from governments, from enterprises, as well as from third parties. Purchased materials will be sent to the Rescue Center directly which saves time, transaction costs and physical distribution costs (Fig. 5.5).
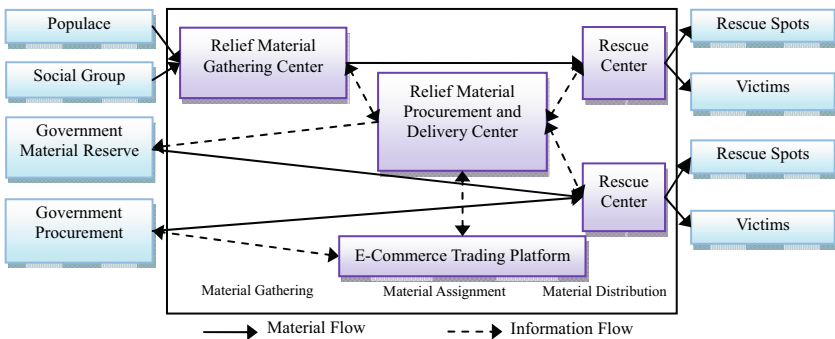
Fig. 5.5   Optimized materials supply system based on e-commerce

On the emergent materials e-commerce trading platform, operational stability and security are the two key points that must be guaranteed. As mentioned above, such platforms can be realized in three ways: by the government independently, by the suppliers or the government completing the procurement of emergent materials using the third-party transaction platform. Considering the particularity of emergent material procurement and long-term government work, it is suggested that the government establishes the trading platform itself, announces a detailed list of materials in demand, allows suppliers to freely register, and issues buying and selling leads and a call for bids on the platform. Then the government can choose the optimal suppliers and make on-line transactions on the platform (Fig. 5.6).
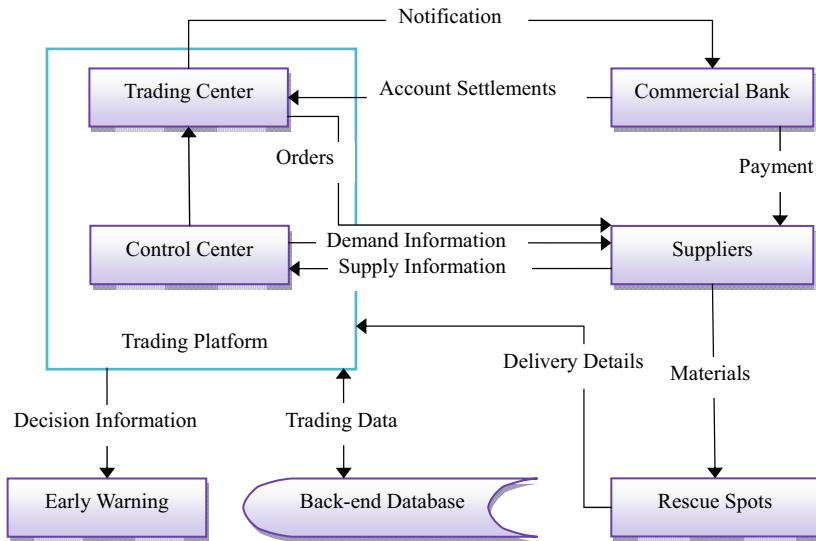
Fig. 5.6   Materials purchase online trading platform

The e-commerce platform should be kept open to material suppliers at any time so they can obtain the demand information publicly. Suppliers register material information from the client. The control center is responsible for calculating the amount of materials available for purchase, and sets the minimum threshold of each material's available volume. Once the available volume of any material is smaller than the minimum threshold, an alarm will be set off by the early warning procedure. Even if there has been no serious accident, the minimum threshold may also be established to prepare for unexpected needs.

In weakening the negative influences that natural disasters bring, it is an effective way to establish e-commerce trading platforms on the Internet by using e-commerce technologies. It not only realizes a more timely deployment of relief materials when disasters come, but also achieves the optimized disposition of relief materials in the after-disaster reconstruction. By shortening the material purchasing duration, reducing procurement costs, e-commerce endeavors to cut

down negative influences to the minimum. Recognizing this, it is worthwhile using e-commerce strategy for unexpected natural disasters.

5.3   Top Ten Industrial Revitalization Plans

5.3.1   Background

Since the end of 2008, the world has been facing a serious financial crisis and economic recession. In order to prevent a fast decline in the economy in China and to promote the stable and rapid development of the national economy, the State Council has announced a stimulus package including the Top Ten Industrial Revitalization Plans. The revitalization plans focus on nine important industrial sectors (textile industry, steel industry, automotive industry, shipbuilding, equipment manufacturing, electronic information, light industry, petrochemical industry and non-ferrous metals industry) and the logistics industry. Currently, the added value of the former nine industrial sectors accounted for 80% of total industrial added value, accounting for about one-third of GDP. It can be clearly seen that these ten sectors play an irreplaceable role in ensuring the stable and rapid development of the national economy and guaranteeing employment.

The 2008 global financial crisis had some negative impact on China's economic performance. A series of economic data in November 2008 vividly describes the fast decline in China's economy, which exceeded many people's expectations. In that month, China's import and export growth rate sharply fell. The export growth dropped from 19.2% in the previous month to minus 2.2%, and import growth fell from 15.7% in the previous month to minus 17.9%, which directly pulled down industrial growth. In November 2008, the national added value of large industrial enterprises only increased year-on-year by 5.4%, 11.9% lower than the same period last year and 2.8% lower than the previous month. The output of pig iron, crude steel and steel products fell 16.2%, 12.4% and 11% respectively. 714,000 automobiles were produced with a decrease of 15.9 percent. The slide in the industrial growth rate caused a decline in generating capacity of 9.6 percent, which created the biggest monthly decline.

Although the financial system in China is relatively closed, it is gradually getting integrated into the international financial environment since the reform and opening up. Actual industries have been closely linked to international finance. As a result, the impact of the financial crisis on the Chinese import and export business is much more serious than that on the financial system. In this context, the formulation of industrial revitalization is very timely. To make it possible to offset the negative impact on the national economy brought about by the sharp decline in the external demand and to ensure the smooth operation of the national economy, at least a positive adjustment of the industrial structure, in-depth industrial promotion and efforts to expand domestic demand are needed.

Additionally, even without this financial crisis, from a long-term point of view it is also necessary to carry out industrial restructuring and to deepen industrial reform. Thirty years ago, China dug the first pot of gold for economic take-off through developing low-value-added, low-tech and labor-intensive processing industries. After thirty years of economic boom, it is definitely infeasible to make continuous further progress only relying on the original economic approaches. Therefore, the formulation of the Top Ten Industrial Revitalization Plans has paid more attention to the needs of future development. It is one of the necessary measures to make China wealthy and powerful.

5.3.2   Opportunities of E-Commerce in Top Ten Industrial Revitalization Plans

Since 2008, various countries' economies have suffered from the worldwide financial crisis, and the e-commerce industry is no exception. Export-oriented B2B websites are the Internet enterprises which are affected most severely by the financial crisis. The stock price of *Alibaba* fell 70% in half a year; and the stock price of *HC360.com* went down 45%. An investigation from the Ministry of Commerce of the People's Republic of China shows that since 2008 in total 40,000 SMEs have collapsed. The related statistics reveal that in the financial crisis, 84.2% of enterprises that never use e-commerce have fallen into trouble while the proportion for those enterprises who have applied e-commerce is only 16.8%.

Compared with traditional industries, the domestic e-commerce industry is really lucky. In 2008, the e-commerce transaction volume amounted to 2 trillion RMB and registered users for online shopping reached 120 million, growing 185% compared to the previous year. In 2008, *Alibaba* attracted 10.5 million registered users and 1.7 million online stores more than the previous year in international and domestic trading markets. Among them, the number of members from the international trading market increased 3.5 million with an annual growth of 80%, which is the highest on historical record. Additionally, the total number of paying members of *Alibaba* in the two markets increased to 432,000, growing 41% more than 2007, surmounting the sum of all previous years. As to third-party payment, by the end of February 2009, people registered on *Alipay* had reached 150 million. The daily peak turnover had amounted to 700 million RMB, and the peak number of daily transactions reached 4 million. In August 2008, the related detailed data was only 100 million, 520 million RMB, and 2 million respectively. The flourishing of *Alipay* demonstrates the vigor and vitality of the e-commerce market.

In the short term, the launching of Industrial Revitalization Plans will help to solve the practical difficulties which these industries are facing and offset the influence that the world financial crisis brought to China. While in the long term it will promote the upgrading of industrial technology, the informationization

transformation and the adjustment of the industrial structure, speed up the independent research and development of core technologies, enlarge employment, and improve the capacity to earn foreign exchange through exports as well. All aspects have a profound influence on the national economy. How to seize the opportunities and play well in the top ten Industrial Revitalization Plans will become the main topic of e-commerce in the future.

Contemporary China needs to explore a new development model of e-commerce with Chinese characteristics. The revitalization of industries is providing a bright prospect for the applications of e-commerce. E-commerce acts as the "accelerator" in industrial transformation and upgrading and the effect becomes more obvious in the context of the international financial crisis. In fact, the relationship between the development of e-commerce and industrial revitalization is quite close. On the one hand, e-commerce with its own characteristics will be a boost for industrial revitalization; on the other hand, industrial revitalization will trigger a huge demand and a vast stage for e-commerce applications, thus becoming an important driving force for developing e-commerce [17]. To make use of e-commerce as fully as possible, the following measures are necessary:

● Building e-commerce innovation projects, exploring the administrative system and mechanism to adapt to the development of e-commerce, and strengthening macro-guidance from the government.

● Encouraging universities, research institutions, industrial associations and intermediary advisory organs to actively solve related difficult major issues in the development of e-commerce, evaluating the effectiveness of the implementation of related policies, developing relevant standards, and searching e-commerce development models.

● Making efforts to settle significant technical constraints in e-commerce applications. Placing emphasis on key technologies such as e-commerce transaction technology, encryption and electronic authentication, online payment, credit management, supply chain management, system integration and so on.

5.3.2.1 Opportunities in the Electronic Information Industry

The rapidly developing information industry has become a major new industry promoting the world economy. Currently, to grasp opportunities, to seize the high-end and to further expand and strengthen the information industry are of high importance. They are not only significant initiatives for responding to the shocks of the international financial crisis and maintaining stable and rapid economic development in China, but also an inevitable choice for building a modern industrial system, enhancing industry's core competitiveness and for achieving sustainable economic and social development.

E-commerce, as an important part of the electronic information industry, will be positively impacted by the Revitalization Plan for this industry. Today, as the growth opportunities for enterprises' revenue is so limited and our country is

suffering unemployment, people all place much hope and attention on creating careers and wealth through this network. This is just the magic power of e-commerce. It is obvious to all that low-cost, low-threshold and high-impact e-commerce makes a great contribution to starting a business for individuals and to earning benefits for enterprises.

The strategic goal, the *Revitalization Plan for the Electronic Information Industry,* states clearly that it means "the effective implementation of information technology to lead the transformation of traditional industries and the further integration of informatization and industrialization"; also "to make a breakthrough in core information technology, to drive a number of new economic growth points by implementation innovations of 3G, next-generation Internet, digitally broadcast television and so on, to make significant progress in the transformation process of industrial development patterns[18]". To conclude, this plan is mainly aimed at new economic growth driven by new applications.

Broadly speaking, these new application forms above all belong to the category of e-commerce. The so-called "new" contains two meanings. The first one means using information technology to transform traditional industries, the second refers to information services and information technology applications of new industries. In the former, the plan supports information technology companies and traditional industrial enterprises to carry out multi-level cooperation and to further strengthen the applications of information technology in education, health care, social security, transportation and other areas. It also encourages accelerating agricultural and rural informatization, developing and expanding agriculture-related electronic products and information service industries. Currently in developed countries and in China some new terms and new applications have emerged, such as electronic medical and electronic agriculture. New applications derived from a combination of e-commerce and one particular industry have quietly entered people's lives. New services like digital TV, IPTV and mobile TV etc. will achieve further development and support according to the guideline of the plan. In Chapter 6 of this book we will give a detailed analysis of the relationship between technologies and e-commerce. In this sense we can   reasonably see that e-commerce will benefit from this industrial revitalization plan.

It is noteworthy that the development of communication equipment manufacturing industries is highlighted in the plan. The following measures are recommended [18]:

● Strengthening the interaction of equipment manufacturers with telecom operators and promoting the integration innovation of products and services.

● Speeding up the access construction of the 3G network, next generation Internet and broadband optical fiber.

● Developing new business and new applications to adapt to features and requirements of the new generation of mobile communication networks so as to drive the updating and upgrading of systems and terminal products.

The electronic information industry gets so much attention that it is undoubtedly the best time to look at m-commerce. While discussing the e-commerce strategy of China's telecommunication industry in Chapter 3, we

have put forward major restricting factors for the development of m-commerce. The *Revitalization Plan for the Electronic Information Industry* has just given positive and targeted suggestions for these constraints. This national level support clears many obstacles on the developing path of m-commerce.

5.3.2.2 Opportunities in the Automobile Industry

In recent years, great changes have taken place in terms of informationization and e-commerce applications in the overseas automobile industry. The production and management of automobile manufacturing firms have broken through the territorial scope of a single enterprise by establishing an expanded supply chain of virtual companies via Internet/Intranet/Extranet. That is, both the planning and control of enterprise resources are integrated into an information system, which forms the smooth flow of information between operating systems within the enterprise. With the help of the ERP system, the enterprise realizes the integrated management of interior cash flow, logistics and information flow. Based on that, the enterprise connects with upstream suppliers through SCM, connects with downstream distributors and customers through CRM and realizes the integrated operations with the aid of the Internet, which enables real-time, integrated and synchronized control of logistics, cash flow and information flow. The globally famous auto parts online procurement platform *Covisint* has realized real-time interconnection and intercommunication among manufacturers, suppliers and transportation enterprises so that the whole process from ordering to delivery has been greatly shortened at each stage. *Ford*, *General Motors* and *Chrysler* purchase more than 650 billion RMB each year through this platform. The costs of over 50,000 automobile manufacturers is reduced from \$100 – \$150 per transaction to less than \$5 on average.

Domestically, in 2007, the e-commerce market of the Chinese automobile industry maintained a stable growth and reached 4.73 billion RMB, with a year-on-year increase of 29.3% compared to 2006. In the automobile industry, the popularization rate of e-commerce among vehicle manufacturers achieved 58.1%, in auto parts enterprises achieved 32.5%, and in automobile trade enterprises achieved 9.4% respectively. From the perspective of market structure, the automobile e-commerce markets mainly include vertical gateways, self-built e-commerce of enterprises, comprehensive e-commerce, and 4S dealer markets etc. They provide diverse level e-commerce services for procurement, sales and production in the automobile industry.

With the launching of the *Revitalization Plan for the Automotive Industry*, the automobile enterprises with more than 90% market share in production and marketing will be reduced to 10 from the present 14, forming two or three large-scale enterprise groups with a production capacity of over 2 million vehicles, and four to five enterprise groups with a vehicle production capacity surpassing 1 million. The government will support the backbone auto parts enterprises to expand their sales through mergers and reconstruction to increase the share of

domestic and foreign automobile markets. Within three years from 2009, the government totally arranged 10 billion RMB as special funds to mainly support enterprises in technological innovation, technological transformations, and developing new-energy automobiles and spare parts. Reorganization of large automobile enterprise groups and mergers of backbone auto-parts enterprises will definitely further lead to the fast development of automobile e-commerce.

Under the stimulus of 4 trillion RMB and the Revitalization Plan, as automobiles are becoming more and more popular, the breadth and depth of e-commerce in the automobile industry will definitely achieve further development.

5.3.2.3   Opportunities in the Equipment Manufacturing Industry

The Revitalization Plan for the Equipment Manufacturing Industry is the second strategy to revitalize the equipment manufacturing industry following the State Council Document No. 8 of 2006 which supplied a number of comments on speeding up the revitalization of this industry. This plan claims the promotion of self-reliance by combining steel, automobile, textiles and other large industrial key projects. The plan also encourages the promotion of localization by developing key projects that are environmentally friendly, developing ultra-high voltage power transmission, coal and metal ore mining, pipeline transportation of natural gas and liquefied natural gas storage and transportation, high-speed railways and urban rail transit. In particular, the plan highlights development of modern manufacturing services, which means making the equipment manufacturing industry become service-oriented.

From a global point of view, e-commerce, computer science and communications technology have fundamentally changed the equipment manufacturing industry from production and services to distribution methods. At the same time they have caused great changes in the area of trade and also accelerated the process of industrial globalization. Due to the rapid development of network manufacturing and virtual manufacturing, design, production, sales as well as service are integrated so that all activities including orders, operations, technological development of products, design, manufacturing and processing, sales, after-sales service etc. can be mostly realized through the network. Under the guidance of "refocusing" strategy and the thinking of service outsourcing, parts manufacturers are separated from equipment OEMs. As the chief of network manufacturing enterprises, OEM manufacturers collaborate with parts manufacturers through the network. In this way upstream and downstream enterprises constitute an industrial chain including collaborative product design, collaborative commerce and decentralized network manufacturing.

In the equipment manufacturing industry of developed countries a number of professional enterprises have emerged which are engaged in networked markets for machine tools, automobiles and parts, electronic products and others. Electronic trading measures such as e-commerce, EDI, Electronic Trade Matching

(ETM) and Electronic Funds Transfer (EFT) are in widespread use in such enterprises, where the third-party e-commerce platform plays an important role. To further develop the localization and autonomy of equipment manufacturing in China, more matched manufacturing services are certainly needed to create a complete industrial chain. From consulting and planning, to research and design, then manufacturing, testing and debugging, monitoring and diagnosis, maintenance and repair until a product is scrapped, and finally disintegration, recycling or reuse, scrap processing, etc. should be on the service list. Facing such a huge market space, it is certain that e-commerce can share a piece of the cake so long as business needs and opportunities are seized precisely.

5.3.2.4 Opportunities in the Petrochemical Industry

In the petrochemical industry, e-commerce is playing a positive role and this effect has become increasingly obvious. Thanks to the highly developed Internet and computer technologies, e-commerce has marched into the petroleum business arena. The emergence of e-commerce not only changes the traditional operational and business mode of the petroleum industry, but also effectively reduces the transaction costs. Thus, the efficiency of the global petroleum industry has been improved.

In recent years, petroleum e-commerce has developed rapidly in China. The website *Energyahead.com* for oil and gas in China contains three major subsystems: E-Procurement, E-Sales and E-Marketplace. Meanwhile, the system provides the management function to suppliers and customers. According to different categories of materials and different market characteristics, the E-Procurement System offers an integrated procurement environment and service options including Catalog-based Procurement, RFQ-based Procurement, Negotiation Procurement, and Reverse Auction Procurement, etc.[19] E-Sales System is divided into four modules: Catalog-based Sales, Negotiation Sales, price biddings and auctions. The E-Marketplace adopts a user membership management system which provides both fixed-catalog-price and dynamic trading platforms to both buyers and sellers. The dynamic trading platform offers options including auctions, reverse auction for price biddings and trading matches, etc.[20].

Sinopec's e-commerce website *Sinopec-ec.com.cn* was launched in 2000. This e-commerce website is used for online sales and online procurement. It can help users to view product inventory and transportation information through the e-commerce center. Sinopec also uses e-commerce systems to establish an online virtual auction market for raw materials suppliers. *Sinopec-ec.com.cn* covers the series of information technologies for building e-commerce platforms including ERP, SCM and CRM.

Through the establishment of e-commerce platforms, the business performance of oil companies is improved effectively. Since implementing e-commerce in *PetroChina Company Limited*, the online transaction value has increased every year, which effectively promotes the coordinated development of

the *China National Petroleum Corporation* as a whole. Practice shows that e-procurement not only greatly enhances the efficiency of bargaining, but also avoids as much as possible human factors that affect the final results in the commercial negotiations, which means buyers completely take the initiative [21].

E-commerce improves the efficiency of the oil industry generally through the following channels: Firstly, e-commerce makes oil companies able to quickly obtain a large amount of trade information in a timely manner, thus reduce information acquisition costs, expand business opportunities, and promote sales and purchases of products. Secondly, e-commerce helps oil companies reduce the procurement procedures, shorten the procurement cycle, and moreover choose the best suppliers at the most ideal price through the realization of global procurement. According to statistics, the commodity price can be reduced by 5% to 10%, the procurement cycle can be reduced by 50% to 70%, and the inventory costs can be reduced by 25% to 50% in an e-procurement mode. Thirdly, e-commerce enables oil companies to break down the regional restrictions of different departments, to strengthen internal coordination in oil companies, to regulate the sub-branch offices' business activities so as to enhance the management level of the whole company. Fourthly, in an open environment based on e-commerce, different oil companies can communicate and cooperate with each other better, learn from each other and achieve a win-win goal in the competition [22].

5.3.2.5   Opportunities in the Logistics Industry

The logistics industry, as a compound service industry, is the integration of transportation, warehousing, freight forwarding, information and business services and other industries. It involves domains of large variety, creates jobs for lots of people, promotes production and stimulates consumption. Although it is so important, the overall level of the logistics industry is still backward in China. China is a country of a huge size and population, which strongly asks for a fully comprehensive logistics network on a large business scale with enough manpower. Unfortunately, as a matter of fact, the construction of a logistics system has only just started in China. In detail, the scale of the operation is very small, the competitive power is weak, and the logistics network appears decentralized. The *Revitalization Plan for the Logistics Industry* states that it is urgent to accelerate the development of modern logistics and to establish a modern logistics service system including multimodal transport and transit facilities, logistics parks, urban distribution, commodity transport, rural logistics, joint development of manufacturing and logistics, the promotion of logistics standards and technology, public logistics information platforms, tackling hard problems in logistics s&t and emergency logistics etc.

To resolve these issues and realize such goals, it is necessary to greatly enhance the informatization level and to build an information-network-based logistics service system. Logistics is the base of e-commerce. A mature e-commerce market needs a highly developed logistics system to support it.

Therefore, the construction of the logistics system is bound to provide a more flexible and reliable guarantee for the application of e-commerce and further promote the application of e-commerce in enterprises to a higher level. Related to this, Radio Frequency Identification Devices, CRM, Internet, wireless networks and other IT infrastructures will also usher in a lot more market opportunities.

Taking third-party logistics as an example, it helps companies reduce operating and capital costs, and also simplifies the transport of procured goods by affording bigger delivery areas and a larger scale of services which a single carrier does not have. Large third-party logistics companies can provide the broadest range of services over the world and achieve benefits of scale via land, sea and air transport. According to statistics, 60% of the global top 500 companies utilize third-party logistics services and many of them use more than one. After third-party logistics comes fourth-party logistics, which is considered a strategic partner rather than a simple business partner by customers. A fourth-party logistics provider is a supply chain integrator which integrates its own resources, capabilities and technologies with other service providers so as to propose integrated supply chain solutions.

5.3.3 Summary

In addition to these industries described above, there exist great imagination and market opportunities for e-commerce in other industries as well. Traditional industries mean the fertile soil of e-commerce. The revitalization of traditional industries must bring an even broader market to the great development of e-commerce. Exactly as Jack Ma, CEO of *Alibaba*, said "In ten years, most companies on the world will do business on the Internet and implement e-commerce. In ten years, China's economy will be still booming. The market is always huge." It is reasonable to believe that e-commerce will become a beacon for the winter!

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6

Technical E-Commerce Strategy

E-commerce, as one kind of new business model, is commercial trade over a wide range of activities with information technology, such as online shopping, online transactions and online payment businesses. Although the business model is the most important for the development of e-commerce, the development of information technology is also very important. E-commerce can not develop well without the development of information technology. Information technology is the foundation of e-commerce. At first, the emergence of e-commerce came from the application of EDI. Then, with the development of information technology, people gradually adopted more and more new information technology in e-commerce to promote its development, which led to high efficiency and low cost for business operations. Many popular technologies such as RFID, mobile computing and cloud computing are adopted by e-commerce.

From the perspective of the development of e-commerce technologies, e-commerce solutions can be divided into three kinds [1]. They are solutions for small and medium size companies, solutions for medium size to large businesses and solutions for large businesses. Small and medium size companies usually use a basic Commerce Service Provider (CSP) to provide e-commerce services because of weak capital resources. CSP can provide a wide range of standard e-commerce services including catalog and transaction processing. Taobao is a typical CSP. For midsize enterprises and some large enterprises, they can choose to purchase the equipment and establish their own e-commerce system so that they can have more control over the site. In general, e-commerce systems for medium size enterprises can interact with database software. Due to high transaction rates and partnerships, large enterprises usually need customizable systems according to their own characteristics. Solutions for large businesses include ERP, CRM, SCM, knowledge management and so on. Now e-commerce provides people with a brand-new communication path in different fields including taxation, banking, transportation, commodity inspection, customs, foreign exchange, insurance, telecommunications and authentication, as well as units such as shopping malls, merchants, enterprises and clients. In addition, with the development of information technology, e-commerce is developing from wired to mobile, from non-embedded to embedded, and from fixed to feasibly customized.

It can be seen that grasping the trends of information technology is very important for developing e-commerce. Only when adopting proper information technology, can e-commerce solutions be accepted by customers and developed fast. Although there are various kinds of information technologies relative to e-commerce, they still have something in common. Any e-commerce site needs fundamental technologies to support it. In addition, advanced technologies can make e-commerce sites more convenient and colorful. We will present e-commerce fundamental technologies, mobile communication technology and advanced technologies in the following.

6.1   E-Commerce Fundamental Technology

E-commerce fundamental technology refers to those technologies any e-commerce solution will need. As we know, e-commerce is based on the Internet. All the information is transferred and displayed on the Internet. So Web technology is needed. In addition, EDI is used to exchange electronic data. E-commerce develops on the basis of EDI technology. Meanwhile, e-commerce needs information processing technologies such as GPS, GIS and RFID. Moreover, there is no doubt that e-commerce is related to electronic payment and customer information protection. So how to protect online transactions and information safety is very important. If the e-commerce system is unsafe, customer information can be easily stolen and hackers can easily pretend to be real customers to purchase commodities. Therefore, security technology is also one of the fundamental e-commerce technologies. Next we will briefly introduce the four kinds of e-commerce fundamental technologies.

6.1.1   Web Technology

Web technology mainly consists of the Web technical structure, markup languages and computer networks. As we know, most e-commerce systems are based on Client-Server architecture, and the Web technical structure is used to standardize the process of information transfer. The markup languages are used to present the information on the WebPages. Meanwhile, computers are distributed in different places so that how to build a computer network is very important.

6.1.1.1   The Web

The structure of Web technology is shown in Fig. 6.1. The Web client acts as the terminal with a browser while the Web server is the mainframe which stores multimedia data resources and provides www services. The middleware invokes

the database and other applications in the Web server. CGI, JDBC and Web API are common middleware. The mechanism of the Web technical structure is that the browser sends an http request to the www server, then the www server processes the request, and returns the processing result to the browser in the form of an html file after receiving the request, and the browser interprets and displays the information finally to the user.
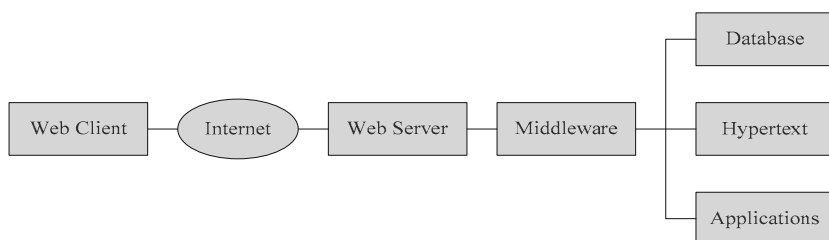
Fig. 6.1   Web technical structure

In addition, the concept of the Web has also developed further, from Web 1.0 to Web 2.0 and to Web 3.0 now. Web 1.0 refers to the first stage of the World Wide Web linking webpages with hyperlinks. Web 1.0 is mainly dial-up with 50 K average bandwidth [2]. Its main function is to read contents on the Internet. At the time, most websites were all about read-only content and static HTML websites. Web 2.0 has developed the Web 1.0 further. It is relative to many kinds of Web applications such as social networking sites, blogs, wikis, video sharing and hosted services to promote users to interact and collaborate with each other in a virtual community. People can share, operate and design with each other on the World Wide Web[3]. Web 3.0 was first launched by Jeffrey Zeldman in 2006. Now there is no official definition of Web 3.0. In general, Web 3.0 emphasizes intelligence and personality. TV-quality open video, 3D simulations, augmented reality, human-constructed semantic standards, and pervasive broadband, wireless and sensors can all be presented in Web 3.0. Instead of searching by keywords, the searching engineer may automatically suggest relative information according to different people. Differences between Web 1.0, 2.0 and 3.0 are shown in Fig. 6.2[4].

6.1.1.2   Markup Language

Markup languages mainly consist of HTML (HyperText Markup Language) and Extensive Makeup Language (XML).

HTML (HyperText Markup Language) is a simple markup language that is used to make hypertext documents. HTML documents are independent of operating system platforms. Any operating system such as UNIX and Windows can use HTML to form web pages. HTML is composed of HTML elements enclosed in angle brackets. Elements have three components: a pair of element tags,

Web 1.0	Web 2.0	Web 3.0
• "the mostly read only Web" • 45 million global users (1996) • focused on companies • home pages • owning content (eg. Britannica Online) • HTML, portals • Web forms • directions ("taxonomy") • pages views • advertising	• "the widely read-write Web" • 1 billion + global users (2006) • focused on communities • blogs • sharing content (eg. Wikipedia) • XML, RSS • Web applicantions • tagging ("folksonomy") • typical website: Google • cost per click • word of mouth	• "the portable personal Web" • focused on the individual • lifestream • consolidating dynnamic content • widgets, drag & drop mashups • user behavior ("meonomy") • typical websites: iGoogle, NetVibes • user engagement • advertisement

Fig. 6.2   Differences between Web 1.0, Web 2.0 and Web 3.0

a "start tag" and "end tag". Some elements are attributed within the start tag and finally, any textual and graphical content between the start and end tag [5]. Though it describes the structure of the document, it cannot define but suggests the way in which the document displays and arranges the information. The final result displayed in front of the user is determined by the display style and the ability to explain tags of the web browser. That is why the same document will be displayed differently in different browsers. Now the version of html is 2.0, which evolved from a subset of the Standard Generalized Markup Language (SGML).

XML can be seen as the simple extension of HTML. XML combines advantages of SGML and HTML while eliminating their disadvantages. XML is a meta-markup language. "Meta-markup" means that developers can define their own tags according to their own needs. For example, one can define tags such as <book> or <name>. Any names that conform to the naming rule of XML can be used as tags, which provide an access to different applications. For large and complex documents, XML is an ideal language. It allows us to designate the vocabulary in documents and the relationship between elements. For instance, it can be prescribed that an author element must have a name sub-element, or the business should include a sub-business[6].

6.1.1.3   Computer Network

The computer network refers to a system that physically links computers with independent functions which are distributed in different geographic locations via a variety of communication apparatus and circuits (like telephone, cable, microwave, fiber-optical and satellite, etc.) and realizes mutual communication according to network protocol so as to share the software, hardware and data resources.

According to the communication distance or regional coverage range, a computer network may be classified into a Local Area Network, Metropolitan Area Network or Wide Area Network (Table 6.1).

Table 6.1   Computer network classification

Network types	Abbreviation	Approximate distribution	Host computers location
Local area network	LAN	10 m	Room
		100 m	Building
		1 km	Campus
Metropolitan area network	MAN	10 km	City
Wide area network	WAN	100 km	Country

According to network topology structure, a network can be classified into 5-types, such as bus-type, star-type, ring-type, tree-type and net-type, as shown in Fig. 6.3.

(a) Bus Network	(b) Ring	(c) Star Network	(d) Tree	(e) Mesh
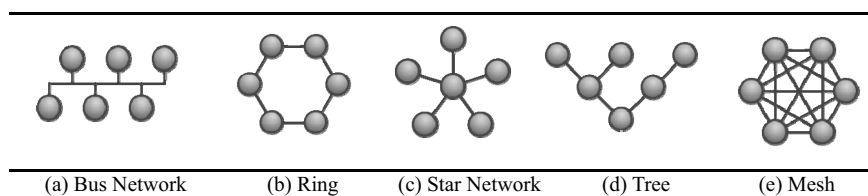
Fig. 6.3   Categories of network topology

6.1.1.4   IPv4 & IPv6

IPv4 (Internet Protocol version 4) is the fourth version of the Internet Protocol (IP) and also the first version that is widely deployed. By far, IPv4 is the most widely used Internet protocol. IPv4 is defined in IETF publication RFC 791 published in 1981 by Jon Postel. As a connectionless protocol for use in packet-switched link layer networks, the IPv4 can be operated in all kinds of bottom networks such as Point-to-Point (PPP) protocol and Serial Line Interface Protocol (SLIP)[7]. IPv4 uses 32-bit addresses, which limits the address space to 2^{32} possible unique addresses. Because some addresses are reserved for special purposes such as private networks, the number of addresses that can really be used is reduced. With a rapidly growing number of Internet users, the IPv4 address pool became exhausted. IPv6 was created to cope with this.

IPv6 has increased the address size from 32 bits in IPv4 to 128 bits, providing vastly more addresses. It is described in the Internet standard document RFC 2460, published in 1998. Like IPv4, IPv6 is also a connectionless protocol for use in packet-switched link layer networks and provides end-to-end datagram transmission across multiple IP networks. Also, IPv6 has many additional features IPv4 does not have. Compared with IPv4, IPv6 has larger address space than in IPv4 because of the longer length of an IPv6 address. Meanwhile, the allocation of IPv6 is much more efficient. The standard size of a subnet in IPv6 is 264 addresses, which is as much as the square of the size of the entire IPv4 address

space. Because of large subnet space and hierarchical route aggregation, Ipv6 can take an entry in the routing table to represent a subnet, which can greatly reduce the length of the routing table and improve the network management and routing efficiency. In addition, Ipv6 increases the support for the multicast and flow control, providing a long-term development opportunity for multimedia on the Internet and a great platform for the control of the Quality of Service (QoS). Moreover, IPv6 hosts can configure themselves automatically when connected to a routed IPv6, which is an improvement of the Dynamic Host Configuration Protocol (DHCP) and makes the network management very convenient. And IPv6 is safer than IPv4. Users in the IPv6 network can encrypt the data in the network layer and decrypt IP packets in Internet Protocol Security (IPsec), which greatly enhances the network security. Lastly, IPv6 also supports network mobility. With IPv6, entire subnets do not need to move to a new router connection point without renumbering[8].

Although IPv6 is superior to IPv4, it is difficult to convert from IPv4 to IPv6. IPv6 deployment is still in its infancy. There is still a long way to go before IPv6 is widely used.

6.1.2   *Electronic Data Interchange*

According to the description by the United Nations Standards Organization, Electronic Data Interchange (EDI) is a means of computer-to-computer transmission that puts the business or administration into a structured data format with an authorized standard. That is to say, EDI is a computer-to-computer transmission of business information between enterprises that uses a standardized format of some kind. The two enterprises that engage in exchanging information are trading partners. Enterprises that exchange data in certain standard formats are regarded as compatible EDI. The business information exchanged is transaction data; it also includes other information related to transactions, such as price quotes and order status. Transaction data between enterprises includes invoices, purchase orders, requests for quotations, bills of lading, and received reports. The data on these five types of forms account for over 75% of all information exchanged by trading partners in the United States.

EDI emerged in the middle of the 20th century. The trade transaction became increasingly active at that time and the trade volume grew very fast. Meanwhile, with fast development of electronic technology and widespread communication networks, the communication between people became increasingly closer. In order to improve business operations, EDI gradually came into being. In the 1980s, EDI was used only in big companies with complicated management as a way to improve the management, promote efficiency and reduce the cost. Since the 1990s, EDI has not been confined within the enterprise or business any longer. It can be said EDI was the earliest adopted form of e-commerce used by enterprises. EDI is even regarded as the origin of e-commerce[9,10].

EDI has five features as follows (Fig. 6.4): i) EDI is electronic information transmission between computer systems; ii) EDI is data exchange from standard format to structured electronic data; iii) EDI is electronic data exchange according to the standard and structure agreed by the sender and the receiver; iv) EDI is electronic data exchange read automatically by computer without human intervention; v) EDI is electronic data exchange for business purposes.
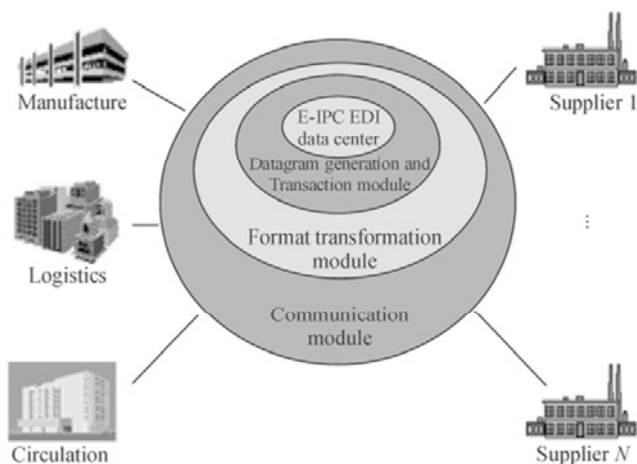
Fig. 6.4   EDI framework

6.1.3   RFID, GPS, and GIS Technologies

6.1.3.1   RFID Technologies

Radio Frequency Identification (RFID) is one of the top ten technologies of the 20th century. In addition, RFID is the core technology of the Internet which will be described in detail below. RFID chips store a lot of information and transmit data information by identifying objects automatically via frequency signals and by acquiring relevant data frequency transmission technology. When an RFID electronic tag (e-tag) is in the valid area of an RFID reader, the information stored in the RFID electronic tag will be automatically emitted to the reader.

The RFID logistics system is operated as follows. When the goods are leaving the distribution center, the RFID reader reads the information on the tags and then transmits it to the processing system for generating the delivery list. When trucks arrive at stores, the RFID reader at the receiving channel scans the goods in the trucks directly, and then accomplishes the receiving and checking processes. After being moved into stores, goods can be put onto the shelves. Real-time information of goods is transmitted to the processing system via the readers on the shelves, to update and monitor inventory data on the shelves.

RF technologies based on RFID can identify and track all physical objects, provide accurate and real-time data, gather, exchange and process real-time information of goods in movement. Thus, different enterprises are integrated into an efficient unified network, which can keep track of the status of vehicles and products efficiently, improve the efficiency of transporting, warehousing, logistics and distribution, and help enterprises realize the automation of business, transaction and work flow in commerce, logistics and manufacturing so that a more intelligent and rapid business chain can be built. Therefore, an efficient logistics tracking system with RFID technology will provide enterprises with a critical platform to collect, release and manage data in the business chain.

6.1.3.2   GPS Technologies

The Global Positioning System (GPS) is a new generation satellite navigation and positioning system which has real-time three-dimensional navigation and positioning capabilities on land, sea and in the air. GPS is composed of 24 satellites evenly distributed in six orbit planes. The ground supervision center including a principal controlling station, 3 upload stations and 5 monitoring stations is in charge of supervising satellites and calculating satellite calendars. The client device of GPS is primarily composed of hardware and processing software. The user receives a GPS satellite signal via a client device, and obtains the information about his location and speed to finally implement GPS piloting and positioning[11].

In recent 10 years, the GPS experience in China's cartography departments has shown that GPS has gained the trust of the majority of cartographers for its notable features such as high precision, automation and efficiency. Now GPS is successfully applied in geodesy, engineering measurement, aerial photographic surveying, guiding and control of transportation, crust movement monitoring, construction project monitoring, resources surveying, and geodynamics. GPS has revolutionized technologies in the field of cartography. In logistics, GPS can be applied to cars' self-positioning, tracking, dispatching, railway transportation management and military logistics.

6.1.3.3   GIS Technologies

Based on geographic space data, a Geographical Information System (GIS) is a computer technology system which adopts geographic model analysis to provide various spaces and dynamic geographical information for geographic research and decisions. Its basic function is to convert chart data (no matter from the database, electronic forms or by being directly inputted in the programs) into a geographic graphic display. Then displayed results can be browsed, operated and analyzed. The range of display can be from intercontinental to detailed neighborhood maps including population, sales conditions, transportation routes and other contents.

Applied in logistics analysis, GIS is mainly used to improve logistics analysis technologies using the powerful geographic data function of GIS. Companies abroad have developed software that provides specialized analysis for logistics analysis with GIS. GIS logistics analysis software has an integrated vehicle driving route model, shortest route model, network logistics model, distribution and integration model, positioning facilities model and tracking goods model, etc.

6.1.3.4   Case Study: Spatial Logistics Information System Based on 3S Integrated Technology

Due to intense competition, the transportation of raw materials has been a source of profits on account of rising labor productivity and an efficient logistics system. This has attracted attention.

A spatial information system is comprehensive geo-spatial information processing and multi-source information related to information processing technology. A GIS, GPS, RS are included in the scope of spatial information systems. With 3S technology (GPS, GIS, and RS) as the representative of modern mapping technology, information visualization techniques, dynamic real-time updates, rapid information acquisition and information analysis are advocated to provide users with a visual map of application solutions. Thus, spatial information technology in the logistics process can play an important role.

3S technology in the logistics system can effectively achieve the integration of logistics information in fast, real-time, with vast amounts of spatial data acquisition and management. In addition, a graphics display can be more convenient in the cargo logistics system to visualize all aspects of the management, in particular choosing transport routes, delivery vehicles, warehouses, scheduling and distribution centers; and setting the capacity of the warehouse, warehouse layout and a reasonable strategy for handling issues such as effective management and decision analysis. In fact, with the development of the logistics and 3S, 3S technology will become an integral part of the whole logistics management process.

As the supporting technology of Digital Earth, 3S and its integration technology is constantly developing applications. Meanwhile, these applications are increasingly being used. There has been much research of the 3S logistics system in recent years, but mainly its applications in GPS and GIS. 3S integration is the trend. The development trend of logistics, integrated logistics and other technologies should be based on 3S study as a whole in an integrated logistics system.

A logistics information system is very similar to other information systems and contains several major elements: a theoretical basis, technical composition, system structure, relations between elements, and system functions. The spatial logistics information system is formed by effectively integrating information technology such as GIS and GPS with logistics management technology, which greatly changes the database, functional framework, analytical model, application model

and so on. The spatial logistics information system includes logistics management technology. It connects with ERP in the process of information flow. Distributed GIS and GPS technology introduce the concept of geographical space in logistics management, emphasizing wide-area geographical analysis, spatial analysis and visualization management. Fig. 6.5 shows spatial logistics information system architecture.
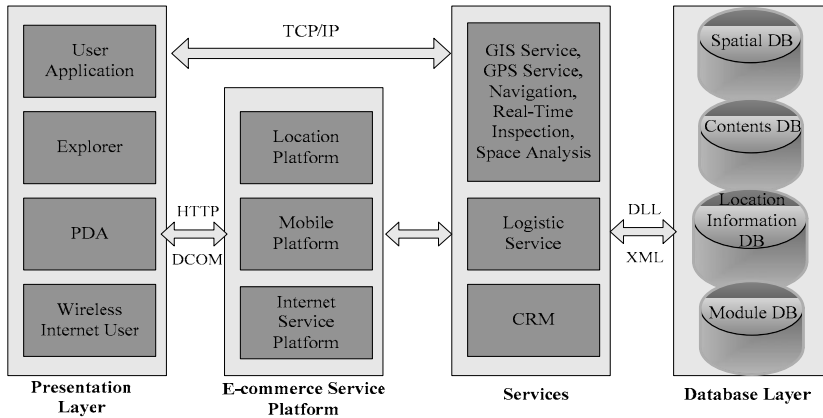
Fig. 6.5   The architecture of a spatial logistics information system

6.1.4   *Security and Other Implementation Issues*

6.1.4.1   Security Issues

E-commerce is vulnerable to a wide range of security threats. Because e-commerce has a high degree of openness to the Internet through commercial activities, attacks against e-commerce systems can disclose or manipulate proprietary information. In addition, due to its lack of necessary regulatory control and a complete network security system, e-commerce still faces a lot of security threats. Therefore, security technologies should not be ignored. Security has become a core issue of e-commerce. And network security is the core of information security.

The complete security architecture of a computer network includes the network's physical security, access control security, system security, user security, information encryption, secure transmission and security management[11]. In general, information security risks exist in the information sharing and transmission process. In order to make sure the e-commerce system is free of malicious attacks, a lot of security technologies have been developed.

6.1.4.2 Data Encryption Technology

Data encryption technology is used to ensure that the secrecy of information can be traced back. Using data encryption technology can make the information in transit and storage unreadable to anyone except those with special keys. There are two critical keys which are named as the encryption key and decryption key in the encryption/decryption system. Of the two, the encryption key is public while the decryption key is private. The mechanism of the encryption/ decryption system is shown in Fig. 6.6. In order to securely send the message to the receiver, the sender needs to transform the original message (called plain text) to the cipher-text which the attacker can not understand even if he gets the transformed message through the encryption algorithm. When the receiver receives the cipher-text, he decrypts the cipher-text through the decryption algorithm [12]. In the process of encryption and decryption, the encryption key and the decryption key are the core. One of them or two of them are the key parameters of the algorithm. The Data Encryption Standard (DES) is a milestone in data encryption which divides keys into a public key for encryption and private key for decryption. It is based on a symmetric-key algorithm that uses a 56-bit key. But DES has some theoretical weaknesses in the cipher and distributed net and the Electronic Frontier Foundation has even cooperated to break a DES key in 22 h and 15 min. So triple DES was developed and demonstrated to be practically secure[13]. As for as the encryption system, there are mainly two kinds which are a symmetric encryption system and asymmetric encryption system. Now DES is an international standard drawn up by the National Institute of Standards and Technology. The encryption technology is relatively mature, which lays the foundation for the security of e-commerce development.
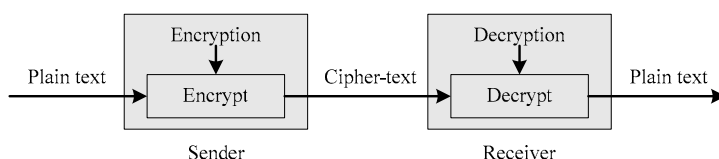
Fig. 6.6 Encryption/decryption system with two keys

6.1.4.3 Digital Signature

In commercial activities, the two parties to the transaction need to sign a document for it to have the force of law. Once the document is signed, it means that both parties agree the content of the document and they are both willing to enjoy prescribed rights and fulfill corresponding responsibilities. Thus the signature should be credible and verifiable. It requires that the signature cannot be counterfeited and modified after the document is signed. But during e-commerce, two parties cannot sign the contract face-to-face so that the signature has to be digital and electronic. Then, how to find a secure and efficient way to make both

parties sign electronic documents becomes a problem. To solve this problem, many digital signature algorithms, such as RSA (Fig. 6.7), DSA and a discrete logarithmic algorithm have been released[14]. Through those digital signature technologies, the receiver can distinguish the sender and find out whether the document was altered in transit. In order to make sure of the electronic signature's legal significance, many countries have issued relevant laws such as the United States, India and some members of the EU[15]. Now a digital signature is widely used in e-commerce.
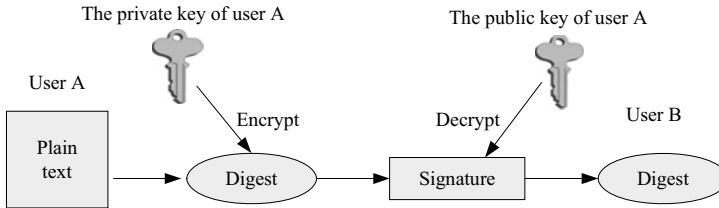
Fig. 6.7   RSA digital signature algorithm

6.1.4.4   Authentication Technology

Authentication technology is used to confirm the operator's identity in the computer network and ensure the operator is the right person. All the information including user identity information is expressed by a specific group of data in the computer network. The computer can only identify the users' digital identity. All the authorization is specific to the authorization of digital identities. So how to guarantee the operator's digital identity becomes important and the identity authentication has a pivotal role as the first gate for protecting Web properties.

The authentication technology can be divided into digital authentication and biological authentication. Digital authentication is using encryption to realize the authentication and the most common authentication is the password. But just using a password is not secure so that a digital signature is usually used to implement the authentication. As far as biological authentication goes, there are a series of ways to achieve this such as face ID Authentication, fingerprint ID Authentication, iris ID Authentication, palmprint ID Authentication, voice ID Authentication and manual signature ID Authentication, etc. [16].

6.1.4.5   Firewall Technology

The firewall is a security system between an Intranet and the Internet which offers access control of the transmission of information between the two networks. The firewall would prevent important information on the Intranet from flowing into the Internet and doubtful information on the Internet from flowing into the Intranet. So the two networks can be safely separated and connected. The firewall technology is to determine what kind of information can pass through the firewall.

The firewall can be divided into two kinds: packet filtering and application proxy. The packet filtering determines whether the packet should be passed according to the packet source address, destination address, port number and protocol category. Because the packet filtering works on the network and transmission layer, the applications do not need to be modified. It makes the packet filtering universal and effective. On the contrary, the application proxy works on the application layer[17]. It can be seen as the middle process between the client and server providing special businesses. The proxy server performs all communications with the Internet. External computers only see the IP address of the proxy server and never communicate directly with internal clients. The application proxy examines the packets more thoroughly and is considered more secure, but uses more memory and processor resources.

6.1.4.6 Secure Payment Technology

SET protocol is widely used in the e-payment process. It was jointly developed by Visa and Master-Card in order to ensure electronic payment security. Besides authenticating a consumer's credit card, SET also authenticates the vendor's identity. In addition, the customer's information is packaged or encrypted and sent to the bank so that the vendor cannot see the account or password of the customer, which makes SET more secure. The customer, online store, bank, e-currency issuer and certification authority are all major participants in the SET protocol. Among them, the certification authority (CA) is a key organization for issuing and managing certificates according to X.509[18]. The data interchange processes of SET protocol are shown in Fig. 6.8.
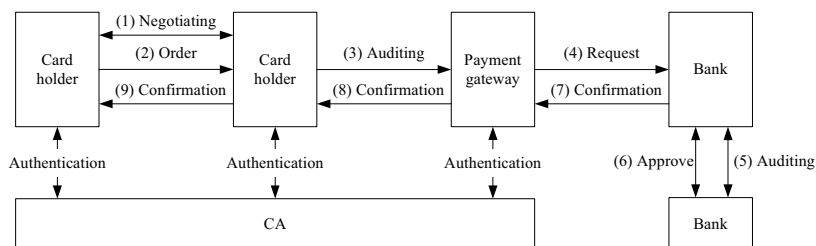
Fig. 6.8 Data interchange process of SET protocol

Security is the key element in the development of e-commerce. Although the Internet is very open, the security problem has been solved to some extent. Because the Internet is very open, people should use two or more secure measures to let them supplement each other. Besides secure technologies, proper security management is necessary. People should pay more attention to network security when using e-commerce. In addition, cooperates should formulate their own security strategies and provide relevant security training programs for the staff.

6.2   Mobile Communication Technology

The development of e-commerce brings us lots of benefits. Among them, m-commerce is a typical one. M-commerce, also known as mobile-commerce and m-business, is not merely a variation of existing Internet services but an extension of e-business with the rapid growth of mobile devices. There is no precise definition of mobile commerce. In fact, it appears that m-commerce is e-commerce or e-business done in a wireless environment, especially via the Internet.

M-commerce is the perfect combination of the Internet, mobile communication technology and other technologies. Technologies to realize m-commerce include 3G, 4G, wireless application protocol (WAP), mobile IP technology, Bluetooth technology, general packet radio service (GPRS), and the Mobile Positioning System (MPS).

6.2.1   Mobile Communication

6.2.1.1   WAP

The WAP system includes WAP gateway, WAP content server and WAP mobile terminal (Fig. 6.9). The WAP gateway plays the role of the translation and transmission of protocol and it is the bridge which connects the radio communication network and the Internet. The communication between the gateway and server is based on Internet communication, namely communicating by HTTP protocol. This means that the service provider does not need to change contents as long as network equipment is added. Then an information service can be provided to mobile users. The content server of WAP stores a great deal of information for access, inquiry and browsing by WAP mobile phone users.
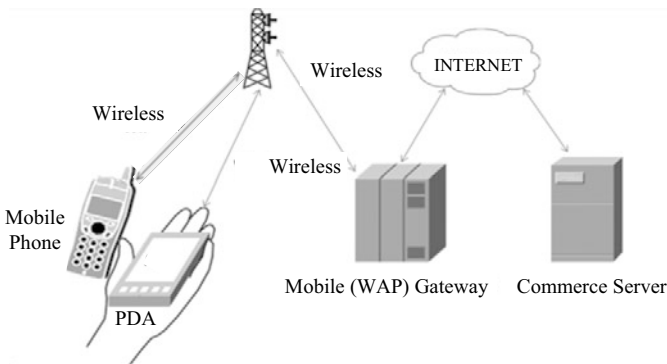
Fig. 6.9   WAP architecture

6.2.1.2   3G Mobile Communication

Compared with an analog mobile phone of the first generation (1G), and GSM and TDMA of the second generation (2G), the mobile phone of the third generation (3G) is the new generation of the telecommunication system that combines wireless communication and the Internet, which is called multimedia communication. It can process various media forms of image, music, video flow and provide various information services including a Web page browser, conference call, e-commerce, etc. In order to provide these services, the wireless network must support different data transmission speeds, that is to say it can support transmission speeds of 2 Mbps, 384 kbps and 144 kbps respectively indoors and outdoors as well as in the moving car. Different from those of the first generation and the second generation, the main features of the 3G system can be generalized as a system of global popularization and global seamless roaming. There are four kinds of 3G standards in the world: WCDMA, CDMA 2000, TD-SCDMA and WiMax. In May 2000, WCDMA, CDMA 2000 and TD-SCDMA were approved by ITU as the three main 3G standards and WiMax was also approved by ITU in 2007. CDMA (Code Division Multiple Access) is the fundamental technology of 3G technology. The 1G system adopts the analog modulation of Frequency Division Multiple Access (FDMA) but its spectrum utilization is very low with lots of signaling interference in voice services. The 2G system adopts the digital modulation method of Time Division Multiple Access (TDMA) which greatly improves the capacity and uses an independent channel. But the capacity of the 2G system is still limited and handoff performance is not perfect. As for CDMA, it has a series of advantages such as simple frequency planning, large capacity, strong anti-multipath capacity, good communication quality and soft switching, which brings great development potential. WCDMA, also called Wideband CDMA, is the original and most widespread radio interface, which was developed from the GSM network and launched by Europe. Its supporters mainly are European enterprises as well as some Japanese enterprises. CDMA 2000 is especially used in North America and Republic of Korea, sharing infrastructure with the IS-95 2G standard[19]. Although supporters of CDMA 2000 are less than those of WCDMA, its development is the fastest. WiMax (Worldwide Interoperability for Microwave Access), also called 802.16 Wireless Metropolitan Area Networking (MAN), is another wireless connection solution. It quickly obtained recognition from enterprises because of low cost. TD-SCDMA was totally independently developed by China and is only offered in China. Now China has comprehensively taken up 3G deployment. Three telecoms—China Mobile, China Unicom and China Telecom are allocated to developing 3G businesses. Among them, TD-SCDMA is deployed by China Mobile while WCDMA and CDMA2000 are deployed by China Unicom and China Telecom. In order to develop TD-SCDMA，China has allocated the biggest telecoms operator in the world, China Mobile, to TD-SCDMA. It can be seen that TD-SCDMA will achieve fast development in the future. China had almost finished the technological testing in 2010. It was estimated that the deployment pilots in six

cities of China would be completed in 2011[20].

The most powerful features of m-commerce are faster download speeds and the extension of cellular connectivity to mobile devices such as phones. High data transmission rates are illustrated in Table 6.2. All 3G networks aim to offer efficient spectrum utilization and worldwide connectivity or global roaming. There is great potential for 3G to change the way mobile devices are used and to dramatically increase m-commerce applications and activities.

Table 6.2   Comparison of 2G and 3G in communication bandwidth [21]

	2G	3G
Bandwidth	30 to 200 kHz	15 to 20 MHz
Connectivity	Dial up	Always on
Hardware	Telephone handset	Mobile computing device
Speed	9.6 to 384 kbps	144 kbps to 2 Mbps
Download delivery time:		
E-mail file (10 kb)	8 s	0.04 s
Web page (9 kb)	9 s	0.04 s
Text file (40 kb)	33 s	0.2 s
Large report (2 Mb)	28 min	7 s
Video clip (4 Mb)	48 min	14 s
TV quality movie (6 Gb)	1,100 h	5 h (approximately)

6.2.1.3   4G Mobile Communication

4G is the fourth generation of cellular wireless standards. It was developed based on the 3G and 2G technology. A 4G system is expected to provide a comprehensive and secure all-IP based mobile broadband solution to laptop computer wireless modems, smartphones and other mobile devices. In 2008, the ITU-R (ITU Radio Communication Sector) [1] specified the IMT-Advanced (International Mobile Telecommunication Advanced) requirements for 4G standards. In the specification, the ITU-R set the speed requirement for 4G services at 100 Mbps for high mobility communication and 1 Gbps for low mobility communication[22]. Very fast speed makes 4G systems able to satisfy any wireless requirement. Through 4G systems, people can get ultra-broadband Internet access services, IP telephony, gaming services and streamed multimedia services. People can smoothly watch movies or play games in a wireless environment.

The network structure of a 4G system can be divided into three layers: physical layer, intermediate layer and application layer. The physical layer provides the access and routing function which is achieved by the connection between wireless network and core network. The intermediate layer offers functions such as QoS mapping, address transformation and complete

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[1]ITU-R: one of the three sectors of the International Telecommunication Unit (ITU) which is responsible for radio communication. Its role is to manage the international radio-frequency spectrum and satellite orbit resources and to develop standards for radiocommunications systems for ensuring the effective use of the spectrum.

management. The APIs among three layers are all open so that developing new applications and services becomes possible. The Ogonal Frequency Division Multiplexing (OFDM) technology is the core technology of the 4G system. Because OFDM has high scalability, good anti-noise and anti-interference, fast wireless data transmission, 4G can provide more efficient wireless telecommunication services.

Compared with 3G, 4G has brought greater online experience. The greatest advantages of 4G are fast communication speed and high voice quality. 3G systems can only reach the transmission rate of 2 Mbps while 4G is expected to reach between 10 to 20 Mbps. It can be seen that 4G is about 10 times faster than 3G. In addition, the frequency spectrum of 4G is wider than that of 3G. According to AT&T, each 4G channel will take up the spectrum of 100 MHz which is 20 times more than that of WCDMA (one kind of 3G system). Fast speed and high transmission quality, something that cannot be achieved in 3G systems, can all be achieved in 4G systems. Even in those services 3G has provided, 4G can also provide better services, not only in the quality but also in convergence and price. The 4G system can provide great wireless multimedia communication services, especially videos at fast speed with high quality. Through 4G systems, people can also obtain a great deal of wireless value-added services such as Wireless Local Loop (WLL) and Digital Audio Broadcasting (DAB). In addition, because APIs of 4G systems are all open and 4G systems can be connected with other networks, 2G and 3G systems can smoothly transit to 4G systems without great investment. So 4G systems can be established based on the infrastructure of 3G systems and fees of 4G systems can be greatly reduced. It is said that some services of 4G systems, such as instant wireless connection, are cheaper than 3G communication.

There are several kinds of 4G candidate systems. Mobile-WiMAX, LTE, IEEE 802.20 and Flash-OFDM have all been considered as 4G candidate systems. But they do not meet the requirement of ITU-R IMT-Advanced[22]. Now only "LTE-Advanced" and "WirelessMAN-Advanced" have met ITU-R IMT-Advanced requirement and both of them will be the mainstream of ITU standards. LTE-Advanced is an enhancement to LTE, and it can reach a peak speed of 1 Gbps download and 500 Mbit/s upload. Its evolution track can be described as: GSM → GPRS → EDGE → WCDMA → HSDPA/HSUPA → HSDPA+/HSUPA+ → LTE → LTE-Advanced. In the development process, some steps in the evolution track can be skipped. WirelessMAN-Advanced is still under development. The ability of 1 Gbps for stationary reception and 100 Mbit/s for mobile reception is still not achieved.

Now China has independently developed its own 4G standard called the TD-LTE – TDD (time division duplex) version of LTE. In May 2010, China Mobile, the developer and operator of TD-LTE, launched the world's first trial TD-LTE network at Shanghai World Expo, using Huawei's E2E network solution. It was said that the download rate of the network was ten times faster than existing 3G networks and a series of HD video services such as video conferencing, VOD and live broadcasting could all be provided on the network[23]. Now China's TD-LTE has been listed as one of the two international 4G standard candidates[24].

More than twelve international telecoms operators in Europe, Asia and North America are willing to adopt TD-LTE as the 4G standard[25]. China Mobile has signed a cooperative agreement on TD-LTE with nine foreign operators and planned 26 TD-LTE trials in the world. It is expected that other countries and regions will start commercial deployment of TD-LTE in 2011. India and Japan have clearly declared they would start TD-LTE deployment [26]. Meanwhile, China will continue to increase the investment in TD-LTE. According to HIS iSuppli, the investment in TD-LTE in China may reach $100 million in 2011, $300 million in 2012, $600 million in 2013 and $1.3 billion in 2014[27]. It can be seen that China's homegrown TD-LTE is likely to occupy advantages in the 4G era.

With the commercial use of 4G systems, wireless speed and transmission quality can be highly improved. As for e-commerce, people can buy commodities online anytime they want and have more convenient shopping experiences than with 3G systems. Meanwhile, consumers can smoothly watch videos online such as advertisements and demos just with small-sized terminals they can carry along at any time. But there are still some challenges for 4G systems. The development of 4G terminals falls behind that of 4G networks. Although the deployment of 4G networks has been completed, people still can not enjoy the pleasure 4G has brought without proper terminals. In addition, there is no global unified standard for 4G systems. Moreover, 3G commercial use is still under development. Now just over 25% of the population in the world has adopted 3G networks[28]. It is estimated it may still need at least ten years to achieve popularity and wide commercial use of 4G technology.

6.2.1.4   Mobile IP Technology

Mobile IP technology can help realize mobile computer roaming seamlessly on the Internet by changing the IP protocol in the network layer. Mobile IP technology makes switching from one link to another possible without changing the IP address and without changing communication under way. Mobile IP technology can well support the application of m-commerce to a certain extent.

The mobile IP technology in the wireless access makes it possible for the global network to connect to multimedia, which meets the demands of the popular computing age. However, the existing mobile IP technology still has many deficiencies and the IPv6 solution is not perfect. But we can be sure that it must be a trend to combine the third generation mobile communication system based on mobile IP technology with the Internet to provide multimedia communication business with high speed and quality.

6.2.1.5   Bluetooth Technology

Bluetooth technology is a kind of short-range radio communication technology. Bluetooth technology can effectively simplify communication among PDAs,

laptops, mobile phones, and other mobile communication terminals. It can also successfully facilitate the communication between the equipment above and the Internet, and make data transmission between modern communication equipment and the Internet quicker and more efficient. Thus wireless communication is expanded.

6.2.1.6   Mobile Positioning System

One application domain of m-commerce is business based on the location. It can provide information for tourists and employees on business trips, such as local news, weather and hotel information, etc. This technology will bring great business opportunities to local tourism, the retail trade, entertainment and restaurants.

6.2.2   Wireless Telecommunications Networks

All mobile devices need to connect with a telecommunications network or with another device. How they do this depends on the purpose of the connection, the capabilities and location of the device, and connection options available at the time. There are four levels of telecommunication networks (Fig. 6.10): (1) personal area networks for device-to-device connections up to 30 feet; (2) wireless local area networks for medium-range connections, typically up to 300 feet; (3) wireless metropolitan area networks for connections; and (4) wireless wide area networks for connecting to a network from anywhere with cellular phone coverage. 3G and 4G described above both belong to the fourth kind of telecommunications network.
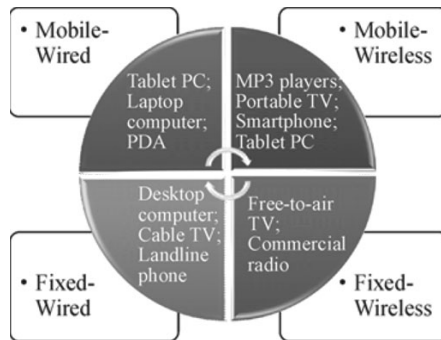
Fig. 6.10   Categories of telecommunication networks

6.2.3   Technical Limitation of Mobile Communication

The technical limitation of mobile communication is shown in Table 6.3.

Table 6.3   Technical limitation of mobile computing[21]

Limitation	Description
Insufficient bandwidth	Sufficient bandwidth is necessary for widespread mobile computing, and it must be inexpensive. It will take a few years until 3G and WiMax are available in many places. Wi-Fi solves some problems for short-range connections
Security standards	Universal standards are still under development. It may take 3 or more years for sufficient standards to be in place
Power consumption	Batteries with long life are needed for mobile computing. Color screens and Wi-Fi consume more electricity, but new chips and emerging battery technologies are solving some of the power-consumption problems
Transmission interference	Weather and terrain, including tall buildings, can limit the reception. Microwave ovens, cordless phones, and other devices in the free, but crowded, 2.4 GHz range interfere with Bluetooth and Wi-Fi 802.11b transmissions
GPS accuracy	GPS may be inaccurate in a city with tall buildings, limiting the use of location-based m-commerce
WAP limitations	Many mobile phone users find that WAP is expensive and difficult to access
Potential health hazards	Potential health damage from cellular radio frequency emission is not known yet. Known health hazards include cell phone addiction, thumb-overuse syndrome, and accidents caused by people using cell phones while driving
Human-computer interface	Screens and keyboards are too small, making mobile devices uncomfortable and difficult for many people to use
Complexity	Too many optional add-ons are available (e.g., battery chargers, external keyboards, headsets, microphones, cradles). Storing and using the optional add-ons can be a problem

6.3   E-Commerce Emerging Technology

A wide variety of innovative technologies applied to e-commerce makes e-commerce easy to adopt by an increasing number of consumers. However, sometimes innovative ideas are other ways to approach the success of the business. Adopting simple and easy-to-use tools in different ways may lead to unexpected achievement. One of the typically innovative technologies is IPTV and one of the typically innovative ideas is SNS. Both of them will be discussed in the following paragraphs. In addition, cloud computing is a new trend in the age of data expansion. With the development of RFID and 3S technology, the Internet of Things will have a great impact on the logistics.

6.3.1 IPTV

IPTV (Internet Protocol Television) describes the system where a digital television service is delivered to subscribing consumers using the Internet Protocol over a broadband connection. Simply, IPTV is television content received through technologies used on the World Wide Web instead of being delivered through a traditional format.

IPTV primarily uses multicasting with Internet Group Management Protocol (IGMP) version 2 for live television broadcasts and Real Time Streaming Protocol for on-demand programs. Compatible video compression standards include H.264, Windows Media Video 9 and VC1, DivX, XviD, OggTheora and the MPEG-2 and MPEG-4.

The IP-based platform offers significant advantages including the ability to integrate television with other IP-based services like high speed Internet access and VoIP. These features make e-commerce applications available. For example, IPTV service providers can add applications to their IPTV offering, such as interactive gaming and information services, including providing weather and stock information. Moreover, IPTV offers the possibility for interactive and targeted advertising to ensure that consumers only receive the information or advertisements relevant to their personal profiles. Consumers can click on advertisements for further information and potentially order advertised products online [29]. Meanwhile, with the development of IPTV, people can also buy things or services by TV. IPTV will provide a platform in favor of consumers and merchants. E-commerce in the form of telephone ordering and cash on delivery will come to the IPTV platform. In this way, e-commerce can expand to more households and consumers can more conveniently make deals.

Now a great many countries have actively developed IPTV and reached some achievement. IPTV has expanded across the globe. At the end of 2009, the number of homes that received IPTV services was 26 million. That number was expected to reach 70 million worldwide by the end of 2014. Revenue from IPTV will rise accordingly from $4.6 billion in 2009 to $12.2 billion in 2014, although only 5% of the world's TV households were expected to subscribe to IPTV platforms by the year 2014.

In 2005, Verizon launched the first IPTV services in the United States and gradually extended IPTV services to other parts of the country,, beginning the prelude to the development of IPTV in America. In 2011, the United States will have 4.8 million IPTV users, accounting for 11.68% of global IPTV users. The United States will have 15.5 million IPTV users by 2013. But the total number of IPTV households in the United States only accounted for 5% with a low penetration level in 2009 [30]. There is great potential for IPTV to develop.

Asia is expected to be the largest region in terms of IPTV subscribers, especially China. It was forecast that IPTV subscribers would reach 28 million by the end of 2014 while global subscribers would reach 70 million. China would contribute 13.7 million, becoming the leading country[31]. Now IPTV is still in an early stage of development. But the government of China is committed to

promoting the three network convergence and preparing for the development of IPTV. Now 12 trial cities such as Shanghai, Beijing, Shenzhen, Qingdao, Xiamen, Dalian, Mianyang, Changsha, Harbin, Nanjing, Wuhan and Hangzhou have finished the construction of an IPTV integration platform[32]. Republic of Korea is also a fast developing country for IPTV. In 2010, Republic of Korea had 3.6 million subscribers and will become the sixth leading country for IPTV in 2014[33].

Although IPTV has great development potential, IPTV still lacks an efficient profit model and a reasonable fee structure. There are also a number of policy barriers and other issues. Along with the demand for interactive services on television, IPTV is still an upward trend. In addition, IPTV in terms of digital ecosystems adapting to the environment of converged content and the new need to switch quickly to a service-oriented content has enhanced and improved product competitiveness in the global emerging markets. Therefore, IPTV still has a long way to go.

6.3.2   SNS (Social Network Service)

A social network service (SNS) is an online platform that focuses on building and reflecting social networks or social relations between people. A social network site often includes each user's profile such as interests, activities and social links [34]. With SNS, people can interact over the Internet by e-mail, instant messaging and so on.

The concept of SNS was brought about by Frigyes Karinthy's six degrees of separation theory. Six degrees of separation refers to the idea that any two people can on average be connected by approximately six steps. One of the first SNS sites called Six Degrees started in 1997. Then a lot of successful SNS sites were established in the United States. Friendster was founded in 2002. In 2003, an SNS site focusing on facilitating business contacts called LinkedIn was founded. Now it has over 50 million users. Google followed the SNS trend and established its own SNS site called Orkut in 2004. In the same year, the most popular SNS site in the world was established too. It was Facebook. In April 2010, about 41.6% of the U.S. population had a Facebook account. The number of Facebook's active users increased from 400 million in February 2010 to over 845 million in February 2012[35].

Fig. 6.11 shows the Facebook profile. There are also some other famous SNS sites in the United States. MySpace has been one of the most popular SNS sites for younger users. YouTube is famous for its video sharing. Twitter has an advantage for short messages and has attracted a great number of users.
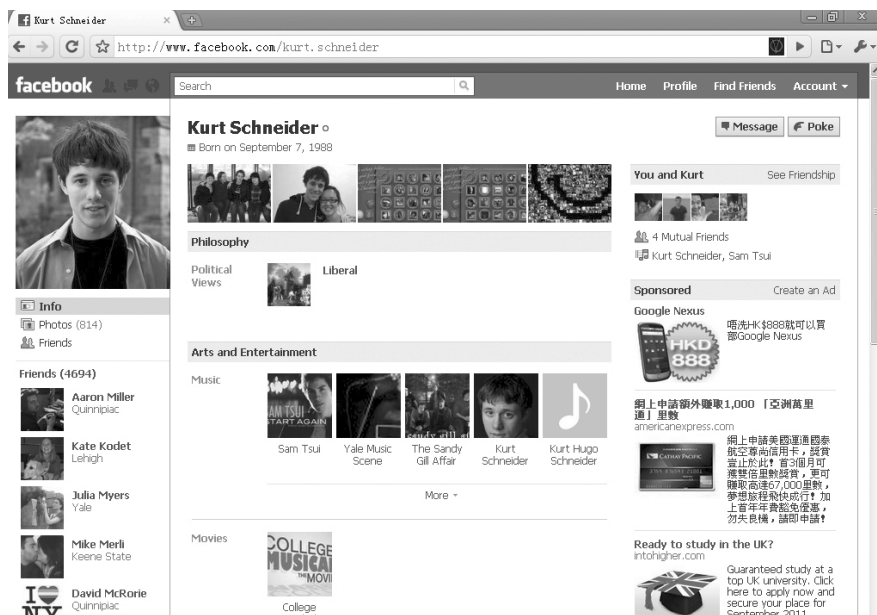
Fig. 6.11   Facebook: an example of an SNS website

Although there are a lot of different SNS sites around the world, the SNS framework can be divided into three layers in general (Fig. 6.12). The bottom layer is the profile which describes users' properties and behavior. The profile can be divided into three. One contains the users' social properties such as names, age, profession, sex and graduation situation. One contains community extended properties such as growth levels, nickname, and virtual career in a community. The last contains implicitly derived properties which the system finds out after deep analysis of all kinds of user tracks in the SNS sites. For example, if a user has much interest in makeup and baby accessories, we can roughly infer the user is a woman with a child. Different SNS sites have different abilities for collecting and analyzing the information. The interlayer is the relation. It can be represented by the relationship between person and person, the relationship between the person and a group and the relationship between different groups. There are two kinds of relations called strong relations and weak relations. The strong relation often refers to friendship. If one person follows another one, we think the two have a weak relation. In an SNS site, the relation is the core. Only when there are many users and rich relationships, can the SNS site grow in popularity. The upper layer is the content and application. The content is composed of official content and UGI. The UGI refers to user generated content such as blog, pictures and instant messages. Applications are the other important resource of SNS sites including tools, games, videos and other interesting apps. Different from apps in other Websites, applications in SNS sites always invoke the information in the profile and relation layer. For example, if we want to develop a group game, we

would invoke basic information about users in the profile layer and users can invite friends to join the game through the relation layer.
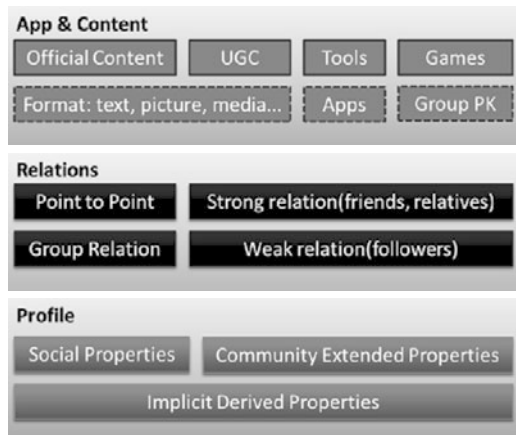
Fig. 6.12   Three typical layers of SNS framework

Meanwhile, the profile, relation and contents are related to each other. The profile will gradually evolve. Users often put many UGCs on the site, browse personalized content, join favorite communities or play interesting games. All these activities will provide much useful information to give the user a much more precise profile. In addition, users will strengthen the relationship by the interaction in apps. Users can also expand their friends circle by six degrees separation. Moreover, the more interesting and useful the contents and Apps, the greater the number of users and potential users.

With the fast development of SNS, there are more and more SNS users. The architecture of an SNS site has to evolve to satisfy the heavy load requirement. Fig. 6.13 shows the evolvement of MySpace.com. Before, MySpace was simply composed of an SQL server and Web servers, just supporting 500,000 users. However, as the number of users increased, the SQL server was limited by I/O speed. So the database was designed in vertical segmentation mode. Different databases served for different functions such as login, customer information and blog. The storage devices were connected with the database through the SAN (Storage Area Network). The SAN connected all the devices together and interacted with the database. In this mode, MySpace.com could support 1.5 – 2 million users online. Then MySpace.com evolved its architecture to support over 10 million users. The SAN was used to store the data according to the capacity in the logic and bundled to different disks instead of a special disk. There was also a data caching layer between the Web server and SQL server, which would be the transcript for the data frequently requested in the memory. The SQL server was also upgraded to 64-bit.
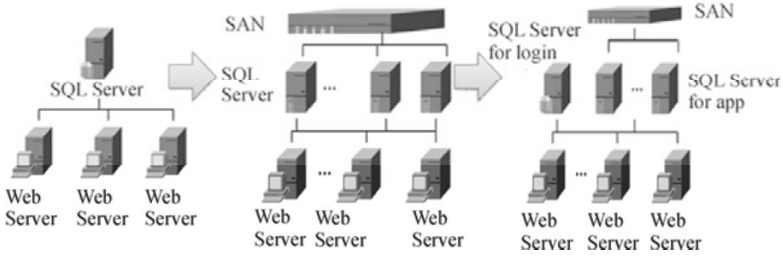
Fig. 6.13   MySpace.com architecture

Now SNS has gradually mixed with e-commerce. SNS strengthens the user viscosity of e-commerce sites and provides a new marketing channel. For SNS sites can take an accurate marketing positioning by analyzing user profiles. Thus e-commerce can achieve effective marketing. In addition, the recommendation from friends plays a decisive role in product evaluation. Most SNS sites have interactive features such as sharing. Users can have their own trading platform similar to Taobao with their linked SNS accounts. Meanwhile, users can update the information, publish their own shopping experiences, and share experiences with friends. It can be seen that SNS is a typical sort of viral marketing and the product information will be fully expanded. Now SNS has developed very well around the world. According to iResearch, SNS users in the United States will reach 150 million with a year-on-year growth rate of 9.9%. Its penetration rate among all netizens will reach 63.7% (Fig. 6.14). According to eMarketer, the number of users was estimated at 160 million, up 4.1%.
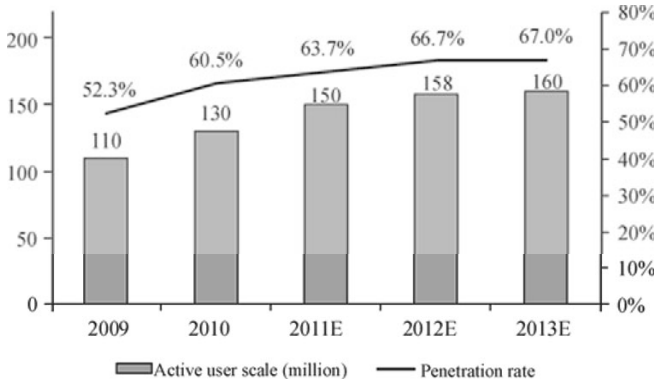
Fig. 6.14   Active user scale in the United States

As the biggest market, China has achieved fast development in SNS. According to iResearch, the SNS market size has grown from 1.21 billion RMB in 2008 to 4.38 billion RMB in 2011. The market size was estimated to reach 9.64 billion RMB in 2014 (Fig. 6.15). The number of SNS users in China reached 370 million in 2011 and it was estimated to reach 510 million in 2014 [36].
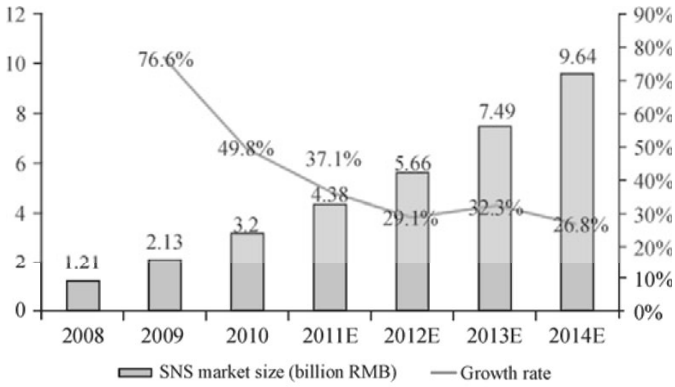
Fig. 6.15   SNS market size in China

In conclusion, the SNS model will be an important channel for network marketing in the future. In the SNS network and other fun sites, users can use their resources to create new business models to build a brand and establish an online trading platform in order to achieve profitability. On the one hand, operators of e-commerce sites and SNS sites will use existing channels to expand their influence. On the other hand, they will develop their own SNS community to strengthen cooperation.

6.3.3   Cloud Computing

Cloud computing is Internet-based computing, whereby shared resources, software and information are provided to computers and other devices on demand like the electricity grid. Cloud computing is a natural evolution of the widespread adoption of virtualization, service-oriented architecture and utility computing. Details are abstracted from consumers, but consumers no longer need expertise in, or control over, the technology infrastructure because the "cloud" will support them. Cloud computing describes a new delivery model for IT services based on the Internet, and it typically involves over-the-Internet provision of dynamically scalable and virtualized resources.

It is a byproduct and consequence that it easily has access to remote computing sites via the Internet. Frequently users can use Web-based tools or applications through a Web browser. The term "cloud" is used as a metaphor for the Internet, based on the cloud drawing used in the past to represent the telephone network and later to depict the Internet in computer network diagrams as an abstraction of the underlying infrastructure. Typical cloud computing providers deliver common business applications online through another Web service or software like a Web browser, while the software and data are stored on servers.

Most cloud computing infrastructures consist of services delivered through

common centers and built on servers. Clouds often appear as single points of access for consumers' computing needs. Commercial offerings are generally expected to meet quality of service (QoS) requirements of customers, and typically include service level agreements (SLAs). The major cloud service providers include Amazon, Salesforce and Google. Other large IT firms that are actively involved in cloud computing are Fujitsu, Microsoft, HP, IBM, VMware, NetApp and Dell.

A community cloud may be established where several organizations have similar requirements and seek to share the infrastructure so as to realize the benefits of cloud computing. The community cloud is more expensive than a public cloud but may offer a higher level of privacy, security and policy compliance. Examples of community cloud include Google's "Gov Cloud".

Cloud computing is generally considered as a kind of distributed computing which automatically splits a large computing network into numerous small subroutines, then hands over information between server systems through an extensive search, and analyzes the results back to the user. Now we can find cloud computing in Web services such as the search engine, Web mail and other services. Through this technology, network service providers can make the information available to tens of millions or even billions of service providers in seconds [37-39].

6.3.4   The Internet of Things

The Internet of Things, also known as the Internet of objects, refers to a self-configuring wireless network of sensors such as RFID, infrared sensors, GPS and laser scanners to achieve intelligent acquisition between things and humans. There are two meanings. First, the Internet of Things connects things to the Internet and the Internet is the core. Second, the client can expand to any goods, and the exchange of information and communication can also be achieved between things and things [36].

The essence of the Internet of Things is to perceive. The perception includes signal collection from sensors, intelligent networking, cooperative processing and information services. In fact, the Internet of Things can be described as the integration of the Internet, sensor network and mobile communication network. Among them, the sensor network is used to achieve the perception and the connection among things. The mobile communication network is for achieving the transmission of the information and achieving the connection among people while the Internet is for achieving the sharing of virtual information. In general, the Internet of Things works in the following steps. First, tag properties of objects by RFID technology and store the information in the RFID chip; second, recognize properties of objects through mobile or fixed RFID sensors and convert the information about properties into a proper data format suitable for transmitting on the Internet; last, use terminals such as mobile phones and computers for real-time tracking, monitoring and managing the goods. The structure of the Internet of

Things is shown in Fig. 6.16. The Internet of Things is composed of RFID tags, readers, Savant Server, the Internet, ONS server, PML server and other databases. In the Internet of Things, people put RFID tags which store the Electronic Product Code (EPC) of each product on the goods, and the reader reads the EPC information. The information on the tag is transmitted to the ONS server through the Internet. The ONS server can find further information about the object through a matched URL or IP-address with the EPC. A distributed savant system is used to process and manage a series of EPC information. The savant system transmits the EPC information to the ONS and the ONS uses the PML server that stores the product files to find matched information.
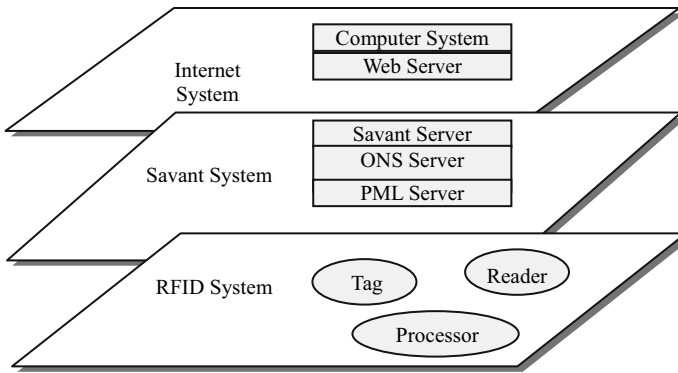
Fig. 6.16   The structure of the Internet of Things

The concept of the Internet of Things was first proposed in 1999 and was called the sensor network at that time. In 2006, the ITU officially proposed the concept of the Internet of Things. Since then, the Internet of Things has received great attention from governments and enterprises. In 2008, IBM released the concept of "Smarter Planet" emphasizing how the world's system and industries were becoming more instrumented, interconnected and intelligent and that people should pay more attention to the application of perceptive technology [41]. In 2009, Obama put the sensor network as a critical technology for economic prosperity and national security and "Smarter Planet" strategy rose to national strategic level. In the same year, the European Commission submitted *The Internet of Things—An Action Plan for Europe*. In *The Internet of Things—An Action Plan for Europe*, the EU emphasized establishing the leadership of the Internet of Things by developing critical resources, standards, relative programs and pilots [42]. Japan also launched "u-Japan" strategy in 2004. The "U" meant ubiquitous. Japan expected to develop wireless infrastructure by 2010 so that exchange of information would be possible anytime, anywhere and from any appliance. The convergence of telecommunications, mobile technology, broadband and digital broadcasting as well as the development of sensor technologies were the key. In August 2009 China also launched the concept of "Sense China" and established a

sensing information center in Wuxi to develop sensor technologies. In November 2009, the Premier of China, Wen Jiabao, delivered a speech called "let the technology lead China's sustainable development". In the speech, Premier Wen emphasized developing sensor networks and the Internet of Things, and making use of information technology to promote industrial upgrading. Now the Internet of Things is just at the early stage of development. It has not completely achieved the interconnection among things and people. According to SRI, it would need some time for the Internet of Things to totally become a physical-world web[39]. The roadmap of the Internet of Things is shown in Fig. 6.17.
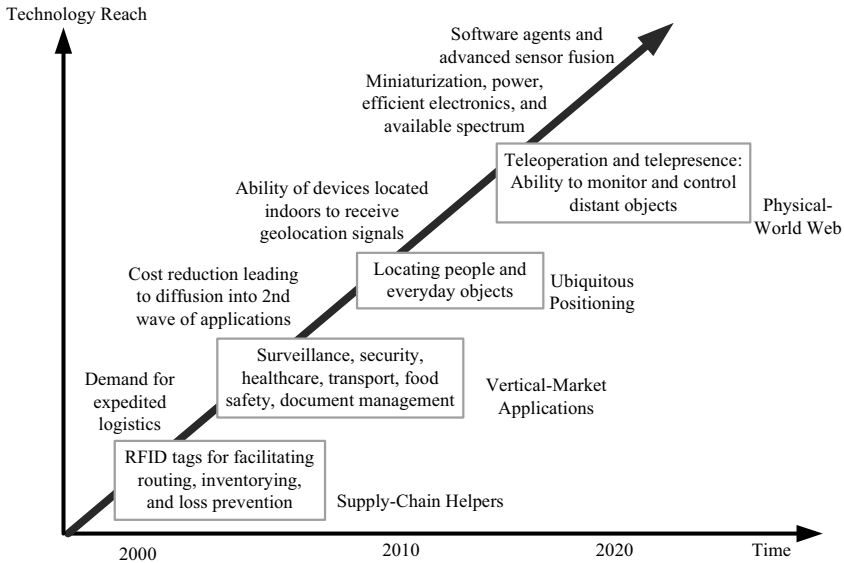
Fig. 6.17 Technology roadmap: the Internet of Things (SRI Consulting Business Intelligence)

In addition, the Internet of Things will greatly promote the development of e-commerce in the fields of logistics, quality control and supply chain management.

● To enhance the quality of logistics services

Now there are always many unsatisfactory situations in logistics services such as sending the product to the wrong destination, inability to query the logistics situation and late delivery. All of them are mainly because enterprises and consumers cannot achieve real-time control of the logistics. However, real-time monitoring of the logistics process can be achieved once the Internet of Things is adopted. The Internet of Things can unify the EPC for each product, imbed an EPC tag in the parcel, read EPC information by RFID technology and transmit the information to the processing center so that enterprises and consumers can make real-time queries. In this way, the quality of logistic services can be greatly improved and consumer satisfaction with online shopping can be greatly enhanced.

● To improve the control of product quality

Through the Internet of Things, the whole process from production to distribution is recorded in detail. When people shop online, they can query all the information from the material to the product as well as the sales situation according to the EPC tag of the product, so that they can get enough information to decide what to buy. In addition, enterprises can easily find out what has gone wrong once there is a product problem.

● To improve the supply chain management

Through the Internet of Things, enterprises can control in real-time each product and the logistics system. In addition, enterprises can not only achieve the control and information sharing of the supply chain, but can also analyze and forecast a potential situation in the future according to the information at different stages of the supply chain. Through the forecast, enterprises can predict future trends and estimate the probability of an accident so that they can take remedial measures in advance. In this way, enterprises can greatly enhance their responsiveness to the market.

6.4   Technology: Strategic Issue of E-Commerce

As referred to above, there are several kinds of technologies in the e-commerce field. These technologies laid the foundation for the development of e-commerce. The birth and development of e-commerce could not progress without the development of e-commerce technology. At first, e-commerce was born based on the Internet and EDI. Then, the development of security technologies such as data encryption technology, digital signature and authentication technology ensured the safety of online transactions so that people were willing to try online purchasing. Now technologies are developing in the mobile environment and e-commerce will enter a mobile era. It can be said that every time the technology is innovative, there will be new changes in e-commerce. In order to grasp e-commerce technical strategy, we have to understand the development trend of e-commerce technologies. Meanwhile, different technologies influence each other. For example, the development of 4G cannot proceed without IPv6 technology and the advantages of 4G technology cannot be seen without the support of IPv6. When formulating e-commerce technical strategy, enterprises should pay attention to the interdependence of different technologies. Moreover, the technology roadmap is another important factor that should be considered when formulating e-commerce technical strategy. Some technologies may not be popular at the time but will be the mainstream in the future. Enterprises should give close attention to technical evolution and develop important technology at an early stage. Otherwise, enterprises will fall behind other enterprises or spend more effort to catch up with others.

Now e-commerce technology is being transformed from stationary computing to mobile computing, from intensive data to mass data and from a fixed to a

distributed environment. Beforehand, the terminal for e-commerce was only the computer. People had to connect with the Internet to get the information and make an electronic exchange. But now the wireless network is developing very fast and mobile devices continually come out. People can easily connect with the network with small mobile devices such as mobile phones and PDAs. Then they can easily make online transactions in the same way as they do on the Internet. With the maturity of the wireless network, relative supporting technologies, especially mobile computing, make transactions through mobile devices as efficient as those on the Internet. There is no doubt that e-commerce will transfer to mobile devices what is more convenient. In addition, with the popularity of online transactions, there will be more and more relative information. Gradually, how to efficiently find useful information, store the information and analyze the information becomes a problem. Then mass data processing becomes important. Meanwhile, in order to improve the efficiency of data storage and data processing, a distributed system is launched. A distributed system consists of multiple autonomous computers that communicate through a computer network[40]. These developing technologies gradually make e-commerce transactions become more and more efficient. E-commerce enterprises can make use of those technologies to efficiently position target consumers. In the end, these technologies will improve e-commerce in different fields such as logistics and marketing, even bringing new e-commerce models.

It can be seen that technologies have a great impact on the development of e-commerce. In fact, technologies and e-commerce both influence each other. E-commerce innovation can be divided into technology innovation and application innovation. Details of e-commerce technology and applications are shown in Fig. 6.18. As far as technologies are concerned, the Web has entered the Web 3.0 age which means a "Web of data" including transferring the www into a generic database, cross-browser content transfer and request mechanism, artificial intelligence, a semantic net and so on[41]. The development and implementation of Web technologies result in mass data on the Internet to analyze, store and request which leads to cloud computing. In addition, mobile technologies such as 3G or even 4G technologies lead to the birth of mobile shopping. The security technology is becoming more and more mature which makes people feel safer to purchase online. Moreover, the 3S technology (GPS, GIS and RS) gives more opportunities for e-commerce and modern logistics. Meanwhile, these new applications in e-commerce put new requirements on the technology. Take mobile shopping as an example. As more and more people adopt mobile terminals to buy commodities online, they will need more bandwidth and faster network speed on the wireless network. What is more, how to protect the security in a wireless network becomes a problem.
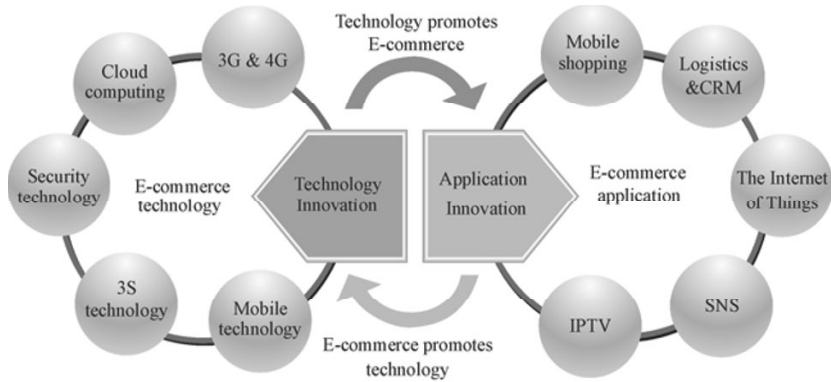
Fig. 6.18   E-commerce technologies and applications

Undoubtedly, the technology is a strategic issue for e-commerce development. By applying proper technologies in e-commerce, the efficiency will be highly improved. As referred to before, IPTV and SNS are two emerging trends. With the development of IPTV, traditional TV will merge with the Internet,, and people can either buy things on the Internet or the TV. It will bring dual influences. On the one hand, IPTV will capture some customer resources which originally belonged to e-commerce. On the other hand, e-commerce can absorb more TV customers such as old people and extend its marketing channels. In addition, e-commerce websites are presenting an SNS trend. Many e-commerce websites have established their own SNS sites for people to communicate and make friends with each other.

Moreover, mobile technologies are developing very fast which promotes e-commerce to develop into m-commerce. Before, e-commerce was mainly based on the Internet. With the development of mobile technologies, people can purchase things just by using mobile devices so that they can make a deal only if they have mobile devices and have access to a mobile network. All of this makes e-commerce more convenient. Customers can use these wireless devices to perform quick searches, compare prices, use a shopping cart, order, and view the status of their orders. Wireless shoppers are supported by services similar to those available for wired shoppers. Cell phone users also can participate in online auctions. For example, eBay offers "any-where wireless" services. Account holders at eBay can browse, search, bid, and rebid on items from any Internet-enabled phone or PDA. The same is true for participants in Amazon's auctions.

Meanwhile, mobile technologies and 3S technologies really extend marketing channels. Before, shoppers and enterprises used to prompt on the TV or in large markets, or paste advertisements which people can easily find. But through mobile technologies and 3S technologies, shops and e-commerce enterprises can easily discover the real-time location of mobile users and their preferences or surfing habits so that they can send user-specific advertising messages to wireless devices. Location-sensitive advertising (using GPS) to find where a customer is can inform

a potential buyer about shops, malls and restaurants close to where the mobile device owner is. For example, Expedia (expedia.com, the largest online travel company) sends SMSs to target segments of frequent travelers offering incentives to enter the Web site which cell phone users can choose for free services and the information will be delivered to their phones[7].

3S and RFID technologies also have a great impact on modern logistics. Logistics is a fundamental component of e-commerce because it is the ultimate realization of the value of goods and services. If the logistics is not handled properly, the value of previous links cannot be demonstrated. In e-commerce, a great percentage of commodities have to be delivered by real logistics while only some commodities and services such as electronic publications and information consultation can be completed directly through network transmission. So how to properly arrange and inquire about the logistic situation is really important. Through 3S and RFID technologies, the situation and location of any goods can be easily found and it is easy to arrange the logistics and for buyers to understand the distribution situation. Meanwhile these logistics situations can be easily delivered to the relevant person by mobile technologies. Moreover, the development of artificial intelligence can help people analyze the information. Through automation tools, accurate and timely logistics information that monitors the logistics process can accelerate the speed, improve the accuracy, reduce the inventory effectively and shorten the production cycle.

CRM can also be influenced by the development of technologies. Call centers have proved a success at handling volumes of non-face-to-face interactions with customers in e-commerce. A call center (also known as a contact center) is an interactive value-added service system providing assistance to customers through interactive call navigation, CTI (Computer Telephony Integration) technology and human agent communication. Customers can access a call center using a phone, FAX machine, wireless device, or computer. Currently the latest e-commerce call centers are based on Internet Protocol (IP) and combine a variety of servers such as CRM, CMS (Content Management System), CTI (Computer Telephony Integration) and IVR (Interactive Voice Response). Traditional voice communication is being extended to multichannel contact services with technologies such as VoIP, E-mail and instant message (IM).

Above all, we can see e-commerce and technologies influence each other. The development of technologies has promoted many kinds of innovation in e-commerce. In addition, technologies are the foundation of e-commerce. E-commerce is built on the basis of technological advances. When developing e-commerce, the development of technologies should not be ignored. Moreover, we should pay attention to the development trends of computer science and analyze the influence it will bring to e-commerce. When we do not seize on the right trend, it is possible to fall behind. Now, with the appearance of mobile communication technology, mobile positioning systems and others, mobile commerce is becoming a new trend because of its flexible and convenient features. Therefore, mobile technologies should be a top priority. And RFID and 3S technologies will bring great benefits to the logistics. With the development of the

Internet and mobile networks, there will be data expansion which will make mass data processing important in the future, so that cloud computing will greatly help e-commerce enterprises store and analyze their own transaction data.

However, commerce is still the main objective while the technology is only the tool. When developing e-commerce, technical support should be taken as a strategic management issue. But a good business model is more important. Besides grasping the right technologies, e-commerce should pay more attention to how to transfer the technology into a feasible business model. Now mobile commerce is a new trend of e-commerce and is only at the initial stage. There are lots of new opportunities for businesses. E-commerce enterprises should grasp this precious opportunity and develop well their own e-commerce strategy.

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