Thesis for the Degree of Doctor of Philosophy

An Empirical Study on the Internal Determinants of Electronic Commerce Success

- Focused on SMEs in Liaoning Province, China -

by

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The Graduate School

Pukyong National University

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성공적인 전자상거래를 위한 기업내부결정요인에 관한 실증연구

- 중국 요녕성 중소기업을 중심으로 -

Advisor: Prof. Kwang-Woon Yun

by

Liqun Mi

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A dissertation
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Abstract

Since the Internet is becoming the favorite business channel for commerce, it is important to understand the characteristics of the digital economy and factors influencing the success of electronic commerce. As more firms utilize the Internet as a medium of choice for commerce in the electronic market, virtually every firm is trying to position themselves and achieve business success. This phenomenon has brought much research interest in the electronic commerce.

The purpose of this study was to identify the internal determinants of SMEs' E-commerce success in China. The initial step in this research was to present problems that Chinese SMEs faced in the implementation of E-commerce. In order to solve these problems, pertinent academic literatures were reviewed. Then the literature review was narrowed down to include studies involving technology integration, strategy execution and organizational change.

Based on the literature review, a research model was presented as a framework to test the set of hypotheses generated in this study. The hypotheses were formulated to determine the relationship between technology complexity, structural mechanism for control, attitude of management, management commitment, organizational coordination, resource utilization and E-commerce success.

Four hundred SMEs in Liaoning Province were selected and questionnaires

were sent to the top managers of these firms. A total of 157 surveys were returned which represented a response rate of 39.3%. One hundred and three cases were considered in the statistical analysis. An examination of reliability and validity of the measurement scales revealed that the measurement scales for each construct was reliable and valid in terms of the internal consistency and accuracy. The result of regression analysis showed that five out of six hypotheses were supported and one was rejected.

Based on the result of empirical analysis, technology complexity, structural mechanism for control, attitude of management, organizational coordination, resource utilization were found to be the internal determinants of E-commerce success. And attitude of management is the most important factor influencing the enterprise's E-commerce success, which is consistent with the finding from qualitative research. According to the findings from empirical research and qualitative research, several suggestions were provided for Chinese SMEs on how to do a successful E-commerce.

This research is an initial study. There are some limitations about it, for example, sample is not enough, there maybe some bias about the procedure and instrument. In the future study, it is necessary to extend the study by further conducting an empirical test across various industries, as a measure of its effectiveness. And it can be conducted on the comparison among China and other Asian countries, i.e., Japan and Korea. Also, more researches should be done to examine any additional factors that might have an influence on business performance of an organization in doing EC.

Key word: electronic commerce success, internal determinants, SMEs

Chapter 1. Introduction

1.1 Background

Since its introduction, the Internet has generated much interest in its usage in business applications. The benefits and business opportunities it provides attract many firms and individuals to invest heavily in information technology (IT) infrastructure and applications development. Owing to the explosive growth in information technology investment and people's interest in the business application of innovative technologies, the platform for electronic commerce attracts the interests of many organizations. For example, Internet applications such as the World Wide Web (www) helped to provide the infrastructure needed to support on-line interactions among various entities. Firms began utilizing the information technologies to gain strategic advantage in business by running the organizational operations efficiently. Information technologies provided firms with following the advantages: information richness, information accessibility, and information distribution.

China has adopted its International Communication Technology (ICT)[1] development strategy in the early 1980s in the context of constructing the information highway as a path to modernization and economic development. It eventually led to the launching of the Golden Project, which include the Golden Bridge, an electronic information network linking provincial regional nodes with a central hub in Beijing; the Golden Card, an electronic money project designed to accelerate the development of electronic banking and a credit card system; and the Golden Gate, a

[1] Ministry of Information Industry of the People's Republic of China, http://www.mii.gov.cn/.

foreign trade information network designed to promote information exchange concerning foreign trade and foreign investment, paving the way for eventual transition toward paperless trade. It is a top-down strategy with government backing and under government control.

Despite this impressive growth in the basic telecommunications infrastructure, e-commerce is still in its infancy. The initial commitments which China made to liberalize progressively its telecommunication services upon accession to the WTO may create a competitive environment that will substantially reduce access cost and spur the growth of electronic commerce. In value-added and paging services, foreign services suppliers may hold 30% of equity shares upon China's accession to the WTO. This may increase to 49% one year later and 50 percent after two years.

Despite the technological and economic obstacles, the number of the Internet users is expected to keep on increasing. As Chinese businesses increasingly incorporate the Internet into their operations, and users become more sophisticated, demand for higher-quality Internet access services will grow. In order to respond to this demand, the role of the private sector in the development of e-commerce in China will have to become more important than in the past. This, coupled with government initiatives and anticipated foreign investment in the ICT sector, will allow China to become a key player in e-commerce, matching its success in international trade.

1.2 Objectives of the Study

The significance of this study is as below:

There are too many studies on the determinant factors of E-commerce success for enterprises. However, some of the factors are not suitable for Chinese enterprises due to the special situations of China. We all know that China is a country changing from planned economy to market economy. There are many differences in mentality and acceptability of new things between Chinese and Western people. So it is necessary to analyze the determinant factors which influence the enterprises' electronic commerce from the Chinese point of view.

Though the development of infrastructure in China had been improved rapidly and Chinese government has devoted to the development of electronic commerce, still there is a large gap between China and some other developed countries due to the late beginning.

Chinese SMEs have been developed rapidly and played an important role in national economies. By the end of October 2006, there were 43.42 million SMEs in China, accounting for 99.8% of Chinese total enterprises. The value of the ultimate products and services created by SMEs reached 58.7% of total GDP. Therefore, this paper focused on Chinese SMEs, especially SMEs in Liaoning Province. Analyzing the situation of adoption of electronic commerce in these enterprises, this paper tried to find out the determinant factors influencing electronic commerce so as to provide some constructive advice and suggestions to the development of electronic commerce in Chinese SMEs and promote the growth and improvement of electronic commerce in China.

There are not many studies on determinant factors which influence Chinese electronic commerce in China now. Also there is a scarcity of studies using the empirical study methods. From this point of view, this paper filled the blank in the study of this field.

1.3 Structure of the Study

In order to fulfill the purpose of this study, this paper used the following research method:

First, a lot of literatures had been reviewed for the sake of establishing the research model and bringing out the hypotheses. The literature reviews studied a lot of papers concerned with the determinant factors influencing electronic commerce and classified the factors referred in these papers and summed up the determinant factors influencing enterprises' electronic commerce from internal and external standpoint.

Second, based on the literature reviews, the research model was brought up, the concerned variables were defined. Investigation questionnaire was designed and sent out to 400 SMEs of Liaoning Province randomly depending on the Liaoning SMEs Directory compiled by Liaoning SMEs Office. Investigation was carried mainly through interview.

After collecting these questionnaires, appropriate statistical analytical methods were used to analyze these data gained from the questionnaires. The first step was to analyze the variables' reliability and validity, the next step was to test the hypotheses by regression analysis, then draw the results from the empirical analysis.

This paper was consisted of 7 chapters as below:

Chapter one consisted of the background, aim, methodology and the composition of the paper.

Chapter two consisted of the definition and current situation of electronic commerce in the world, and criteria and current situation of Chinese SMEs.

Chapter three consisted of the literatures for critical successful factors influencing electronic commerce by scholars from all over the world and

explanation of the definitions and relationships among variables.

Chapter four was based on the chapter 3 to establish research model and bring out hypothesis for the empirical analysis. Also the measurement methods for testing the variables were produced and the methods for sample selection and data collection were recorded.

According to the data collected from the questionnaire, Chapter five consisted of the analysis and test of research model and hypotheses. Through analyzing the general characters of the enterprises surveyed, testing the variables' validity and reliability, and testing the hypotheses using suitable methods, conclusions were deduced.

Chapter six listed some findings about the influencing factors from the interview survey.

Chapter seven consisted of conclusion deduced from the synthetic sum up of the above result derived from empirical analysis, the deficiency of this paper, and the after study direction.

Chapter 2. Current Situation of E-Commerce

2.1 E-business and E-commerce

Electronic Business, or "e-business", may be defined broadly as any business process that is supported by automated information system. E-business usually includes e-commerce. E-commerce seeks to add revenue streams using the Worldwide Web or the Internet to build and enhance relationships with clients, partners and to improve efficiency.

Kolakota and Whinston (1997[2]) define EC from the following perspectives:

-From a communications perspective, EC is the delivery of goods, services, information, or payments over computer networks or by any other electronic means.

-From a business process perspective, EC is the application of technology toward the automation of business transactions and work flow.

-From a service perspective, EC is a tool that addresses the desire of firms, consumers, and management to cut service costs while improving the quality of goods and increasing the speed of service delivery.

-From an online perspective, EC provides the opportunity of buying and selling products and information on the Internet and other online services.

Efraim Turban et al. (2001[3]) add to this:

-From a collaborations perspective, EC is the framework for inter- and intra-organizational collaboration.

-From a community perspective, EC provides a gathering place for community members, to learn, transact and collaborate.

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[2] R. Kalakota, A.B. Whinston (1997), *Electronic Commerce: A Manager's Guide*, Addison-Wesley, Reading, MA., pp.5-8.

[3] Efraim Turban, David King, and Jae Lee (2001), *Electronic Commerce 2002: A Managerial Perspective* (2nd Edition), Pearson Education, November, pp.3-14.

2.2 Current Situation of E-commerce

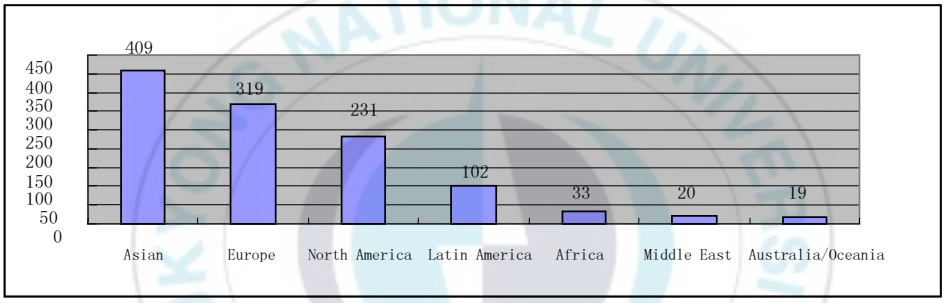
2.2.1 Current Situation of E-commerce in the World

(1) Infrastructure

From a global view, the absolute number of Internet users grows quickly, but the prevalence rate is still low. According to the latest statistics, by the end of 2006, the world's total number of Internet users was 1.13 billion, and the average Internet penetration rate was 17%. (Figure 1 and Figure 2) The number of Internet users in the United States, China, Japan ranks among the world's top three.

Figure 1: Internet users by world region in 2006

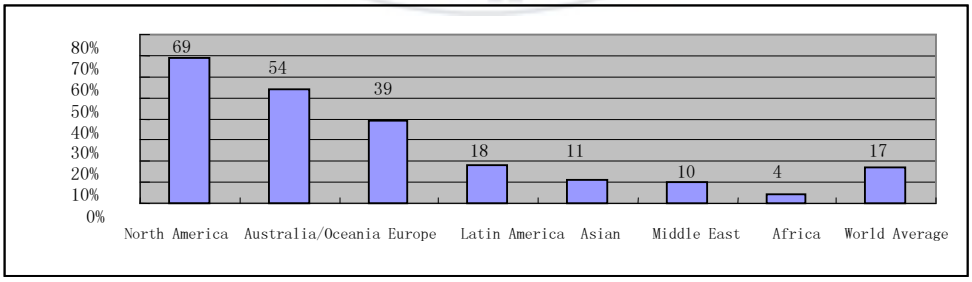
(Unit: million)



Source: Internet world stas, http://www.internetworldstats.com/

Figure 2: Internet penetration rate by world region in 2006

(Unit: %)



Source: Internet world stas, http://www.internetworldstats.com/

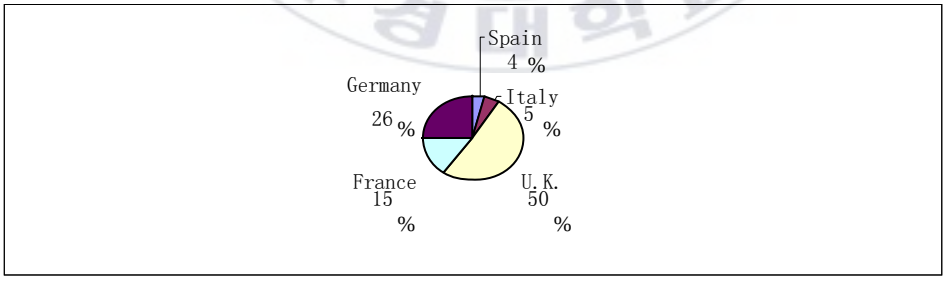
Recently, the hotspot in the development of Internet infrastructure was the rapid growth of broadband users and mobile phones. Seventy-seven percent of worldwide Internet users used broadband connections by the end of 2006, compared to 21% dial-up users, according to Ipsos Insight's annual Face of the Web study. Broadband access grew 7% in 2006 from the previous year. The popularity of mobile browsing is growing rapidly. One out of three adults had access to the Internet through mobile devices by the end of 2006.

(2) E-commerce market

The main mode of international E-commerce remains B2B, C2C and B2C. In these ways, B2C and B2B, especially B2B, play an important role. The growth of e-commerce was mainly affected by B2B. Presently, B2B transactions make 80-90% of the global e-commerce sales.

The United States is still the world's largest E-commerce market. In 2006, E-commerce sales in the United States reached $131 billion. Other countries' e-commerce transaction volume has also significantly increased. In 2005, Canadian Internet sales reached $39.2 billion. In Europe, according to the eMarketer survey, E-commerce sales were $97 billion in 2005, increased by 37% from the previous year (Figure 3).

Figure 3: Distribution of E-commerce sales in Western Europe in 2005



Source: eMarketer, http://www.emarketer.com/

2.2.2 Current Situation of E-commerce in China

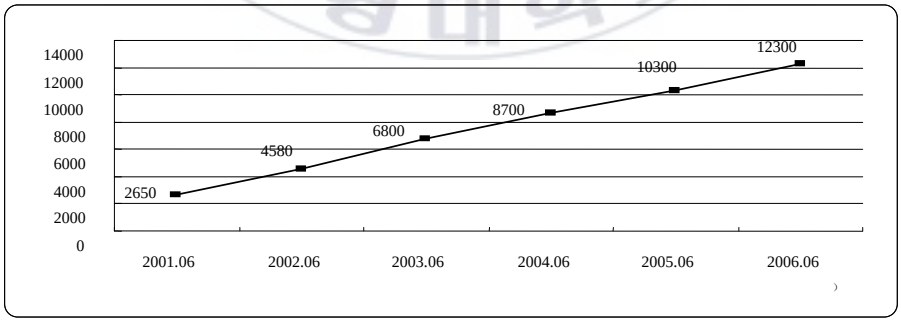
In March 6, 1998, the Beijing Century Intercom Technology Company sold its first item over the Internet. Also, it was the first online sale in business history of China. In the early 1990s, China began to adopt EDI, and then pushed a series of "Golden Bridge" and "Golden Card" projects using electronic technology. Especially in the security trading and aviation ticketing sectors, computers and Internet technologies have already been in widespread use (He, 2005).

(1) Infrastructure

In July, 2006, the China National Network Information Center (CNNIC) issued "Statistical report of the 18th China Internet development condition" in Beijing. The report showed that, the Internet users reached 123 million in China, increasing by 19.4% compared with the previous year. Compared with the first survey conducted in October 1997, the number of Internet users was 198.4 times more in 2006 (see Figure 4). Of which the users accessing to Internet through broadband were 77 million. The computers accessing to the Internet were 54.5 million in 2006, increasing by 19.5% compared with the previous year.

Figure 4: Growth of Internet users from 2001 to2006

(Unit: million)



Source: CNNIC, http://www.cnnic.net.cn/index/0E/00/11/index.htm

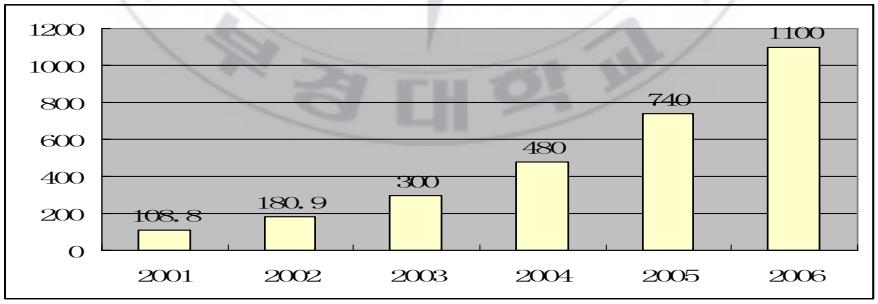
(2) E-commerce market

With the rapid growth of domestic Internet users, Chinese E-Commerce demonstrates accelerating development potential. Giants such as Sinopec, CNPC, Sinochem, COFCO and China Minmetals introduced various E-Commerce, which effectively developed business, generally enhanced the efficiency of commercial activity, extended the range of commercial activities, and reduced the transaction cost. At present, under vigorous promotion of all levels of national governments, economy and trade departments, various E-Commerce activities are developed and promoted all over the country. The third party network service platforms, such as Alibaba.com, Ebay.com.cn, Taobao.com, have led to the massive development of small and medium enterprises and individual E-Commerce, and promotion of internationalization of E-Commerce.

Currently, according to statistics, there are more than 4,000 E-Commerce websites in China. The total transaction amount of E-Commerce in 2006 achieved RMB1100 billion (see Figure 5), increasing by 49% compared with the previous year.

Figure 5: The total amount of EC transaction in China from 2001 to 2006

(Unit: billion RMB)



Source: CCID Consulting, http://www.ccidconsulting.com/report_detail.asp

2.3 Criteria and E-commerce Development of Chinese SMEs

2.3.1 Criteria of Chinese SMEs

Chinese SMEs include state-owned enterprises and non-state-owned enterprises as well. According to the "Tentative Provision on Criteria of SMEs in the People's Republic of China" issued by Ministry of Commerce of the People's Republic of China in Feb 29, 2003, the criteria of Chinese SMEs are as follows (Table 1).

Table 1: Criteria of Chinese SMEs

	Small Enterprises			Medium Enterprises		
	worker	**Sale (Million￥)**	**Assets (Million￥)**	**worker**	**Sale (Million￥)**	**Assets (Million￥)**
Manufacture	Less than 300	Less than 30	Less than 40	300-2000	30-300	40-400
Construction	Less than 600	Less than 30	Less than 40	600-3000	30-300	40-400
Wholesale	Less than 100	Less than 30		100-200	30-300	
Retail	Less than 100	Less than 10		100-500	10-150	
Transportation	Less than 500	Less than 30		500-3000	30-300	
Lodging and Restaurant	Less than 800	Less than 30		400-800	30-150	

Source: http://www.sdpc.gov.cn/zxqy/zcfg/t20050715_36687.htm

2.3.2 E-commerce Development of Chinese SMEs

Chinese SMEs' E-commerce is an important component of Chinese E-commerce. The development of SMEs E-commerce plays an important role in promoting economic growth, expanding employment size, changing the economic growth mode. E-commerce has a very significant

effect on reducing cost, expanding market, accessing business opportunities, sharing information, and enhancing competitiveness for SMEs.

Chinese SMEs' E-commerce application and its place in the whole E-commerce have distinctive Chinese characteristics. Compared with developed countries, Chinese SMEs are in large quantities, industry wide, short history, relative dispersion and dynamic transactions. All these characteristics created the favorable conditions for Chinese SMEs to develop e-commerce in particular.

Because of these characteristics, Chinese SMEs' E-commerce has three notable features (1) SMEs, instead of big enterprises, are the mainstay of the implementation of e-commerce; (2) focusing on marketing rather than the procurement, (3)focusing on expansion procedures rather than on reduction of costs.

SMEs' E-commerce applications involve enterprise application (demand) and the service system (supply). Enterprise application is the core of SMEs' E-commerce, including various aspects and business mode. It needs a strong and comprehensive support, including technical support such as network, hardware and software, and various services such as marketing promotion, application integration, credit, payment, logistics, advisory and intermediary services. Since 2004, enterprise application service system has begun to show a trend of positive interaction. SMEs' E-commerce application stepped into the stage of innovation and rapid growth.

2.3.3 Chinese SMEs' E-commerce Application from 2004 to 2006

Since 2004, the environment for SMEs' e-commerce application has been further improved, and the scale of application has been further expanded. The quality of application, the application model of innovation,

and the service system have been further improved.

Office of the State Council issued the "Opinions on accelerating the development of e-commerce" in January 2005. In this document, the importance of electronic commerce for SMEs was stressed. The document said that the government should "support SMEs' e-business applications, raise awareness of the importance of electronic commerce for SMEs, support third-party e-commerce service platform for small and medium-sized enterprises, help SMEs invest in talent, implement e-commerce for SMEs to improve business efficiency, reduce transaction costs, and promote information technology SMEs". After this document was issued, demand for application of SMEs' E-commerce grew rapidly. In rough estimation, there were 500,000 SMEs which frequently used e-business in 2005, and by the end of 2006, it accounted for 8.8 million SMEs. The eventual realization of the SMEs e-commerce transactions in a variety of ways were about RMB480 billion in 2006, accounted for around 37.6% of total E-commerce transaction.

(1) Internet marketing application

E-commerce has been applied to all aspects of SMEs' business such as Internet advertising, online searching for buyers or sellers, online discussions, e-procurement, and online sales, etc. Among these, applications related to Internet marketing are the most common, most effective and most popular forms of E-commerce for SMEs. The scale of Internet marketing from 2002 to 2006 is shown in Table 2.

Table 2: Scale of Internet marketing from 2002 to 2006

(Unit: million RMB)

	2002	**2003**	**2004**	**2005**	**2006**
Search engine	120	280	570	1040	1350
Network advertising	490	1030	1770	3130	4660
Total	610	1310	2340	4170	6010

Source: iResearch, http://www.iresearch.com.cn/html/Default.html

(2) Search engine promotion

To meet the increasing demand for network marketing by SMEs, since 2004, the amount and size of network marketing service providers grew rapidly. Among various network marketing services, the promotion of search engine accounted for 84.49% and became the most important and the most popular network marketing service for SMEs.

More and more enterprises use search engine (Table 3). In the developed areas, 50.14% of enterprises have already bought and 24.13% of enterprises are planning to buy Baidu and Google services.

Table 3: Scale of enterprises using search engine

Year	**2001**	**2002**	**2003**	**2004**	**2005**	**2006**
Scale	70,000	170,000	280,000	500,000	975,000	83,000,000

Source: http://xxhs.mofcom.gov.cn/zt/column/subject/dzshwbg/subjectjj.html

(3) E-commerce services

Since 2004, the third-party E-commerce service developed rapidly. The number and size of E-commerce platform continued to expand, and service capacity has continued to improve. The third-party service has become the main driving force of Chinese SMEs' E-commerce.

According to incomplete statistics, there were more than 9.2 million SMEs using third-party platforms to do e-commerce, accounted for 28% of the total Chinese SMEs in 2006.

Investigations have shown that information release, web-site construction, network advertising and online marketing ranked the top three in third-party E-commerce service for SMEs.

2.4 Obstacles in the Development of Chinese SMEs' E-commerce

E-commerce provides a platform of fair competition between SMEs and large enterprises. However, while SMEs get the development opportunities, they also face a number of problems which prevent the further development of E-commerce.

At present, the problems in the internal conditions, external environment and application modes of SMEs E-commerce application affect and hinder the development of SMEs E-commerce to a certain extent.

The first obstacle is an inadequate understanding of E-commerce. The managerial infrastructure in many SMEs lag behind, and the top management does not adequately realize the importance of information or fully aware of E-commerce. Some top managers consider E-commerce as simply being on-site or building a website without the related managerial infrastructure. The negative attitude of top management hinders the development of E-commerce.

Shortage of funds, technology and personnel are other obstacles. E-commerce is a capital-intensive high-tech industry. With less assets, relatively poor technology and low quality staff, SMEs are not attracted by E-commerce entirely because of its high initial investment and slow return. In the short term, the return on e-commerce of the early input will make SMEs loss momentarily, which makes SMEs hesitate to do E-commerce. The low degree of information technology inside SMEs, imperfect information departments, and inadequate coordination, shortage of E-commerce staff, especially the lack of versatile staff also prevent the development of E-commerce.

The imperfect technological environment supporting E-commerce in SMEs is another obstacle. Information technology support is the key for

developing E-commerce in SMEs. It is necessary for SMEs to have the corresponding technological conditions and the environment to transfer from the traditional ways of trading to E-commerce. From the technological aspect, Chinese software industry is not conducive to the development of e-commerce. From the environmental aspect, the implementation of e-commerce in SMEs needs a standardized business environment and reformed internal environment to make the internal procedure standardization.

The risks and potential security problems brought by E-commerce is also an obstacle. The safety of E-commerce system is directly related to the interests of all sides in transaction. Chinese information security system is not perfect yet, which makes the parties worry about the safety of electronic transactions. Especially in SMEs which do not have their own independent server, security risks are greater.

Chapter 3. Literature review

Through the literature review of relevant topics on electronic commerce success and the factors affecting e-commerce success, what other researchers have done was presented in the field. The relevant literature on the topics of interest was reviewed to provide background information and a concrete theoretical support for the research, especially to set the stage for a constructive discussion on the model of E-commerce success.

3.1 Research Issues on E-commerce Industry

3.1.1 Classification of E-commerce

Generally, e-commerce is classified according to business focus. As for a business focus, the type of buyers (end customers or business customers) is used to identify a type of business focus.

If a buyer is an end customer, it is called business to customer (B2C) e-commerce (Applegate et al., 1996[4]; Riggins and Rhee, 1998[5]; Fruhling and Digman, 2002[6]). Examples of B2C models are Amazon.com and Barnesandnoble.com.

When a buyer is an organization or a business customer, it is called business-to-business (B2B) e-commerce (Applegate et al., 1996; Riggins and Rhee, 1998; Fruhling and Digman, 2002).

In the past few years, a new breed of e-commerce has entered the mainstream market: customer-to-customer (C2C) e-commerce, also called person-to-person (P2P) e-commerce. C2C commerce has, as a basic

[4] L.M. Applegate, C.W. Holsapple, R. Kalakota, F.J. Radermacher and A.B. Whinston (1996), "Electronic Commerce: Building Blocks of New Business Opportunity", *Journal of Organizational Computing and Electronic Commerce*, 6(1), pp.1-10.
[5] F.J. Riggins and H.S. Rhee (1998), "Towards a Unified View of E-Commerce", *Communications of the ACM*, 41 (10), pp.88-95.
[6] A.L. Fruhling and L.A. Digman (2000), "The Impact of Electronic Commerce on Business-Level Strategies", *Journal of Electronic Commerce Research*, 1(1), pp.13-22.

phenomenon, been in existence for a long time before the Internet; it could be argued that it is the oldest form of commerce. The most notable examples are Web-based auction and classified as sites. Recently, armed with the global connectivity provided by the Internet, C2C commerce has begun to extend into the online domain in a manner significant both in financial terms as well as for its impact on consumer behavior.

3.1.2 Policy and Law of E-commerce

Despite the rapid development of e-commerce and the talks about its impact on global business, policy-makers are still struggling to come to terms with its true value and effect. To promote and ensure the development of e-commerce, some international organizations and governments are trying to formulate some policies of e-commerce.

The OECD is one of several international organizations dealing with questions such as these. In 1998 it brought together senior level representatives of government, business, unions and non-government organizations at a high-level conference in Ottawa and issued "E-commerce initiative" as a future program and action.

In 1997, American President Clinton issued "A Framework for Global E-commerce". Following this, the United States government worked out a series of schedule to promote information technology. This plan will greatly accelerate the National electronic, Internet-based development. At the same time, the first perspective has resulted in a large number of economic policy initiatives in order to further develop E-commerce in European Union. Within this, one important set of initiatives relates to the funding of collaborative research especially between industry and universities under different research framework programs, where the most recent one is the Information Society Technologies Program. Another set of initiatives are the EU policy documents such as the "eEurope Initiative:

An Information Society for All", and "The European e-Action Plan", etc. Also, many countries enacted laws such as E-signature laws, etc. to regulate the development of e-commerce.

3.1.3 E-commerce Adoption

It is widely accepted that it is important for business to embrace e-commerce and to adopt Internet technologies. E-commerce technologies include searching for products, services, information, advertising, and buying, selling and paying for products and/or services. The adoption of electronic commerce technologies is important for enterprises' on-going survival. It improves the ability of enterprises to compete with other enterprises and enables the small businesses to operate on an international scale. In addition, e-commerce technologies provide a cost-effective way for enterprises to market their business, launch new products, improve communications, gather information, and identify potential business partners.

However, due to the worries of costs and results might be followed by the adoption of e-commerce, some enterprises cautious when they adopt e-commerce. So, many researchers made studies about the factors affecting the adoption of e-commerce in order to promote it. Researchers have identified a variety of factors that affect technology adoption in small business (e.g. Fichman and Kemerer, 1993[7]; Harrison et al., 1997[8]; Iacovou et al., 1995[9],). Many factors identified can be categorized as relating to owner/manager characteristics, to firm characteristics, or to costs and return on investment.

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[7] R.G. Fichman and C.F. Kemerer (1993), *Toward a theory of the adoption and diffusion of software process innovations*, In L. Levine (Ed.), Processing of IFIP Conference on Diffusion, Transfer, and Implementation of Information Technology, pp.23-30.

[8] D.A. Harrison, P.P. Mykytyn and C.K. Riemenschneider (1997), "Executive Decisions about Adoption of Information Technology in Small Businesses: Theory and Empirical Test", *Information Systems Research*, 8 (2), pp.171-195.

[9] C.L. Iacovou, I. Benbasat and A. Dexter (1995), "Electronic Data Interchange and Small Organizations: Adoption and Impact of Technology", *MIS Quarterly*, pp.465-485.

3.1.4 E-commerce Success

Talking about electronic commerce, there is a critical question emerging under this explosive E-commerce growth. What is the performance of the best practice of successful e-commerce enterprises?

Frank (1997) suggested seven steps to EC success as follows: First, to recognize that EC solutions are business systems, not just computer systems; second, responsibility and ownership for EC must come from the top; third, process creation is critical; fourth, Internet channel conflict must be resolved; fifth, management of internal change is a key factor; sixth, customer demographics and needs must be addressed; seventh, new IT skill sets and methodologies are needed.

Frank (1997) provided the guidelines for the firms to manage their business operation efficiently in doing EC. Other components of success at the application level worth mentioning are: user involvement, executive management support, clear statement of requirements, proper planning, realistic expectation, and shorter project milestones.

Further, Maloff (1997[10]) outlined 12 steps the firm can take to maximize its growth. He addressed various aspects of an organization and these are as follows: (1) identify specific, quantifiable results that you believe the Internet is likely to yield for your organization (this enables monitoring of EC success), (2) assign responsibility for web and Internet activities to one person or a small, clearly defined group of people (this helps put everyone in the common ground and have employees understand the company Internet strategy, (3) choose and utilize the specific solution that meets the business requirements, (4) clearly communicate with the customers, (5) set the functional requirements in consideration of organizational capability, (6) utilize the advantage of Internet's global reach in ways of requests for information (RFIs) or requests for quotes

[10] Joel Maloff (1997), "Growing a Business at the Net Speed", *Internet World*, July, pp.68-70.

(RFQs), (7) let the customers know that your company is actively involved in EC, offering variety of product/service with advanced IT capability through marketing effort, (8) extend the size of your workgroups by getting the people involved, (9) enhance research capability of your firm, (10) make it easy for customers to utilize the functionality of your web site, enhancing interactivity, (11) provide do-it-yourself capability in finding information and placing an order, and (12) take a global approach to business by thinking ahead. However, the most important factor is the intelligent planning for pursuing EC, using the Internet in strategic and innovative ways to enhance organizational business.

In one of the few surveys of Internet-facilitated electronic commerce, Kennedy and Dietsch (1995[11]) showed that company size did not have any influence on business success on the Internet, implying that on-line success does not result from the factors such as scale economics and a large employee size. Wilder (1996[12]) suggested the characteristics of companies that have the signs of EC success as follows: aligned business goals with IT strategy; In-house technical expertise to support the IT needs of an organization; making the right IT investment decisions to support the changes in the business processes; Top management commitment to electronic commerce; Coordinated efforts of various business units-Different divisions should share the common goals of an organization and work in the best interests of the company at the same time benefiting themselves; Short project cycles-Employees should get the job done well by focusing on their tasks and taking responsibilities of their actions; Well designed incentive structures to motivate the employees to

[11] W. Kennedy and Dietsch (1995), *Making Money On-line*, Sunsite Publication, pp.37-39.
[12] Clinton Wilder (1996), "Pouring Cash Into The Internet-In 1995, Companies Learned What They Could Gain by Doing Business Online, Now They're ready to Make Investments", *Information Week*, January 1.

perform well in their jobs; Efficient use and management of corporate resources

According to a survey done by Giga Information Group in 1996, many people believe that security and privacy issues are the top barriers to EC acceptance, whereas convenience and ease of use by employees was driving force for EC acceptance by business users. In addition, cost saving and quick response to customer inquiries are other drivers of EC (Trommer, 1996[13]).

Arthur (1996) addressed that the barriers to acceptance of EC are: lack of security; lack of standards/infrastructure; lack of understanding potential value of EC; privacy; availability of content; social acceptance; organizational barriers; regulatory constraints such as the requirement for signed contracts; lack of accepted business practices; cost of implementation. And driving forces towards the acceptance of EC are: potential to reduce the cost of marketing and sales; convenience and ease of use for employees; convenience and ease of use for customers; technological advances; speed to market; facilitates better business decisions; facilitates strategic coupling between trading partners; facilitates collaborative and simultaneous product/service development.

[13] Dianne Trommer (1996), "ECS Catalog Merges EDI/NET Platform-Enables Online Ordering in EDI Format Over Net", *Electronic Buyers' News*. May 20.

3.2 Theoretical Perspective of Factors Affecting EC Success

According to the literature on electronic commerce, several variables have been identified as possible determinants for electronic commerce success. Kimberly and Evanisko (1981[14]) identified three predictors: CEO characteristics, organizational characteristics, environmental characteristics. Tornatzky and Fleischer (1990[15]) listed three factors influencing electronic success: the organizational factor, technological factor and environmental factor. Thong (1999[16]) identified four variables: CEO characteristics, IS (Information System) characteristics, organizational characteristics and environmental characteristics. Jeon (2006[17]) adopted four groups of characteristics: CEO characteristics, e-business characteristics, organizational characteristics and environmental characteristics.

For the sake of simplicity, this study adopts two groups of factors affecting electronic commerce success: external factors (factors from outside world, such as environmental characteristics.) and internal factors (factors inside the enterprises, such as CEO characteristics, organizational characteristics, technological factor. etc.) according to the literatures.

3.2.1 External Factors

The external factors, also called environmental factors, refer to those factors that are not directly related, but to a certain extent affecting the performance of a firm, , such as policy, law, security, infrastructure, credit,

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[14] J.R .Kimberly and M. J. Evanisko (1981), "Organizational Innovation: the Influence of Individual, Organizational, and Contextual Factors on Hospital Adoption of Technological and Administrative Innovations", *Academy of Management Journal*, 24, 689-713.

[15] L.G. Tornatzky and M. Fleischer (1990), *The Process of Technological Innovation*, Lexigton Books, Lexington, MA.

[16] J.Y.L Thong (1999), "An Integrate Model of Information Systems Adoption in Small Business", *Journal of Management Information System*, 15, 187-214.

[17] B.N. Jeon, K.S. Han and M.J. Lee (2006), "Determining Factors for the Adoption of E-business: the Case of SMES in Korea", *Applied Economics*, 38, 1905-1916.

logistics, etc.

Many countries' governments had done their best to promote electronic commerce. In 1997 President Clinton issued "Framework for Global Electronic Commerce" to support the development of electronic commerce. This established the framework of national policy and influenced on the development of E-commerce in US as well as in the rest of the world. EU issued "Proposal for European E-commerce" too. From 1993, Chinese government started the "Golden Bridge", "Golden card", "Golden Custom", "Golden Tax" etc. and promoted the development of E-commerce in China. Based on this, many researchers suggested that government's policy influence the success of EC (Lu, 2002[18]; Liao et al., 2003[19]).

Following the rapid progress of Internet economy, E-commerce legislation attracted many governments' attention. They began to enact laws to promote EC. Up to now, there are more than 10 countries passed the laws about EC. For example, "EC law" in Singapore (1999), "The Basic Law of EC" in Korea, "Unified EC Law" in Canada are known to us. Lu (2002), Sun (2002[20]) and Yu (2005[21]) found that laws played an important role in the success of e-commerce.

According to the research made by Han and Noh (1999[22]), Hagel and Rayport (1997[23]), and Cai (2006[24]) security is one of the critical success

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[18] Y.H. Lu (2002), "The Problems and Development Strategy of Chinese EC", *Journal of Jilin University*, vol.3, pp.15-17.

[19] X.Q. Liao et. al. (2003), "China's E-Commerce Report in 2003", Ministry of Commerce of People's Republic of China.

[20] Wei Sun (2002), "The Problems and Countermeasures to China's EC Development", *Journal of Liaoning Teachers' College*, pp.21-23.

[21] Ning Yu (2005), "A Study on the Factors to Influence Development of China's EC", *Business Times*, vol.21, pp.13-1.

[22] K.S. Han and M.H. Noh, "Critical Failure Factors that Discmyage Electronic Commerce Growth", *International Journal of Electronic Commerce*, Vol.2, No.2, 1999-2000, pp.25-44.

[23] J. Hagel and J.F. Rayport, "The Coming Battle for Customer Information", *Harvard Business Review*, January-February, 1997, pp.53-65.

[24] Y.T. Cai (2006), "A Study on Four FactorsInfluencing Development of Chinese E-commerce", *E-commerce World*, vol.10, pp.21-22.

factors for EC. They argued if the security and privacy cannot be protected properly, there would be less people who would like to do Internet transactions. Security affects satisfaction as well as the usage of customers and suppliers.

Internet Infrastructure plays an important role in EC's growth. In developed countries, this factor might not be as important as in developing countries because the Internet infrastructure in developed countries is also developed well. Cai (2006), Wu (2000[25]) studied Chinese EC situation and argued that Internet infrastructure is a critical success factor for China's E-commerce.

Developing e-commerce means the customers and businesses have to face the credit problem. Customers are afraid of not receiving the right goods, and businesses are afraid of not receiving the money. In China, due to the old habits and cultures, credit is a big problem. Lu (2002) and Sun (2002) studied this problem and indicated that credit is a critical success factor for EC, especially in China.

Hoffman and Novak (1997[26]), Burn and Barnett (2000[27]), Yu (2004[28]) argued that the drop-behind logistics sometimes limit the EC growth in certain content. E-commerce needs rapid, nice delivery to fulfill its performance. So logistics is another critical success factor of e-commerce.

3.2.2 Internal Factors

The internal factors refer to the factors which are directly related to the performance of a firm, including advantages and disadvantages of a firm,

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[25] Y. Wu (2000), "Initiate the New Age of Chinese E-commerce" *High-tech Bureau of High Technology*, Ministry of Science and Technology, Beijing, China.

[26] D.L. Hoffman and T.P. Novak, "A New Marketing Paradigm for Electronic Commerce", *Information Society*, Vol.13, January-February, 1997, pp.43-54.

[27] J. Burn and M. Barnett (2000), "Emerging Virtual Models for Global E-commerce- World Wide Retailing in The E-Grocery Business", *Journal of Global Information Technology Management*, Vol.3, No.1, , pp.17-35.

[28] Y. Yu (2004), "Three Main Factors which Influence China's EC Growth", *EC World*, vol.5, pp.11-12.

such as CEO characteristics, organizational characteristics, technological factor, etc. In this thesis, the internal factors will be classified into three groups such as technology integration, strategy execution and organizational change.

Technology integration

Technology is a powerful enabling factor for capturing the organization's knowledge, sharing it, and accumulating it internally and for reaching external knowledge. Effective use of the IT greatly facilitates efficiency, speed, and synergy. It even changed the rules to operate successful business in the digital market (Bourdreau and Couillard, 1999[29]).

By turning to the help of technology, companies sought to increase efficiency with EDI, standardized methods for conducting business-to-business transactions involving exchanges of purchase orders and invoices. Through EDI, companies have reduced data errors, and lowered order-processing costs in the past. But, the problems of inflexible proprietary standards, relatively high transaction costs, and system usually without real-time capabilities still persisted. On the contrary, we are currently in the rapidly evolving environment of technology where EC is steadily growing. EC is a way of buying and selling goods and services electronically and it signifies all business processes both internal and external that can be done online in a secure manner. EC increases the potential for doing things better in a more cost efficient ways and makes it easy to get access of available online real-time information that is both internal and external, and brings different functionality together. It combines online shopping, reach of the Internet, and efficiency of EDI together to offer quality products and services people want. Thus, it opens

[29] Andre Bourdreau and Guy Couillard (1999), "Systems Integration and Knowledge Management", *Information Systems Management*, Fall, pp.24-32.

a new channel of efficient information exchange and distribution (Trommer, 1996).

The different levels of doing EC serve as a guideline for the companies to pace their transition toward EC environment, considering their IT capabilities and readiness to face the drastic changes in the ways they do business in an organization. Thus, to facilitate the smooth transition, a clear strategic vision should proceed the actual technology implementation, and this is where the role of IS department comes into a play. IS connects the strategic vision with the execution of the action plans with its technology support. It is initiated by building the right technological infrastructure that can accommodate the different EC efforts (Currid, 1996[30]). For EC effort to be successful, IS department should be involved in the process of project implementation.

Achieving EC success also involves daunting technology challenges. As major elements influencing technology characteristics, Premkumar et al. (1994[31]) used five factors: complexity, compatibility, costs, relative advantages and communicability. The companies not only need to constantly upgrade their systems and technology tools, but also they have to educate their personnel continuously as well. Companies often have to overcome the complexities of the technology and know how to utilize the resource as efficiently as possible. For example, to facilitate fast exchange between confidential enterprise intranets for EC, companies need to communicate through intranet security firewalls with the customers, suppliers, and competitors. And, companies need to know how to communicate with external entities through the extranets, value-providing networks that use the public Internet for inter-enterprise collaborative

[30] Cheryl Currid (1996), "Commerce and Confusion-Electronic Commerce Comes in Many Forms-but All Need Help from IS", *Information Week*, June 10, pp.11-13.
[31] G. Premkumar, K. Ramamurthy and S. Nilakanta (1994), "Implementation of Electronic Data Interchange: an Innovation Diffusion Perspective", *Journal of Management Information Systems*, 11, pp.157-186.

systems. The companies also have to make sure that Internet-based services of EC are integrated with the systems they and customers already have in place.

As can be seen from a number of examples, many companies are implementing new functionality to facilitate EC. Toshiba has implemented international procurement system site where it lists description and specs of items Toshiba wants to purchase. Through this procurement system, Toshiba also invites potential suppliers to e-mail details of price, availability, etc. On-line product (content) customization with adaptive responsive capabilities is another key factor companies are emphasizing for advancement of web-based EC. It is important to understand specifically what the customers want and to meet their demands. The personalized approach of marketing gives companies the chances to boost business transaction on the Internet. According to Geoffrey Bock, senior consultant at Patricia Seybold Group, a research company in Boston, the fever of EC is affecting the companies to move from the concept of mass marketing and mass distribution to more viable solution of targeting markets. Cisco allows customers to configure, price, and order products based on their needs. Cisco also enables customers to view order status, offer customer support, and makes intranet application available for employees (McKeefry, 1996[32]). In addition, Heineken's use of Resource Chain Voyager is a good example of collaborative planning to reduce excess inventory and lead-time. Distributions also log onto Heineken's intranet to view forecast information and adjust beer suppliers based on demand.

One way of finding out if a company's Internet, intranet and EC solutions are living up to the test is determining whether the objectives set

[32] Hailey L. McKeefry (1996), "Net Success Requires New Business Models-Cos. Can Enhance Value to Customers with Web", *Electronic Buyers' News*, September 23.

for achieving EC success are met or not. For example, increasing level of communication between the companies and their customers and improved quality of customer service works as good indicators of how much EC success the companies have achieved. Ultimately, the EC success will be determined by the level of user participation from the economic aspects and the quality of the functionality that is useful from the technology point of view.

Strategy execution

A number of studies emphasized the importance of strategy in E-commerce success. Tabor (1998[33]) suggested that a synergistic relationship between business strategy and strategic fit is the determinants for E-commerce success. Plant (1999[34]) studied the success factors associated with over 40 organizations in the U.S. and Europe and identified that strategy and its execution played an important role in E-commerce success.

Strategy execution is used to make informed decisions about important business issues based on the knowledge gained. The business issues involve minimizing operational costs, manufacturing the customized products, providing quality customer service, and optimization of resource utilization. For achieving and sustaining the competitive advantage, the execution of strategy in an organization has become an important factor (Jarvenpaa and Tiller, 1999[35]). Thus, the role of strategy execution is emphasized even more. Strategy execution requires identifying and examining the key functional areas where the company should make necessary organizational and process improvements. By putting several

[33] S.W. Tabor (1998), "An Examination of Electronic Commerce and the Internet Role of Technology, Critical Success Factors and Business Strategy", *Ph.D dissertation*, University of North Texas.
[34] R. Plant (1999), *"eCommerce: Formulation of Strategy"*, Prentic-Hall, Upper Saddle River, N.J.
[35] S.L. Jarvenpaa and E.H. Tiller (1999), "Integrating Market, Technology and Policy Opportunities in E-business Strategy", *Journal of Strategic Information System*, 8(3), pp.235-249.

check mechanisms, strategy execution can help achieve maximum value of fits supply chain and streamline operations.

Strategy execution along with the use of information technology helps a company to develop good understanding of what it does best and take appropriate actions to handle the problems they face by focusing on its strength and weakness. Companies implement incentive measures to ensure the maximum performance of employees through collaboration. Important thing to notice here is that companies should not have any conflicting goals in place for employees in terms of getting their jobs done.

Successful companies have good business practices. They constantly evaluate their current processes, practices, and technical abilities to identify new improvement opportunities, leading to standard market practices. And, the resulting efficiencies in processes contribute to reduction in cost. As mentioned, companies rely on performance measurement mechanisms to transform their business. It can help companies to identify the key success factors and act on them to improve the relevant processes involved.

According to Kruzner (1996), the six most important keys to success of strategy execution are (1) committed top management support, (2) linkage between performance measures and strategic business goals, (3) using the performance measures that cross traditional organizational boundaries and facilitate cooperation between different business units, (4) designing performance measures that best account for the aspect of each business area, (5) providing incentives and reward for cooperating behaviors of employees, and (6) effort of accommodating the needs of the end-users taking advantage of the resources available. Company should understand that IT investment decisions made most effectively when they consider the needs of the users and how the technologies can be best used in business

processes. It's not the amount of IT investment that determines the success of an organizational change effort. There are more important factors that contribute to how can be successful in today's fast changing environment. Top management's support helps to radically change employee attitude toward the whole project. With the right incentive system in place, top management push motivates employees to be more pro-active and cooperative to the change efforts of a company. Understanding the sure benefits of EC, we believe that change efforts to facilitate EC in an organization will be readily met by the employees without much resistance. In regards to EC, we believe the critical issue is not whether changes should be made more or not, rather it is the question of how should the changes be implemented considering the relevant issues involving the strategy, process, and technology. It is getting into details of the implementation plan and proceeding with the plan with an appropriate time line (Porra, 2000[36]).

Organizational change

Companies are engaged in many change efforts with a goal of improving the efficiency in the business operations. Designing new organizational forms require companies to begin analyzing the existing organizational processes and finding ways to improve these process arrangements. Using the coordination theory, Crowston (1997[37]) shows the ways to manage dependencies among tasks and resources involved in the process for successfully implementing a change in an organization. He argues that as companies go through continuous changes in their business processes, it becomes more important for them to find alternative solutions to solve and better deal with the problems they constantly face in

[36] J. Porra (2000), "Electronic Commerce Internet Strategies and Business Models-a survey", *Information System Front*, 1(4), pp.389-399.
[37] Kevin Crownston (1997), "A Coordination Theory Approach to Organizational Process Design", *Organization Science*, Vol.8, March-April, pp.157-175.

the business. Business success of firms often depends on reducing time to market and improving quality. Thus, this puts pressure on firms to effectively use information technology (IT).

In dealing with changes in an organization, coordination effort is very important. Malone and Crowston (1994[38]) define coordination as "managing dependencies between activities". The role of actors performing interdependent activities to achieve desired goals is also emphasized as being a key factor underlying the concept of coordination theory for managing change processes efficiently. The goal of coordination theory is to identify the critical processes and improve its performance. Knowing how processes are similar and where they differ is a first step is a key task in identifying the dependencies in an organization. The dependency comes from the fact the changes in one business process affect other process whether positively or negatively. The directionality of the impact is determined by the nature of the organizational setting and characteristics of its components such as people, goals, resource, etc. Particularly, providing much incentive for people to perform their tasks well in implementing changes in the processes will help companies to achieve their planned business goals.

For managing changes in processes, alternative processes should be suggested by first identifying the existing dependencies and coordination problems faced by an organization and the next step is to consider what coordination mechanisms can be used efficiently. The coordination mechanisms are additional activities the company has to perform to overcome the coordination problems (Malone and Crowston, 1994) and they primarily involve information processing activities thus it requires support of information technology. Companies use a coordination mechanism called task assignment to manage the dependencies between a

[38] T. W. Malone and K. Crowston (1994), "The Interdisciplinary Study of Coordination", *Computing Surveys*, Vol.26, No.1, pp.87-119.

task and an actor by finding a best person to handle the task and the person relies on IT as help tool. IT lowers the cost of company's coordination efforts by making it easier to collect information.

To determine the dependencies between different processes, companies should examine the common factors shared by the tasks being performed in terms of resources and see how these resources are being used. From this, we will often see that the activities are performed in many different ways even thus the similar resources are used for two different tasks.

Changes in the processes are made with optimistic view of the outcome. Lientz and Swanson (1980) suggest three reasons for making changes to a process. One is to take a corrective action to fix the problems that exist in the process. Perfective changes are also made to master the process for maximum performance efficiency without altering the core activities of a process. Lastly, adaptive changes are recommended to add new functionality to better meet the changing user requirements.

Organizations have varying goals of the change process. But, Crowston (1997) suggests the following as some of the common goals of the change process organizational share. To ensure that all critical program parameters are documented for better identification; to make sure proposed change is an outcome of coordinated outcome of different business units and it is approved or rejected by top management through their involvement; to ensure that document status is made available to all users. This keep everybody informed about the status of changes being implemented; to ensure the changes are implemented quickly and efficiently. The duration of changes in processes should be short to keep up with the rate of technological development and fast changing user requirements. Further, the common strategies organizations share across industries for managing changes are: taking calculated risks, leveraging vendor expertise, simplifying the process, and hiring people who are

adaptive to changes (Wilder and Angus, 1997[39]).

Successful implementation of change efforts also involves the validation of change. People are not just happy hearing about the promise of the benefits the change will deliver. People want to have a chance to analyze the functionality of the new system, to test it, and provide feedback on its performance. This is an important way of facilitating constructive criticism. People should be given an opportunity to voice their opinion about the new system or change in the process under a set time framework. Here, the important point is that people's feedback should be taken seriously in making the final modifications in the change effort and once being approved, people should show their support for the new system or change in the process. Simply, there is no turning back after the validation stage of the change process.

According to the literature review, there are two groups of factors affecting electronic commerce success/business performance- external factors and internal factors. As listed above, the external factors include the policy, law, security, credit, etc. These factors are studied by many researchers and accord with Chinese situation. So, the researchers' results of study home and abroad were cited in a table (The outline of external factors and internal factors will be shown in Table 4).

As for the internal factors, based on the literature review, this study adopts three groups of factors affecting electronic commerce success/business performance: technology integration, strategy execution and organizational change. Each of these three characteristics consists of two sub-factors: technology integration consists of two sub-factors: technology complexity and structural mechanism for control. Strategy execution covers two sub-factors: attitude of management and management commitment. Organizational change reflects two aspects:

[39] Clinton Wilder and Jeff Angus (1997), "Pace of Change: Faster than the Speed of Data", *Information Week*, July 21.

organizational coordination and resource utilization. Although many western researchers made studies on Western SMEs, we do not know if they are suitable for Chinese SMEs because of Chinese special situation of "Market Economy". In the fields of thoughts and acceptability for receiving new things, there are many differences between Chinese and Western people. So it is necessary to analyze the critical successful factors which influence the enterprises' electronic commerce from the Chinese point of view. For this, the questionnaires were sent to SMEs in Liaoning Province and the empirical method was used to test the data and hypotheses.

In next chapter, the hypotheses and research model will be presented according to the literature review above and a more detailed explanation will be given.

Table 4: Summary of previous research about E-commerce success

Determinants of E-commerce success		**Researchers**
External factors	Policy	Lu (2002); Liao (2003)
	Law	Lu (2002); Yu (2005)
	Security	Han and Noh (1999); Hagel and Rayport (1997); Cai (2006)
	Infrastructure	Cai (2006); Wu (2000)
	Credit	Lu (2002); Sun (2002)
	Logistics	Burn and Barnett (2000); Yu (2004)
Internal factors	Technology integration	Yang and Papazoglou (2000); Kang (2001); Zmud (1983)
	Strategy execution	Kang (2001); Zmud (1987); Jarvenpaa and Tiller (1999)
	Organizational change	Zmud (1987); Grensing-Pophal (2000); O'Hara (1999)

Chapter 4. Hypotheses and Research Model

4.1 The Research Hypotheses

In summary of literature review, a set of hypotheses was developed, explaining the interactions among the key organizational factors in the model. Through this model, it is hoped to add much more eager into the research in EC success factors. First, this study tries to show that the electronic commerce success is achieved when the firms effectively integrate the technology in an organization, aligned with business objectives. Second, it tries to show that firms that execute strategies more efficiently in an organization will be more likely to achieve EC success. Third, it tries to show that firms that accommodate organizational change, adapting to new business conditions, will be better at achieving EC success.

Business performance (Electronic commerce success) is considered as a dependent variable in this research. In the research model, business performance (EC success) of an enterprise is mainly determined by technology, strategy, and organizational change. EC success involves the complementarity of strategy and business processes that are leveraged by information technologies.

There are a number of measures for performance, different measures appropriate for the business settings. In most cases, multiple measures are used to access and evaluate the business performance (Venkatraman and Ramanujam, 1986[40]). Other measures of firm performance include pretax profits such as a percentage of sales, return on assets, return on net worth,

[40] N. Venkatraman and Vasudevan Ramanujam , “Measurements of Business Economic Performance: An Extimation of Method Convergence”, *Journal of Management*, Vol.13, No.1, 1987, pp.109-122.

and five year average growth rate, and the extensive use if IT contributes to the strong financial performance of the firms (Sethi et al., 1993[41]). Organizational performance is generally enhanced through improvement in the individual performance on assigned responsibilities including better decision making, timely completion of tasks, provision of more comprehensive solution to problems, etc. (Robey, 1991[42]). It can be seen that the business performance is improved through the interaction of strategy, technology, and process related issues. Business performance of an organization was viewed in the framework of interrelated technologies, efficiency of strategy execution, and change in the work context and nature of work. Robey (1991) refers to the changes in the work context as including authority, influence, communication, political, social, relationships, etc. and changes in the nature of work as including its complexity, rigidity, interest, variety, autonomy, norms, familiarity, etc.

Technology integration is the extent of comprehensive and integrated approach to information technologies, including computing, telecommunications, and office automation (The degree to which different technologies are integrated with each other). Similarly, system integration is defined as "the mixing of divergent and often incompatible technologies, applications, data business processes, and communications into an enabling and uniform architecture and functional structure". Technology integration is known to evolve in organization through four stages of interconnectivity, interoperability, semantic consistency, and convergent integration. And, its key challenge is that of managing complexity, diversity, rapid evolution, security, and changing technology requirements (Bourdreau and Couillard, 1999). Lewis et al. (1995[43]) also indicate that

[41] Vijay Sethi, K.T. Hwang and C. Pegels (1993), "Information Technology and Organizational Performance", *Information & Management*, Vol.25, pp.193-205.
[42] D. Robey (1991), *Designing Organizations*, Boston, MA: Irwin., pp.61-73.
[43] J.D. Lewis, (1990), *Partnerships for Profit: Structuring and Managing Strategic Alliance*s, New York: Free Press.

technology integration reflect a comprehensive and integrated approach to information technologies including computing, telecommunications, and office automation. Similarly, degree of interoperability of electronic commerce applications delineates the level of technology integration in an organization. Especially, the operational systems should be able to support the integrated view of the business elements across the departmental boundaries. And, this is accommodated by integration of business functions, application program interfaces, databases, and legacy systems in various units of an organization (Yang and Papazoglou, 2000[44]).

The EC success/business performance is affected by the level of technology integration in an organization. Firms use a number of systems and applications. They differ in functionality and technology platform. Companies have an incentive to quickly move to EC environment. Faster they invest in new technologies and adapt to new business infrastructure, the more benefits they can receive over time. The main question surrounding EC is not that of whether companies should adopt it or not, instead it is what they should do to make it a success by utilizing the functional capabilities of different technologies available supporting EC (Schnaidt, 1997[45]). Thus, I suggest that the compatibility issue of different front-end and back-end technologies is important for the enterprisers. Information technologies should have a high level of compatibility for synergistic working of the applications and systems. In order for the systems to communicate with each other efficiently, heterogeneity in hardware and operating systems platform should be avoided. But, in many cases, there is low level of systems integration between the Internet and firm's internal system. For example, internal IS functions such as order

[44] Jian Yang and M.P. Papazoglou (2000), "Interoperation Support for Electronic Business", *Communications of the ACM*, Vol.43, No.6, June, pp.39-47.
[45] Patricia Schnaidt (1997), "Taking the Buyer's Side in E-Commerce", *Network Computing*, May1.

processing are not integrated with Internet applications (Poon and Swatman, 1999[46]). In order for the firms to be successful in EC, they need to achieve high level of technology integration between the front-end web systems and rest of the systems in an organization. They should insure that what the customers and suppliers see are same as what the employees see internally. This will enable the employees to communicate with the customers and suppliers on the equal footing, speaking the same language and accessing the same information. Therefore, the firms with high level of technology integration will be more likely to achieve EC success.

The common objective of companies is to respond to customer needs and increase market share. The objective can be met by the technology effectively. Thus, companies have to understand the characteristics of the technology and determine where it can be used best. There has to be a good match between the functions of technology and its application. As the Internet technology becomes a critical part of corporate operations, company's ability to explore ways to conduct business-to-business transactions over the Internet becomes more important. That is because just investing money in technology is easy but knowing how to effectively use the technology in business is very difficult (Hayes, 1996[47]). Firms need to integrate their systems with internal systems and applications, in order to efficiently support its business activities. It is vital that the companies doing EC achieve a high level of integration between the web storefront and the back-office systems and applications to achieve efficiency, and ultimate profitability.

Technology complexity: Yang and Papazoglou (2000) suggests that as sophistication of commerce applications increase, the need to harmonize business models, process, and representation as a way of business and

[46] Simpson Poon and Paula M.C.Swatman (1999), " An Exploratory Study of Small Business Internet Commerce Issues", *Information & Management*, Vol.35, pp.9-18.
[47] Mary Hayes (1996), "Using the Net to Deliver the Goods", *Information Week*, September 9.

technology integration also increased. In product commercialization, technological complexity is often regarded as a major problem (Hagedoorn, 1993[48]; Langlois and Everitt, 1992[49]). If the technology complexity of a system is high, it will be difficult to achieve the desired level of technology integration in an enterprise. Therefore, the firms should make sure that they have the technical capability to manage the systems and applications with varying degree of sophistication and functionality. Knowing that technology integration is a daunting task due to the complexity involved with technical details and functionality of variety of systems the firms own, firms need to push for compatibility among the systems by enhancing system capability and enabling collaboration/communication based on easy to use information technology.

Based on the discussion on the technology complexity factors, it is possible to suggest the following hypothesis:

H1. Firms with high technology complexity will have a less likelihood in achieving electronic commerce success.

Structural mechanism for control: Structural mechanisms are needed because without it, employees might not act in ways that lead to achievement of organizational goals. Business operations or the employee behaviors while performing their tasks are controlled by means of business and technology standards, which are set through policies and procedures. The controls are used to ensure that employees exert effort toward attainment of organizational goals through efficient execution of business plans. The core of control focuses on organizational efforts to

[48] J. Hagedoorn (1993), "Understanding the Rational of Strategic Technology Partnering: Inter-organizational Modes of Cooperation and Sectoral Differences", *Strategic management Journal*, Vol.14, pp.371-385.

[49] R. Langlois and M.J. Everitt, "Complexity,Genuine Uncertainty, and the Economics of Organization", *Human Systems Management*, Vol.11, pp.67-75.

ensure that target performance goals are met. The control and coordination functions are implemented to identify and correct deviations from the plan and what is norm. Therefore, the structural mechanism in the form of controls provides a benefit when it results in actions that affect performance improvement (Zmud, 1983[50]). Firms have a number of mechanisms in place to monitor business activities, facilitate communication/collaboration, and control the flow of information. Structural mechanism for control is also used to modify organizational policies and business rules. Often, information technologies are utilized to provide the functions of structural mechanism for coordination and control. Firms that have the structural mechanism for coordination and control will run its business operations more efficiently and they will be more successful in EC.

Based on this discussion, it is possible to suggest the following hypothesis:

H2. Firms with high structural mechanism for control will have a high likelihood in achieving electronic commerce success.

Strategy execution is an ability of an organization to carry out a company-wide strategic plan. Strategy execution is very important for determining the business performance of an organization and leading EC to a success. I state that the successful firms carry out action plans promptly to achieve competitive advantage. And, they formulate business strategies and coordinate the effort to execute them efficiently. Especially, knowing that implementation of EC initiatives is time critical, strategic execution of the related plans is a critical factor of EC success. Firms in general, which are able to execute the strategic plans efficiently, have various teams and groups working hard in order to meet the corporate

[50] Robert W. Zmud (1983), *Information Systems in Organization*s, Palo Alto, CA: Scott, Foresman and Company., pp.35-39.

objectives. Common understanding of the corporate goals for electronic commerce and adapting well to new demand on the organization are the key requirements for the firms to systematically implement the EC project initiatives. Strategic planning and decision-making likewise affect the strategy execution in an organization. In sum, firms that have an ability to perform strategy execution efficiently will be more likely to achieve EC success.

Attitude of management: Jarvenppa and Ives (1991[51]) referred to executive participation as the CEO's activities or substantive personal interventions in the management of IT, and they argued that executive participation relates to the CEO behaviors involving information systems planning, development, and implementation. Similarly, attitude of management is defined as degree of manager's' understanding of the specific benefits of collaboration with partners (Henderson, 1990[52]; Lewis, 1990). Attitude of management is critical for the business performance of an enterprise. It is an integral component of any successful project. Active attitude of management leads to superior conversion effectiveness and efficient performance for IT investment. That is why attitude of management is one of the key organizational factors known to lead to successful use of IT (Kwon and Zmud, 1987[53]) and execution of strategic plans. Active attitude of management should show their commitment in the project initiatives by actually putting their share of time and effort, and it will contribute to a high probability of the work getting done quickly and efficiently with much success. Surely, the successful companies have key shareholders and the top management involved in the project planning

[51] Sirkka L. Jarvenppa and Blake Ives (1991), "Executive Involvement and Participation in the Management of Information Technology", *MIS Quarterly*, June, pp.205-224.
[52] J.C. Henderson (1990), "Plugging into Strategic Partnerships: The Critical IS Connection", *Sloan management Review*, Vol.30, No.3, pp.7-18.
[53] T.H. Kwon and R.W. Zmud (1987), "Unifying the Fragmented Models of Information Systems Implementation", in *Critical Issues in Information Systems Research*, R.J. Boland Jr. and R.A. Hirscheim (eds.), Wiley.

and decision-making from the initial stage of the project. Poon and Swatman (1999) found that direct management involvement was common among the participants of their study-management not only knows their direct responsibility but also assumes an active role in electronic commerce activities such as responding to customer inquiries and suggesting directions for web page design. Especially for the small businesses, the management support and enthusiasm are known to be very important as evidenced in previous research (Cragg and King, 1993[54]; DeLone, 1988[55]; Martin, 1989[56]).

Based on this discussion, it is possible for us to get this hypothesis:

H3: Firms with active attitude of management will have a high likelihood in achieving electronic commerce success.

Management commitment can be increased when there is a common understanding of corporate objectives and it is facilitated by the incentive measures that motivate the people to work together and perform their tasks within the accepted boundaries of organizational business practices and performance guidelines. Firms with a high level of departments' coordination will be efficient in strategy execution and they have a systematic business operation with close interactions among the employees in an organization. There will be a social punishment when an individual fails to conform to the accepted norm. For one, a strong peer pressure discourages deviation from the organizational norms in the team-based work arrangement, and it plays a supervisory role (Barua et al., 1995[57]).

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[54] P.B. Cragg and M. King (1993), "Small-Firm Computing: Motivators and Inhibitors", *MIS Quarterly*, Vol.17, No.1, pp.47-60.

[55] W. DeLone (1988), "Determinants of Success for Computer Usage in Small Business", *MIS Quarterly*, Vol.12, No.1, pp.51-66.

[56] C.J. Martin (1989), "Information Management in the Smaller Business: The Role of the Top Manager", *International Journal of Information Management*, Vol.9, pp.187-197.

[57] A. Barua, C.H. Lee and A.B. Whinston (1995), "Incentives and Computing Systems for Team

For many established companies, the key challenges of EC are not so much strategic as they are organizational. By achieving departments' coordination in doing EC, the companies can succeed in EC. The companies with critical assets, strong brands, established customer relationships, and existing logistics systems will be more efficient as they effectively organize for EC (Freeland and Stirton, 2000[58]) by means of achieving high management commitment.

Many companies allowed a number of business units and functions to pursue their own strategies with various business initiatives in the early stages of EC development. It encouraged different entities to experiment, learn, and handle fast responses to new competitive threats by exploring the new opportunities. However, the shortcoming was that there wasn't much coordination and the consequence was in mixed results. This put much focus on understanding the issues of coordination, companywide processes, and common standards in an organization. By defining a coherent strategic and operational framework for EC initiatives, the companies are able to execute their business plans and manage the portfolio of EC initiatives more efficiently (Freeland and Stiron, 2000).

Based on this discussion, it is possible for us to get this hypothesis:

H4: Firms with high management commitment will have a high likelihood in achieving electronic commerce success.

Organizational change is the extent of changes made in an organization in terms of improving the business practices and process. It is another intermediate factor, which affects the EC success/business performance of an organization, in the business value model of EC success. A lot of changes take place in an organization on a daily basis.

Based Organizations", *Organizational Science*, Vol.6, No.4, July-August. Pp.15-21.

[58] D. Grant Freeland and Scott Stirton (2000), "Organizing for E-commerce-Discussion Paper", *Boston Consulting Group*, April 1.

Changes are made in an organization in a variety of ways. Maybe that will be new technology can be implemented, new people can be hired, or new organizational structures, policies, or procedures can be established. As change is composed of different components, it is implemented in varying degrees (O'Hara et al., 1999[59]). Firms need to adapt fast to changing needs of the customers and new technology trends, and they need to accommodate the organizational change in the right direction by right amount. Organizational change involves making changes to business practices and improving the business processes, ultimately making the organization function more efficiently. We suggest that it helps the companies to improve its organizational efficiencies by eliminating any glitches in work processes and introduce better product and service offerings. The key is fundamentally changing the process and culture of the organization to ensure that change is actively encouraged and guideline is provided (Bertin, 1997[60]). Firms have to realize that a change process is difficult to sustain if those involved aren't provided with cues and resources along the way that they are headed in the right direction. The cues include feedback and, sometimes, reward to motivate individuals to be actively involved in the change effort (Grensing-Pophal, 2000[61]). Firms should make sure the structural elements in their organizations are changed in the complementary manner. Change effort requires a balance in the degree of certainty reduction, differentiation, and integration. The elements should change together, mutually benefiting each other in order to consider any change project a success (Miller and Friesen, 1982[62]).

When the existing processes and systems are working well, companies

[59] M.T. O'Hara, R.T. Watson and C.B. Kavan (1999), "Managing the Three Levels of Change", *Information Systems Management*, Summer, pp.63-70

[60] Lou Bertin (1997), "Technology for Success", *Information Week*, September 15, pp.33-35.

[61] Lin Grensing-Pophal (2000), "Leading through change", *Credit Union Management*, Vol.23, No.2, February, pp.10-13.

[62] D. Miller and P.H. Friesen (1982), "Structural Change and Performance: Quantum Versus Piecemeal-Incremental Approaches", *Academy of Management Journal*, Vol.25, No.4, pp.867-892.

don’t feel the urgency to rethink the ways they do a business and make any changes in an organization. However, if the pressure mounts due to the increased level of competition, they begin to reach out and take new processes into consideration in order to improve organizational efficiency. Then, companies try to evaluate how the new processes supported by innovative technology solutions might affect the existing practices of an organization and how the processes can be integrated into an organization with ease, avoiding any resistance with in. Organizations need fast move fast and quick adapting to changes in order to preserve their competitive advantage. Due to do so, they should be able to reconfigure their key business processes in accordance with the changes in the market conditions (Yang and Papazoglou, 2000). A change in one configuration to another provides new insight into reconfiguration of business process to achieve productivity improvement. For the companies, technological and organizational enablers help implement the complex process of organizational change (Grover et al., 1995[63]). Looking at the relationship between technology and the degree of change, all new information technologies bring changes in organizations, and the degree of change varies depending on the capacity of technology introduced and goals for the technology use (O’Hara, 1999). This shows that technology is a key factor that provides support for achieving and maintaining competitive advantage and brings successful changes in an organization.

Successful redesign and implementation of a cross-functional business process contributes to major organizational change. If a company’s processes are continually being refined and improved through less dramatic and risky means, there might not be a need for a step-function change. Successful firms like Motorola and General electric have

[63] Varun Grover, James T.C.Teng and K.D. Fiedler (1995), “Technological and Organizational Enablers of Business Process reengineering”, in *Business Process Change: Concepts, Methods, and Technologies*, Varun Grover and J. Kettinger (eds.), IDEA Group Pub., pp.16-33.

internalized the practice of organizational change in the corporate culture. Their change program encourages the employees to seek continually better ways to do work and improve performance. Their change approaches are effective in making the necessary changes suited to their business environment. Their success is attributed to the fact that they have focused their improvement effort, not on eliminating jobs, but on eliminating needless and non-value adding work so employees can be more productive by focusing on the important activities (Davenport, 1995[64]). The successful change effort requires the improved understanding of the rational for change and enthusiasm for the new method of completing the job tasks. The key is generating a positive attitude toward change (O'Hara et al., 1999) and it requires different components of organizational structure working together in the right direction.

Organizational coordination is one of internal determinants of E-commerce success and its IT capability indicates the degree to which IT capability supports the information processing requirements associated with the organization's internal determinants of E-commerce success (Sabherwal and Kirs, 1994[65]).Organizational coordination is challenging to achieve in an organization. It requires employees to have clear understanding of the goal and business directions. Employees are to perform their business tasks to achieve the corporate objectives. Therefore, the responsibilities of each individual and entity are clearly defined to distinguish the job functions and conflicts. This arrangement helps to assign business tasks and account for the outcome of the projects in an organization. And, it also makes it easier to implement the organizational

[64] T.H. Davenport (1995), "Business Process Reengineering: Where It's Been, Where It's Going", in *Business Process Change: Concepts, Methods, and Technologies*, Varun Grover and J. Kettinger (eds.), IDEA Group Pub., pp.1-3.
[65] R. Sabherwal and P. Kirs (1994), "The Alignment between Organizational Critical Success Factors and Information Technology Capability in Academic Institutions", *Decision Science*, Vol. 25, No.2, pp.301-331.

change when improvement needs to be made in business practice and process. There is a clear boundary of tasks and responsibilities, thus accommodating the organizational change would require only the minimal work. If firms don't have any conflicting interests within an organization, they can manage their resources and time to get the business tasks done much efficiently.

Firms with a highly specialized system of roles, clear reporting relationships, and a just reward system run smooth business operation and executes business activities efficiently. The characteristics of these mechanistic (referring to efficient operation) form of organizations are that (1) jobs are narrow in scope, (2) tasks are well defined by rules and procedures that standard performance can be achieved, (3) responsibilities are clear, (4) a clear hierarchy of authority exists for control and coordination of work, (5) rewards are based on performance directly, (6) employees interact in a professional level with regard to job functions (Robey, 1991).

Coordinated effort in pursuing EC initiatives is critical in achieving the desirable outcome at the end. Business units should work toward a common goal to take an advantage of complementary resources and processes through constant communication and close cooperation. They should be involved earlier to contribute to overall success of the projects. Moreover, the companies need clear strategic vision and business objectives for EC before getting into it. These companies should even have the in-house technical expertise to provide necessary IT support for EC. It is important that companies continue to assess their IT capacity to better prepare for future challenges (Currid, 1996). The large multidivisional enterprises should make sure that they don't continue to pursue separate Internet strategies among different business units in order to avoid wastefulness and unnecessary redundancy without company-wide

coordination. These enterprises are characterized as having a single enterprise-wide structure, but the key problem is that they don't share much in common. Solution to this problem is having the different business units maintain their autonomy while sharing the resources through the organizational coordination, encouraging the business units to work together whenever possible (Maloff, 1996). This is critically important for policy setting and firms' ability to enable organizational change. In sum, organizational coordination emphasizes understanding of the corporate vision and ideas for detecting the long term opportunities and helping decision-making (Bourdreau and Couillard, 1999).

Based on this discussion, it is possible for us to get this hypothesis:

H5: Firms with tight organizational coordination will have a high likelihood in achieving electronic commerce success.

Resource utilization: I argue that organizational change in particular needs high level of resource utilization since it requires a lot of communication and coordination efforts in carrying out the changes required in the business practice. Information technology is highly leveraged in a form of resource utilization to provide information support and automate the business practices, enabling the organizational change. It is important that various EC initiatives are coordinated within an organization to better utilize the available resources and to lead the EC business initiatives to success. Simply, without the technology resources to support it, change effort can not be carried out efficiently and moreover, and firms can not even support its business functions and perform business activities for EC. Firms with valuable resources and capabilities may gain at least competitive parity from utilizing organizational resources (Mata et al., 1995[66]).

[66] F.J. Mata, W.L. Fuerst and J.B. Barney (1995), "Information Technology and Sustained Competitive Advantage: A Resource-Based Analysis", *MIS Quarterly*, Vol.19, No.4, pp.487-506.

Much of the technology needed to do electronic commerce is in place. Companies just have to figure out how to utilize the resources available best to them by having the well defined business goals that are aligned with IT strategy. Many business processes can benefit from utilization of shared computing resources and telecommunication technologies. The shared computing resources and telecommunication enable many firms to coordinate their business activities in more efficient ways than before (Grover et al., 1995[67]).

Electronic commerce is very demanding on the technical expertise of a company. It requires people with knowledge in Internet protocol, Internet security, database connectivity, and various business applications. But, unfortunately, this knowledge is not gained overnight. Thus, to become a leader in electronic commerce, companies should have not only the accumulated knowledge in technology but the users who can smartly take an advantage of the resources available to them (Bort, 1997[68]).

Based on this discussion, it is possible for us to get this hypothesis:

H6: Firms with high degree of resource utilization will have a high likelihood in achieving electronic commerce success.

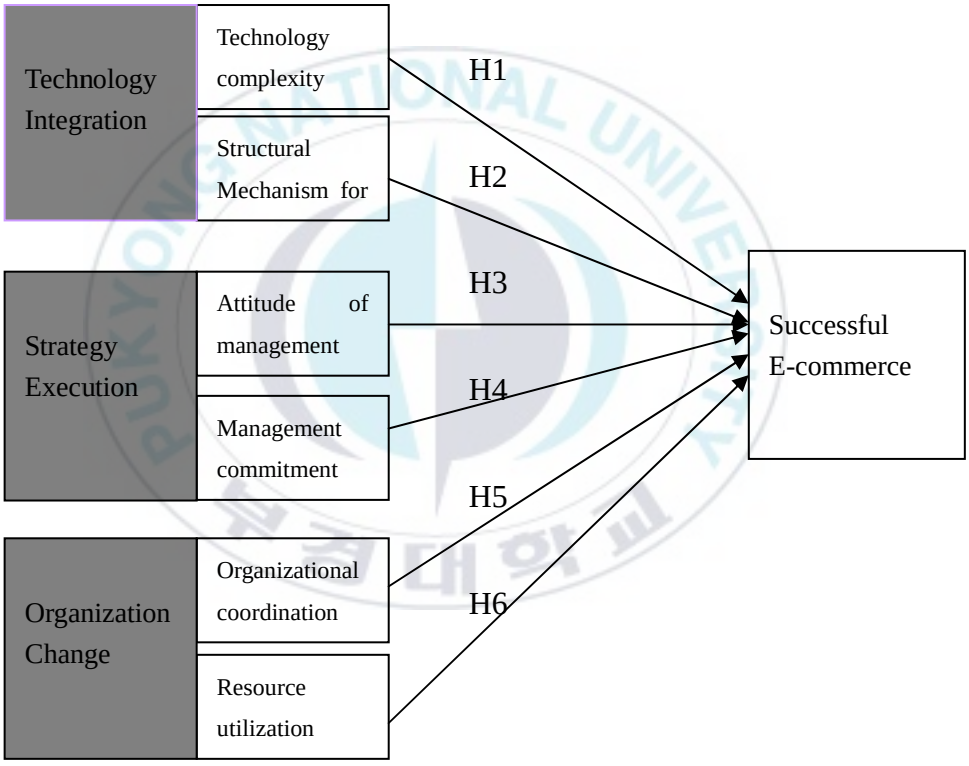
[67] Varun Grover, Seung R. Jeong, William J. Kettinger nd James T.C. Teng (1995), "The Implementation of Business Process Reengineering", *Journal of Management Information Systems*, Vol.12, No.1, Summer, pp.109-144.

[68] Julie Bort (1997), "Show Me the Business", *VAR Business*, June 15.

4.2 Research Model

Based on the literature review, a research model of electronic commerce success is presented. It is used to predict the success behaviors of organizations in doing EC. Figure 6 outlines the research model for understanding the factors that determine the success of electronic commerce. The factors help in better understanding the mechanisms with which the electronic commerce success occurs. The relationships among the variables (factors) will be tested to validate the model, and the findings may further refine the model.

Figure 6: Research model



Research Constructs/Variables

The research model of EC success is consisted of 7 constructs. Electronic commerce success/business performance is considered as a

dependent variable. Technology complexity, structural mechanism for control, attitude of management, management commitment, organizational coordination, and resource utilization are the independent variables.

In the research model, EC success /business performance of an organization is mainly determined by technology complexity, structural mechanism for control, attitude of management, management commitment, organizational coordination, and resource utilization. EC success involves the complementarity of strategy and business processes that are leveraged by information technologies.

EC success/business performance refers to the level of business performance achieved based on business operation and it can be characterized by various aspects of an organization. The key objectives of the firms that are trying to achieve EC success are cost efficiency, coverage of new market, and value creation for customers. A firm could be recognized as being successful in EC or having achieved high level of business performance through the measures and evaluation of its market share, financial performance (i.e., net profit, revenue, ROI), company reputation, rate of product/service innovation, customer satisfaction, productivity increase, etc.

Technology complexity refers to the level of sophistication in technical detail and features of information technologies (functionality). Rogers (1983[69]) also defines complexity as the degree to which technology innovation is perceived as difficult to use.

Structural mechanism for control means the level of systematic tools in place for supporting the coordination and control tasks of an organization.

Attitude of management is defined as the level of management's involvement in various aspects of business operation in an organization,

[69] E.M. Rogers (1983), *Diffusion of Innovation*, New York: Free Press, pp.26-47.

characterized by sponsoring the projects and setting clear organizational directions (i.e., company officials such as VPs, CIO, CEO, etc.).

Management commitment refers to the level of conformance to accepted norms as reflected in an ability to interact and /or maintain close ties in an organization (Ravindran, 1996[70]).

Organizational coordination refers to the degree of having common and /or shared goals and objectives in an organization. It has a positive influence on organizational change. The linkage or coordination enables the firms facilitate acquisition and development of information technologies that is congruent with the needs of the organization and strategic directions (Bowman et al., 1983[71]).

Resource utilization means the level of resource usage in order to efficiently support the business operation in an organization. It is another key factor that influences organizational change. Business operation in an organization requires certain level of resource utilization. Resource should be allocated efficiently across the company for the employees to perform their tasks.

[70] Ravindran, Suryanarayanan (1996), "Organizational Mechanisms that Impact Information Sharing Attitudes", *Doctoral Dissertation*, University of Texas at Austin.
[71] Bowman, B.J., Davis, G.B. and Wetherbe, J.C. (1983), "Three Stage Model of MIS Planning", *Information & Management*, Vol.6, No.3, pp.11-25.

Chapter 5. Research Methodology and Empirical Analysis

5.1 Survey Methods and Survey Implementation

5.1.1 Variables

The constructs were oprationalized by referencing the work of several researchers where relevant. The instruments which used in previous research were modified to be used in this study. Few new questions were added to the instrument where relevant. All the measurement scale items that were used are shown in the Appendix. In all, total of 53 items were generated as measures for the constructs. The constructs could not be measured directly since they are latent variables. Thus, the constructs were operationalized with their observed variable measures. Each construct was operationalized with four to five question items. The classification of the variables (constructs) with its relevant definitions is outlined in Table 5. The measurement scales used for the question items are same. A five-point Likert-type scale was used, with anchors ranging from 1 (strongly disagree) to 5 (strongly agree). The details concerning the operationalization of the constructs in the research framework are as follows:

The construct of electronic commerce success/business performance was operationalized with nine scale items. The scale items were modified from Chan al. (1997[72]) and Kang (2001[73]) and developed based on the prior research (DeLone and McLean, 1992; Scott, 1995[74]; Cheney and

[72] Y.E. Chan, S.L. Huff, D.W. Barclay and D.G. Copeland, (1997), "Business Strategic Orientation, Information Systems Strategic Orientation, and Strategic Alignment", *Information Systems Research*, Vol.8, No.2, June, pp.125-150.
[73] S. M. Kang (2001), "Business Value Model of Electronic Commerce Success", *Dissertation*.
[74] Judy E. Scott (1995), "The Measurement of Information Systems Effectiveness: Evaluating a Measuring Instrument", *Data Base Advances*, Vol.26, No.1, February, pp.43-61.

Dickson, 1982[75]) with appropriated modifications to make them relevant to the business settings of electronic commerce. The questions were designed to evaluate the business performance of an organization with respect to EC in ways of market share, customer satisfaction, revenue, and profit, etc. The respondents were asked the questions to provide the relevant information of business performance in numerical values with regard to electronic commerce.

Technical complexity was assessed by four items asking the respondents to indicate their level of agreement or disagreement on the level of technical sophistication in terms of technology functionality. The items used to construct technical complexity were developed based on the research by Thong (1999[76]) and Singh (1997[77]) with necessary modifications.

Structural mechanism for control was operationalized by four items asking questions about the systematic tolls put in place for supporting business operation of an organization. The items were developed for this study based on the research done by Robey (1991), Kang (2001), and they are utilized in ways appropriate for this study.

Attitude of management was operationalized by four items asking respondents to indicate their level of agreement or disagreement on the level of top management's active participation and sponsorship of business initiatives for EC. The items used to construct management commitment were adapted from Rainer and Watson (1995[78]), Lee and Kim (1999[79]) with necessary modifications for business setting of EC.

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[75] P.H. Cheney and G.B. Dickson, "Organizational Characteristics and Information Systems: An Exploratory Investigation", *Academy of Management Journal*, Vol.25, No.1, pp.170-184.
[76] James Y.L. Thong (1999), "An Integrated Model of Information Systems Adoption in Small Businesses", *Journal of Management Information Systems*, Vol.15, No.4, pp.187-214.
[77] Kulwant Singh (1997), "The Impact of Technological Complexity and Interfirm Cooperation on Business Survival", *Academy of Management Journal*, , Vol.40, No.2, pp.339-367.
[78] R. K. Jr. Rainer and H.J. Watson (1995), "The Keys to Executive Information System Success", *Journal of Management Information Systems*, Vol.12, No.2, pp.83-98.
[79] J. Lee and Y. Kim (1999), "Effect of Partnership Quality on IS Outsourcing Success: Conceptual

Management commitment was operationalized by four items. The questions are related to the level of departments' coordination to standard and desired business practices. The four questions were adapted from Ravindran (1996) and modified to be used in my study.

Organizational coordination was operationalized by four items about sharing and understanding of corporate goals, directions, and functional roles. The respondents were asked to indicate whether they agreed or disagreed with each statement. The items were developed on the basis of work done by Rohrbaugh (1981[80]) and Segars and Grover (1998[81]) with relevant modifications.

Resource utilization was operationalized by four items asking the respondents to rate the extent of agreement or disagreement with each statement. The questions are related to the level of resource usage/consumption to facilitate communication and implement necessary changes in the business practice and process. The items used to construct resource utilization were developed based on previous research (Ravindran, 1996; Kang, 2001; Mata et al., 1995) with necessary modifications for business setting of EC.

Table 5: Independent and dependent variables (constructs)

Variable Name	Type	Definition
EC success	Dependent Variable	The level of business performance achieved based on business operation
Technology complexity	Independent variable	The level of sophistication in technical detail and features of information technologies
Structural	Independent	The level of systematic tools in place for supporting

Framework and Empirical validation", *Journal of Management Information Systems*, Vol.15, No.4, spring, pp.29-61.

[80] John Rohrbaugh (1981), "Operationalizing the Competing Values Approach: Measuring Performance in the Employment service", *Public Productivity Review*, June, pp.141-159.

[81] A.H. Segars and V. Grover (1988), "Strategic Information Systems Planning Success: An Investigation of the Construct and Its Measurement", *MIS Quarterly*, June, pp.139-163.

mechanism for control	variable	the coordination and control tasks of an organization
Management commitment	Independent variable	The level of conformance to accepted norms as reflected in an ability to interact and /or maintain close ties in an organization
Attitude of management	Independent variable	The level of management's involvement in various aspects of business operation in an enterprise (i.e., company officials such as VPs, CIO, CEO, etc.)
Organizational coordination	Independent variable	The degree of having common and /or shared goals and objectives in an organization
Resource utilization	Independent variable	The level of resource usage in order to support the business operation in an organization efficiently.

5.1.2 Survey Implementation

To gather the data required to empirically test the measurement and research model, the survey methods were used with the guidelines provided by Alreck and Settle (1985[82]). The study collected data from SMEs, operating in Liaoning Province, China. The companies in the sample belonged to manufacturing, electric and food industries. Initially, Liaoning SMEs Directory was first used to compile a list of 735 SMEs, operating in the Liaoning Province. From that, random sample of 400 companies was obtained.

A research participation request letter (see Appendix) was sent to CIO or CEO of the 400 enterprises along with a summary of study objectives (providing detailed description) and a survey questionnaire. The letter stated the purpose and objectives of the research and the benefits of participating in the study. If they decided to participate, they were asked to complete the questionnaire and return it. The survey required either CEO or CIO, senior company executive, or functional manager (i.e., EC/E-business, IT, sales, marketing, etc.), who has overall understanding

[82] P.L. Alreck and R.B. Settle (1985), *The Survey Research Handbook*, Homewood, Illinois: Irwin, pp.23-28.

of business operation, to answer the question items. Instructions were provided for each category of the questionnaire. They were also provided with contact information for any question they might have regarding the study and survey instrument.

The survey consisted of three sections. Section A consisted of the questions relating to company characteristics. Section B contained the questions relating to the personnel information. Lastly, Section C asked questions about the EC mechanism in an enterprise. All the items were measured along the same scale. The items were borrowed from the research done by Auger and Gallaugher (1996).

The respondents were asked to answer each question in full and return the surveys directly to the interviewer. Each respondent was assured of confidentiality of individual responses. In order to assure the reasonable response rate, a meeting with the enterprises supported by the Shenyang Municipal Government was held. This effort has resulted in additional survey being returned. In all, 157 respondents were collected, thereinto, 103 respondents are valid, and it accounted for overall response rate of 39.3%.

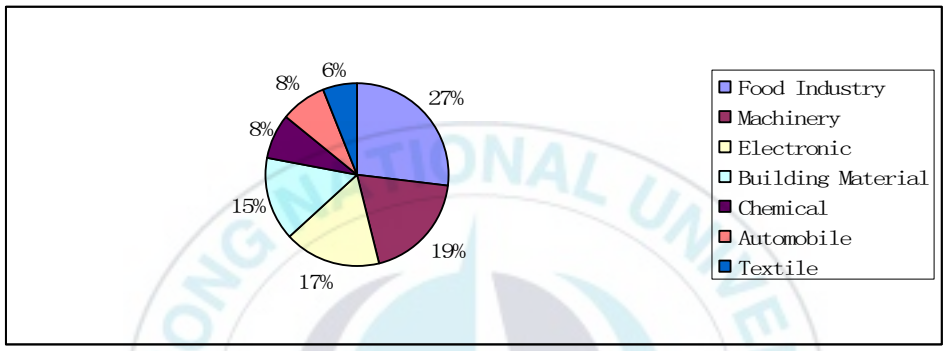
5.2 Data Collection and Characteristics of Sample

The characteristics of the survey respondents are displayed below. More detailed descriptive information about the subjects and the sample are shown.

Firm's Characteristics

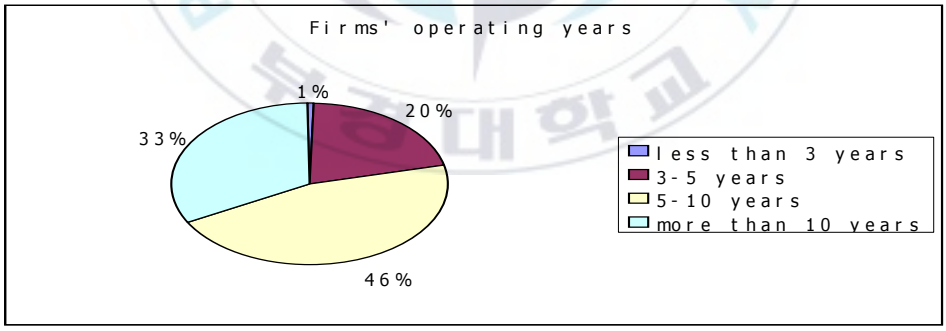
The responding firms are consisted of 23 public firms (22%) and 80 private companies (77.9%). The distribution of responding firms' industry is shown below (Figure 7).

Figure 7: Distribution of responding firms' industry



The operating time of respondent firms' are different (see Figure 8).

Figure 8: Firm's operating years



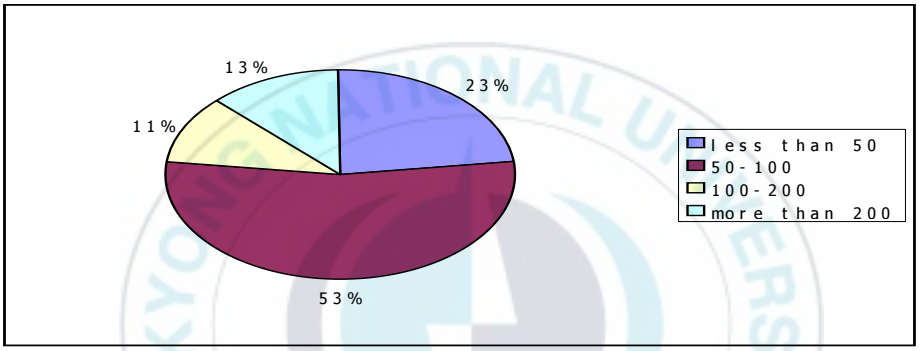
Based on the survey, the information and administration software mainly used by these respondent firms are financial management, storage management, office automation and customer relationship management.

The survey result showed that most of the responding firms (81%) had centralized organizational structure. There are 52 firms, accounted for 50.5%, which are highly information intensive, considering the nature of their business. And all the surveyed firms have Internet link, the Internet penetration rate is 100%.

Staff Situation

The respondent results show that the number of employees in responding firms varies from 26 to 1178. The details are shown in Figure 9.

Figure 9 : Number of employees



The survey results also tell us that there are 22 firms which have a special MIS (Management Information System) department, and the employees in their MIS departments vary from 10 to 25.

About 63% of CEOs had overseas experience and 67% of them had university education or above.

Situation of E-commerce application

With regard to electronic commerce application, 25.9% of the responding firms had a company homepage. 70.2% of the firms had a webpage. From the data we can see that if the CEO of a company had

overseas experience and had a higher education degree, the company is more likely to have a homepage or a webpage and use E-commerce in their business.

86.4% of the respondents indicated that the use of IT such as Internet and Intranet has synergistic effect on their work. 30.8% of the responding firms indicated that they have online business transactions (EC). Although the firms are pursuing EC, majority (57.8%) of the firms indicated that they are still utilizing the Internet/WWW mainly for company introduction and public relations.

Further, 76.2% of the firms that having already implementing E-commerce are mainly doing EC in business-to-customer area, and majority (70.7%) of the firms indicated that they are not involved more in business-to-business EC than business-to-customer. This showed that the firms are still in early stage of the electronic commerce, especially in the business-to-business area. And, the firms can drive business benefits by achieving EC success.

5.3 Data Analysis

5.3.1 Data Analysis Methods

To empirically confirm the hypotheses, this investigation will examine the relationships between these constructs by having participants evaluate several self-service applications that utilize similar processes. Data analysis for this study included a variety of methods to assess validity and reliability of the measurement instrument, evaluate normality of the data. Cronbach's alpha was used to determine the reliability, and factor analysis was utilized to determine the extent of validity, and data reduction. Then the correlation analysis was used to test if there is relationship between the variables. The Statistical Package for the Social Sciences (SPSS) Computer Program 13.0 for windows version was used to analyze the data.

5.3.2 Data Analysis Results

The data were collected by using survey method. All the scale items were tested as described in the following section.

This study confined to establishing reliability as measured by Cronbach's alpha (Bohrnstedt and Knoke, 1982[83]) and used principal axis factoring analysis to show that each scale item measured a single construct which it was intended to measure. The Cronbach's alpha is the basic formula for determining reliability based on internal consistency, and it is commonly accepted measure of internal consistency reliability (Cronbach and Meehl, 1981[84]). As shown, the objective of the scale item development is to ensure content validity, and it refers to the

[83] G.W. Bohrnstedt and D. Knoke (1982), *Statistics for Social Data Analysis*, F.E. Peacock Publishers, Itasca, IL., pp.21-72.
[84] W. Cronbach and P.E. Meehl (1981), "Construct Validity in Psychological Testing" in *Measurement for Management Decision*, R.O. Mason and B.E. Swanson (eds.), Reading, MA, Addison Wesley Publishing Co., pp.335-359.

representativeness or sampling adequacy of the construct domain (Carmines and Zeller, 1979[85]).

Factor analysis was performed and Cronbach's alphas were calculated to assess the validity and reliability of the five-point Likert scale items for the constructs in the research model (see Table 6).

Table 6: Summary statistics for measures

Measure	**Reliability of coefficient**		
	Acronym	**Items**	**Cronbach's alpha**
Technical complexity	TC	5	0.719
Structural mechanism for control	SMC	4	0.807
Management commitment	MC	4	0.710
Attitude of management	AM	4	0.765
Organizational coordination	OC	4	0.720
Resmyce utilization	RU	4	0.733

The results of reliability at the individual construct level showed that all the scale items for the constructs loaded reasonably on their respective factors with the Cronbach's alpha for one construct exceeding 0.80 and five constructs exceeding 0.70. All the reliability coefficients met the generally accepted norms of 0.60 and above to be regarded as reliable measures. Researchers have suggested that reliabilities of 0.70 or higher are appropriate for the hypothesized measures of a construct (Nunally, 1994[86]). Further, Nunnally indicted that the cutoff point of 0.50 for factor loading is acceptable measure. Pedhazar and Pedhazar Schmelkin (1991[87]) also suggested that acceptable reliability is at least 0.5 or 0.6 in the early

[85] E.G. Carmines and R.A. Zelelr (1979), *Reliability and Validity Assessment*, Newburry Park, CA: Sage Publications.
[86] J.C. Nunally (1994), *Psychometric Theory*, 2nd ed., New York, McGraw-Hill.
[87] E.J. Pedhazar and L. Pedhazar Schmelkin (1991), *Measurement Design Analysis: An Integrated Approach*, Lawrence Erlbaum Associates, Publishers, pp.53-61.

stages of basic research and usually over 0.7. In addition, the factor analysis result showed low cross-loading among the scale items. Based on the results of the factor analysis, the scales were judged adequate according to the theoretical support based on prior research and/or the guidelines recommended by Hair et al. (1998[88]).

Construct validity was checked by means of factor analysis. The first step is to justify if the original data is suit for factor analysis. (Table 7)

Table 7: KMO and Bartlett's Test

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		.753
Bartlett's Test of Sphericity	Approx. Chi-Square	955.650
	df	300
	Sig.	.000

This result showed us that Kaiser-Meyer-Olkin Measure of Sampling Adequacy reached 0.753 indicating sufficient items for each variable, the significant of Bartlett's Test of Sphericity is 0, so the original data was suit for factor analysis.

Six of the proposed E-commerce success constructs that have been drawn from and modified from earlier studies were examined with a principal axis factoring analysis using a varimax rotation.

Analysis was performed on the twenty-five items that measured electronic commerce success (Business performance).The factor analysis resulted in 6 factors, as shown in Table 8. The six factors have eigenvalues greater than 1.0, which is a common criterion for a factor to be useful. The measurement instrument demonstrates acceptable validity.

[88] Hair, J.F., Anderson, R.E., Tatham, R.L. and Black, W.C. (1998), *Multivariate Data Analysis with Readings*, 3rd ed., Macmillan, New York.

Table 8: Summary of factor analysis of the variables

Item	Factor					
	MC	SMC	TC	OC	AM	RU
MC1	.699	.048	-.146	.041	.043	.143
MC2	.664	.141	-.153	.102	.085	.104
MC3	.651	.105	.052	.028	.228	.149
MC4	.589	.207	.065	.163	.232	.082
SMC1	.315	.600	-.123	.245	.017	.006
SMC2	.278	.726	-.174	-.153	.145	.089
SMC3	.309	.705	-.225	.050	.226	-.049
SMC4	.265	.773	-.049	-.020	.225	.084
TC1	-.116	-.159	.724	-.024	.125	.133
TC2	-.091	-.035	.655	.070	-.074	-.216
TC3	-.080	-.148	.678	-.037	-.067	-.021
TC4	.136	-.010	.727	-.057	-.172	-.027
TC5	-.201	-.054	.538	-.101	-.069	-.339
OC1	.090	-.070	-.188	.767	.169	-.083
OC2	.094	.055	.028	.754	.014	.036
OC4	-.038	.382	-.054	.598	-.041	.387
AM1	.187	-.019	-.173	.258	.755	.021
AM2	.033	.153	-.106	.139	.769	-.039
AM3	.201	.242	.047	-.094	.745	.216
AM4	.272	.205	-.051	-.025	.554	.357
RU1	.250	-.009	.071	.370	.100	.605
RU3	.269	-.019	-.151	.127	.045	.717
RU4	.097	.210	-.103	.066	.187	.766
Eigenvalues	6.378	2.286	2.084	1.541	1.406	1.281
%of Variance	25.512	9.143	8.335	6.165	5.623	5.125

Extraction Method: Principal Axis Factoring.

Rotation Method: Varimax with Kaiser Normalization.

a Rotation converged in 17 iterations.

According to this, two items (OC3, RU2) were dropped (less than 0.5). After deleting OC3, RU2 items, all items had factor loading of 0.5 or greater. The measurement instrument demonstrates acceptable validity.

Once the validity and reliability of the measurement were assessed and found to be satisfactory, the items comprising each variable were summated into a single composite measure for each respondent on each variable.

The correlation analysis was first performed on these variables. The results showed that there was a significant relationship between these variables. (Table 9)

Table 9: Pearson correlations

TC	1	SMC	AM	MC	OC	RU	ES
SMC	-.325**	1					
AM	-.234*	.448**	1				
MC	-.225*	.516**	.470**	1			
OC	-.256**	.329**	.276**	.291**	1		
RU	-.216*	.319**	.359**	.417**	.513**	1	
ES	-.442**	.498**	.594**	.332**	.538**	.571**	1

** Correlation is significant at the 0.01 level (2-tailed).

* Correlation is significant at the 0.05 level (2-tailed).

From this table we can see that all values are significant ($p<0.05$) and in the same direction (except Technology complexity). Most of the values are weak in correlation (less than 0.5), so I can use these variables to do regression analysis and test if they have effects on E-commerce success/ business performance. Some of values are larger than 0.5 (marked in gray background), which means there may be strong relation between the independent variables. Later the multicollinearity problem will be tested in regression analysis.

5.4 Test on Hypotheses

There are six hypotheses tested in this study. The major statistical method used to test these hypotheses was the multiple regression analysis. The followings are the findings of this study based on the six hypotheses.

Table 10: Results of regression analysis

Model	Unstandardized Coefficients		t	Sig.	Collinearity Statistics
	B	Std. Error			VIF
Constant	1.236	.423	2.920	.004	
TC	-.167	.052	-3.222	.002	1.160
SMC	.153	.065	2.371	.020	1.582
AM	.351	.068	5.150	.000	1.438
MC	-.184	.082	-2.231	.028	1.613
OC	.203	.068	2.984	.004	1.439
RU	.283	.075	3.787	.000	1.553

Adjusted R^2=.615, F=28.111

a Predictors: (Constant), RU, TC, AM, SMC, OC, MC

b Dependent Variable: Electronic commerce success/business performance

The value of adjusted R^2 (.615) suggested 61.5% (shown in Table 10) of the variability in electronic commerce success/business performance is attributable to Technology complexity, Structural mechanism for control, attitude of management, management commitment, organizational coordination and resource utilization combined.

This table showed us that F=28.111 and is significant (p<.001).This indicated that this regression model (factors on electronic commerce success/business performance) was statistically significant.

Multicollinearity among the independent variables was assessed by

examining the VIF. Because the VIF is lower than 3, then there is no problem with multicollinearity in this analysis.

As shown in the table, the direction of relationship between technology complexity and business performance was negative and significant (<.05), as expected. This suggested clear support for Hypothesis 1.

The results showed us that the direction of relationship between structural mechanism for control and business performance was positive and significant (<.05), which provided clear support for Hypothesis 2.

The direction of relationship between attitude of management and E-commerce success was positive and significant, which provided clear support for Hypothesis 3.

The above results did not support for Hypothesis 4, that the direction of the relationship between management commitment and electronic commerce success/ business performance was positive. So Hypothesis 4 was rejected.

As shown in the table, the direction of relationship between organizational coordination and business performance was positive and significant, as expected. This suggested clear support for Hypothesis 5.

Hypothesis 6 was also supported because resource utilization had a positive effect on E-commerce success and their relationship was significant according to the analysis result.

A summary of the results of all hypotheses tests is presented in Table 11.

Table 11: Results of hypotheses tests

Hypotheses	Tested results
H1. Firms with high technology complexity will have a less likelihood in achieving electronic commerce success.	Supported
H2. Firms with high structural mechanism for control will have a high likelihood in achieving electronic commerce success.	Supported
H3: Firms with active attitude of management will have a high likelihood in achieving electronic commerce success.	Supported
H4: Firms with high management commitment will have a high likelihood in achieving electronic commerce success.	Rejected
H5: Firms with tight organizational coordination will have a high likelihood in achieving electronic commerce success.	Supported
H6: Firms with high degree of resource utilization will have a high likelihood in achieving electronic commerce success.	Supported

5.5 Empirical Research Findings

In this section, the empirical research findings are shown and the internal factors of E-commerce success are determined.

The above study empirically studied the internal determinants of electronic commerce success based on the data from SMEs in Liaoning Province. As noted from the result of regression analysis, structural mechanism for control, attitude of management, organizational coordination and resource utilization had the positive effects on electronic commerce success while the complicated technology had negative effect on E-commerce success.

Based on the survey, we found that among the respondent enterprises, those which perceive wide availability of personnel to administer online exchange and easy integration with existing systems are more likely to choose electronic commerce and believe that will bring the electronic commerce to success. Beyond the statistical significance, this relationship makes good practical sense. In essence, it says that if enterprises perceive the technology to be easy to adopt, execute strategies more efficiently, accommodate organizational change, adopt new business conditions well, they will do successfully in electronic commerce. The observed importance of this relationship provides empirical support and validation of the research done by Bourdreau and Couillard (1999), Lewis et al. (1995), O'Hara et al.(1999), Grensing-Pophal (2000), Yang and Papazoglou (2000), Yu (2005), Kang (2001). Their researches emphasized the impact of technology, strategy and organizational change on electronic commerce success, which is reflected in the results of this study.

The result of regression analysis showed that attitude of management is the most important factor affecting E-commerce success of a firm (the absolute B value is larger than others), which is consistent with what we

learned from the interview survey.

However, as shown in the result of regression analysis, management commitment is negatively related to electronic commerce success, which was opposite to Hypothesis 4 and it did not provide support for Ravindran (1996), Freeland and Stirton (2000)'s observations. It is possible that a more powerful analysis using a larger sample would find statistical support for their researches. Or maybe the above researchers' results were drawn from the survey done by western enterprises, and Chinese SMEs have different business system due to the beginning of the market economy. We all know that in a market economy, the cooperation between departments of a firm is important for the firm to execute a strategy. But for Chinese SMEs, owing to its small size and short history, most of them are owned by family, the cooperation between departments is weak, and few pay attention to the cooperation between departments. Generally, the structure of Chinese SMEs is highly centralized, which means the top management decides everything and all departments follow the decision without their own idea. Maybe it is the Chinese SMEs' characteristics that result in the different outcomes. Or, the differences in individual characteristics still might have influenced the ways they interpreted the question items. Thus, this might have led to a certain degree of response bias.

These results presented should provide SMEs with an increased awareness of the opportunities EC offers when the firms approach EC with considerable preparation and strategic goal in mind. Thus, the firms should have a better understanding of how they should behave in the electronic market and manage key organizational mechanism affecting their business performance.

Chapter 6. Findings from Qualitative Research

By reviewing the literatures, 6 internal determinants influencing E-commerce success of SMEs were found and tested. While in the course of the interview survey, several other factors were found to be related to the E-commerce success of SMEs. So, in this chapter, some findings about the influencing factors from the interview survey will be listed.

6.1 Effects of ownership structure

Chinese SMEs by ownership structure can be divided into state-owned enterprises, private enterprises and foreign-funded enterprises. The different nature of enterprises makes them different in business operation. Learned from the survey, private and foreign-funded enterprises operate in a more flexible way than the state-owned enterprises, and it will be easier for private and foreign-funded enterprises to adopt new technologies and new processes to improve their business practices than for the state-owned enterprises. Also, they can apply E-commerce earlier and gain good results from E-commerce success, such as getting new customers, Network marketing, etc.

Usually, the state-owned enterprises have to accept the supervision and administration of the government, and they should get the consent of the government when they want to make any changes to improve their business practices. Because of this, the state-owned enterprises generally had a late start in E-commerce adoption. However, once they begin to apply E-commerce in their business practices, they can get the support form government, especially financial and technical support. With the help of government, they will have a rapid growth in E-commerce application and achieve E-commerce success faster than the private enterprises.

6.2 Effects of organizational structure

Organizational structure includes highly centralized structure and highly decentralized structure. Some of Chinese SMEs are family-owned enterprises, and the organizational structure of these enterprises is highly centralized. As a highly centralized firm, once the manager of the firm makes a decision, the firm can rapidly execute the plan. So when the manager of the firm realizes the importance of E-commerce and wants to implement it, it is easier for this firm to link the implementation of E-commerce with the goals of the enterprise, which may result in E-commerce success.

For example, an auto parts production enterprise in Liaoning is a family owned enterprise and has a centralized structure. When the general manager of this firm visited several enterprises in Zhejiang Province (a province famous for its rapid development of SMEs), he saw good results of using internet as a tool to promote their products. When he came back, he decided to establish their own web page to promote their products and find new customers. His idea was supported by other managers of the firm easily because the financial and manufacturing managers were his brothers and they believed in him. A month later, a webpage was established by professionals and some pictures of products were shown. The firm also linked their webpage to some famous search engines to increase the click rate. In the next six months, the sales increased by 20%.

6.3 Effects of business characteristics

No matter what industries SMEs belong to, highly information technology dependent firms (high-tech firms) generally have advantages in implementing E-commerce and easily achieve E-commerce success because of their business characteristics. These kinds of firms realize the importance of information technology earlier and start E-commerce earlier.

Also the technology complexity will not become an obstacle of E-commerce success for these kinds of enterprises. Thus, highly information technology dependent firms easily achieve E-commerce success.

There are many electronic enterprises involved in the interview survey. According to the survey, these kind of firms launched E-commerce earlier because their business operations are related to information technology. Just like the general manager of a digital technology company said, they learned the importance of information technology for their business practices and paid much attention to the application of it to keep up with the development. So when they faced E-commerce, they could easily adopt it due to their ability of using information technology. For them, the complicated technology of E-commerce was not the barrier for their E-commerce success. And the understandings of operation of E-commerce help them get good results in the implementation of E-commerce. After the establishment of the firm's own homepage, they learned the latest information about digital products, needs of customers, etc. These made the firm change their products as soon as possible to meet the needs of customers and increase the sales in a short time.

6.4 Effects of firm size

Investment in E-commerce is a factor which influences E-commerce success. As we know if a firm has enough money to buy necessary equipments for E-commerce (such as computers, linking with Internet, etc.) and hire professionals, then the firm will likely achieve E-commerce success.

But as small enterprises, some of the enterprises do not have enough funds and can not invest more in E-commerce. Due to this reason, manager of a company dealing with food retail said that they can not

afford to use E-commerce although they would like to. As a firm with 26 workers and a computer, they thought it was expensive to buy several computers and spend money on broadband access. They can not afford to employ professionals either.

Slightly larger scale of enterprises (or called medium enterprise), some could deal with this case well. Although they had the problem of shortage of funds, they could solve this by changing the structure of enterprises to meet the need of E-commerce. The enterprises tend to get all necessary E-commerce resources and let one department implement E-commerce. In this way, the enterprises do not have to invest much in E-commerce and can implement E-commerce by fully utilizing the existing resources.

For example, there is a business company with 81 employees and 8 computers engaging in the food trade. This firm wanted to implement E-commerce and found that they had not enough money to establish a special MIS department. But they did not give up and found a way to solve this problem. First, they linked their 8 computers as Intranet so that they did not have to send paper documents from sales department to financial department and eatablished the paperless office automation inside the company. Then they appointed the sales department to collect information online and distribute concerned information to other departments. Thus, all departments could share the information. Gradually, the working efficiency was raised and the coordination of all departments became stronger. The general manager of this firm often proudly told others that they did E-commerce well with limited funds.

6.5 Effects of CEO's experience

From the interview survey, I learned that if firms' CEOs have a higher level of education and overseas experience, generally they have open-mind and higher abilities to accept new things. So it will be easier

for them to implement E-commerce. During the implementation of E-commerce, they will use foreign experiences for reference, which induce the higher possibility of E-commerce success.

There is a firm which produces eyecare foods using sheep's liver as raw materials in Shenyang. Since its establishment, the firm made many television and newspaper advertisements. The idea of advertising via Internet did not occur to them until the CEO of this firm attended an exhibition in Germany. During the exhibition, the CEO had a good discussion with foreign traders. But when they asked him if his company had a home page to view the products or if he had an e-mail address to keep in touch, he was embarrassed and admitted he had not yet. When he came back to China, he thought about it. Following the trend of international trade, the CEO applied an e-mail address first. Then the firm established a web-page and linked it to some famous research engines such as Baidu, Sohu, Yahoo, etc. Now they have their own homepage and extended the scope of business from food to some eye-protecting instruments.

6.6 Effects of employees' characteristics

Shortage of E-commerce personnel is the problem which firms worry about when they want to implement E-commerce. The interview survey showed that among the factors hindering the application of E-commerce for SMEs, shortage of E-commerce personnel, business information matching, and inefficient effect brought by E-commerce were ranked in the top three. Some bigger enterprises can train E-commerce personnel by themselves, but small and medium enterprises can not afford this. Usually, they hope the government and university can cooperate and provide such personnel for them.

As a firm having operated over 10 years, a company producing general

cleaning preparation in Liaoning still was not able to do E-commerce though it urgently needed in order to improve business performance. The reason was that they did not have the right personnel to do E-commerce. They had many skilled workers and some production professionals. Also they had many excellent salesmen. But these personnel were proved to be not suitable for doing well in Internet marketing. They hired some students majoring in E-commerce, but these students did not bring better results to this firm due to their lack of working experiences and lack of knowledge about combination of E-commerce technology with the firm's business. The shortage of E-commerce personnel makes many firms like this firm stay behind of E-commerce.

6.7 Effects of organizational culture

Although more and more enterprises realize the importance of E-commerce, a few of them regard E-commerce as an unnecessary performance for their business. A company selling textile in Liaoning Province is one of this kind of enterprises. With over 10 years experience in selling textiles, they thought they could do it well without E-commerce. The manager said that their business had nothing to do with E-commerce. When being asked why he thought so, he said that from his point of view, Internet related things are all fraudulent.

Although his words were kind of radical, this represented real thoughts of some people. The unsafety of online transactions and some people's failure experiences cast a shadow in E-commerce application. So, there is a long way to go for improving people's understanding of E-commerce and helping enterprise to use E-commerce to achieve business success.

Chapter 7. Conclusion

7.1 Summary of the Study

Since the Internet is becoming the favorite business channel for commerce, it is important to understand the characteristics of the digital economy and factors influencing the success of electronic commerce. As more firms utilize the Internet as a medium of choice for commerce in the electronic market, virtually every firm is trying to position themselves and achieve business success. This phenomenon has brought much research interest in the electronic commerce.

The purpose of this study was to identify the internal determinants of SMEs' E-commerce success in China. The initial step in this research was to present problems that Chinese SMEs faced in the implementation of E-commerce. In order to solve these problems, pertinent academic literatures were reviewed. Then the literature review was narrowed down to include studies involving technology integration, strategy execution and organizational change.

Based on the literature review, a research model was presented as a framework to test the set of hypotheses generated in this study. The hypotheses were formulated to determine the relationship between technology complexity, structural mechanism for control, attitude of management, management commitment, organizational coordination, resource utilization and E-commerce success.

Four hundred SMEs in Liaoning Province were selected and questionnaires were sent to the top managers of these firms. A total of 157 surveys were returned which represented a response rate of 39.3%. One hundred and three cases were considered in the statistical analysis. An

examination of reliability and validity of the measurement scales revealed that the measurement scales for each construct was reliable and valid in terms of the internal consistency and accuracy. The result of regression analysis showed that five out of six hypotheses were supported and one was rejected.

Based on the result of empirical analysis, technology complexity, structural mechanism for control, attitude of management, organizational coordination, resource utilization were found to be the internal determinants of E-commerce success. And attitude of management is the most important factor influencing the enterprise's E-commerce success, which is consistent with the finding from qualitative research. According to the findings from empirical research and qualitative research, several suggestions were provided for Chinese SMEs on how to do a successful E-commerce.

This research is an initial study, determining the factors of EC success and suggesting the characteristics of successful EC enterprises, and it should serve as a promising beginning for more comprehensive and detailed study of EC success.

7.2 Suggestions

The findings of this study have implications (practical and theoretical) for many of issues in EC. From the theoretical point of view, this research will bring more stimulating and richer discussion on the issues of EC success. From the practical point of view, although this study is focused on SMEs in Liaoning Province, I believe that it will help SMEs make wise IT investment and focus on key issues of EC all over the China. In that regard, this study provides helpful guidelines for firms trying to achieve EC success by leveraging information technology.

As mentioned in Chapter 2, the development of Chinese E-commerce faced some problems. Based on this study, some solutions are presented:

(1) Implementing and maintaining an electronic commerce environment is a task that demands significant planning and effort. Thus, no enterprise should proceed with full-scale electronic commerce initiative until it is ready to provide the necessary support both organizationally and technologically. Senn (2000) suggests that enterprises must carefully plan and prepare to gain insight into the potential of electronic markets and knowledge of successful business structures. He argues that gaining the necessary experience and knowledge to seize the emerging opportunities at the right time is vital. According to this study, in order to achieve success in their projects, Chinese SMEs need to create an environment that allows the IS group replicate project processes across the company instead of starting all over from the beginning (Wilder and Angus, 1997). It is not an easy task but the companies should be able to learn from their mistakes and elaborate on their success by making further progress. It will save the cost involved in planning a project and actually implementing it.

(2) In the implementation of a new organizational structure for its e-commerce, enterprise must incorporate fresh perspectives on the online

business involving the entire value chain by having the right people with the right mindset and the right culture. Having the right and skilled people to use the IT resources to get the works done is as important as having the key technologies run the business operations. Companies need a skilled worker who has the ability to deal with uncertainty. Companies have to introduce new methods of recruitment and incentives to attract qualified personnel with the right mindset and culture because the skilled employees are the core asset of the digital companies. To do so, companies should take team-based approach to the project undertaking.

(3) Taken all together, all the determinants of E-commerce success provide a unique setting to the company, its internal processes and style of business practice, its system, its hardware and software configuration, and its culture. Thus, to achieve the success in electronic commerce, it is vital that each department of the company work together and concentrate on the fulfillment of E-commerce within the company and with outside parties. In this case, the IT department of an enterprise should manage the implementation work, making sure the systems and applications are fully integrated into the company's standard business processes and different business units.

(4) As the business environment changes and the rules of business competition get defined for e-commerce, the companies have to modify their business procedures, goals, and plans adequately. In order to do so, they need to make the key decision in reference to a set of goal-oriented metrics. These are growth, time to market, customer acquisition costs, traffic, revenue per customer, customer loyalty, and success in achieving the milestones for new EC business model building (Freeland and Stirton, 2000). One way a company can quickly adapt to the changing conditions is by forming the strategic partnerships with multiple firms to take an advantage of the synergy effect. The partnering companies can provide a

rich experience of doing business in the digital markets and help leverage the existing assets and resources to succeed in EC.

(5) Companies need to apply balanced and coordinated approach to electronic commerce. Companies should set standards for server maintenance, web page, physically different tools and applications. For example, the intranet applications should be used uniformly at different business units to put company directories, human resource documentations, and corporate policy statements (Sustar, 1997). Any differences should be detected and eliminated. Thus, the early guided development efforts on the units of the company could save them a lot of resources and costs in the future. It could also help avoid conflicts that might arise among different business units of an organization.

(6) Companies should develop intranets as the strategic centers of corporate information such as data warehousing and data mining. Enabling web-based access to multiple databases to get key business information in a short period of time is critical to success in business. Thus, companies need to plan carefully IT infrastructure implementation. Considering that the infrastructure is not cheap, companies need to make right investment decisions for their future. And, the success of technology implementation can be achieved only if there are a central approach to project management, progress monitoring, the support of upper management, the technology development that is closely integrated with corporate goals and business processes.

7.3 Limitations

Despite of an effort to ensure the validity of the study, there are still some limitations for this study. This section discusses the limitations posed by the sample, procedure, and instruments used in this research.

The sample is selected from the Liaoning SMEs Directory, representing the companies in many fields in the Liaoning Province, China. However, the sample of companies does not perfectly represent the companies doing electronic commerce and achieving business success. Therefore, the results may be with the limited generalization of those companies with some success.

The survey was conducted through sending the questionnaire to the sample organizations. The survey participation request letter was sent to CEO of the each enterprise and collected. Some surveys with missing or incomplete data were dropped. Furthermore, the questionnaires that arrived later than the expected return data had to be dropped for timely data analysis. This might have excluded valid research data from the overall data tabulation.

The differences in individual characteristics might have influenced the ways they interpret the questionary items. Thus, this might have led to a certain degree of response bias. For example, it is possible that the respondents answered the questionary items based on what is socially acceptable or what would be desirable, rather than their true answers. The best ways to ensure that items are free from the factors that create bias and error are to focus precisely on specific issue or topic and keep each question item brief. Using two or more simple sentences are far preferable to one compound sentence, and it is easier to understand.

7.4 Future Research Directions

Several research directions can be suggested for future research in this area. Electronic commerce offers a wide range of notable research opportunities.

First, the research effort can be focused on extension of the study by further conducting an empirical test across various industries, as a measure of its effectiveness. In order to do so, the measurement instrument developed in the study should be further tested and refined. Considering the early nature of my research, further improvements can be made in research design. It will help determine the relevance of this study across various industry settings and refine the model of EC success by considering newly emerging issues.

Another opportunity for future research is to conduct an empirical study of analyzing the characteristics of the successful firms in EC and examining their organizational structure, building on the finding of this research. Perhaps, the performance of the companies in different industry sectors can be compared and key determinants of EC success that are more unique to certain market conditions and organizational structure can be examined. It could provide the detailed insights into the differences in business characteristics of firms.

Second, future research can be conducted on the comparison among China and other Asian countries, i.e., Japan and Korea. Based on the similar cultural background and area, comparisons with these countries may give China a chance to know each other better and give Chinese SMEs a chance to develop fast.

Lastly, more research should be done to examine any additional factors that might have an influence on business performance of an organization in doing EC. Because the people’s needs, business and computing

environment continuously change, it is necessary to inquire about other variables that have significant impact on market mechanism to extend the understanding of the EC success in different contexts. The changing characteristics of business and computing environment should be carefully examined to analyze the new forces affecting the EC success.

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Appendix A. Questionnaire in English

An Empirical Study on Internal Determinants of E-commerce Success

Dear Participant,

We are writing to request your cooperation for a study being conducted by International Commerce Department of Pukyong National University, Korea. This study is focusing on the critical factors of electronic commerce success. The research will provide insight into strategies, technologies, process and execution that lead to E-commerce success and a better understanding of the distinction between winners and losers in the new digital economy. Your initial participation in a testing part of the research study would be greatly appreciated.

We are asking you for about 10-15 minutes of your time to fill out a questionnaire about the factors that might affect electronic commerce and business activities of your firm regarding electronic commerce. I would appreciate if you complete the enclosed survey questionnaire and return to me. Your comments regarding the survey questionnaire would be very helpful.

In order to refine the research model and survey instrument, it is important that we receive a response from you on every item. I would like to emphasize that your responses are kept completely confidential and will not be used for anything other than academic research purposes. The results of the study will be used only in aggregate form. I will make available to you the results of my study.

Thank you in advance for your cooperation. Please do not hesitate to contact me by e-mail (anniemlq@yahoo.com.cn), if you have any question.

Sincerely,

Yun, Kwong-Woon
Professor of Pukyong National University
Liqun Mi
Doctorate student of Pukyong National University

Section A. Company Characteristics

(In this section, please answer the following questions about your firm.)

1. Company's name: _____

2. Type of company: □ state owned □ private □ Joint Venture □ others

3. How long did your company set up:

□less than 3years □3-5years □5-10years □more than 10years

4. How many employees are in your company? _____

5. How many Annual Sales are in your company? _____

6. How many computers does your company have approximately? _____

7. Do you use Internet? □yes □no

8. Industry in which your company operates:

□machinery □electronics □chemical □light industry

□textile □automobile □building materials □foodstuff

9. Which kind of information or administration software does your company use? (you can choose more than one item)

□financial management □storage management □HMS □OA

□production and sale management □CRM □SCM □MIS

□PDM □DSS □PLC □Nested software □ＩＣchips □NC

□FMS □MRP □ERP □CAD/CAM □CIMS

□Data Base □CAT □Others (please give clear indication)

10. Your organizational structure: □highly decentralized □highly centralized

11. Your business is highly information technology dependent □yes □no

12. Your company's level of E-commerce is (You can choose more than one item):

□nothing about E-commerce □product/service information dissemination

□company's introduction □price of product/service information dissemination

□looking for other company's product/service information

□looking for business partner □discussing terms of trade

□contract via internet □payment/settlement via internet

□transportation/logistics □application to Customs, inspection and insurance

□after service and customer complaint □platform for long-term partner

□business communication（email） □Others(please give clear indication)

13.Your company have：（you can choose more than one item）

□web site □web page □EDI system □EC expertise

14. After implementing EC, the benefits which your company got are:

(Please circle the response that best matches your opinion)

	Strongly Disagree				*Strongly Agree*
More customers	①	②	③	④	⑤
Increased sales	①	②	③	④	⑤
Reduced business expenses	①	②	③	④	⑤
More economic benefits in short time	①	②	③	④	⑤
Advantage in a long time	①	②	③	④	⑤
Good investment income from E-commerce	①	②	③	④	⑤

Section B. Staff Characteristics

(Please answer the following questions about your firm's staff)

15. How many employees are in your MIS department? _____

16. CEO's age: □20-30 □31-40 □41-50 □above 51

17. CEO's education: □Middle school □high school □college

□university □master degree or above

18. Does CEO have abroad experiences? □yes □no

19. Do the managers have abroad experiences? □yes □no

Section C. Internal Determinants of E-commerce Success

(The following questions are about the factors influencing E-commerce success. Please indicate your level of agreement or disagreement with the following statements)

I. Technology complexity

Technology complexity refers to the level of sophistication in technical details and features of information technologies. It is used to find out if your company can use the technologies easily to implement E-commerce.

	Strongly Disagree				*Strongly Agree*
20. Implementation of EC application is technically challenging for my company.	①	②	③	④	⑤
21. It is difficult to support EC activities through IT in my company	①	②	③	④	⑤
22. We need much work to put technology solution in order to implement EC.	①	②	③	④	⑤
23. EC requires the involvement of various IT experts due to the sophisticated technical details involved.	①	②	③	④	⑤
24. My employees do not fit for EC work.	①	②	③	④	⑤

II. Structural mechanism for control

Structural mechanism for control means the level of systematic tools supporting the control tasks and coordination of an enterprise.

	Strongly Disagree				*Strongly Agree*
25. My company's computer system linked to Internet.	①	②	③	④	⑤
26. There are standards that support EC in my company.	①	②	③	④	⑤
27. There is an adequate coordination between different job functions through the means of IT in performing EC tasks.	①	②	③	④	⑤
28. We have supervisory control regarding EC activities.	①	②	③	④	⑤

III. Attitude of management

Attitude of management is defined as the level of top management (CEO, CIO, etc.)'s support for and involvement in EC.

	Strongly Disagree				*Strongly Agree*
29. Management supports EC initiatives.	①	②	③	④	⑤
30. Top management is involved in making and executing EC plans.	①	②	③	④	⑤
31. The communication channel is opened between top management and employees,	①	②	③	④	⑤
32. Top management is involved in strategic planning and setting directions for EC.	①	②	③	④	⑤

IV. Management commitment

Management commitment refers to the level of departments' to interaction and maintenance of close ties in implementing EC in an enterprise.

	Strongly Disagree				*Strongly Agree*
33. There is an intense information sharing between the departments to support EC.	①	②	③	④	⑤
34. The departments share corporate goals of EC and they work together to achieve them.	①	②	③	④	⑤
35. Departments have high capacity of interactions for EC.	①	②	③	④	⑤
36. We have a high degree of inter-organizational collaboration and cooperation in doing EC business.	①	②	③	④	⑤

V. Organizational coordination

Organizational coordination refers to the degree of having common and shared goals in an enterprise.

	Strongly Disagree				*Strongly Agree*
37. Department role and objectives are clearly defined	①	②	③	④	⑤
38. Departments share common understanding of corporate goals for EC	①	②	③	④	⑤
39. It is hard to understand the company's direction or purpose for EC	①	②	③	④	⑤
40. The departments seem to be without central purpose or direction for EC	①	②	③	④	⑤

VI. Resource utilization

Resource utilization means the level of resource usage in order to efficiently support the implementation of EC in an enterprise.

	Strongly Disagree				*Strongly Agree*
41. It remains largely unrecognized, inaccessible, and underutilized information in conducting EC	①	②	③	④	⑤
42. The equipment an employee needs to gather, maintain and process information is available to him at the right time for performing EC	①	②	③	④	⑤
43. Resource is allocated efficiently across the company to support various EC initiatives	①	②	③	④	⑤
44. Much resource is required to make the changes in the business process related to EC	①	②	③	④	⑤

VII. E-commerce success

E-commerce success refers to the level of business performance achieved based on implementation of EC and it can be characterized by various aspects of an enterprise as below.

	Strongly Disagree				*Strongly Agree*
45. Lower cost	①	②	③	④	⑤
46. Improved customer service	①	②	③	④	⑤
47. Promoted distribution	①	②	③	④	⑤
48. Increased profit	①	②	③	④	⑤
49. Improved competitiveness	①	②	③	④	⑤
50. Increased market share	①	②	③	④	⑤
51. Improved manager's efficiency	①	②	③	④	⑤
52. Increased company reputation	①	②	③	④	⑤
53. Promoted cooperation within industry	①	②	③	④	⑤

Appendix B. Questionnaire in Chinese

第一部分　　企业基本情况

(这部分是调查企业基本情况及企业使用电子商务的现状，请回答下列问题)

1. 企业名称：
2. 企业类型：　☐ 国有/国有控股　☐ 民营　☐ 三资　☐ 其他
3. 已开业时间：　☐3 年以下　☐3-5 年　☐5-10 年　☐10 年以上
4. 企业微机数：
5. 企业上网了吗？　☐是　☐否
6. 所属行业：　☐机械　☐电子　☐轻工　☐化工　☐纺织　☐汽车　☐建材　☐食品

7．贵企业应用过那些计算机信息技术或管理软件？（多选题）

☐财务管理　☐库存管理　☐生产和销售管理　☐人力资源管理
☐客户关系管理　☐供应链管理　☐办公自动化　☐信息管理系统
☐产品数据管理　☐决策支持系统　☐嵌入式软件　☐可编程控制器
☐ＩＣ芯片　☐智能化数控　☐柔性制造系统　☐制造资源计划
☐企业资源计划　☐计算机辅助设计/制造　☐计算机辅助测试
☐计算机集成制造系统　☐数据库　☐其他（请注明）

8．企业结构：　☐高度集权　☐分散

9．业务高度依赖信息技术　☐是　☐否

10. 您的企业利用互联网或电子商务开展过那些活动？（多选题）

☐没有开展过任何商业活动　☐企业介绍和形象宣传
☐发布本企业产品/服务信息　☐发布本企业产品/服务价格信息
☐了解和搜寻其他企业的产品/服务信息　☐商谈交易条件
☐搜寻交易对象　☐了解和搜寻一般供求信息
☐网上交易（签合同）　☐网上支付/结算
☐运输和物流管理　☐报关，报检（商检），保险
☐提供售后服务和受理客户投诉　☐作为长期合作伙伴的交易平台
☐商业通信（如电子邮件）　☐其它（请注明）

11. 您的企业有自己的:（多选题）

□网站　　□网页　　□EDI 系统　　□专门的电子商务技术人员

12. 为开展电子商务已投入的资金：

□10 万元以下　　□10-50 万元　　□50-200 万元　　□200 万元以上

13. 您的企业在开展电子商务后

	完全不同意				*完全同意*
客户大大增加	①	②	③	④	⑤
销售额增加	①	②	③	④	⑤
单位销售额所发生的交易费用降低	①	②	③	④	⑤
短期内就给企业带来经济效益	①	②	③	④	⑤
为企业的长远发展带来好处	①	②	③	④	⑤
电子商务的投资收益良好	①	②	③	④	⑤

第二部分　企业人员情况

（下面是有关企业人员情况的问题，请如实回答）

14. 企业雇员数 _____

15. 管理信息系统雇员数 _____

16. CEO 年龄：　□20-30　□31-40　□41-50　□51 以上

17. CEO 受教育程度　□初中　□高中　□大专

□大学　□研究生及以上

18. CEO 是否有海外经历（出国考察或留学）　□是　□否

19. 高层管理人员是否有海外经历　□是　□否

第三部分　　影响电子商务成功的因素

（此部分是关于影响企业电子商务成功要素的问题，请按您同意与否的程度选择）

一、技术复杂性

（技术复杂性是指贵公司是否会因信息技术复杂而影响电子商务的实施）

	完全不同意				*完全同意*
20. 应用电子商务对我们企业是一项挑战	①	②	③	④	⑤
21. 在我们企业很难通过因特网来实现电子商务	①	②	③	④	⑤
22. 我们需要做更多工作来解决技术问题	①	②	③	④	⑤
23. 要进行电子商务，需要各种专家的参与	①	②	③	④	⑤
24. 技术复杂，不适合我们的雇员	①	②	③	④	⑤

二、企业利用技术的能力

（企业应用技术的能力是指企业内部对开展电子商务的配套能力，如有适宜的技术标准、信息系统等）

	完全不同意				*完全同意*
25. 因特网与我们企业的计算机系统兼容	①	②	③	④	⑤
26. 我们企业有用来支持电子商务活动的技术标准	①	②	③	④	⑤
27. 通过因特网进行电子商务使各部门功能得以协调	①	②	③	④	⑤
28. 我们对开展电子商务有监督机制	①	②	③	④	⑤

三、管理层态度

（管理层态度是指高级管理人员对开展电子商务的接受度和参与度）

	完全不同意				*完全同意*
29. 管理层支持企业开展电子商务	①	②	③	④	⑤
30. 高级管理人员参与了电子商务计划的拟定和实施	①	②	③	④	⑤
31. 高级管理人员和雇员之间沟通流畅	①	②	③	④	⑤
32. 高级管理人员参与企业战略计划地制定并清楚企业战略与电子商务之间的关系	①	②	③	④	⑤

四、各部门协调

（各部门协调是指企业内部各部门为实现电子商务而采取的合作与努力程度）

	完全不同意				*完全同意*
33. 部门间实现信息共享	①	②	③	④	⑤
34. 各部门为企业战略和电子商务的实现而紧密合作	①	②	③	④	⑤
35. 部门间业务互动能力强	①	②	③	④	⑤
36. 部门间协调合作能力强	①	②	③	④	⑤

五、企业与各部门关系

（企业与各部门关系是指各部门是否理解企业开展电子商务的目标）

	完全不同意				*完全同意*
37. 各部门职能和目标明确	①	②	③	④	⑤
38. 各部门都理解企业目标	①	②	③	④	⑤
39. 各部门很难理解公司开展电子商务的目的	①	②	③	④	⑤
40. 公司没有电子商务的中心目的和方向	①	②	③	④	⑤

六、企业资源利用

（企业资源利用是指企业在开展电子商务过程中是否能很好利用已有资源）

	完全不同意				*完全同意*
41. 在从事电子商务过程中，企业仍有大量资源未被开发利用	①	②	③	④	⑤
42. 工作人员需要用来收集、保存、处理信息的设备可以及时获得	①	②	③	④	⑤
43. 资源在公司内得到有效分配	①	②	③	④	⑤
44. 在业务过程中，资源的需求发生变化	①	②	③	④	⑤

七、成功的电子商务

（这部分是衡量企业开展电子商务是否成功的标准）

	完全不同意				*完全同意*
45. 降低运行成本	①	②	③	④	⑤
46. 提高客户服务	①	②	③	④	⑤
47. 扩大分销渠道	①	②	③	④	⑤
48. 提高收益	①	②	③	④	⑤
49. 创造竞争能力	①	②	③	④	⑤
50. 提高管理者效率	①	②	③	④	⑤
51. 帮助管理者制定决策	①	②	③	④	⑤
52. 促进行业内合作	①	②	③	④	⑤
53. 为决策提供信息	①	②	③	④	⑤

성공적인 전자상거래를 위한 기업내부결정요인에 관한 실증연구
-중국 요녕성 중소기업을 중심으로-

Liqun Mi

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요약

정보통신기술의 발달로 인해 전자상거래시장은 기하급수적으로 확대되어 왔으며, 많은 기업들이 인터넷을 마케팅의 전략적 도구로 활용하기 위해 노력하고 있다. 따라서 전자상거래의 성공을 좌우하는 디지털 경제 및 요인의 특성을 이해하는 것이 중요하다. 그 결과 국내외에서 전자상거래에 대한 많은 연구가 발표되었고 현재에도 진행되고 있다.

중국은 일찍이 1980 년대 초에 국제적인 정보통신기술(ICT) 개발 전략을 채택하고, 전자상거래 기반조성을 위한 노력을 시작하여 정보통신 인프라의 발달이 급속하게 진행되고 있다. 특히, 대기업은 물론이고 4 천 3 백만개가 넙는 민간 중소기업중 30% 이상이 전자상거래를 활용하고 있다. 2005 년 기준 중소기업들의 전자상거래 총 거래액은 전년에 비해 약 16.8%가 증가한 1,938.7 억 RMB 인 것으로 나타났다.

그러나 이처럼 중국 산업에 있어서 전자상거래의 중요성이 날로 부각되고 있지만 중국의 정보통신 환경은 주요 선진국에 비해 많이 낙후된 실정이며, 기업들의 전자상거래 활용도 부진한 상태이다. 또한 실무적, 기술적, 법률적, 이론적 측면에서 체계가 확립되지 않아 기업의 전자상거래 채택과 전자상거래산업의 발전에 큰 저해요인이 되고 있다.

이 연구는 중국의 국민경제에서 매우 중요한 위치를 차지하고 있는 중국 현지의 중소기업들을 대상으로 전자상거래 이용실태와 성공요인을 실증적인 방법을 이용하여 분석함으로써 전자상거래의 발전적 모델을 제시하는 것을 그 목적으로 하고 있다.

이러한 연구목표를 달성하기 위하여 이 논문은 다음의 연구 방법을 이용했다. 첫째, 전세계 및 중국의 전자상거래 산업 현황을 분석함으로써 중국 전자상거래의 발전을 위한 전제조건 및 장애요인을 분석하였다. 둘째, 전자상거래 관련 기존연구들의 문헌연구를 통해 중국 전자상거래 산업의 성공을 위한 내부적 요인과 외부적 요인을 분석하여 가설과 연구모형을 설정하였다. 셋째, 본 연구의 가설에 대한 실증적 검증을 위하여 중국 요녕성 중소기업을 대상으로 설문조사를 실시하고, 통계적인 분석방법을 이용하여 수집한 데이터를 분석하여 가설을 검증하였다.

검증결과는, 첫째, 내부적 성공요인은 기술복잡성(Technology complexity), 구조적 통제 메커니즘(Structural mechanism for control), 관리자 태도(Attitude of management), 경영층의 몰입도(Management commitment), 조직의 통합(Organizational coordination), 그리고 자원의 이용(Resources utilization) 등이 성공적인 전자상거래 운용에 궁극적인 영향을 미치는 것으로 조사되었다. 둘째, 이 다섯가지 요인중에서 관리자 태도가 가장 중요한 요인으로 확인되었으며, 이러한 결과는 정성분석의 결과와도 일치한다.

이 논문은 전자상거래 성공요인을 도출해내고 이를 실증적으로 검증함으로써 중국 현지 기업의 전자상거래 성공을 위한 모델을 제시했다는 점에서 가장 큰 의의가 있다. 그 결과를 바탕으로 중국 중소기업에게 필요한 전략적, 정책적 시사점을 도출하였다. 그러나 이 연구는 표본의 수가 다소 부족하고 연구방법에 있어서 절차와 분석도구에 치우쳤다는 점에서 한계점을 갖고 있다. 향후 연구에서는 더 많은 기업을 대상으로 한 폭넓은 연구와 함께 전자상거래 성공요인에 대해서도 측정변수를 다변화하여 연구가 진행되어야 할 것이다.

주제어: 전자상거래, 중소기업, 내부적 성공요인

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